Essays on the Impact of Credit Policies in Developing Countries

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ESSAYS ON THE IMPACT OF CREDIT POLICIES IN DEVELOPING COUNTRIES

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Abstract

My doctoral research focuses on analyzing how credit policies and regulations affect the credit access of constrained firms. The first chapter focuses on the effectiveness of a national-level directed credit program in India. I exploit a policy-induced variation in program eligibility to study the differential impact of the program across the firm-size distribution. In the second chapter, I evaluate the impact of an export program that subsidized short-term export loans for manufacturing firms in India. I estimate the effect of the credit subsidy scheme on subsidized firms by mapping the eligible product lines to firms while controlling for firm- and sector-level differences across firms and accounting for shocks to export demand.

Chapter 1. Governments around the world implement programs to improve the credit access of small businesses. Evaluating the impact of policies undertaken is important to ensure that the policies achieve the desired outcomes. However, in the absence of randomized policy assignment and the availability of controls for the credit demand of firms, establishing a causal link between the program eligibility and the improvement in credit access is an econometric challenge. In the first chapter *"Could Directed Lending Programs Hurt Small Businesses? Evidence from India,"* I study the impact of an expansion in a size-based directed or preferential credit policy that targets small businesses in India. In 2006, the Indian Government expanded the official definition of small businesses, thereby including relatively bigger firms in

the pool of firms eligible for its large-scale directed credit program called the *priority sector lending program*. The discontinuity in eligibility to the nation-wide credit program helps identify the impact of the program across the firm-size distribution.

Larger eligible firms are likely to be favored by banks because making bigger loans to larger firms helps banks economize on transaction costs while still meeting their directed lending quotas. Exploiting the eligibility discontinuity and using a modified difference-in-differences strategy, I find that the benefits of the policy intervention flow disproportionately to the larger firms. Newly-eligible firms experience an increase in the rate of growth of institutional credit, as well as higher investment and sales growth. The smaller, previously-eligible firms, on the other hand, are crowded out in the bank credit market, when compared to a reference group of ineligible firms. The positive impact on newly-eligible firms is highly correlated with firm size, even within the group. The financial constraints literature documents the role of banking relationships in overcoming credit constraints for small firms, specifically, the duration of the relationship and the multiplicity of bankers. Using the information on bankers of the firms and the duration of each firm-bank pair, I find that the firms with longer and multiple banking relationships experience less crowding out. While my analysis confirms the results from the empirical literature on the positive role of longer bank relationships and the multiplicity of bankers, I do not find evidence supporting the relationship-lending advantage of small and local banks. These findings suggest that the comparative advantage of small banks in relationship-lending is limited by the cost-minimizing incentive of banks. Moreover, firms that borrow from banks that are farther away from the mandated directed lending target experience less crowding out as well. Smaller firms located in districts with more intense local competition from newly-eligible firms are also crowded out more, implying that such policy expansions could potentially worsen the existing regional disparities in access to institutional credit across the country.

This study points to an important side effect of a well-intentioned policy intervention, aimed at increasing credit access of all small firms, and simultaneously providing banks with more lending avenues to achieve their directed lending targets. By virtue of its design, however, it distorts the lending incentives of banks, allowing them to exploit the policy shift as an opportunity to lower transaction costs. This suggests that in a setting with lending quotas if institutional lenders are unable to satisfactorily lower transaction and information costs, they will make loans to the largest eligible borrowers, whenever possible. Future policy design must be guided by research that assesses the overall impact of existing programs, in order to develop programs that expand access to finance while limiting economic distortions.

Chapter 2. In *"The Impact of Credit Subsidies on Export Performance,"* I study the impact of an export credit intervention on the export performance of firms in the subsidized product lines in India, both at the intensive and at the extensive margin of exports. The Government of India formulated the Interest Rate Subvention Scheme in 2007 to reduce the cost of short-term credit for exporters in employment-intensive sectors, given their important contribution to the GDP and the workforce employment. Short-term loans of exporters are mainly working capital loans in the form of pre- and post-shipment export credit. Between 2007 and 2013, the government announced subsidies on short-term bank loans on a semi-annual or annual basis for specific sectors or product lines. The immediate goal of the scheme was to minimize short-term credit frictions of SMEs across all sectors, and large firms in export-oriented labor-intensive sectors. The long-term goal of the scheme, as has been understood in recent years when the subsidies were expanded, was to provide Indian exporters credit at internationally competitive rates.

I construct a detailed data set which matches the balance-sheet data on medium and large exporting firms in the Indian manufacturing sector from 2006-2013, with their eligibility status based on products manufactured by them. To control for ex-

port demand shocks, I create a demand index that measures the product-level shocks to export demand, aggregated across importer countries for the firms in the sample. There are three key findings in this paper. *First*, I find that the impact of subsidies is estimated at about 5-8% in a difference-in-differences sense, compared to non-subsidized firms. The subsidies are not effective in the event of a substantial drop in world demand, as that experienced in 2009, in the aftermath of the global financial recession. This points to the limited usefulness of credit support as a policy tool during a major downturn. *Second*, the impact of credit subsidies is increasing in pre-existing fiscal benefits enjoyed by exporting firms, implying that there is a complementary effect of existing export incentives. The impact of the subsidy is also highly heterogeneous across firm-specific characteristics. Larger and more productive firms benefit to a lesser extent than their counterparts. In contrast to the findings in the literature, firms' financial health indicators such as liquidity and leverage do not have any differential effect on the subsidized firms. Also, subsidized firms with longer bank relationships benefit relatively more. *Finally*, I do not find any impact on the export participation of firms, which is not unexpected given the short-term and unanticipated nature of the subsidy scheme.

The findings from these two studies are policy relevant not only for India but for other developing economies that implement similar policies. If government authorities and regulators in India want to effectively evaluate similar credit subsidy programs, they must be forward-looking and collect appropriate data that facilitate the evaluation of these programs, especially for small and micro firms. Future research evaluating credit support programs would benefit immensely from improved data on variables such as employment, expansion in product variety and export destinations, as well as loan-level details of firms.

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CHAPTER 1

COULD DIRECTED LENDING PROGRAMS HURT SMALL FIRMS? EVIDENCE FROM INDIA

Access to adequate and timely credit significantly affects the growth of small businesses (Beck and Demirguc-Kunt (2006)). Governments and policymakers across the world design programs to improve the credit access of small businesses. Relatively high cost of credit, the requirement of posting collateral and limited access to equity capital, continue to put the majority of small firms outside the net of institutional sources of credit. In India, less than 10% of small firms have access to institutional credit. The Government of India channels credit to small firms by way of eligibility to a national-level directed lending program that requires all commercial banks to direct 40% of their total annual credit to targeted *priority sectors*. This policy, however, encourages banks to target larger and relatively safer eligible borrowers for two reasons. *First*, larger firms are more likely to pledge higher collateral against their loans, and hence are safer to invest in than firms that do not have sufficient assets to pledge. *Second*, banks can minimize transaction costs on their directed lending portfolio by making fewer big loans to the larger firms to achieve the mandated loan *quota*. Thus, size-based directed lending policies can result in asymmetric allocation of subsidized credit across the firm-size distribution.

In this paper, I study the effectiveness of this directed credit program by exploiting a policy-induced variation in program eligibility, focusing on the differential impact across the firm-size distribution. In 2006, the Government of India substantially

expanded the official definition of small firms. In India, firms are defined as small based on an *investment threshold*. If the gross value of plant and machinery of a firm is less than the official threshold, it is categorized as a *small* firm. Bank loans made to all small firms are classified as *priority sector loans*. After the revision in the definition, larger firms were included in the pool of eligible firms. The inclusion of more firms provided banks with an opportunity to substantially expand their priority sector lending portfolio by targeting the larger firms.

My analysis proceeds in three steps. *First*, I analyze the effect of the policy change on small firms using a variant of the difference-in-differences strategy. Using detailed balance sheet data on a panel of firms from the *Prowess* database, I compare the always- and recently-eligible groups to the reference group of never-eligible firms, controlling for firm-specific variables and demand-side factors. I find that the larger eligible firms experience a faster rate of growth of bank credit, sales, and investment, whereas the smaller always-eligible firms get crowded out and experience declining growth in bank credit.[1] I also find that the positive impact on the recently-eligible firms is highly correlated with firm size even within the group. *Second,* I examine the role of bank relationships in mitigating the crowding out of small firms. The literature documents the role of bank relationships in overcoming credit constraints, specifically, the duration of the relationship and the multiplicity of associated bankers (Berger et al. (2001), Berger and Udell (1995)). I use firm-bank matched data, complemented with bank-level financial variables such as the size of bank assets and banks' *distance* or *shortfall* from the mandated lending target. I find that firms with longer and multiple bank relationships, and firms that borrow from banks that are farther away from the mandated directed lending target, experience less crowding out. *Third,* I try to explain the asymmetric impact of the policy intervention across the firm-size distribution using the *intensity of competition* that firms face in the local credit

[1] This interpretation is relative to never-eligible firms in a difference-in-differences sense.

market. I exploit the regional heterogeneity in credit market competition at the district level. In districts with fewer recently-eligible firms, I expect the crowding out of smaller firms to be minimal, and vice-versa.

To test this hypothesis, I construct a data set combining data on the district-level firm distribution from the *Fourth All India MSMED Census*.[2] The census provides a snapshot of firm-level attributes of the universe of registered SMEs in 2006-2007, i.e., the year before the policy change. The *Master Office File*[3] maintained by the Reserve Bank of India provides the data on the presence of bank branches in every district in India. I compute two measures of local credit market competition, one based on the competition from other small firms in the region, and the other based on the presence of priority sector shortfall-bank branches. The results confirm my hypothesis that smaller firms indeed get crowded out relatively more in districts with more competition, compared to their counterparts in districts with less intense competition from larger firms.

The first contribution of this paper is to show that expansions in directed credit policies that target firms based on size crowd out the smaller firms by incentivizing banks to favor larger firms. I find evidence of a differential impact on growth in bank borrowings as well as firm sales and investment growth across the firm-size distribution. My findings related to the role of multiple bank relationships and the duration of bank relationships confirm the results from the related literature. Longer and multiple bank relationships mitigate the crowding out of smaller firms. Always-eligible firms that borrow from small and local banks are hurt more than those firms that borrow from large banks. This finding suggests that in an environment with mandated lending targets, the comparative advantage of small banks in relationship-

[2] The census data can be downloaded from the website of the Micro, Small and Medium Enterprise Development Ministry.

[3] The Master Office File can be downloaded from the website of the Reserve Bank of India. It provides bank branch names, address, and date of opening of each bank branch in India.

lending is limited by the cost-minimizing incentive of lenders. My second contribution is to assess the impact of the program exploiting regional variation in the intensity of local credit market competition. Small firms in districts with a higher proportion of recently-eligible competitors are hurt more by the policy expansion. Over time, such effects could worsen the regional disparity in access to institutional credit of the smallest firms across the country. In the absence of loan-level data matched to firms and banks,[4] it is not possible to study the effect of the credit program's expansion on the extensive margin.[5] Due to data limitations, I can study the impact of the program expansion only on the intensive margin. I suspect that the policy expansion has the potential to severely hurt small firms at the extensive margin as well. These results have policy implications not only in India, but in other developing economies that implement similar preferential-lending policies by penalizing financial institutions.

The remainder of this paper is organized as follows. Section 1 provides an overview of the related literature and discusses the contributions of this paper. Section 2 provides the details of the institutional setting and describes the policy change. Section 3 discusses the choice of the data and the data sources. Section 4 describes the empirical strategy. Section 5 presents the results of the analyses. Section 6 discusses the robustness checks. Section 7 concludes and discusses policy implications.

1 RELATED LITERATURE

This paper relates to two main strands of the literature focusing on credit access of small firms. First, the studies that evaluate the impact of credit policies on small firms and analyze the role of bank relationships in overcoming credit constraints. Second, the literature that documents the undesired effects of credit programs.

[4] No regulatory authority records and maintains balance sheet data of all small firms. While the RBI collects loan-level data from all commercial banks in India, it does not require banks to identify borrowers and report firm-level variables such as size by assets, sales and profitability.

[5] The policy expansion has the potential to hurt the credit access of always-eligible small firms at the extensive margin much more than at the intensive margin.

A positive relationship between increased access to finance and firm growth has been established by numerous studies (Rajan and Zingales (1998), Demirguc-Kunt and Maksimovic (1998), Ayyagari et al. (2008)). Using cross-country firm-level survey data, Beck et al. (2005) find that among small firms, the firms reporting lower growth rates are those firms that face greater financial constraints. Aghion et al. (2007) find that access to credit boosts entry among small firms and helps small firms take advantage of growth opportunities. Most studies find a stronger effect of financial constraints on smaller firms.[6] Nikaido et al. (2015) find that that enterprise size, among other factors,[7] is positively associated with access to formal credit for small firms in the unorganized sector in India. Using a cross-section of the universe of *registered* firms in India from the Fourth All India Census of Micro, Small & Medium Enterprises (2006-2007), I analyze the relationship between firm size and institutional credit access of small manufacturing enterprises. I find that firm size, account keeping status and growth rate of value added, are positively associated with access to credit.[8]

I contribute to the literature that focuses on the evaluation of credit programs. Lelarge et al. (2010) exploit the extension of guarantees to new sectors in France and find that newly-eligible firms raised more external finance at lower interest rates, which subsequently led to an increase in the probability of bankruptcy. Bach (2013) studies a policy of bank loans made from subsidized funds to specific sectors in France and finds evidence of increased debt-financing of targeted small firms, with no subsequent surge in default risk. Banerjee and Duflo (2014) analyze loan-level information from one of India's biggest banks. They exploit a temporary policy reform and its subsequent

[6] Using cross-country survey data of firms of 54 countries, Beck et al. (2005) find that financing constraints affect firm growth more adversely among small firms relative to large firms. Oliveira and Fortunato (2006) find that small Portuguese firms are likely to grow much faster than large firms when their financial constraints are eased.

[7] Other factors are owner's education level, registration status, diversified business.

[8] Table 1.26 in Appendix 1.B shows the external sources of credit and a breakdown between institutional and non-institutional credit access of small firms. Only about 25% of registered small firms reported access to informal or formal credit.

reversal,[9] that decided the eligibility threshold of Indian SMEs between 1998 and 2000. They find large effects of becoming *prioritized* on firms' bank borrowings, profit and growth. Their results however, only apply to one bank in India. Studies have also documented the undesired or unintended effects of similar directed lending policies. Zia (2008) uses a reversal of eligibility for subsidized export-credit to study the impact of the program on exporting firms in Pakistan. The study finds that while small firms reduced their sales after the reversal, the large, listed and group firms did not suffer. Cole (2009) finds evidence of political cycles in agricultural lending via such programs in India. A working paper by Kumar (2014) documents the credit misallocation across agricultural and manufacturing sectors in India due to the presence of political cycles in bank lending. A working paper by Bhue et al. (2016) is the closest study in terms of the policy setting in this paper. They discuss the strategic slowdown in growth of investment in newly-eligible small firms near the investment cut-off compared to the newly-eligible small firms away from the cut-off.[10] They do not address the asymmetric impact of the policy change across firm-size distribution. To my knowledge, this is the first study to exploit this variation in eligibility to the directed lending program to study the impact on small firm lending and growth. I find that compared to a reference group of never-eligible firms, newly-eligible bigger firms experience higher rates of bank credit growth, sales, and investment, whereas the always-eligible, smaller firms get crowded out and experience declining growth in bank credit.

I also contribute to the remarkably diverse literature focused on the role of bank relationships in overcoming information asymmetries and improving the credit access of small firms. Berger and Udell (1995) find that small borrowers with longer bank relationships pay lower interest rates and are less burdened by the need to pledge

[9] In a working paper, Kapoor et al. (2012) study the causal impact of credit constraints on exporting firms using the same temporary policy reform in India.

[10] I discuss the estimated coefficients corresponding to their sample and strategy in Section 5.

collateral. Petersen and Rajan (1994) find that close ties with an institutional creditor increases financing opportunities for small businesses. Hernández-Cánovas and Martínez-Solano (2006) find that SMEs that work with fewer banks obtain debt at a lower cost. A substantial body of empirical research has also shown that small banks are more willing to deliver bank loans to SMEs than large banks. Many of these studies support the "Cookie Cutter vs Character" approach (Cole et al. (2004)), or the "Small Bank Advantage" hypothesis (Berger et al. (1995), Jayaratne and Wolken (1999), Berger and Udell (2002)), suggesting that small banks have an advantage in small business lending either due to their access to soft-information on the borrowers or through the benefits of relationship lending. While my analysis confirms the results from the empirical literature on the positive role of longer bank relationships and the multiplicity of bankers, I do not find evidence supporting the relationship-lending advantage of small and local banks. My findings suggest that the comparative advantage of small banks in relationship-lending is limited by the cost-minimizing incentive of bankers. To my knowledge, no previous work has analyzed the impact of size-based directed lending policies across firm-size distribution, discussing the role of bank relationships in mitigating the crowding out of always-eligible firms.[11]

2 INSTITUTIONAL SETTING AND POLICY CHANGE

Prevalence of Directed Lending. Given the importance of small firms in the economy, governments and regulators across the globe implement policies aimed at improving access to credit for small businesses. Preferential or directed lending[12] mandates, refinancing schemes, interest rate caps and credit guarantees are commonly used policy tools in developing economies. Most countries implement these policies

[11] It is highly likely that the banking sector benefited from this redefinition of targeted eligible firms, given the directed lending targets in place. The analysis of the banking sector is outside the scope of this study, primarily due to data limitations.

[12] Directed lending refers to the practice of extending loans on preferential terms to specific targeted sectors that have otherwise been marginalized by institutional credit.

by either imposing constraints on the banking sector, or by having center and state governments earmark funds to be spent towards increasing credit access of financially constrained sectors. Table 1.1 summarizes policy tools and target sectors of select developing economies.

Table 1.1: Preferential Lending: Policy Tools and Targeted Sectors

Country	Targeted Sectors	Policy Tool
Bolivia	SMEs, Social Housing, High Productivity Sectors	Lending Quota, Interest Cap
Thailand	Small-scale Industries, Agriculture	Lending Quota (20%)
Indonesia	SMEs	Lending Quota (20%)
Philippines	SMEs	Lending Quota (8%)
India	SMEs, Agriculture, Housing, Weaker Sections	Lending Quota (40%)
Vietnam	SMEs, Agriculture, Exports, Technology	Interest Rate Cap
Malaysia	SMEs	Interest Rate Cap

Sources: World Bank report *Finance in South Asia 2010*, Federal Reserve Bank of San Francisco report *Asia Focus 2014*, author's press search.

Banking System in India. In India, the directed lending policy is implemented via the commercial banks. India's banking system is organized into commercial, regional-rural and co-operative banks. Both public[13] and private banks fall under the commercial bank category. Public banks are bifurcated into the State Bank Group and the Nationalized Banks Group. The Reserve Bank of India (RBI) is the central bank of India. As of 2017, the banking system consisted of 26 public sector banks, 25 private sector banks, 43 foreign banks, 56 regional rural banks, 1,589 urban cooperative banks and 93,550 rural cooperative banks, in addition to cooperative credit institutions. The public sector banks control about 72% of commercial banking assets, followed by domestic private sector banks and foreign banks controlling about 21% and 7%, respectively.

Priority Sector Program in India. All domestic commercial banks in India are mandated to direct 40% of their total annual credit to sectors demarcated as

[13] The government is the majority shareholder of public banks comprising about 72% of the market.

priority sectors. The priority sectors include sectors impacting large sections of the population, the weaker sections of the society and the sectors which are employment-intensive such as agriculture, and micro and small enterprises. Over the years, the list of priority sector eligible borrowers has been expanded to include low-income housing, education, export credit and renewable energy sector. The Reserve Bank of India announces and updates the list of priority sectors. It also informs banks about internal targets in addition to the overall 40% target, and about loan amount limits associated priority sector loans. Loans made to micro and small enterprises across all industries count as priority sector advances. To ensure fair distribution of credit to the most vulnerable segments, *within-category* internal targets are mandated for agriculture and loans to weaker sections. Table 1.2 lists the sub-targets of priority sector lending during the year 2006-2007. While sub-targets for micro enterprises are allotted, no such safeguard has been put in place for the small enterprises.

Table 1.2: Priority Sector Lending Targets at Sector and Sub-Sector Level

Sector	**Sub-sector Target**	**Internal Target**
Agriculture	–	18%
Weaker Sections	–	10%
Micro & Small Enterprises (MSEs)		–
— Micro Enterprises I	0.0 - 0.5 INR Mln	40% of total MSE
— Micro Enterprises II	0.5 - 2.5 INR Mln	20% of total MSE
— Small Enterprises	0.5 - 2.5 INR Mln	–
Total Priority Sector		**40%**

Note: Micro Enterprises Groups I and II correspond to micro firms with investment in plant and machinery upto INR 0.5 Million and between INR 0.5-2.5 Million, respectively.
Source: RBI Master Circular, PSL Targets and Classification, July 2013.

Banks are free to set the interest rate on priority sector loans based on the borrowers' risk assessment.[14] Shortfalls from announced targets are closely monitored by the

[14] Specific borrower categories are offered loans on terms decided by the Reserve Bank of India. For most categories, the RBI Priority Sector Guidelines do not lay down a preferential rate.

central bank officials. Banks falling short of the target are required to lend the shortfall amount to Rural Development Bonds at very low interest rates decided by the RBI on a quarterly basis. If a bank repeatedly falls short of meeting this target, it risks being disallowed from expanding its branch network across the country.

Policy Change. The regulatory change that I exploit is the MSMED Act of 2006. In October 2006, the Parliament of India enacted the Micro, Small and Medium Enterprises Development Act or the MSMED Act.[15] The Act provided a variety of facilities such as improved credit access, skill and training development, technology upgradation, market linkages and marketing support. With the enactment of the MSMED Act, the upward revision of the investment ceiling led to an expansion in the pool of firms eligible for directed lending, thus improving credit access for the recently-eligible small firms. The always-eligible firms retained eligibility, as usual. Thus, the revision in the investment ceiling led to an expansion in the pool of small firms eligible for directed lending,[16] as summarized in Table 1.3.

In addition to the revision in the size-determining upper bound, the policy intervention also pushed the banking sector to achieve a 20% year-on-year growth of loans made to SMEs, and ultimately double the credit available to SMEs in the next five years. The year-wise growth in bank credit to the micro and small firms sector is shown in Figure 1.1. Bank credit to these firms did more than double between 2007 and 2012, which is touted as a policy success.[17] However, in the absence of a demarcation between always-eligible and the recently-eligible firms, it is unclear which type of firms generated this growth in credit, i.e., the distinction between always-eligible and recently-eligible groups' bank credit growth before and after the year of the policy

[15] A different set of rules were laid out for the manufacturing and service sectors. This study focuses on the manufacturing sector. Capital investment cut-offs for manufacturing sector small firms were defined based on investment in plant and machinery.

[16] The details of the threshold definition and priority sector eligibility can be found on the website of the Reserve Bank of India at www.rbi.org.in/scripts/ViewMasCirculardetails.

[17] The initial jump seen in 2008 is partially due to inclusion of service-sector small firms in the priority sector.

change can not be observed in Figure 1.1.

Table 1.3: Revision in the Definition of Small Firms due to the Policy Change

Policy Timing	**Firm Size Criterion** (Value of plant & machinery)	**Eligible Group of Firms**
Before 2007	2.5 - **10** INR Million	Always-Eligible Firms
After 2007	2.5 - 10 INR Million & 10 - **50** INR Million	Always-Eligible Firms & Recently-Eligible Firms

Notes: The firm-size determining investment threshold is defined in terms of value of plant and machinery installed. Bank loans to *small* firms are eligible as *priority sector lending*.
Source: Reserve Bank of India public announcements via Master Circulars.

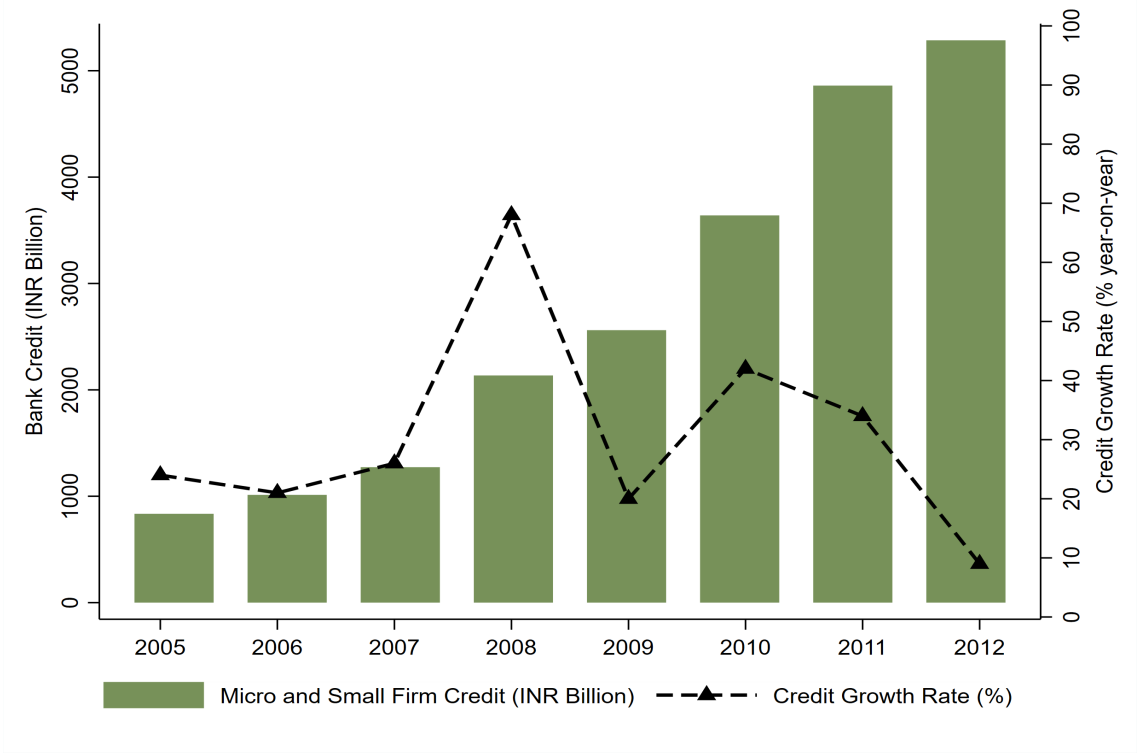


Figure 1.1: Growth in the Bank Credit Flowing to Micro and Small Enterprises.
Source: Annual Report of Micro and Small Enterprises for the year 2011-2012.

3 DATA

Selection of the Data. I focus on changes in the access to institutional credit and on the investment growth of firms before and after the implementation of the policy expansion. The main financial variables of interest are bank borrowings, investment in capital and total borrowings. While the ideal data to use in this setting are firm-bank matched loan records from before and after the policy change, such data are unavailable.[18] In the absence of the ideal data, I use firm-level audited balance sheet data that include information on firm-bank relationships. I also construct a data set of credit market competition measures at the district and pin-code level, using publicly available census data, and RBI's bank-branch network directory. I study a panel of firms that reported their financial information in all the years in the chosen period. I winsorize the data based on total sales, total assets and total invested capital. I exclude all firms that reported exports greater than 10% of total sales.[19]

Data Sources. I use data on firms, banks and district-level data on small firm distribution and bank branch networks. I also use industry-level aggregate variables, industry-level deflators and wholesale price index. For the *firm-level data*, I use the *Prowess* database of the Centre for Monitoring Indian Economy (CMIE). Financial information is extracted from audited financial statements, and the stock and credit-rating data are compiled from other published sources. *Prowess* provides time-series on firm-level bank borrowing and total institutional borrowings, along with a break-down of the firms' institutional borrowings by the source. Gross value of plant and machinery of a firm is used to categorize it into a group. Data on firm-bank relation-

[18] The Reserve Bank of India does not record such data. Due to a change in the firm-size definition, the loan accounts information submitted by all commercial banks to the Reserve Bank of India was no longer comparable before and after the policy change. After the definition update, bank records also re-classified recently-eligible firms loans to 'small' in addition to the always-eligible firms' loans, without any way to identify always-eligible from recently-eligible borrowers.

[19] Exporting firms are excluded because a different set of credit rate policies and guarantees apply to exporters. Moreover, starting in 2007, SME exporters were eligible for a 2% interest rate subsidy which was later increased to 3%. Such differences could distort the true analysis.

ships are also available in the *Prowess* database. I merge the sample of firms with its bankers, as well as the bank-specific variables for the time period studied. Prowess also classifies firms by industry according to the NIC code,[20] which is the Indian equivalent of the SIC classification scheme.[21] An alternate source of data is the Annual Survey of Industries (ASI) surveys at the factory level, but they do not capture audited financial information of the associated firms. The ASI also does not report bank borrowings at the factory-level or the gross value of plant and machinery across the entire sample. Bank loan officers are more likely to use audited financial data to calculate the cut-offs determining firm size, i.e., whether a firm is small, medium or large by the official definition,[22] hence the choice of the *Prowess* database.

Data on district-level firm distribution is from the *Fourth All India MSMED Census*.[23] The census provides a snapshot of firm-level attributes of the universe of registered SMEs in 2006-2007, i.e., the year before the policy change. For district and pin-code level data on bank-branch networks, I rely on the *Master Office File* maintained by the Reserve Bank of India.[24] Based on these two additional datasets, I compute two measures of local competition for the firms in my sample. The first measure is based on the competition from other small firms in a district, and the second measure on the proportion of priority sector shortfall branches in a district.

[20] I use two-digit industry classification from the National Industrial Classification 2008 for India.
[21] Standard Industrial Classification is a four-digit industry classifier used in USA and UK.
[22] This was confirmed by officials at the Reserve Bank of India as well as with the managers of two Indian banks: State Bank of India and HDFC Bank.
[23] Data obtained from the MSMED Ministry Official Website.
[24] I observe the exact branch names, address and the date of opening of each branch at the pin-code level in India in the Master Office File published by the Reserve Bank of India.

Data on industry aggregates from 2003-2009 are taken from the Historical Time Series collected by the *Ministry of Statistics and Programme Implementation*. I use the Wholesale Price Index (WPI) series to deflate nominal variables.[25] Further details of data sources are provided in Appendix 1.A.

Sample Period and Comparison Groups. The MSMED Act of 2006 was implemented midway through the financial year[26] in October, 2006. I use the following financial year 2007-2008 as the first year after the policy change, until 2009-2010. I choose this ending year because starting 2010 two important regulatory changes were implemented which are likely to distort the true picture of the crowding-out of always-eligible firms: the deregulation of the then current interest rate regime, and the introduction of a credit guarantee scheme targeted at small firm credit access. This policy revision brought a huge number of small firms across all industries, regions and ownership types, under the priority sector. I use the variation in the status of firms to estimate the exposure to the program, by comparing firms across industries in three groups, namely, always-eligible, recently-eligible and never-eligible groups. Since firm size is determined by the nominal value of investment in plant and machinery,[27] I use this criterion to split the firms into the three groups. There is insufficient coverage on micro enterprises for any meaningful empirical analysis.[28] I control for group-specific time trends.

Descriptive Statistics. In Table 1.4, I present the descriptive statistics of the sample of firms in this study for the financial year 2006-2007. I assign firms to one of

[25] Bank loans and debt data are deflated by the *All-Commodities WPI*, firm-level variables such as sales, assets, profits, and industry-level aggregates are deflated by the corresponding *industry-specific* WPI.

[26] The financial year in India runs from April 1 - March 31.

[27] In the absence of mandatory disclosure of number of employees in annual reports, this definition of size limits the use of accounting tricks to subvert the intent of the categorization, and bankers can access this information through audited reports.

[28] In a another paper, I am trying to separately study the effect on district-level micro-enterprise credit using confidential district-industry-level data on bank credit of micro firms, made accessible by the Reserve Bank of India.

the three groups: Always Eligible, Recently Eligible or Never Eligible,[29] based on the gross plant and machinery in 2006-2007. In the same year, the average sales of the always-eligible firms is about one-half of the average sales of recently-eligible firms. The average investment in fixed assets for always-eligible firms is less than half of that of recently-eligible firms. The average utilization seems almost uniform across all the groups, while average profitability is decreasing as we go from the never-eligible to the always-eligible firms. The never-eligible firms, on the other hand are bigger by a factor of about twenty vis-a-vis the recently-eligible firms. On average, the share of bank borrowings is decreasing in firm-size, i.e., always-eligible firms are relatively more dependent on bank credit, followed by recently- and never-eligible firms.

Data Exclusions. I exclude two types of firms from the analyses. I exclude exporters from the analysis because all SME exporters enjoyed access to subsidized credit via an Interest Rate Subsidy Program starting 2007.[30] The summary statistics for all firms, *including* exporters, is presented in Table 1.17 in Appendix 1.B. I also adjust for firms from the 41 items covering broad groups of sectors - Hosiery, Hand Tools, Drugs & Pharmaceuticals, Stationery and Sports Goods, whose investment cut-off was enhanced to INR 10 Million in 2001-2002.[31] The details of such bank credit policies are periodically announced via Master Circulars issued by the Reserve Bank of India. I make the above exclusions after carefully reading these circulars, and obtaining clarifications from the officials at the Banking Statistics Department at the Reserve Bank of India. In the district-level variables, I drop two states, Jammu & Kashmir and Arunachal Pradesh, due to data unavailability.

Bank-level Data on Small Loans. From a bank's perspective, the expansion in the definition of small firms should ease the priority sector lending constraint, thus, allowing the bank to make loans that are less risky and/or have lower transaction costs

[29] Always Eligible (INR $2.5-10$), Recently Eligible (INR $10-50$), Never Eligible (>50)
[30] The scheme was announced in five phases via public circulars: Interest Rate Subvention Scheme.
[31] Details included in master circulars issued by the Reserve Bank of India.

in the aggregate. The opportunity to reallocate their resources away from the smaller firms may help reduce the share of non-performing loans in the small loans category. However, due to the unavailability of banks' loan-level data identifying firms by size, such an analysis can not be attempted. Investigating the effect of the policy on bank profitability is an interesting area for future work, if regulators were to make such data available for the purpose of research. Anecdotal evidence suggests that internal policy directives were pushing banks to generate at least 20% year-on-year growth in small firm credit, which was a very challenging for most bankers.[32]

Preliminary Evidence. I plot the sum of bank borrowings and total sales for the always-eligible and recently-eligible groups[33] using the firms in my panel. On first glance, from Figure 1.2, it seems that the stock of bank borrowings and total sales of the recently-eligible firms rose much more compared to always-eligible firms. However, these are unconditional sums, and no causal claim can follow from these trends without controlling for demand-side factors and firm-level variables.

[32] Source: Interview with Ranjana Kumar, Former CMD, Indian Bank; Vigilance Commissioner.

[33] Both the figures are calculated after deflating by the Wholesale Price Index. The trend for the never-eligible firms is shown in Figure 1.6 in Appendix 1.B.

Table 1.4: Descriptive Statistics: Always-Eligible Vs Recently-Eligible Vs Never-Eligible Firms in 2006-2007

	Always Eligible (AE)			Recently Eligible (RE)			Never Eligible (NE)		
Variable	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**
Total Sales	228	104	193	460	182	282	1,386	6,149	63,779
Total Assets	249	85	148	507	210	1,368	1,449	4,212	30,366
Fixed Assets	249	**32**	42	507	**70**	152	1,449	**2,425**	16,079
Plant & Machinery	249	9	10	507	26	12	1,449	1,835	13,041
Total Liabilities	249	85	148	507	210	1,368	1,449	4,212	30,366
Total Borrowings	213	28	50	477	112	1,167	1,410	1,268	8,234
Bank Borrowings	165	21	40	400	38	98	1,316	597	3,174
Bank Share	165	**0.70**	0.31	399	**0.64**	0.3	1,316	**0.62**	0.3
Profitability	243	**0.02**	0.6	500	**0.06**	0.25	1,444	**0.11**	0.31
EBITDA	243	7	26	500	13	36	1,444	465	3,278
Utilization	228	**1.27**	1.19	460	**1.28**	1.18	1,386	**1.30**	0.9
Current Ratio	247	5	23	504	4	9	1,448	3	10
Quick Ratio	247	4	15	504	3	12	1,448	2	7

Note: The groups Always Eligible, Recently Eligible and Never Eligible are constructed based on the cut-offs in terms of value of investment in plant and machinery in INR Million in 2006-2007. A firm is categorized as Always Eligible, Recently Eligible and Never Eligible, if the value of plant and machinery of the firm is between INR 2.5-10 Million, between INR 10-50 Million, and > INR 50 Million, respectively. Profitability and utilization are calculated by scaling by total assets, bank share is calculated by dividing bank borrowings by total borrowings, and the current ratio and quick ratio are calculated by scaling by total current liabilities. The exact definitions of the financial variables are provided in Appendix 1.A. All the financial variables correspond to the averages of financial year 2006-2007 of *non-exporting* firms. Ratios are winsorized at the 1% level.

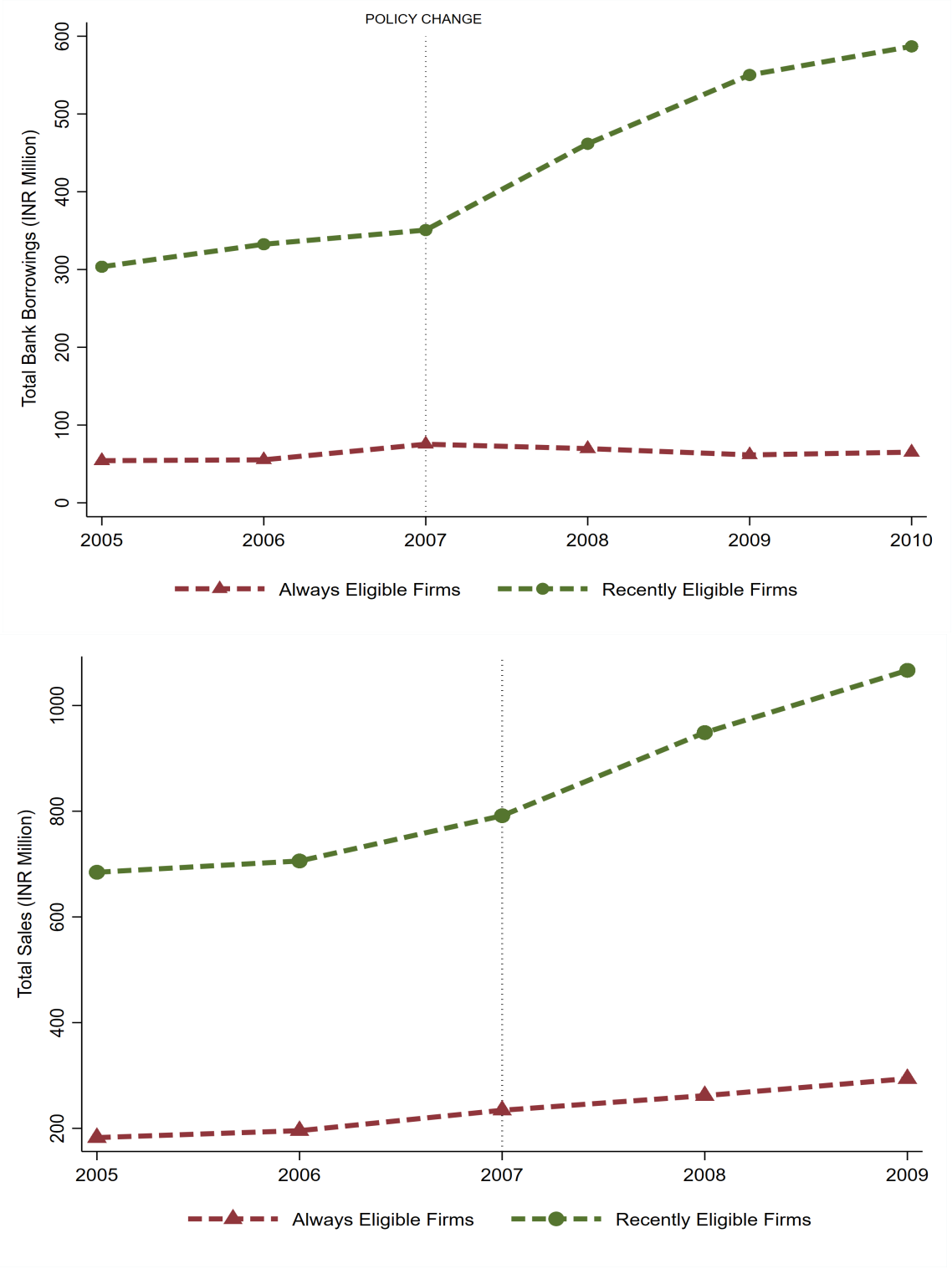


Figure 1.2: Sum of Bank Loans (top) and Sales (bottom) of the Small Firm Groups. *Source:* Author's calculation using the panel of firms available in the *Prowess* Database.

4 EMPIRICAL STRATEGY

4.1 BASELINE SPECIFICATION

I investigate the differential effect of the policy change on the *growth of deflated bank borrowings* Δy_{ist} of firm i, industry s, time t with the following empirical model:[34]

$$\begin{aligned}\Delta y_{ist} = \beta_0 + \sum_g \beta_1^g \times \mathbb{1}(\text{Group } g_i) \times After_t \; + \; \sum_g \beta_2^g \times \mathbb{1}(\text{Group } g_i) \times t \\ + \sum_g \beta_3^g \times \mathbb{1}(\text{Group } g_i) \; + \mathbf{X}_{\boldsymbol{it}}^{'}\delta + \mathbf{IO}_{\boldsymbol{st}}^{'}\gamma + \eta_i + \lambda_t + \epsilon_{ist}\end{aligned} \tag{1.1}$$

$$\mathbb{1}(\text{Group } g_i) = \begin{cases} \textbf{A}\text{lways } \textbf{E}\text{ligible (Plant \& machinery value 2.5 - 10 INR Million)} \\ \textbf{R}\text{ecently } \textbf{E}\text{ligible (Plant \& machinery value 10 - 50 INR Million)} \\ \textbf{N}\text{ever } \textbf{E}\text{ligible (Plant \& machinery value } > 50 \text{ INR Million)} \end{cases}$$

The group indicator g_i corresponds to each firm's assigned group based on investment thresholds in 2005-2006, which is the the year before the enactment of the policy change. The indicator $After_t$ is equal to 1 for years after the year of the policy change. The firm-level controls $\mathbf{X}_{it}$ include firm size (total sales), total fixed assets, profitability ratio and the default ratio.[35] I include firm fixed effects to control for time-invariant firm characteristics, year fixed-effects to account for aggregate macroeconomic shocks, and industry aggregates $\mathbf{IO}_{st}$, i.e., output and industry output growth,[36] to control for industry-specific time trends that may affect the outcome variable, and ϵ_{ist} is an i.i.d. error term, with $E(\epsilon_{ist} | \mathbf{X}_{it}, \mathbf{IO}_{st}, \mathbb{1}(\text{Group } g_i), t) = 0$.

The coefficients of interest β_1^g capture the relative differential effect in terms of

[34] Changes in growth are computed as the difference of log of the level variables. The group indicators are absorbed by the firm-fixed effects and are ommitted while running the regressions.
[35] Detailed description of these firm-level controls is available in Appendix 1.A.
[36] Two-digit NIC industry codes categorize firms' industry. Industry output and industry output growth at the two-digit industry level are obtained from the Annual Survey of Industries.

the growth of bank borrowings, due to the change in priority sector eligibility of firms across the always-eligible and recently-eligible firms (β_1^{AE}, β_1^{RE}), vis-a-vis the reference group of never-eligible firms. The specification in Equation 1.1 allows for different intercepts and different linear trends across the three groups. This specification helps control for any other policy or macroeconomic changes that occurred at the time of this policy change, and which could potentially affect the demand and supply of debt at the group level. This approach relates well to previously adopted empirical strategies in the non-experimental program evaluation literature based on multiple *pre* and *post* treatment periods, and is an improvement over the simple difference-in-differences (DD) method since it controls for different time trends across groups.[37]

Following the literature, I focus on the first difference in logs of deflated bank borrowings, since bank borrowings are a stock variable and known to be persistent, following a fat-tailed distribution. For similar reasons, I use the same transformation in the other outcomes as well. I follow Bertrand et al. (2004) in their treatment of clustering at the level of treatment for difference-in-differences type estimation, and cluster standard errors at the level of the treatment status, i.e., at the firm-level. I also estimate other standard errors[38] and find that the firm-level clustering produces the most conservative standard errors.

Non-bank Borrowings. I estimate the same specification given by Equation 1.1 with growth of *other borrowings* as the dependent variable, to check if the recently-eligible firms simply used bank borrowings to substitute for other financing. These *other borrowings* include all other debt of a firm obtained from sources other than banks. Negative sign on the coefficients β_1^{AE} and β_1^{RE} is indicative of evidence in favor of firms substituting the increased bank loans for other sources of credit.

[37] Francesconi and van der Klaauw (2007) employ a similar empirical specification to study the employment effects of a Working Families' Tax Credit in Britain, comparing lone mothers and single women without children.

[38] Conventional, heteroskedasticity-robust and clustering at the two-digit industry level.

Firm-size Effects. In order to test the presence of differential impact of the policy change across the firms in the recently-eligible group, I divide the group into terciles, based on the gross value of plant and machinery pre-policy change, which helps study the impact within the treated group. As earlier, I winsorize at the 1% level around all the constructed groups. I estimate the following specification:

$$\begin{aligned}\Delta y_{ist} = \beta_0 + \sum_{\widetilde{g}} \beta_1^{\widetilde{g}} \times \mathbb{1}(\text{Group } \widetilde{g}_i) \times After_t \; + \; \sum_{\widetilde{g}} \beta_2^{\widetilde{g}} \times \mathbb{1}(\text{Group } \widetilde{g}_i) \times t \\ + \sum_{\widetilde{g}} \beta_3^{\widetilde{g}} \times \mathbb{1}(\text{Group } \widetilde{g}_i) \; + \mathbf{X}_{\boldsymbol{it}}^{'} \delta + \mathbf{IO}_{\boldsymbol{st}}^{'} \gamma + \eta_i + \lambda_t + \epsilon_{ist}\end{aligned} \tag{1.2}$$

As before, the group indicator $\widetilde{g}_i$ corresponds to each firm's assigned group based on investment thresholds in 2005-2006, but the recently-eligible group split into *three* sub-groups in the increasing order of the value of investment in plant and machinery: RE_1, RE_2 and RE_3, i.e., the first, second and third tercile, respectively.

$$\mathbb{1}(\text{Group } \widetilde{g}_i) = \begin{cases} \text{AE} & \text{(Plant \& machinery value 2.5 - 10 INR Million)} \\ \text{RE}_1 & \text{(Plant \& machinery value 10.3 - 19.9 INR Million)} \\ \text{RE}_2 & \text{(Plant \& machinery value 19.9 - 35.4 INR Million)} \\ \text{RE}_3 & \text{(Plant \& machinery value 35.4 - 49.9 INR Million)} \\ \text{NE} & \text{(Plant \& machinery value } > 50 \text{ INR Million)} \end{cases}$$

The coefficients of interest are β_1^{AE}, $\beta_1^{RE_1}$, $\beta_1^{RE_2}$ and $\beta_1^{RE_3}$ capturing the differential effect across the sub-groups withing the treated group. As in the earlier specifications, I include firm and year fixed effects, and industry-year controls.

Real Outcomes. To analyze the impact on real outcomes of the firms across the always-, recently- and never-eligible groups following the policy change, I study their *pre* and *post* growth in investment and total sales. I use the same specification as Equation 1.1 for the baseline estimation and then switch to Equation 1.2 to look at within the treated group effects. The coefficients of interest still are β_1^{AE}, β_1^{RE}, which capture the differential effect of the change in priority sector eligibility of firms, on investment and sales growth. I repeat the estimations with the recently-eligible group split into terciles, where the coefficients of interest are β_1^{AE}, $\beta_1^{RE_1}$, $\beta_1^{RE_2}$ and $\beta_1^{RE_3}$.

- For the **investment-growth** regression the dependent variable is the ratio of investment to capital, $I_{i,s,t}/K_{i,s,t-1}$. I control for the cash flow to capital ratio, $\frac{\text{Cash Flow}_{ist}}{K_{i,s,t-1}}$ and the lagged sales growth, $\Delta\text{sales}_{i,s,t-1}$.

- For the **sales-growth** regression the dependent variable is the growth of sales, i.e., the change in *log*(sales), $\Delta\text{sales}_{i,s,t}$. I control for one-period lagged cash flow to capital ratio $\frac{\text{Cash Flow}_{i,s,t-1}}{K_{i,s,t-2}}$.

An interesting feature of this quasi-experiment is the coincidental occurrence of the *post-Act* period with the onset of an important recession. While most commercial banks in India were not directly exposed to the financial recession, the simultaneous liquidity crunch and economic slowdown eroded net worth of Indian banks as well as firms. Had the banks' and firms' net worth been higher for macroeconomic reasons, it would be difficult to control for dampening credit constraints in the economy. This period of slowdown in bank lending activity as well as manufacturing growth lends these estimates stronger external validity.

4.2 THE ROLE OF BANK RELATIONSHIPS

The impact of the policy change across firm groups can also differ based on the type of bankers, as well as the characteristics of the firm-bank relationships. I exploit the matched firm-bank sub-sample in the *Prowess* database. The database provides the list of banker(s) for a subset of firms for every year, as reported in the firms' annual report.[39] I characterize each firm's bank type based on the associated banks' ownership and size, and each firm's bank relationship type based on duration of the bank relationship as well as the presence of multiple bank relationships.[40] I denote *bank type* or *relationship type* variable by τ_i. The definition of τ_i varies depending on the criterion being assessed.

Firm-lender relationships are typically expected to help resolve market failures and are known to be especially important for small firms. Bank relationships can potentially reveal otherwise private information about borrowers, that can either help relax financial constraints of small firms, or further constrain them. I investigate the effect of the duration of the bank relationship(s), and the effect of the having multiple bank relationships as opposed to a single bank relationship.

Duration of Relationship(s). Small firms likely benefit from longer relationships in the face of large information asymmetries with outside investors. However, longer associations can accompany high switching costs and hold-up issues. The direction or magnitude of the crowding out due by duration of firm-bank relationships for small businesses thus remains ambiguous.

Multiple Bank Relationships. Firms build multiple bank relationships to protect themselves against hold-up rents inherent among exclusive bank relationships.

[39] Since data on bankers is not a mandatory disclosure for firms per the Indian Companies Act, I can only study a sub-sample of firms.

[40] I do not expect the loan growth across never-eligible firms distinguished by relationship type to have been affected by this policy change choose this group to be the reference group. The results do not change if I switch the base to never-eligible firms split by above the median or below the median firm relationship type. These regression results are available on request.

Incumbent banks may be unwilling to increase lending to smaller or younger firms due to poor performance in the past or due to insufficient collateral, or perhaps due to a change in the bank's incentives to make fewer small loans due to a shift in the priority sector lending constraints, thus, inhibiting growth opportunities of small firms. Multiple bank relationships could mitigate the crowding out effect for the smallest firms, and possibly benefit the *relatively* larger firms. At the same time, having multiple bankers could in itself be a sign of good firm health.

I measure the duration of bank-firm relationships and the number of bankers for each firm.[41] For firms that report more than one bank per firm-year, the relationship duration measure is based on the median duration among the matched firm-bank pairs.[42] I assign firms in each group to either above or below the median firm. For the duration of relationship measure, τ_i can take $\{$*Long, Short*$\}$, where *Long* and *Short* correspond to above or below the median firm's duration of relationship in every group. Similarly, for the number of bankers measure, τ_i can take $\{$*Single, Multiple*$\}$, where *Single* and *Multiple* correspond to firms with only one banker and firms with more than one banker.

$$\begin{aligned}\Delta y_{ist} = \beta_0 &+ \sum_g \sum_\tau \beta_1^{g,\tau} \times [\mathbb{1}(\text{Group } g_i) \times \mathbb{1}(\text{Relationship Type } \tau_i)] \times After_t \\ &+ \sum_g \beta_2^g \times \mathbb{1}(\text{Group } g_i) \times t + \sum_g \beta_3^g \times \mathbb{1}(\text{Group } g_i) + \mathbf{X}_{\boldsymbol{it}}' \delta + \mathbf{IO}_{\boldsymbol{st}}' \gamma \\ &+ \eta_i + \lambda_t + \epsilon_{ist}\end{aligned} \tag{1.3}$$

As before, the coefficients of interest are in $\beta^{g,\tau}$ where τ is the *relationship type* being analyzed and g is the group indicator. I present the estimated coefficients from

[41] The availability of the data is from the 1990s and extends to recent years, but I restrict the series to the time period relevant for the study.

[42] For the relationship duration measure, only firm-bank pairs that occurred in adjacent years were counted as recurring pairs. For the expansion in number of bankers measure, I construct a binary variable indicating whether a firm expanded the number of relationships after 2007.

estimating the model in Equation 1.3, with the never-eligible firms as the base group. Next, I study the impact of the policy change based on two important characteristics of banks, namely the priority sector lending shortfall of banks and size of banks.

Bank Directed Lending Constraint. All commercial banks are mandated to achieve their priority sector lending targets. However, not all banks are able to meet these targets. In fact, some banks have historically never met the mandated target. The aggregate shortfall of the banking sector in meeting the lending quota are depicted in Figure 1.3. Banks falling short of the target are required to lend the shortfall amount to Rural Development Bonds at very low interest rates decided by the RBI periodically. This penalty encourages directed lending deficient banks to seek eligible borrowers. Given the opportunity to expand their directed lending portfolio, the high shortfall banks may try to aggressively increase loans to the larger eligible borrowers, but may not be in a position to lose their existing always-eligible borrowers. Using information on the *shortfall status* of matched bankers, I test for the effect of this constraint on crowding out of small firms.

Bank Size. Another aspect driving small business lending is the size of banks. Smaller and more local banks tend to have a comparative advantage in *relationship lending* since they have better local presence and access to soft information on borrowers. Large banks, on the other hand, may not be as suitable for such lending due to higher monitoring costs of small loans, and as a result, require high collateral to provide small business credit. This asymmetry in the nature of lending has been termed "Cookie Cutter Vs Character" approach in the literature (Cole et al. (2004)). I test whether relationship-lending plays a role in reducing the crowding out of the smallest firms.

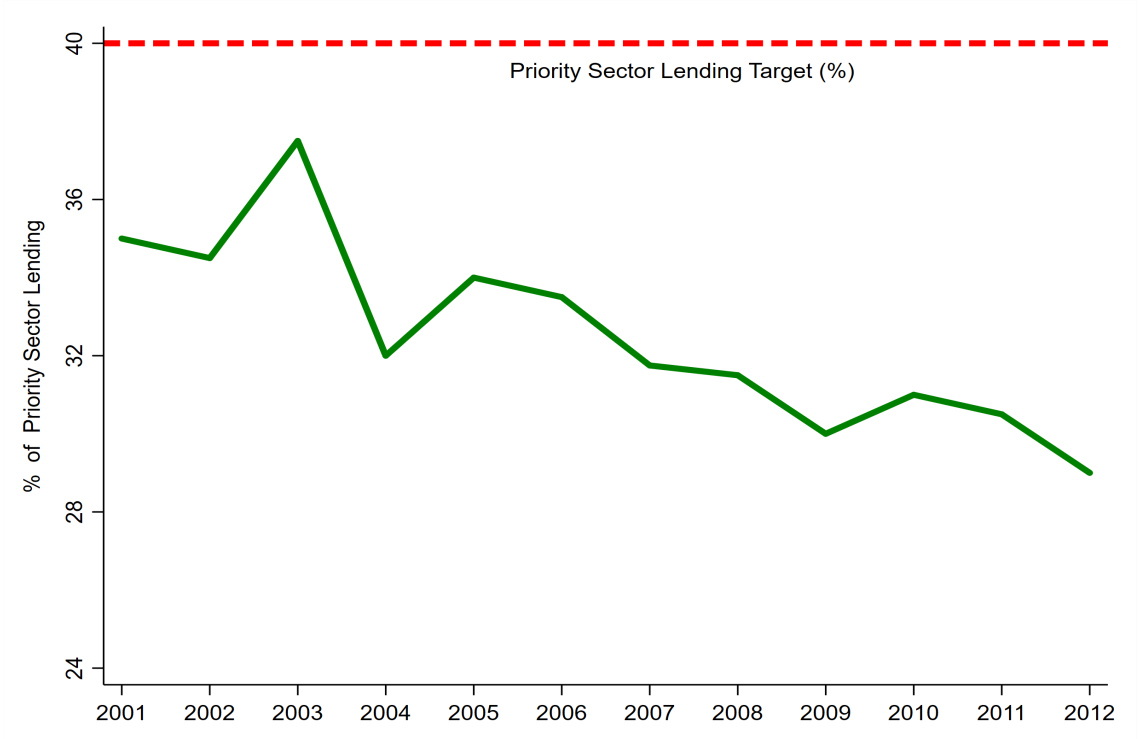


Figure 1.3: Share of Priority Sector Credit in Total Credit of the Indian Banking Sector. *Source:* Data available in reports published by the RBI in the years 2011 and 2012.

In the sub-sample with matched firm-bank pairs, each firm's bank type is denoted by $\tau_{i,t} = \{High\ Shortfall,\ Low\ Shortfall\}$ or $\{Small\ Bank,\ Big\ Bank\}$. For firms that report more than one bank per firm-year, bank type is determined by aggregating all bank-firm pairs and assigning the type based on the median ratio of target shortfall or bank size for each group[43]. The indicator variable $\mathbb{1}(\text{Bank Type } \tau_i)$ is the aggregated bank type of a firm for the 2004-2009 period. I use the following specification:[44]

[43] The associated bankers and their ownership type is quite persistent across this time period.

[44] As a check, I also introduce both types of never-eligible firms based on their associated banks and find a statistically insignificant coefficient.

$$\Delta y_{ist} = \beta_0 + \sum_g \sum_\tau \beta_1^{g,\tau} \times [\mathbb{1}(\text{Group } g_i) \times \mathbb{1}(\text{Bank Type } \tau_i)] \times After_t$$
$$+ \sum_g \beta_2^g \times \mathbb{1}(\text{Group } g_i) \times t + \sum_g \beta_3^g \times \mathbb{1}(\text{Group } g_i) + \mathbf{X}'_{it}\delta + \mathbf{IO}'_{st}\gamma \quad (1.4)$$
$$+ \eta_i + \lambda_t + \epsilon_{ist}$$

The coefficients of interest are $\beta^{g,\tau}$ for bank type τ and firm group g. I do not expect the lending across never-eligible firms distinguished by associated bank type to have been affected by this policy change.

4.3 THE ROLE OF LOCAL COMPETITION

To estimate the importance of competition on the differential impact of directed lending policies across the firm-size distribution, I examine the characteristics of the *local institutional credit markets* in India. The spatial distribution of firms as well as bank branches at the district-level provides cross-sectional variation in the competitiveness of each local credit market. In districts with fewer recently-eligible firms competing for directed credit, I expect the relatively smaller always-eligible firms to be crowded out less, and vice-versa. This is precisely because in these districts there are fewer recently-eligible firms that banks may favor. To test this hypothesis, I construct a data set combining data on the district-level firm distribution from the *Fourth All India MSMED Census* available with the MSMED Ministry. The census provides a snapshot of firm-level attributes of the universe of registered SMEs in 2006-2007, exactly the year before the policy change. I combine this cross-sectional data set with the district-level bank branch locations obtained from the *Master Office File* maintained by the Reserve Bank of India.[45]

[45] I observe the exact bank branch names, address, and date of opening of each bank branch in India at the pin code level in the Master Office File published by the Reserve Bank of India.

Measuring Local Competition. I measure local credit market competition from other eligible small firms at the district level as the ratio of the number of recently-eligible firms to the total eligible small firms that already have access to bank credit.[46] Firms in the census can be assigned a category based on the value of plant and machinery reported for 2006-2007. I calculate a local competition index for each district d, and based on the median of this index I assign the local competition measure as $\{High,\ Low\}$.

$$\text{Local Competition}_d = \frac{\text{Number of Recently-Eligible Firms in District } d}{\text{Number of Total Eligible Firms in District } d} \tag{1.5}$$

Measuring Local Banking Constraints. I also construct a measure based on priority sector lending shortfall of banks at the district level. Using data on priority sector lending of bank b at the national level, I calculate the directed lending shortfall distance of banks from the mandated targets. Then using data on bank branch presence in district d, I calculate the interaction of the shortfall distance of bank i and an indicator variable denoting branch b of bank i. I divide this expression by the total number of bank branches b in district d to obtain an average measure of the banks' priority sector constraints in the local credit market. Again, based on the median of this average, I assign the local constraint measure as $\{High\ Shortfall,\ Low\ Shortfall\}$.

$$\text{Local Banking Constraint}_d = \frac{\sum_i \sum_{b \in d} \mathbb{1}(Branch_{b,i}) \times \text{Shortfall of bank } i}{\text{Number of Total Bank Branches in District } d} \tag{1.6}$$

[46] I also construct the local competition measure using the total firms irrespective of bank credit access, as well as using total firms with a positive credit demand, but the results are robust to these variations.

5 RESULTS

5.1 MAIN SPECIFICATION

Effect on Bank Borrowings. In Table 1.5, I present the baseline results of the estimation of Equation 1.1. After controlling for firm-specific factors and for time trends, recently-eligible firms' bank loans grew about 19.2 percentage points more after the policy change relative to the reference category of never-eligible firms. In contrast, the growth in bank loans of always-eligible firms decreased by 25.2 percentage points in relative terms. It is interesting to note the magnitude of these coefficients despite a negative trend in the data for recently-eligible firms and a positive trend for always-eligible firms. These results also confirm the evidence from the rapidly growing sum of bank borrowings of recently-eligible firms in the sample compared to the stagnating always-eligible firms as presented in Figure 1.2.

Effect on Non-Bank Borrowings. In Table 1.6, I present the results of estimates from the regression in Equation 1.1, replacing the dependent variable with growth in *other borrowings* comprising all other debt obtained from institutional sources other than banks, including long-term and short-term borrowings, and trade credit from suppliers. For credit from other financial institutions, the coefficient on the post-policy period variable for recently-eligible firms is statistically significant and indicates an increase in *other borrowings* by about 4.1 percentage points. The recently-eligible firms do not use the increase in bank credit to substitute for other sources of institutional financing. The coefficient on the always-eligible post-policy variable is positive but not significant. For trade credit, the second largest source of finance for small firms (after internal funds, and followed by bank credit), I find a statistically significant increase of 14 percentage points in the growth rate for the always-eligible firms and a negative but statistically insignificant change for recently-eligible firms.

Table 1.5: Impact of the Policy Change on the Growth Rate of Bank Borrowings

Variable ($\Delta y_{t,t-1}$)	(1)	(2)	(3)
Always Eligible × After	-0.036	-0.141	-0.252**
	(0.061)	(.094)	(0.119)
Recently Eligible × After	0.066*	0.176**	0.192**
	(0.039)	(0.069)	(0.086)
Always Eligible × t		0.037	0.078*
		(0.030)	(0.045)
Recently Eligible × t		-0.038*	-0.056*
		(0.019)	(0.029)
Number Of Observations	10,453	10,453	8,484
Industry-Year Controls	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the baseline estimates of the impact of the policy change from 2004 to 2009 on the growth of bank borrowings across the firm groups, corresponding to Equation 1.1. The dependent variable is change in log of bank borrowings. The indicator $After_t$ equals 1 for years after 2006-2007, the year of passing of the Act. Controls for firm size, fixed assets and profitability are log(sales), growth(fixed assets) and the EBITDA ratio, respectively. Firm and year fixed effects, as well as industry-year fixed effects are included as indicated. All borrowings are deflated using the WPI, and firm sales and assets are deflated using industry-specific deflators.

Effect across Firm Size within the Treated Group Table 1.7 presents the results of estimating Equation 1.2. The recently-eligible group is categorized into terciles (RE_1, RE_2 and RE_3), to analyze whether firm-size variation, even within the recently-eligible group, made a significant difference in growth of bank loans.[47] I find that the upper tercile RE_3 firms experience the biggest jump in growth of bank loans of about 23 percentage points, followed by the second to largest group, the middle tercile (RE_2) by 25.4 percentage points, in relative terms. The bank loan growth of always-eligible firms decreased by 25.1 percentage points. These results point to the disparity even within the recently-eligible group in terms of loan growth due to changing lending incentives towards the *larger* recently-eligible firms.

[47] These coefficients are estimated relative to the reference group, i.e., the *never-eligible* firms that did not enjoy the priority sector privileges before or after the policy change.

Table 1.6: Impact of Policy Change on Growth Rate of Other Borrowings

Variable ($\Delta y_{t,t-1}$)	(1)	(2)	(3)
Panel A: Other Financial Institutions			
Always Eligible × After	0.007	0.045*	0.033
	(0.034)	(0.027)	(0.021)
Recently Eligible × After	0.009	0.071**	0.041*
	(0.048)	(0.033)	(0.024)
Panel B: Trade Credit			
Always Eligible × After	0.169***	0.149**	0.143**
	(0.060)	(0.069)	(0.071)
Recently Eligible × After	-0.042**	-0.038**	-0.037
	(0.020)	(0.021)	(0.024)
Number Of Observations	9,192	9,192	8,820
Group-level Time Trends	No	Yes	Yes
Industry-Year Controls	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. The dependent variable is change in log of *other* borrowings. Trade credit corresponds to liabilities due in the next twelve months for purchase of goods, services and expenses from suppliers, as well as bills payable. All other variables are same as in the baseline results in Table 1.5.

Due to data restrictions, I can only estimate the differential impact of a policy push on the *intensive* margin. Given that less than 10% of small firms have access to institutional finance in India, this poses a huge concern for complete rationing of always-eligible firms, especially for those firms without access to formal credit.[48]

Effect on Real Outcomes In Table 1.8, I report the coefficients from estimating Equation 1.3 and 1.4, i.e., the real effects of the policy change until 2009 controlling for cash flow and sales growth. The recently-eligible firms experience an increase in both investment and sales growth, in a difference-in-differences sense, by about 3.1 and 5.1 percentage points, respectively. The sign of β_2 for always-eligible

[48] The Reserve Bank of India maintains aggregate loan accounts in the banking system but doesn't record firm-level characteristics, making it impossible to track the always-eligible and recently-eligible groups' loan growth separately before and after the policy change.

Table 1.7: Impact of Policy Change using Recently-Eligible Sub-groups

Variable ($\Delta y_{t,t-1}$)	(1)	(2)	(3)
Always Eligible × After	-0.036	-0.141	-0.251**
	(0.061)	(0.098)	(0.119)
Recently Eligible (1^{st} Tercile) × After	0.168**	0.281**	0.080
	(0.066)	(0.111)	(0.149)
Recently Eligible (2^{nd} Tercile) × After	0.009	0.185*	0.254*
	(0.058)	(0.106)	(0.133)
Recently Eligible (3^{rd} Tercile) × After	0.038	0.079	0.227**
	(0.063)	(0.109)	(0.110)
Number Of Observations	10,453	10,453	8,484
Group-level Time Trends	No	Yes	Yes
Industry-Year Controls	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. The dependent variable is change in log of bank borrowings. The RE_i is split into terciles - RE_1, RE_2 and RE_3. All other variables are same as in the baseline results in Table 1.5.

firms is negative, although statistically insignificant. This magnitude is very much in line with results from Banerjee and Duflo (2014) and Kapoor et al. (2012), who study previous eligibility changes for a similar credit program for small firms in India. This implies that there is evidence that the recently-eligible firms increased both sales and investment at a faster rate in a relative sense, compared to the control group, after the policy change. However, there is no evidence indicating the presence of a corresponding slowdown for the always-eligible group. In order to examine this result, I investigate changes in two important firm-level variables that could absorb the decrease in the growth of bank credit, and the increase in the use of trade credit, namely, changes in the inventory stock and profitability. I find that the always-eligible firms exhibit a decrease in profitability whereas the recently-eligible group exhibit an increase. Thus, it is likely that the policy affected the bottom line of the always-eligible firms in the two years following the change, as a result of an increase in credit-related costs.

Table 1.8: Impact of Policy Change on Investment and Sales Growth

Dependent Variable	I_t/K_{t-1}	Δsales $_t$	Profitability
Always Eligible × After	0.011	-0.039	-0.068***
	(0.017)	(.094)	(0.016)
Recently Eligible × After	0.031***	0.051**	0.035*
	(0.012)	(0.026)	(0.021)
$\frac{\text{Cash Flow}_{i,s,t}}{\text{K}_{i,s,t-1}}$	0.093***		
	(0.023)		
Δ Sales $_{t-1}$	-0.007		
	(0.008)		
$\frac{\text{Cash Flow}_{i,s,t-1}}{\text{K}_{i,s,t-2}}$		0.034	
		(0.026)	
Number Of Observations	9,423	9,423	9,423
Industry-Year Controls	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes†

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. † indicates that the firm controls corresponding to this regression exclude the EBITDA ratio. The dependent variables are the investment-to-capital ratio and total sales growth. All other variables are same as in the baseline results in Table 1.5.

Table 1.9 reports the coefficients from estimating Equation 1.2 but for the effect on real outcomes across the always- and recently-eligible terciles (RE_1, RE_2 and RE_3) or groups demarcated by the median recently-eligible firm (above the median / below the median firm).[49] The coefficients in Table 1.9 are comparable to the results in the analysis presented in Bhue et al. (2016). The authors compare the bottom and top terciles of only the recently-eligible firms (RE_1 and RE_3) using only those recently-eligible firm groups in the regression, and find a slowdown in the growth of investment by about 5 percentage points in a relative sense. They do not include or report the coefficient on the dummy for the middle tercile. Using all small firms as well as a reference category of never-eligible firms, I find this *difference-in-differences* estimate to be larger for the top tercile as in their analysis, but the difference I observe is around 2.2 percentage points.

[49] The median and tercile demarcated groups are based on value of firms' plant and machinery.

Table 1.9: Impact of Policy Change on Investment and Sales Growth by Sub-groups

Dependent Variable	I_t/K_{t-1}		ΔSales_t	
	(1)	(2)	(3)	(4)
Always Eligible × After	0.011	0.011	-0.039	-0.039
	(0.017)	(0.017)	(0.042)	(0.042)
Recently Eligible (1^{st} Tercile) × After	0.056***		0.053	
	(0.019)		(0.042)	
Recently Eligible (2^{nd} Tercile) × After	0.00003		0.047	
	(0.018)		(0.041)	
Recently Eligible (3^{rd} Tercile) × After	0.034**		0.051**	
	(0.017)		(0.026)	
Recently Eligible (< Median) × After		0.039**		0.054
		(0.015)		(0.034)
Recently Eligible (> Median) × After		0.021		0.045
		(0.015)		(0.037)
Number Of Observations	9,423	9,423	9,423	9,423
Firm, Industry-Year Controls	Yes	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. The dependent variables are the investment-to-capital ratio and total sales growth. The RE_i is split by the terciles or by the median. All other variables are same as in the baseline results in Table 1.5.

On the middle tercile, I find a coefficient near zero, albeit statistically insignificant. This result is not explained by the strategic slowdown intuition suggested in their paper. The coefficient on the middle tercile is not reported in the robustness results of the paper.[50] Hence, there is no explanation provided for absence of *at least* some investment growth post the policy change for the middle tercile, even if the slower growth of the top tercile is strategic. I split the recently-eligible group into two groups (below and above the median firm) and find no evidence indicative of a strategic investment slowdown. In Table 1.22 in Appendix 1.A, I repeat these regressions using alternate industry-time controls and find very similar results.

[50] This is for the most recent version of the working paper in 2017.

5.2 THE ROLE OF BANK RELATIONSHIPS

To investigate the impact of the policy change across firm groups based on firms' bank relationships, I exploit the the firm-bank matched sample. In the baseline estimation for the sample of firms matched to their bankers, I find that the always-eligible firms experience a slowdown in growth of about 41 percentage points, while the recently-eligible firms experience growth in bank borrowings of about 22 percentage points.

Table 1.10: Summary of Bank Relationship(s) of Small Firms from 2004-2009

Bank Relationship(s)	**Always Eligible**	**Recently Eligible**
Total Firms	148	380
Duration of Bank Relationship(s)		
Median Duration	4	4
% Firms With Duration $\geq$ 6 years	26%	34%
Multiple Bank Relationships		
Median # Bankers	1	1
% With Unchanged # Bankers After 2007	61%	67%

Source: Author's calculations using *Prowess* database.

Table 1.10 provides a summary of bank relationships of firms across the always- and recently-eligible groups. There is no significant difference across the two groups if we compare the median duration of bank relationships or the median number of bankers across the sample time period. Only 26% and 34% of firms in the always- and recently-eligible groups, respectively, have a relationship with their bankers throughout the sample period comprising at least 6 years. In terms of expanding the number of bankers, 39% and 33% of always- and recently-eligible firms respectively, formed new bank relationships after the policy change.

Duration of Bank Relationship(s). The results of the regression in Equation 1.3 with matched firm-bank sub-sample with respect to duration of firm-bank

relationships are reported in Panel A of Table 1.11. The duration of firm-bank relationships influences the magnitude of the impact of the policy change, as can be seen from column (2) of Panel A. The always-eligible firms with longer bank relationships get crowded out to a smaller extent compared to those with shorter and more abrupt bank relationships. This difference is about 12 percentage points. The recently-eligible firms with longer relationships experience an increase in growth of loans almost twice that of recently-eligible firms with shorter relationships.[51] Figure 1.4 plots the coefficient estimates for bank relationship duration by buckets, and the effect of longer relationships among both groups can be clearly seen.

Multiple Bank Relationships. In column (2) of Panel B of Table 1.11, comparing the coefficients on always-eligible firms indicates that firms that successfully expanded their bank relationships experienced a smaller decrease in growth of bank loans, compared to firms that had either fewer or unchanged number of bank relationships. The difference is about 5 percentage points. The recently-eligible firms that expanded their bankers did not seem to benefit more than those that did expand, in fact, the recently-eligible firms that did not expand their bankers grew their bank loans more than the those that expanded the number of bankers. This is indicative of existing banks of recently-eligible firms extending more credit to them.

Next, I study the impact of the policy change across two important dimensions of firms' banks.

[51] The coefficients corresponding to *High* and *Low* duration of relationship types for recently-eligible firms are close to 30.1 and 16.4 percentage points , respectively.

Table 1.11: Impact of the Policy Change: Bank Relationship Characteristics

Variable ($\Delta y_{t,t-1}$)	(1)	(2)
Panel A: By Duration of Relationship(s)		
Always Eligible × After × Long Relationship	-0.247	-0.359*
	(0.177)	(0.214)
Always Eligible × After × Short Relationship	0.256	-0.477**
	(0.194)	(0.213)
Recently Eligible × After × Long Relationship	0.292**	0.301**
	(0.115)	(0.138)
Recently Eligible × After × Short Relationship	0.191*	0.164**
	(0.114)	(0.081)
Panel B: By Number of Relationship(s)		
Always Eligible × After × Multiple Relationships	-0.153	-0.386**
	(0.219)	(0.180)
Always Eligible × After × Single Relationship	-0.308*	-0.433**
	(0.175)	(0.205)
Recently Eligible × After × Multiple Relationships	0.224*	0.204**
	(0.123)	(0.098)
Recently Eligible × After × Single Relationship	0.177*	0.228*
	(0.096)	(0.118)
Number Of Observations	7,860	6,405
Industry-Year Controls	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes
Firm Controls	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates of the impact of the policy change across the matched firm-bank sample, corresponding to Equation 1.3. All other variables are as in the baseline results in Table 1.5.

Bank Directed Lending Constraints. The results of the regression in Equation 1.4 with matched firm-bank sub-sample are reported in Panel A of Table 1.12. The coefficients on always-eligible firms with a relationship with public sector banks Vs private sector banks reveal that while always-eligible firms were crowded out across both bank types, the extent of crowding out among private bank relationship group was higher by almost 20 percentage points. On the other hand, the coefficients on recently-eligible firms across bank types reveal that firms with relationship with pub-

lic sector banks experienced a growth rate in bank credit higher than the private bank counterparts by almost 10 percentage points. The coefficient on never-eligible firms relative the base category[52] is statistically insignificant, which is as expected, since never-eligible firms were not affected by this policy change.

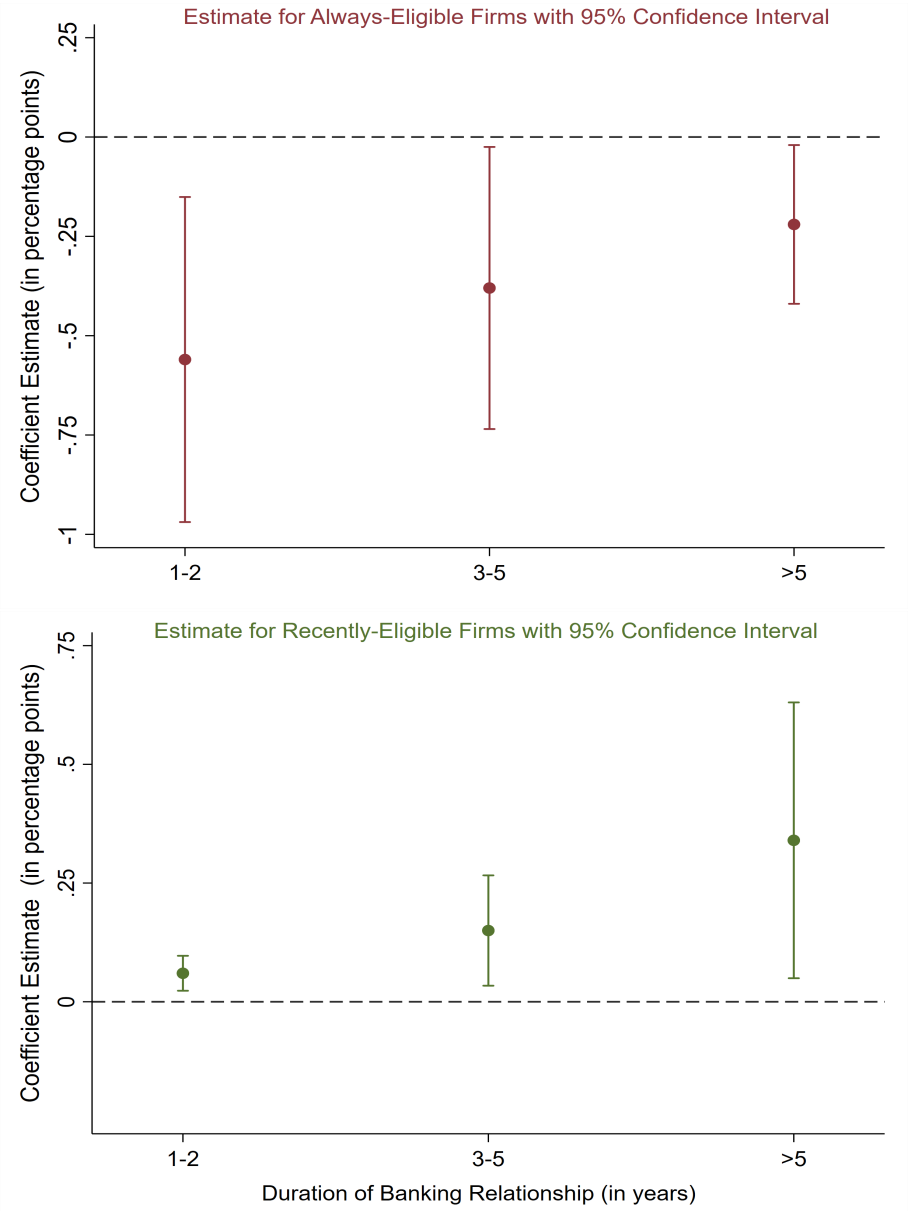


Figure 1.4: Coefficients of the After Policy Change Indicator Across the Firm Groups. *Source:* Author's calculations from regression estimates corresponding to Equation 1.3.

[52] Base category is *never-eligible* firms linked to public sector banks.

Table 1.12: Impact of the Policy Change: Bank Type

Variable ($\Delta y_{t,t-1}$)	(1)	(2)
Panel A: By Bank Directed Lending Shortfall		
Always Eligible × After × High Shortfall Banks	-0.207	-0.378*
	(0.169)	(0.202)
Always Eligible × After × Low Shortfall Banks	-0.628*	-0.445**
	(0.371)	(0.200)
Recently Eligible × After × High Shortfall Banks	0.209**	0.269***
	(0.138)	(0.103)
Recently Eligible × After × Low Shortfall Banks	0.119**	0.190*
	(0.059)	(0.111)
Panel B: By Bank Size		
Always Eligible × After × Small Banks	-0.517*	-0.495**
	(0.293)	(0.250)
Always Eligible × After × Big Banks	-0.384*	-0.397**
	(0.202)	(0.189)
Recently Eligible × After × Small Banks	0.116	0.098*
	(0.130)	(0.058)
Recently Eligible × After × Big Banks	0.204**	0.232**
	(0.096)	(0.118)
Number Of Observations	7,860	6,405
Industry-Year Controls	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes
Firm Controls	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates of the impact of the policy change across the matched firm-bank sample, based on bank type, as in Equation 1.4. All other variables are same as in the baseline results in Table 1.5.

Bank Size. The results of the regression in Equation 1.3 with the matched firm-bank sample are reported in Panel B of Table 1.12. The coefficients suggest that relationships with smaller and more local banks did not mitigate the crowding out effect for the always-eligible firms. If anything, they experienced slower growth in bank credit by about 10 percentage points relative to the firms associated with bigger banks. The recently-eligible firms with small or local bankers did not benefit as much relative to the recently-eligible firms associated with bigger banks.

5.3 THE ROLE OF LOCAL COMPETITION

In the baseline estimation for the sample of firms matched to district-level measures of competition, I find that the always-eligible firms experience a slow down in growth of about 30 percentage points, while the recently-eligible firms experience growth in bank borrowings of about 27 percentage points. The results of the regressions corresponding to the local competition measures are presented in Table 1.13.

Local Firm Competition. In column (2) of Panel A of Table 1.13, I find that among the always-eligible firms, those exposed to more competition tend to experience more crowding out. The difference is about 12 percentage points. In other words, the small(er) firms in regions with higher proportion of competing recently-eligible small firms, tend to do relatively worse. These results are not sensitive to the measure used for the smaller firms.[53] Thus, the local competition effect can potentially worsen access to credit for small firms, more so on the extensive margin, especially in regions with greater competition from the larger recently-eligible firms. Differential impact across the firm size distribution, coupled with pre-existing regional disparities in access to credit, has the potential to worsen the region-level growth of small businesses.[54]

Figure 1.5 illustrates the median-demarcated regions of *high* and *low* competition for small firms. In districts to the right of this line, always-eligible firms are more likely to get crowded out. Unfortunately, these districts also exhibit poorer access to credit for always-eligible firms. For the recently-eligible firms, I do not find much of a difference in the coefficients across districts with high and low competition, leaning in the direction of faster growth when surrounded by fewer competitors.[55] While the

[53] I use the median as well as the mean of the local competition index to categorize districts into *High* and *Low Competition.* I also calculate the competition measure by counting all the eligible firms irrespective of previous or current access to institutional credit.

[54] Regressions using an alternative local measure without accounting for pre-existing bank credit access are reported in Table 1.27 in Appendix 1.A

[55] Alternate measures of local competition produce slightly different results, but still in the direc-

larger firms are able to achieve positive growth in loans irrespective of competition type, the difference between the high and low competition estimates is sensitive to the measure of competition, and should be interpreted with caution.

Table 1.13: Impact of Policy Change based on Local Competition Measures

Variable ($\Delta y_{t,t-1}$)	Coefficient
Panel A: By Local Firm Competition	
Always Eligible × After × High Competition District	-0.340**
	(0.146)
Always Eligible × After × Low Competition District	-0.228***
	(0.076)
Recently Eligible × After × High Competition District	0.251*
	(0.138)
Recently Eligible × After × Low Competition District	0.277**
	(0.131)
Panel B: By Local Banking Constraints	
Always Eligible × After × High Shortfall District	-0.277**
	(0.118)
Always Eligible × After × Low Shortfall District	-0.434*
	(0.224)
Recently Eligible × After × High Shortfall District	0.318**
	(0.127)
Recently Eligible × After × Low Shortfall District	0.214**
	(0.097)
Number Of Observations	5,574
Industry-Year Controls	Yes
Firm and Year Fixed Effects	Yes
Firm Controls	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates of the impact of the policy change across the competition measures computed in Equation 1.5 and 1.6 in Section 6. All other variables are same as in the baseline results in Table 1.5.

tion of recently-eligible firms in more competitive districts growing slower.

Local Banking Constraints. In column (2) of Panel B of Table 1.13, I find that the smaller firms are crowded out less in districts with more banks that are farther away from their directed lending target at the national level. The larger recently-eligible firms grow their credit more in directed lending deficient regions. The presence of more priority sector deficient banks in a region may result in weaker crowding out of smaller firms and more aggressive lending to the larger eligible firms. This is because these banks are more constrained by the shortfall from their target, and may not have the incentive to crowd out smaller firms. However, this measure does not control for credit demand in the *High Shortfall* or *Low Shortfall* district.[56]

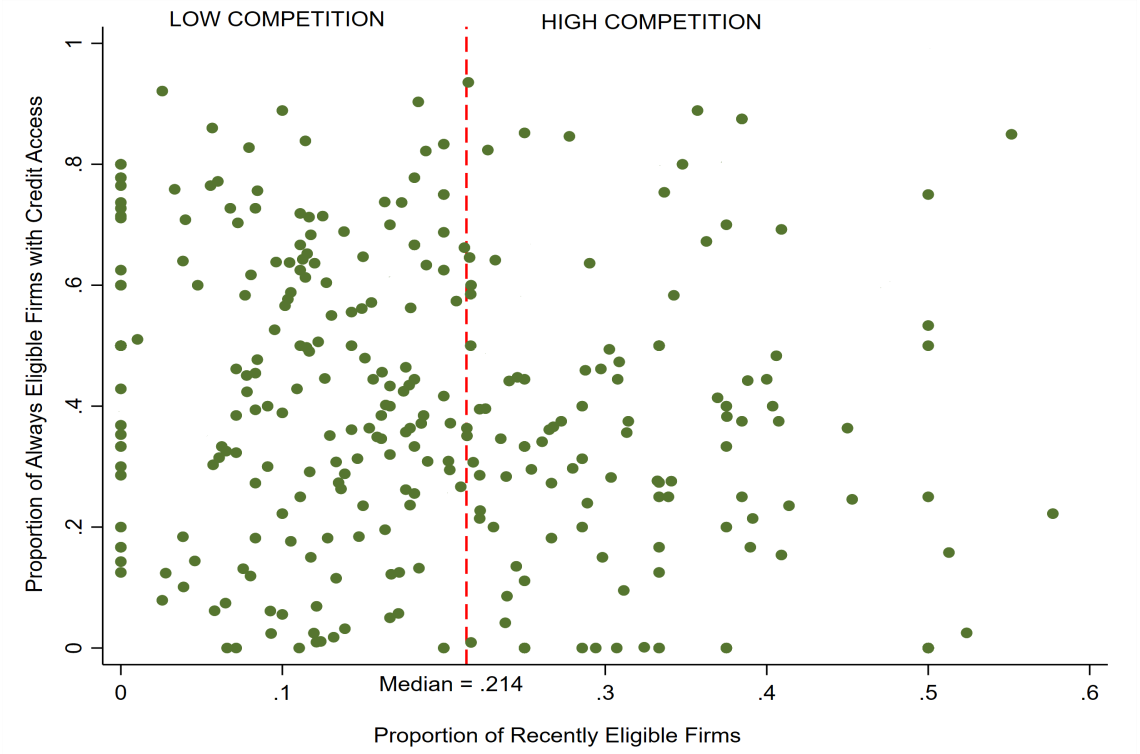


Figure 1.5: Distribution of Districts based on Local Competition and Credit Access. *Source:* Author's calculation using the *Fourth All India Firms Census* for 2006-2007.

[56] These results should be interpreted with caution due to weaker identification. I am trying to get controls for credit demand at the district level.

6 ROBUSTNESS

I perform a series of robustness checks to test the sensitivity of the estimates. The results from two important checks are presented in this section.

Alternative Dependent Variables. I measure the impact on bank loans and other borrowings using alternative measures and repeat all the regressions using Equation 1.1. In Table 1.14, I present the estimates using scaled change in bank loans ΔY_t / Assets $_{t-1}$ as the dependent variable. The difference-in-differences estimates[57] are statistically significant, and in the same direction as the estimates presented in Section 7. I also use alternative measures such as the scaled level of bank loans Y_t / Assets $_{t-1}$, and find similar results. The results are presented in Appendix 1.B.

Table 1.14: Impact of Policy Change on Scaled Change in Bank Borrowings

Variable ($\Delta Y_t / Assets_{t-1}$)	(1)	(2)	(3)
Always Eligible × After	0.0002	-0.339**	-0.272*
	(0.082)	(0.161)	(0.140)
Recently Eligible × After	0.112*	0.022	0.146**
	(0.057)	(0.103)	(0.074)
Number Of Observations	8,874	8,874	8,504
Industry-Year Controls	Yes	Yes	Yes
Group-level Time Trends	No	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates corresponding to Equation 1.1. All variable are the same as those in Table 1.5.

Alternative Industry-Year Controls. To rule out the concern of the results being partially driven by measurement error industry-level aggregates, I use both the level output and growth series as controls for industry trends across time. I also use industry-year fixed effects. These results are similar in magnitude and sign, with a

[57] The coefficient estimate corresponding to the difference-in-differences variable.

positive difference-in-differences coefficient for recently-eligible firms and a negative coefficient for always-eligible firms, as presented in Table 1.15. I repeat this estimation using terciles of the recently-eligible group and find that the lower tercile RE_1 grows faster than RE_3, in a relative sense.[58]

Table 1.15: Impact on Growth of Bank Borrowings using Industry-Year Effects

Variable ($\Delta y_{t,t-1}$)	(1)	(2)	(3)
Always Eligible × After	-0.041	-0.182*	-0.262**
	(0.067)	(0.109)	(0.133)
Recently Eligible × After	0.084**	0.190***	0.207**
	(0.042)	(0.072)	(0.088)
Number Of Observations	10,453	10,453	8,484
Industry-Year Fixed Effects	Yes	Yes	Yes
Group-level Time Trends	No	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates corresponding to Equation 1.1. All variable are the same as those in Table 1.5.

False Cut-Off Test. Since recently-eligible firms are bigger than always-eligible firms in size by definition, the captured effect may simply be driven by *firm size*, i.e., the bigger firms grow their bank credit faster during this sample period. To check for this, I construct alternate control and treatment groups based on firm size. In Table 1.16, I present a case where I use medium and large firms as the control and treated groups, respectively, and conduct the same differential impact analysis.[59] I do not find notable evidence of crowding-out of medium firms relative to large firms. I estimate similar checks using an alternate dependent variable and using industry-year fixed effects, discussed in Appendix 1.B.

[58] Unlike Bhue et al. (2016), the magnitude of the difference-in-differences estimate is only 1 percentage point. The results are presented in Appendix 1.B.

[59] This exercise is which is akin to running a *placebo* experiment. Other constructions of arbitrary control and treatment groups available upon request.

Table 1.16: Impact on Growth of Bank Borrowings using a False Cut-off

Variable ($\Delta y_{t,t-1}$)	(1)	(2)	(3)
Large Firms × After	-0.127**	-0.170*	-0.119
	(0.053)	(0.095)	(0.122)
Large Firms × t		0.014	-0.058
		(0.025)	(0.030)
Number Of Observations	7,405	7,405	6,033
Industry-Year Controls	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. The indicator LA_i equals 1 if the firm is characterized as large (> 100 INR Mln in plant and machinery) in 2006-2007. The reference group is medium firms group (> 50 and < 100 INR Mln in plant and machinery). The other details are same as those in Table 1.5.

Survivor Bias and Sample Selection. Less than 5% of the firms in the data exit due to unknown reasons. Since the *Prowess* database does not report entry and exit of firms, I refrain from analyzing the same. In other words, I can not attribute the exit of firms from my sample to a formal shut-down or closure. The survey data on small firms from the *Fourth All India MSMED Census* reports 7% of closures due to access of finance. The final sample of firms only comprises those firms whose financial variables are available from 2004-2010, or only those firms that survived the entire period. Its fair to interpret the results as the effect of the policy change on the most stable firms. Moreover, the sample of always-eligible small firms in the data used in this study are not representative of the universe of small firms in India, with more firms entering in the higher-end of the firm size distribution . This selection disproportionately includes firms that report their audited accounts. However, to the extent that firms following strict bookkeeping rules and the bigger than average firms are over-represented, they are less likely to be negatively affected than their excluded counterparts.

Evaluating the impact of *directed* lending programs is challenging. Even if it can be established that the program eligibility is causal in terms of improved credit access

for firms, it is hard to determine *if* and *how* the program affects firm growth, in the medium and the long term. Moreover, such programs impose other costs too. Lending mandates lead to cross-subsidization within banks, with non-priority borrowers partially paying the costs through higher interest rates. Banks may experience lower returns on their priority sector lending, or experience increasing burden of accumulating non-performing assets among the priority sectors. This study abstracts from the analysis of these general equilibrium effects mainly owing to data limitations.

7 CONCLUDING REMARKS

This study finds evidence of undesired distributive effects of size-based credit programs. I exploit a discontinuity in program eligibility to study the differential impact of a nation-wide directed lending program across the firm-size distribution. I find that the benefits of the policy intervention flow disproportionately to the larger firms. Newly included firms that gain eligibility experience an increase in the rate of growth of institutional credit, as well as higher investment and sales growth. On the other hand, the *smaller* always-eligible firms are crowded out in the bank credit market. The newly-eligible firms also experience increased investment and sales growth after the policy change, while there is no evidence of any improvement in the real outcomes for the always-eligible small firms. Since banks are subject to a directed *lending quota*, they prefer to lend to larger firms as economies of scale decrease *transaction costs*.

This paper further analyzes the impact of the directed lending program on small firm credit access across *two dimensions*: the role of bank relationships, and the role of competition in the local bank credit market. Using firm-bank matched data, I find that small firms with longer and multiple bank relationships suffer less. Firms that borrow from banks farther away from the mandated quota also experience less crowding out. Surprisingly, long-term relationships with small and local banks do not mitigate the crowding out. Using district-level measures of firm competition, I

find that smaller firms indeed get crowded out more in districts with more intense competition from larger firms, and vice-versa. Over time, such effects risk worsening existing regional disparities in access to institutional credit of small firms across the country.

This study points to an important *side effect* of a well-intentioned policy intervention aimed at increasing credit access of *all* small firms, and simultaneously providing banks with more lending avenues to achieve their directed lending targets. By virtue of its design, however, it distorts the lending incentives of banks, allowing them to exploit the policy shift as an opportunity to lower transaction costs. This suggests that in a setting with *lending quotas*, if institutional lenders are unable to satisfactorily lower transaction and information costs, they will choose to make loans to the largest eligible borrowers whenever possible. Future policy design must be guided by research that assesses the overall impact of existing programs, in order to develop programs that expand access to finance while limiting economic distortions.

APPENDIX

APPENDIX

1.A VARIABLE DEFINITIONS

Firm-level Variables. These definitions have been taken from the *Prowess* database dictionary and correspond to the firm-level variables used in Section 4.

1. **Total sales** is the sum of sales and income from non-financial services.
2. **Total assets** refer to sum of all current and non-current assets held by a company as on the last day of an accounting period.
3. **Gross fixed assets** refer to the aggregate un-depreciated value of all of a company's gross fixed assets as on the last day of an accounting period. It is essentially the sum of the costs of construction or acquisition. It also takes into account capitalized expenses. If a fixed asset is sold at any point in time, the historical cost thereof is deducted from the value of the gross fixed assets.
4. **Gross plant and machinery** is the total un-depreciated value of the installed plant and machinery as at the end of the accounting period. These are essentially production facilities for manufacturing goods.
5. **EBITDA** refers to earnings or profits before depreciation, interest, tax and amortization. These are called PBDITA in the database.
6. **Current ratio** is a liquidity ratio that measures a company's ability to meet its short term obligations, i.e., to pay off its short term liabilities, typically within one year. A ratio below one implies inadequacy and a ratio just above one would indicate a "just-about" adequate ability to meet current liabilities. But,

a ratio that is much above one would indicate too much of short term asset on hand that could possibly be deployed for better long-term use.

7. **Quick ratio** is the ratio of quick assets to quick liabilities. It measures the ability of a company to pay its immediate or short term liabilities by using its cash and near cash current assets. It is a more stringent measure of short term liquidity as compared to the current ratio. Quick assets differ from current assets mainly in that they exclude inventory.
8. **Total liabilities** are the sum of all the resources deployed. They include all sums owed to the shareholders in the form of share capital and reserves & surpluses, all sums owed to lenders in the form of secured and unsecured loans and all current liabilities and provisions. It also includes deferred tax liability.
9. **Total borrowings** includes all forms of debt, interest bearing or otherwise, secured and unsecured, short-term or long-term, and any other financial debt issued by financial institutions, government, the RBI, syndicated loans, etc.
10. **Total bank borrowings** are the aggregate borrowings from banking institutions, whether obtained from a single bank or a syndicate. All types of loans in the form of short-term loans, long term loans, cash credits, bank overdrafts, etc. are treated at par and are combined under this category bank borrowing.
11. **Total forex earnings** is the sum total of the earnings of a company in terms of foreign exchange, including earnings from export of goods, export of services, forex earning dividend, forex earning interest, and deemed export sales.
12. **Export earnings** is the total Free-On-Board (F.O.B.) value of the goods exported by a company, as disclosed in the notes to accounts in the balance sheet. These include export of goods calculated on F.O.B basis, royalty, know-how, professional and consultation fees, interest and dividends, and other income.
13. **Export sales ratio** measures the export earnings from goods and services as a percentage of sales. This ratio is a measure of the degree of exposure of a

company to exports markets, i.e., how much business a company generates by catering to export markets.

Industry Aggregates and Deflators. The Wholesale Price Index (WPI) is used to deflate the level variables. The data are obtained from the Ministry of Commerce Industry website, which is responsible for compilation of price data and release of All-Commodities WPI series and Industry-wise WPI series. The borrowings variables are deflated by the all-commodities WPI, and the firms' level variables such as sales, assets, and profits, as well as the national level industry-wise output are deflated by the industry-specific WPI series. I map the firm two-digit industry code to the industry codes for which the WPI series are available.

Industry Output Series. The national-level industry output and growth series are taken from the Annual Survey of Industries' Historical Time Series collected by the Ministry of Statistics and Programme Implementation. These series span years 2003-2009. Since the National Industrial Classification (NIC) were changed twice in the span of those years[60], I map the code books across the years to obtain a common series that corresponds to the NIC 2008 series. Each firm in the sample is mapped to one of the following industries:

1. Crop and animal production, hunting and related
2. Forestry and logging
3. Fishing and aquaculture
4. Mining of coal and lignite
5. Extraction of crude petroleum and natural gas
6. Mining of metal ores

[60] NIC 1998 was updated to NIC 2004, and NIC 2004 was updated to NIC 2008.

7. Other mining and quarrying
8. Mining support service activities
9. Manufacture of food products
10. Manufacture of beverages
11. Manufacture of tobacco products
12. Manufacture of textiles
13. Manufacture of wearing apparel
14. Manufacture of leather and related products
15. Manufacture of wood and products of wood and cork
16. Manufacture of paper and paper products
17. Manufacture of printing and reproduction of recorded media
18. Manufacture of coke and refined petroleum products
19. Manufacture of chemicals and chemical products
20. Manufacture of basic pharmaceutical products
21. Manufacture of rubber and plastics products
22. Manufacture of other non-metallic mineral products
23. Manufacture of basic metals
24. Manufacture of fabricated metal products
25. Manufacture of computer, electronic and optical products
26. Manufacture of electrical equipment
27. Manufacture of machinery and equipment
28. Manufacture of motor vehicles, trailers and semi-trailers
29. Manufacture of other transport equipment
30. Manufacture of manufacture of furniture
31. Other manufacturing

1.B FIGURES AND TABLES

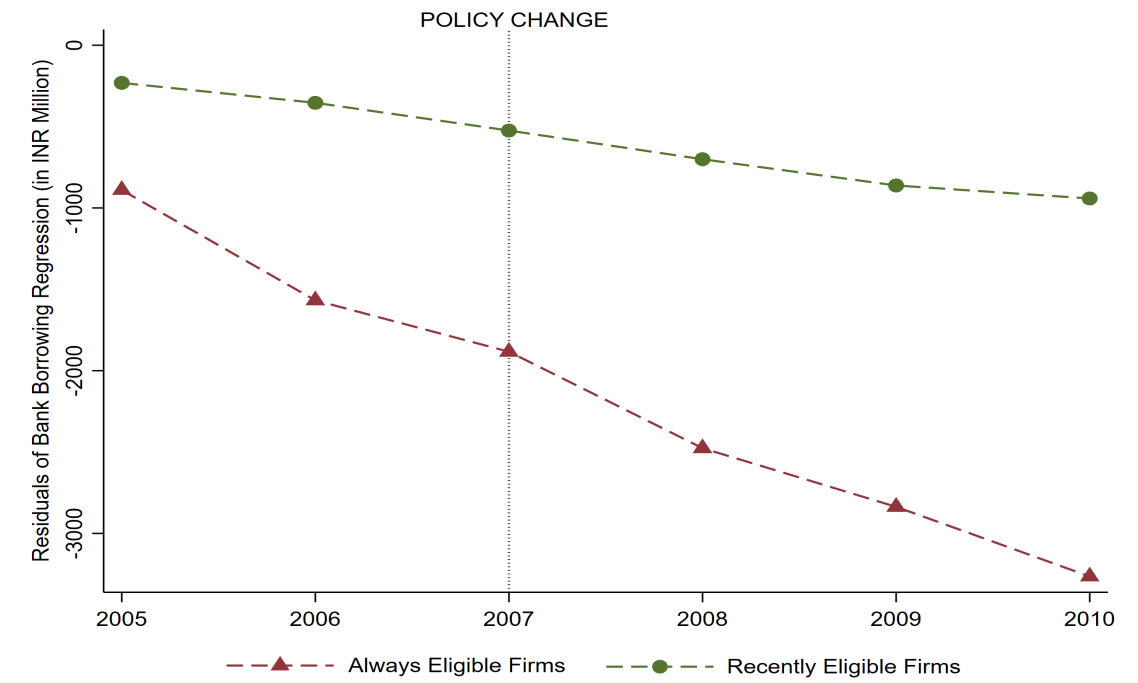
Differences in Time Trends. To check for differences in trends across the three groups of firms (Always Eligible, Recently Eligible, Never Eligible), I run a regression of bank borrowings and firm sales, separately, and plot the sum of residuals corresponding to each group.

$$y_{ist} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1} \times IO_{st} + \boldsymbol{\beta_2} \times \Delta IO_{st} + \epsilon_{ist}$$

In the regressions, I control for industry-specific business cycles using the aggregate industry output IO_{st} and growth rate of industry output ΔIO_{st}. I find evidence of differences in time trend for both groups in their borrowings as well as sales growth. These differences are evident from the time plot of the sum of group-wise residuals, as can be seen in Figures 1.4 and 1.5. Since there is a difference in the trend across the small firms and large firm group, I control for group-wise time trends in all the regressions in my empirical analysis.

Trends for Never-Eligible Firms. In Figure 1.6, I plot the deflated sum of total bank borrowings and total sales for the never-eligible firms.

Summary Statistics for All Firms. In Section 3 which discusses the data, I explain why I exclude exporters from this analysis due to their special access to *export credit* programs during the time frame of this study. Here, I report descriptive statistics for all firms in this period, including the exporting firms, in Table 1.17.



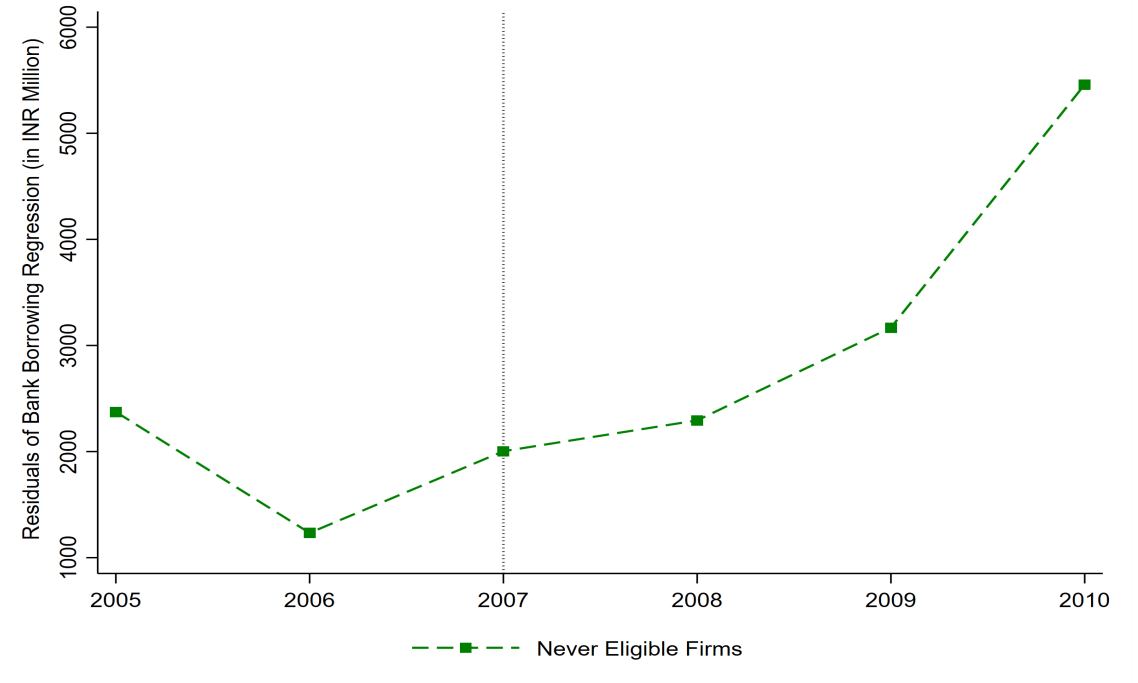


Figure 1.6: Group-wise Summed-up Residuals from the Bank Borrowings Regression.
Source: Author's calculations based on firm-level data from the *Prowess* database.

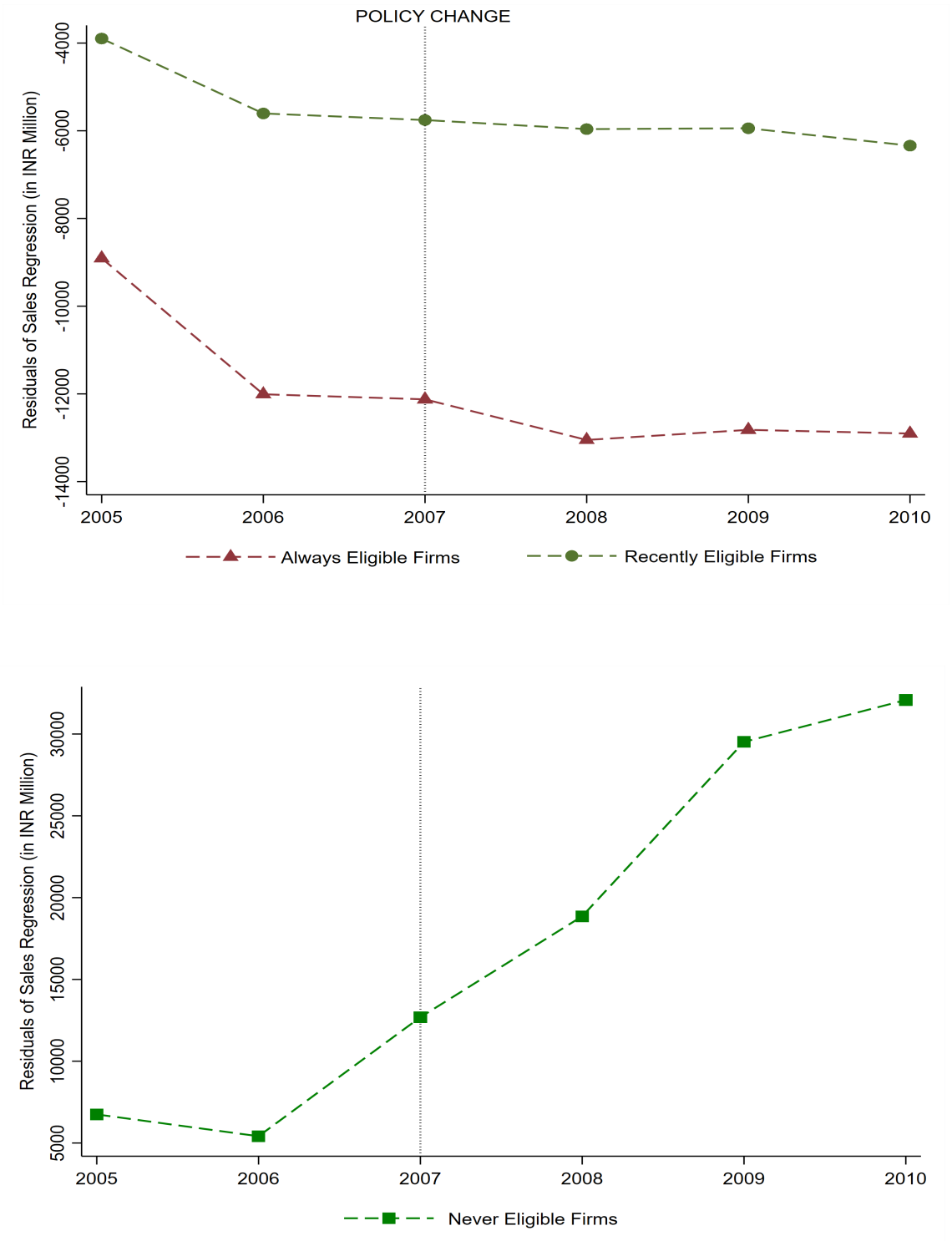


Figure 1.7: Group-wise Summed-up Residuals from the Total Sales Regression.
Source: Author's calculations based on firm-level data from the *Prowess* database.

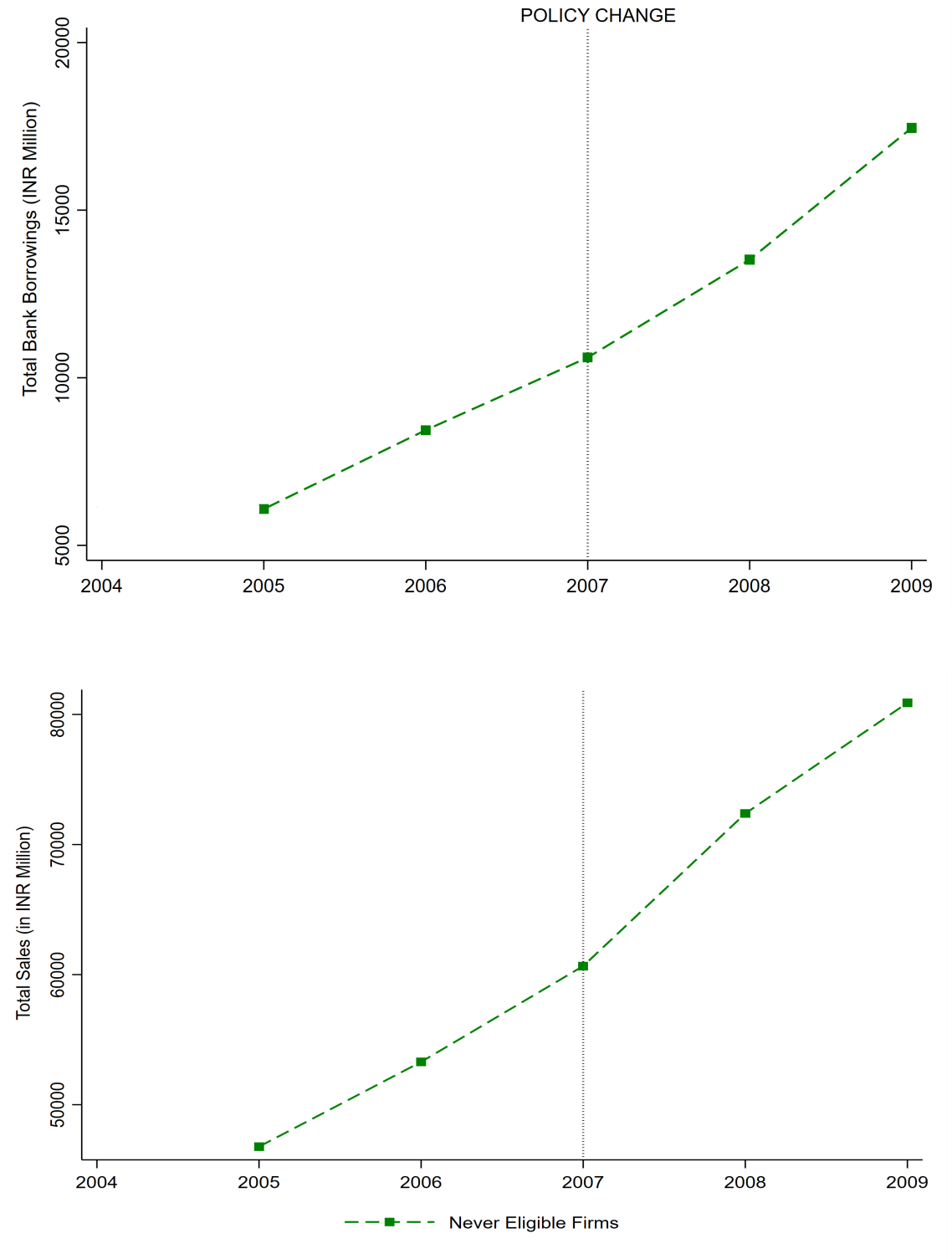


Figure 1.8: Sum of Total Bank Borrowings and Total Sales for the Never-Eligible Firms.
Source: Author's calculations based on firm-level data from the *Prowess* database.

Table 1.17: Descriptive Statistics: Always Eligible Vs Recently Eligible Vs Never Eligible Firms (2006-2007)

	Always Eligible (AE)			Recently Eligible (RE)			Never Eligible (NE)		
Variable	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**
Total Sales	236	175	680	593	232	670	2,203	5,836	54,743
Total Assets	257	131	459	640	230	1,238	2,268	4,779	32,396
Fixed Assets	257	**31**	54	640	**70**	138	2,268	**2,912**	22,856
Plant & Machinery	257	9	10	640	26	13	2,268	2,279	19,376
Total Liabilities	257	131	459	640	230	1,238	2,268	4,779	32,396
Total Borrowings	216	47	206	600	104	1,042	2,199	1,527	8,733
Bank Borrowings	167	42	183	510	42	96	2,085	792	4,121
Bank Share	167	**0.70**	0.32	509	**0.65**	0.30	2,084	**0.65**	0.29
Profitability	251	**0.04**	0.62	633	**0.07**	0.23	2,084	**0.11**	0.26
EBITDA	251	12	37	633	16	40	2,263	556	3,928
Utilization	236	1.32	1.24	593	1.24	11.09	2,203	1.22	0.80
Current Ratio	255	**5**	22	637	**4**	21	2,267	**3**	9
Quick Ratio	255	4	15	637	3	12	2,267	2	6

Notes: The groups Always Eligible, Recently Eligible and Never Eligible are constructed based on the threshold investment in plant and machinery in INR Million in 2006-2007. If the value of plant and machinery of a firm is between INR 2.5-10 Million, its in the AE small firms category, if its between INR 10-50 Million then its in the RE small firms category, and if its > INR 50 Million then its in the NE firms category. Profitability and utilization are calculated by scaling by total assets, bank share is calculated by dividing bank borrowings by total borrowings, and the current ratio and quick ratio are calculated by scaling by total current liabilities. The exact definitions of the financial variables is provided in Appendix 1.A. All the financial variables correspond to the averages of financial year 2006-2007 of *exporting* and *non-exporting* firms. Ratios are winsorized at the 1% level.

ROBUSTNESS TESTS

Table 1.18: Impact of Policy Change on Scaled Change in Bank Borrowings

Variable ($\Delta Y_t/Assets_{t-1}$)	(1)	(2)	(3)
Always Eligible × After	0.0001	-0.227**	-0.272**
	(0.082)	(0.110)	(0.114)
Recently Eligible (1^{st} Tercile) × After	0.181***	0.218	0.225
	(0.063)	(0.187)	(0.189)
Recently Eligible (2^{nd} Tercile) × After	0.029	0.083	0.082
	(0.072)	(0.077)	(0.084)
Recently Eligible (3^{rd} Tercile) × After	0.136**	0.121*	0.178**
	(0.066)	(0.074)	(0.076)
Number Of Observations	8,874	8,874	8,504
Industry-Year Controls	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. The RE_i is split into terciles. All other variables are same as in the baseline results in Table 1.5.

Table 1.19: Impact of Policy Change on Level of Bank Loans Scaled by Assets

Variable ($Y_t/Assets_{t-1}$)	(1)	(2)	(3)
Always Eligible × After	0.077	0.0004	-0.017
	(0.099)	(0.060)	(0.021)
Recently Eligible × After	0.108	0.101**	0.041**
	(0.091)	(0.044)	(0.019)
Always Eligible × t		0.031	0.006
		(0.022)	(0.007)
Recently Eligible × t		0.003	-0.011
		(0.023)	(0.009)
Number Of Observations	9,192	9,192	8,820
Industry-Year Fixed Effects	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. The dependent variable is bank borrowings scaled by assets, corresponding to Equation 1.1. The other details are same as those in Table 1.5.

Table 1.20: Impact of Policy Change on Growth of Firm Investment and Sales using Industry-Year Fixed Effects

Dependent Variable	I_t/K_{t-1}	$\Delta sales_{t,t-1}$
Always Eligible × After	0.009	-0.059
	(0.017)	(0.048)
Recently Eligible × After	0.027**	0.048*
	(0.012)	(0.027)
$\frac{\text{Cash Flow}_{i,s,t}}{\text{K}_{i,s,t-1}}$	0.094***	
	(0.023)	
Δ Sales $_{t-1}$	-0.007	
	(0.008)	
$\frac{\text{Cash Flow}_{i,s,t-1}}{\text{K}_{i,s,t-2}}$		0.034
		(0.028)
Number Of Observations	9,423	9,423
Industry-Year Fixed Effects	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes
Firm Controls	Yes	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates corresponding to Equation 1.3 and 1.4, using industry-year fixed effects. The other details are same as those in Table 1.8.

Table 1.21: Impact of Policy Change on Share of Bank Loans in Total Loans

Bank Borrowings/Total Borrowings	(1)	(2)	(3)
Always Eligible × After	-0.059***	-0.009	-0.025
	(0.018)	(0.022)	(0.019)
Recently Eligible × After	-0.035***	-0.043***	0.032**
	(0.012)	(0.014)	(0.016)
Always Eligible × t		-0.017**	-0.009
		(0.007)	(0.008)
Recently Eligible × t		-0.026***	-0.023***
		(0.004)	(0.006)
Number Of Observations	11,086	11,086	8,816
Industry-Year Fixed Effects	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates of the impact of the policy change on the share of bank borrowings corresponding to Equation 1.1. All variables are same as in Table 1.5.

Table 1.22: Impact of Policy Change using Industry-Year Fixed Effects

Variable ($\Delta y_{t,t-1}$)	(1)	(2)	(3)
Always Eligible × After	-0.041	-0.181**	-0.263**
	(0.067)	(0.108)	(0.133)
Recently Eligible (1^{st} Tercile) × After	0.176**	0.287**	0.106
	(0.069)	(0.116)	(0.152)
Recently Eligible (2^{nd} Tercile) × After	0.040	0.203*	0.273**
	(0.060)	(0.108)	(0.132)
Recently Eligible (3^{rd} Tercile) × After	0.051	0.098	0.229**
	(0.064)	(0.109)	(0.114)
Number Of Observations	10,453	10,453	8,484
Group-level Time Trends	No	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates of the impact of the policy change across firm groups and sub-groups of RE_i firms, corresponding to Equation 1.2. All other variables are same as in Table 1.5.

Table 1.23: Impact of Policy Change using Industry-Year Fixed Effects

Dependent Variable	I_t/K_{t-1}		$\Delta sales_t$	
	(terciles)	(median)	(terciles)	(median)
Always Eligible × After	0.009	0.009	-0.059	-0.059
	(0.018)	(0.017)	(0.048)	(0.048)
Recently Eligible (1^{st} Tercile) × After	0.044**		0.036	
	(0.020)		(0.042)	
Recently Eligible (2^{nd} Tercile) × After	0.0008		0.042	
	(0.019)		(0.042)	
Recently Eligible (3^{rd} Tercile) × After	0.034*		0.063	
	(0.018)		(0.046)	
Recently Eligible (< Median) × After		0.031*		0.045
		(0.016)		(0.036)
Recently Eligible (> Median) × After		0.022		0.049
		(0.016)		(0.037)
Number Of Observations	9,423	9,423	9,423	9,423
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates of the impact of the policy change on real outcomes using industry-year fixed effects, as in Equation 1.3 and 1.4. The dependent variables are the investment-to-capital ratio and total sales growth. The RE_i is split into terciles or by the median. All other variables are same as in Table 1.8.

Table 1.24: False Cut-off: Impact of Policy Change using Industry-Year Effects

Variable ($\Delta y_{t,t-1}$)	(1)	(2)	(3)
Large Firms × After	-0.133**	-0.137	-0.111
	(0.055)	(0.097)	(0.124)
Large Firms × t		0.001	0.008
		(0.025)	(0.041)
Number Of Observations	7,405	7,405	6,033
Industry-Year Fixed Effects	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates of the false cut-off test using alternate industry-year controls. The indicator LA_i equals 1 if the firm is characterized as large (> 100 INR Mln in plant and machinery) in 2005-2006. The reference category are medium-sized firms. All other variables are same as in Table 1.5.

Table 1.25: False Cut-off: Impact of Policy Change on Scaled Change in Bank Loans

Variable ($\Delta Y_{t,t-1}$)	(1)	(2)	(3)
Large Firms × After	-0.107	0.036	-0.077
	(0.094)	(0.125)	(0.088)
Large Firms × t		-0.058	0.023
		(0.068)	(0.030)
Number Of Observations	6,259	6,259	6,038
Industry-Year Controls	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes
Firm Controls	No	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates of the false cut-off test using medium and large firms as *control* and *treated* groups, respectively, and using industry-year fixed effects. The dependent variable is the change in log of bank borrowings. The indicator LA_i equals 1 if the firm is characterized as large (> 100 INR Mln in plant and machinery) in 2005-2006.

Table 1.26: External-finance based Composition of Registered Small Firms in 2006-2007

	Source(s) of External Finance				
Firm Size	(i) None	(ii) Only formal	(iii) Only informal	(iv) Both	**Total**
All Small Firms	46,152	12,288	1,034	2,172	**61,648**
	(75%)	(20%)	(2%)	(3%)	
Always Eligible	37,859	9,767	800	1,496	**49,923**
(81%)	(76%)	(20%)	(2%)	(3%)	
Recently Eligible	8,293	2,521	234	676	**11,725**
(19%)	(71%)	(21%)	(2%)	(6%)	

Notes: This table displays the composition and sources of credit as reported by *small* firms in the All India Fourth Annual Census. Small firms are assigned Always Eligible or Recently Eligible status based on the value of reported gross plant & machinery. Formal sources of credit comprise commercial and co-operative banks, development financial institutions and any government-run credit support programs.

Table 1.27: Impact of Policy Change based on Local Competition Measures

Variable ($\Delta y_{t,t-1}$)	(1)	(2)
Always Eligible × After × High Competition District	-0.325**	-0.314**
	(0.133)	(0.124)
Always Eligible × After × Low Competition District	-0.271**	-0.275**
	(0.118)	(0.121)
Recently Eligible × After × High Competition District	0.221*	0.262*
	(0.132)	(0.138)
Recently Eligible × After × Low Competition District	0.301**	0.266*
	(0.103)	(0.137)
Number Of Observations	5,574	5,574
Industry-Year Controls	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes
Firm Controls	No	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates of the impact of the policy change across the competition measures computed in Equation 1.5 and 1.6 in Section 6. All other variables are same as in the baseline results in Table 1.5.

CHAPTER 2

THE IMPACT OF CREDIT SUBSIDIES ON THE EXPORT PERFORMANCE OF INDIAN FIRMS

In recent years, trade policy in developing countries has focused on trade facilitation and export promotion. A variety of targeted government-funded programs have been employed by policymakers to stimulate firm exports (Lederman et al. (2010)). The justification of government intervention in export markets is mostly based on the theory of asymmetric information and other market failures which are more intensified for exporting firms (Feenstra et al. (2014)). Such policies target multiple dimensions of exporting activity, namely, raising exports of existing exporters, improving survival probability of the hardest hit export industries, and assisting exporters to diversify the export basket as well as the export destinations. Export support schemes vary in their intent, from providing direct production or export assistance in facilitating access to new destinations, to assistance in marketing export products to new foreign markets, upgrading infrastructure and technology, and reducing other trade barriers such as administrative expenses. State-funded loan guarantees, export insurance and export credit subsidies are other commonly employed policy tools.[1]

The Government of India formulated the *Interest Rate Subsidy Scheme* in 2007, to reduce the cost of short-term credit for exporters in *employment-intensive sectors*, given their important contribution in the GDP.[2] Short-term loans of exporters are

[1] A detailed summary is provided in Van Biesebroeck et al. (2016) listing all studies using firm-level evidence on export promotion by country. A close to exhaustive list of 21 studies covering 16 countries is provided for studies conducted in the last decade.

[2] The contribution of exported goods in the GDP was about 12.26% and 13.71% in 2005 and

mainly working capital loans in the form of pre-shipment and post-shipment export credit. Between 2007 and 2013, the government announced subsidies on short-term bank loans on a semi-annual or annual basis. SMEs across all product lines, and large firms across specific product lines or sectors were eligible for subsidized export credit. While minimizing short-term credit frictions of SMEs and labor-intensive firms was the immediate goal of the policy in the wake of the global recession, the long-term goal of the program was to provide Indian exporters credit at internationally competitive rates.[3] The Federation of Indian Export Organization felt these credit support measures were insufficient to make Indian manufacturing exports competitive, and that in the absence of appropriate government support, the decline in expected exports could cost close to 1.5 million jobs in the export sector.[4] According to the Interim Budget Report of 2009-2010, the interest subsidy on pre- and post-shipment credit for employment oriented sectors and SMEs from March until September 2009 would involve a financial expense of USD 100 Million. Since subsidy support schemes pose a significant financial burden to the government budget each year, it is important to uncover which factors determine the success of these credit market interventions, both in terms of improvement in export volumes and employment generation.

In this paper, I study the impact of this export credit intervention on the export performance of subsidized firms at the intensive and extensive margin of exports, as well as on the export participation decision.[5] I exploit the variation in eligibility to the subsidy at the firm-level due to the staggered nature of the program targeting a different set of firms based on product lines across the time period 2007-2013. Since this program did not involve a randomized choice of beneficiaries, subsidized firms

2010, respectively, according to UNCTAD country profiles. See Figure 2.1 in Appendix 2.C for the share of select industries in total exports.

[3] To my knowledge, no other explicit reasoning was provided regarding the choice of labor-intensive sectors, for the provision of these export credit subsidies.

[4] According to G.K. Pillai, the Commerce Secretary, there was an anticipated loss of 1.5 million jobs in the export sector during 2008-2009 due to a USD 15 Billion decline in expected exports.

[5] Due to data restrictions, it is not possible to study the impact of the subsidies on employment.

are likely to be different from non-subsidized firms. I control for firm-level and sector-level differences, as well as for demand-side shocks to estimate the effect of the policy on subsidized firms. For this empirical analysis, I construct a detailed data set which matches the balance-sheet data on medium and large exporting firms in the Indian manufacturing sector from 2006-2013, with information on the firm-bank relationships, with the year-wise eligibility status at the product-level. I compute a firm-level measure of demand shock using the past product-level import dependence on destination countries, which is likely highly correlated with firm-level export growth. There are two main findings of this paper. *First*, I find that the impact of subsidies is estimated at between 5-8% in a difference-in-differences sense, compared to non-subsidized exporters.[6] The subsidies are not effective in the event of a substantial drop in world demand, as that experienced during the year after the global financial recession, suggesting the limited usefulness of credit support as a policy tool during a major global downturn. *Second*, the impact of credit subsidies is higher for firms already enjoying above average fiscal benefits, implying a complementary effect of pre-existing export benefits. Larger and more productive firms benefit to a lesser extent than their counterparts, implying that firms with more intense credit constraints benefit relatively more. Firms' financial health indicators such as liquidity and leverage do not have a differential effect on subsidized firms. Also, subsidized firms with stronger bank relationships benefit relatively more. Finally, I do not find any impact on export participation of firms. This is not unexpected given the short-term and unanticipated nature of the subsidy scheme.

[6] Van Biesebroeck et al. (2016) find that in Peru and Belgium, the impact of export promotion was about 20%. Görg et al. (2008) find that only large enough export grants can lead to about 5% expansion in exports. Martincus and Carballo (2010) find that export promotion activities have a positive effect on the extensive margin of firms' exports but they do not have any robust impact on the intensive margin in the cases of Peru and Costa Rica. Cansino et al. (2013) find that a trade promotion program in Spain led to improving export intensity by 10%.

The remainder of this paper is organized as follows. Section 1 provides an overview of the related literature. Section 2 provides the details of export-credit financing policy in India. Section 3 describes the data sources used in the study and the methodology to map the various data sets used in this study. Section 4 describes the empirical strategy and the results. Section 5 discusses robustness checks and important caveats. Section 6 concludes and discusses policy implications of the findings.

1 RELATED LITERATURE

There are three key findings in the literature evaluating the effectiveness of export promotion policies. *First*, export promotion has proved to be more successful for existing exporters. Girma et al. (2009) find that conditional on firm characteristics, production subsidies stimulate export activities of existing Chinese exporters but have not been very helpful for firms trying to enter the export market. Görg et al. (2008) find that export grants help existing Irish exporting firms to compete more effectively on the international market but do not find similar evidence for non-exporters to start exporting. Helmers et al. (2010) find that export subsidies in Colombia positively impacted export volumes and the impact is diminishing in subsidy size and in the degree of a firm's *connectedness* to the government. A plausible explanation for these results in the literature is the persistent nature of key firm-level characteristics such as productivity, profitability, external finance dependence, and possibly political economy aspects, which are difficult to affect with temporary export support programs (Manova (2012), Chaney (2016), Melitz (2003)). *Second*, most studies find evidence supporting the presence of a stronger impact of export programs with respect to *entry* into new markets vis-a-vis improving export volumes among established exporters. Using highly disaggregated export data for Chilean exporters over 2002-2006, Martincus and Carballo (2010) find that export promotion activities have heterogeneous effects over the distribution of export performance along both the ex-

tensive and intensive margins. Stronger effects are observed on the lower end of the distribution of export volumes and the lower and upper ends of the distributions of the number of destination countries and products. Defever et al. (2017) study the Cash Incentive Scheme for Exports program provided by the Government of Nepal, which is granted primarily to large exporters. They find a small positive effect on the number of eligible products exported and on the number of destination markets reached. *Third*, evaluating the export programs with respect to the medium- to long-term in addition to the short-term reveals that their impact is short-lived and heterogeneous across firms. Cadot et al. (2015) study beneficiaries of matching grants for export business-plan making in Tunisia and find that the positive impact on export volumes and improved diversification across destinations and products persisted only for three years. Van Biesebroeck et al. (2015) study the causal impact of the Canadian Trade Commissioner Service on export volume on Canadian exporters. They find that while Canadian firms which received assistance from Canada's Trade Commissioner Services at any time in the past exported significantly more than the control group, the impact declines in subsequent years if firms do not receive support anymore.

In this paper, I contribute to the existing literature by studying the firm-level impact of a recent export credit subsidy program in India from 2007-2013, with a focus on the intensive margin of exports of medium and large exporters. I also analyze the effect of firm-bank relationships with respect to duration of relationship and access to multiple bankers. To my knowledge, Kapoor et al. (2017) is the only other study analyzing the impact of a credit program subsidizing Indian exporters in the small sector. Exploiting a natural experiment provided by two policy changes, first, in 1998, which made small-scale firms eligible for directed credit, and then, a subsequent reversal in policy in 2000, the authors find evidence of an increase in bank credit growth, and a 22% increase in export earnings. They find no subsequent drop in

export earnings following the reversal of the policy suggesting the temporary program helped form lasting firm-bank relationships.

While the role of credit in determining export performance of firms has been at the core of the trade-finance literature, numerous studies have also linked the recent trade collapse to demand-side shocks (Behrens et al. (2013), Eaton et al. (2016), Levchenko et al. (2010), Chakraborty (2018)), rather than to only supply-side constraints (Bricongne et al. (2012), Chor and Manova (2012), Paravisini et al. (2014)). In this analysis, I account for shocks to demand for exports by controlling for GDP growth in importing countries. There is also evidence of a negative impact on exporters from worsening health of the financial institutions supporting exporters. Amiti and Weinstein (2011) establish a causal link between shocks in the financial sector to exporters that result in exports declining faster than domestic output during banking crises. Since the banking sector in India had very limited exposure to the global banking sector, I do not expect to find a link between banker health and firm performance. I capture differential effects in the performance of firms which enjoyed access to foreign capital markets, to the extent that access to capital markets abroad are a signal of a certain degree of foreign credit dependence.

2 EXPORT CREDIT POLICY IN INDIA

The Export Financing Scheme was first introduced by the Reserve Bank of India (RBI) in 1967 to make short-term credit accessible to exporters at internationally comparable interest rates, which in turn would help them price export products more competitively for the international market. There are two main types of short-term export credit extended by banks, namely, pre-shipment and post-shipment credit.[7] *Pre-shipment credit* is a short-term loan or advance or any other credit provided by a bank to an exporter for financing the purchase, processing, manufacturing or

[7] Definitions are available in RBI documentation available at Master Circular RBI/2012-13/74.

packing of goods prior to shipment, on the basis of letter of credit opened in favor of the exporter by an overseas buyer or a confirmed order of export of goods from an overseas buyer. *Post-shipment credit* is a short-term loan provided to an exporter to manage the working capital cycle gap until the realization of export proceeds and includes any loan or any advance granted to an exporter, in consideration of the security of any duty drawback allowed by the Government from time to time.

Interest Rate Regimes. Interest rates on export loans have historically been regulated by the RBI. From 2003-2010, the interest rate on exports-related loans was determined based on the Benchmark Prime Lending Rate (BPLR). Under the Export Financing Scheme until 2010, rupee export credit interest rates were capped at the banks' Benchmark Prime Lending Rate, set by banks at a quarterly frequency.[8] Starting July 1, 2010, banks were advised to switch over to the system of Base Rate. Under the BPLR regime, the RBI fixed only the ceiling rate of interest for export credit while banks were free to decide the rates of interest within the ceiling rates keeping in view the BPLR, the spread guidelines, credit history of the borrowers, and the borrower-risk perception. Starting July 1, 2010, the BPLR was replaced by the Base Rate, and consequently interest rate on rupee export credit was determined by using the base rate as a price floor. While large exporters were unaffected by switching interest rate regimes, small exporters that may have previously been credit rationed, were benefited under the Base Rate regime.[9]

Export Credit Interest Rate Subsidy Scheme. The scheme was originally referred to as *Export Credit Interest Rate Subvention Scheme*. The Government of India formulated the scheme in 2007 to reduce the cost of short-term credit for *export-oriented employment-intensive sectors*. An interest rate subsidy was applied to both

[8] Foreign currency export loans are also available at a cheaper cost, but were instead linked to the LIBOR rate.

[9] To my knowledge, there is no study that examines the presence of a differential impact of the interest rate regime shift. There is only anecdotal evidence suggesting the relative differential impact across different firm sizes.

pre-shipment (packing credit) and post-shipment credit. From 2007 to 2013, subsidies on short-term bank loans for exporters were announced. The rate of the subsidy was 2% for all years until the last scheme in 2013 when it was raised to 3%. The announcement of eligible exporters was mostly made on a year-to-year basis and on some occasions on a semi-annual basis which was later extended until the end of the year. Once announced, banks were required to pass on the full extent of the subsidy to eligible exporters, but they had operation flexibility in terms of deciding the duration of the short-term loan, the repayment cycle, and also in demanding complete documentation of export transactions from exporters. While SMEs across all product lines were eligible, large firms were eligible for subsidized export credit only across specific product lines. The eligible product lines were either pinned down at the four- or three- or two-digit (product-level) HS codes. Various industry groups believe that such subsidies were in line with WTO norms, and that competitors such as China, Bangladesh and Vietnam, are able to provide much lower interest rates on export credit.[10]

Selection of Eligible Exporters. The goal of the subsidies was to minimize short-term credit frictions for SMEs and export-oriented labor-intensive sectors in order to promote exports. While this line of reasoning is intuitive for small firms which are typically credit constrained, it is less clear why large exporters were subsidized. The announcements made by the RBI include information on explicit targeting of labor-intensive sectors in order to boost exports and protect the huge number of workers in these sectors. To my knowledge, no study investigates if the eligible labor-intensive sectors experienced either improved sales or worker retention. In fact, there

[10] An article in The Hindu quoted *Himanshu Tewari*, Partner, BMR Associates LLP: "Though such interest subvention schemes are considered to be an element of export credit, they do not strictly fall in the definition of direct export subsidy within the WTO Agreement on Subsidies and Countervailing measures." Also, they quoted *A Sakthivel*, Chairman of Federation of Indian Export Organisation:"Interest in China is 6.25 per cent and in Bangladesh it is 6.75 per cent. These rates are still lower than that offered to exporters, even after the 3 per cent subvention."

is little evidence even to show that the selected labor-intensive sectors contributed heavily to employment growth for the sample period. A study commissioned by the Indian Council for Research on International Economics Relation, Das et al. (2009) identifies export-oriented labor-intensive sectors and does not find conclusive evidence on the link between credit-constraints, export performance and employment potential. The export-oriented labor-intensive sectors identified for the study include leather goods, apparel goods, gems and jewelry, sports goods and metals. These sectors overlap with a majority of the sectors and product lines that were eligible under the subsidy scheme from 2007-2013.[11] After being discontinued in the financial year 2014-2015, the policy was replaced by the *Interest Equalisation Scheme* for 5 years for 416 specified tariff lines, and across all lines for exports of Micro, Small and Medium Enterprises.[12]. The sample period of study in this paper is limited to the years of the first policy, which was announced in a staggered manner from 2007-2013.[13]

3 DATA

Firm-level data. I use annual firm-level balance sheet data from the *Prowess* database to evaluate the impact of the Export Subsidy Scheme from 2007-2013.[14] The database accounts for more than 70% of the economic activity in the organized industrial sector, 75% of corporate taxes and 95% of excise duty collected by the Indian Government (Goldberg et al. (2010)). The database provides firm variables such as industry code, product code,[15] ownership details, total sales, total assets, value of goods exported, total capital, borrowings, and variables indicating financial

[11] A detailed list of eligible product lines from 2007 to 2013 is available in the Appendix 2.B.
[12] The announcement is available on the RBI website: Interest Equalisation Scheme on Pre and Post Shipment Rupee Export Credit
[13] To investigate the impact of the more recent export credit program currently in place will require more recent data which is likely to be available by 2019.
[14] The data availability at the quarterly level for export details is poor.
[15] The database categorizes firms according to the four-digit NIC codes. There are total of 1,886 products linked to 108 four-digit NIC industry codes across the 22 manufacturing sectors spanning the industrial composition of the Indian economy.

health. The definitions of variables used in this study are presented in Appendix 2.A. According to estimates in Chakraborty (2018), the average industry exports summed over all firms in a manufacturing industry in *Prowess* explains around 36% of exports from the same industry category of trade data, and the ratio varies from 18% (leather) to as high as 60% (beverages) across two-digit NIC industries.

To identify subsidized firms each year, I map the *Prowess* detailed National Industrial Classification (NIC) industry-level codes to the Indian Trade Clarification based on Harmonized System of Coding (ITC-HS) four-digit product-level codes. This mapping is typically required in any study in this literature studying Indian trade data, however, to my knowledge, it has never been made publicly available for researchers from an institutional source.[16] The database also provides the list of banker(s) of firms for each year.[17] I use this firm-bank matching to characterize each firm's bank relationship and bank type based on the bank relationship duration and the associated banks' count and ownership.[18]

Trade Flows. I use trade data provided by *UN Comtrade* to compute exports of India at the two-digit HS code level. Trade data are also available in the *DataBank* series of the World Bank. These data are used to construct a demand shock emanating from slowing growth in importer countries as well as to understand how the economies in select importer countries grew during the sample period. In Figure 2.1, I plot the trend of export and GDP growth for the world, India, China and USA. The GDP as well as export growth of India and China move in sync during this period. The only year with negative GDP and export growth rate is the year 2009.

[16] Since this manual mapping is tedious and can be prone to judgments, I map the subset of eligible HS four-digit product codes to NIC four-digit codes in the data, and map only the HS two-digit product codes to NIC four-digit codes for the full sample of firms.

[17] Data available for a slightly smaller sample than the full sample.

[18] For firms that report more than one bank per firm-year, the *duration* is based on the median duration among the matched firm-bank pairs, that occurred in adjacent years. For the *number of bankers* measure, I count the median number of bankers of firms across the sample period. For the *bank ownership* measure, I compute the median of the proportion of state-owned banks.

Figure 2.1: Trend in Growth of Exports and GDP from 2006-2013 in Select Countries. *Source:* Author's calculations using country-wise series from World Bank's *DataBank*.

Industry-level Deflators I use industry-level deflators and the wholesale price index to deflate the firm-level data. Data on industry aggregates are taken from the Historical Time Series collected by the *Ministry of Statistics and Programme Implementation*. I use the WPI series to deflate nominal variables.[19] Industry-level deflators are also used in the calculation of firm productivity.

Sample Period. The sample period for the study is 2006-2013. The reference year is 2006, i.e., the year preceding the year the subsidies were first introduced.

Data Exclusions. I restrict my analysis to medium and large firms. Data on

[19] Bank loans and debt data are deflated by the *All-Commodities WPI*, firm-level variables such as assets, profits, and industry-level aggregates are deflated by the corresponding *industry-specific* WPI.

the gross value of plant and machinery is used to demarcate firm size, according to the official definition.[20] Since this policy is announced three to six months in advance and only for a period of six to twelve months, I focus on the short-term impact on pre-existing exporting firms, and exclude firms that did not export in the reference year. I exclude firms which do not use any bank credit, as the policy works via a subsidy on the interest rate on short-term bank export credit. Due to this exclusion, I drop close to 6% of the exporting firms in my sample. In addition, I drop some unreasonable observations with negative values for some key variables, such as total assets, total debt, total sales, total export, and gross fixed assets.

Summary Statistics. In Table 2.1, I present the summary statistics of the sample of manufacturing firms in this paper for the financial years 2007-2008, i.e., the first year of the subsidy scheme. I report the statistics in three groups - all firms, only exporting firms and subsidized exporting firms. From Table 2.1, we can see that about 26% of the firms were exporters in 2007.[21] In the first year of the subsidy scheme, about 65% of exporters in my sample were eligible.[22] Exporting firms in the data have above average sales and assets. Exporters are relatively more dependent on bank loans, and among them the subsidized set of firms, more so. While exporters are more productive and more profitable firms, the subsidized firms are marginally less profitable as reflected in their EBITDA ratio. All firms across categories do not appear to differ on average in terms of their short-term liquidity or debt-ratio. Subsidized exporters exhibit higher export intensity than non-subsidized exporters, but this trend is not stable across years.

[20] Small and micro-sized exporting firms are eligible for additional credit support throughout this period and accounting for them is beyond the scope of this paper.

[21] The ratio of exporters in the data varies between 25-33% in the data from 2006-2013.

[22] This is the highest percentage of subsidized firms since the entire textiles and engineering goods sectors, in addition to other product lines, were eligible for the export credit subsidy.

Table 2.1: Summary Statistics for Manufacturing Sector Firms in India in 2007 (in INR Million)

	Total Firms			Only Exporters			Subsidized Exporters		
Variable	**N**	**Mean**	**Median**	**N**	**Mean**	**Median**	**N**	**Mean**	**Median**
Total Sales	3,753	5,341.88	956.90	975	7,715.67	1,329.50	638	5,999.89	1,211.70
Total Assets	3,753	4,901.51	932.00	975	8,623.75	1,334.30	638	6,726.19	1,124.60
Fixed Assets	3,753	2,447.17	596.00	975	4,522.12	662.00	638	3,423.22	574.30
Total Borrowings	3,753	1,578.30	259.15	975	2,783.73	428.40	638	2,326.46	349.85
Bank Borrowings	3,753	908.29	264.40	975	1,715.48	292.50	638	1,470.72	251.05
Short-term Bank Loans	3,753	299.31	80.85	975	529.01	147.60	638	487.43	123.65
Foreign Borrowings	3,753	26.03	0.00	975	65.82	0.00	638	54.73	0.00
Export of Goods	3,753	891.41	7.30	975	2,909.23	485.30	638	1,906.53	398.50
Fiscal Benefits	3,753	157.90	0.00	975	43.22	1.50	638	50.08	1.80
Ratios or Derived									
Bank Borrowings Share	3,753	0.57	0.35	975	0.61	0.45	638	0.63	0.41
Productivity	3,424	0.81	0.79	892	0.98	0.95	573	0.96	0.94
EBITDA Ratio	3,753	0.14	0.12	975	0.17	0.13	638	0.15	0.12
Liquidity Ratio	3,753	1.30	1.13	975	1.35	1.19	638	1.34	1.18
Leverage Ratio	3,753	1.99	1.02	975	2.22	1.04	638	2.20	1.14
Export Intensity	3,753	0.14	0.01	975	0.39	0.32	638	0.42	0.35

Note: The sample consists of medium- and large-sized firms and excludes small and micro-sized firms based on the official firm size definition of the MSMED Act of 2006. The definitions of firm-level variables are provided in Appendix 2.A. *Bank borrowing share* is the ratio of bank borrowings to total borrowings. *Productivity* measure is the logarithm of the TFPR (Total Factor Productivity Revenue) calculated following Asker et al. (2014). These measures are very similar to the estimates in Chakraborty (2018), calculated for manufacturing firms using the *Prowess* database for 2001-2010, using the method in Levinsohn and Petrin (2003). *EBITDA ratio* is earning before interest, taxes, depreciation and amortization expenses, scaled by total assets. *Liquidity ratio* is the current ratio. *Leverage ratio* is the ratio of debt to equity. *Export intensity* is the ratio of exported goods to total sales. All variables correspond to the financial year 2007-2008.

4 EMPIRICAL STRATEGY AND RESULTS

The studies in the literature evaluating export support programs use quasi-experimental methods to compare the export performance of *treated* firms with that of a *control* group of firms. In the context of this paper, the firms that become *eligible* for the export credit subsidies each year are considered as treated and are identified by the indicator variable $\mathbb{1}(\text{Subsidized}_{ijt})$. To assess causality between the subsidy scheme and firms' export outcomes, the non-random nature of policy assignment must be accounted for. The policy maker's choice of the set of subsidized industries depends on which industries they perceive as *employment oriented* or *labor-intensive*, and those facing stiff competition from highly subsidized export sectors in other countries. While such policy assignment is non-random, it is also not based on firm-specific characteristics such as productivity, profitability and the financial health of exporting firms. Additionally, industry support boards perhaps have some lobbying power in the process, but specific firms are unlikely to have determined policy assignment at the sector or product level. To address these concerns, I use a difference-in-differences estimator, while conditioning on a set of firm and industry covariates. Since I observe a panel of both treated and control firms, before and after the policy announcement period, I can control for firm-specific time-invariant unobserved factors as well.[23]

4.1 BASELINE ESTIMATION

In the baseline estimation, I examine the effect of the export subsidy program on exports using a generalized version of difference-in-differences. Since the subsidy program varies in terms of eligible product lines,[24] the year-wise effect of the subsidy can be estimated using the following specification:

[23] Most papers in this literature control for selection either by using through matching techniques, fixed effects, or two-step selection estimation methods.

[24] Eligible product lines are mapped to firms using the National Industrial Classification 2008 (NIC-2008) at the four-digit level.

$$\log(\text{exports})_{ijt} = \beta_0 + \sum_{t=2007}^{2013} \beta_t \times \mathbb{1}(\text{Subsidized}_{ijt}) + \mathbf{X}'_{ijt}\delta + \gamma_{jt} + \eta_i + \lambda_t + \epsilon_{ijt} \tag{2.1}$$

The subsidized group indicator $\mathbb{1}(\text{Subsidized}_{ijt})$ corresponds to the group of firms that are subsidized in year t. The year 2006 is assumed as the reference year and is omitted from the regression to avoid the dummy variable trap.[25] The subsidy indicator variable is interacted with its corresponding year since the eligible set of product-lines (and hence firms) vary every year. Firms in certain industries manufacturing handlooms, carpets and handicrafts enjoyed continued eligibility, and others lose access to subsidized export credit after one year, but may re-enter. The firm-level observables $\mathbf{X}_{ijt}$ include one-period lagged measures of firm size, return on assets ratio or EBITDA ratio and firm productivity.

In additional variations, I also include the short-term liquidity ratio and leverage ratio.[26] I account for industry-year specific effects γ_{jt}, determined by both demand-side factors in export markets as well as domestic industry-level factors impacting firm costs. These also account for other industry-level export incentives announced by the Indian government in the wake of the global recession in 2008-2009.[27] To account for time-invariant firm-level unobservables, I include firm fixed effects η_i. To control for macroeconomic or aggregate shocks in the economy,[28] I include year fixed-effects λ_t. The term ϵ_{ijt} is an i.i.d. error term. Thus, the specification assumes $E(\epsilon_{ijt} | \mathbf{X}_{ijt}, \mathbb{1}(\text{Subsidized}_{ijt}), \gamma_{jt}, \eta_i, \lambda_t) = 0$.

Firm-level controls include one-period lagged values of log of firm's total assets,

[25] The year 2006 is the financial year 2006-2007 which spans April 1, 2006 until March 31, 2007.
[26] Detailed description of firm-level variables is provided in the Appendix 2.A.
[27] In later specifications, I control for year-wise variation in export demand for directly by constructing a firm-specific export demand shock which varies at the HS two-digit code and year level, which corresponds to the four-digit NIC level industry codes.
[28] The Reserve Bank of India undertook an expansionary monetary policy during the year of the crisis, providing more liquidity to the credit markets by lowering the repo rate from 9% to 4.75%, and the reverse repo rate from 6% to 3.25%. The CRR was lowered from 7.5% to 5%, and the SLR was relaxed as well.

the return on assets ratio or the EBITDA scaled by total assets, and firm-level productivity calculated using the method outlined in Asker et al. (2014). This method is an extension of Olley and Pakes (1996) with imperfect competition in output markets. Van Beveren (2012) explains how this estimation method overcomes issues related to simultaneity, selection (unbalanced panel, survival probability) and omitted output price bias. The main measure of short-term liquidity is the current ratio, and an alternate measure, the quick ratio is used as a robustness check later in the paper. The leverage ratio corresponds to the debt to equity ratio reported at year end. All firm-level controls are lagged one period to avoid simultaneity bias to the extent possible.

Following Bertrand et al. (2004) in their treatment of clustering at the level of treatment for difference-in-differences type estimation, and cluster standard errors at the level of the treatment status, i.e. at the firm-level. The coefficients of interest β_t capture the relative effect in terms of growth of exports, due to the change in subsidy status of firms in year t relative to a control group of firms that are not subsidized. The specification given by Equation 2.1 allows for year-wise estimates for the impact of subsidies: β_{2007}, β_{2008}, β_{2009}, β_{2010}, β_{2011}, β_{2012} and β_{2013}.

In columns (1) and (2) of Table 2.2, I report the year-wise coefficients corresponding to the subsidized firms. After including firm-level controls, I find that the differential effect on export growth of subsidized firms is about 4-5%. The only exception is the year 2009 where the coefficient is 0.029 and is statistically insignificant at the 5% significance level. There is not enough evidence to support that these coefficients are not equal, as implied by the F-test. As a result, I alter the specifications in the rest of this paper to include a *common* subsidized status indicator term across years, while also reporting important year-wise coefficients in Appendix 2.C. I also estimate Equation 2.1 with the log of non-exported goods, i.e., domestic market sale of goods, as the dependent variable. I do not find any evidence of a differential impact on the

subsidized firms' domestic sales due to the export credit policy eligibility.

Table 2.2: Impact of the Export Subsidy on Firm Exports from 2007-2013

$\textbf{log(exports)}_{ijt}$	(1)	(2)
Subsidized_{ijt} × Year 2007	0.065***	0.053**
	(0.023)	(0.025)
Subsidized_{ijt} × Year 2008	0.030*	0.038**
	(0.017)	(0.018)
Subsidized_{ijt} × Year 2009	0.028*	0.029*
	(0.016)	(0.017)
Subsidized_{ijt} × Year 2010	0.042***	0.041**
	(0.015)	(0.019)
Subsidized_{ijt} × Year 2011	0.051***	0.047**
	(0.015)	(0.021)
Subsidized_{ijt} × Year 2012	0.055***	0.051**
	(0.017)	(0.022)
Subsidized_{ijt} × Year 2013	0.063***	0.052**
	(0.016)	(0.020)
$\text{log(assets)}_{ijt-1}$		0.661***
		(0.044)
$\text{EBITDA Ratio}_{ijt-1}$		0.800***
		(0.071)
log(TFPR)_{ijt-1}		1.84***
		(0.031)
F-stat (Difference between coefficients)	0.22	0.42
Prob > F	0.971	0.866
Number of Observations	7,339	6,134
Industry-Year Controls	Yes	Yes
Firm Controls	No	Yes
Firm and Year Fixed Effects	Yes	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the baseline estimates of the impact of the export subsidy program from 2007 to 2013 on the exports of firms, corresponding to Equation 2.1. The dependent variable is the deflated log of exports. The base year is the financial year 2006-2007, the year before the program was introduced. Firm-level controls for size, profitability and productivity are one-period lagged log of total assets, EBITDA scaled by total assets, and log of TFPR, respectively. Productivity is calculated following Asker et al. (2014). Firm and year fixed effects, as well as industry-year fixed effects are included. All firm-level variables are deflated using industry-specific deflators.

4.2 DEMAND SHOCKS

"We are highly dependent on external demand from the US and Europe. Until demand picks up in these regions, exports won't rev up." - Prabir Sengupta, former Commerce Secretary[29]

To control for the change in global demand conditions for exporting firms, I construct a firm-specific demand index which accounts for product-specific exposure to demand from various foreign destinations or importer countries, using the real GDP growth across these countries as a proxy for change in demand.[30] Firm-level data by export destination countries are unavailable.[31] So, I map firms by their NIC industry codes to two-digit HS commodity (or product) codes. I use product-level data on exports by destination country detailed at the two-digit HS code provided by *Comtrade* for India. I use these data to approximate the firms' exposure to foreign importer countries, i.e., the share of exports from India in a sector going to a certain country. I map these demand exposure levels to the importer countries' real GDP growth rate using World Bank's *DataBank*. Summing the product of demand exposure weight and real GDP growth rate produces a year-wise demand index for firms.

$$\text{Demand Index}_{jt} = \sum_d \frac{\text{Exports from India}_{djt}}{\text{Exports from India}_{jt}} \times \%\Delta\text{GDP}_{dt} \tag{2.2}$$

The main concern with this time-varying demand shock index is the potential endogeneity. A contemporaneous drop in exports volume of a firm in a certain product category due to rising transportation or other costs in that industry could cause the

[29] As quoted in an article titled *Nowhere To Go* (February 22, 2009) in the Business Today.

[30] I employ the data on exports at the two-digit HS code due to data availability reasons, and also to keep the demand-side controls at a broader industry level than the product level, which may be sensitive to changes in importer country demand trends. These data can can be downloaded from the the World Bank and the UN Comtrade websites, in the DataBank and International Trade Statistics Database, respectively.

[31] As a result, the impact of the policy can not be disentangled in terms of intensive or extensive margin of exports by export destinations.

drop in export flows, rather than an actual drop in demand for that product in the importer country. To address this concern, I restrict the importer-country demand weights or shares to the year 2005, i.e. the year before the sample period begins.

$$\text{Demand Index}_{jt} = \sum_d \frac{\text{Exports from India}_{dj2005}}{\text{Exports from India}_{j2005}} \times \%\Delta\text{GDP}_{dt} \tag{2.3}$$

Table 2.3 reports the annual averages of the demand indices constructed using the method outlined above. As expected, the magnitude in the years 2008 and 2009 reflect the impact of the recession. This also in sync with the overall decline in the growth of the world economy as depicted earlier in Figure 2.1.

Table 2.3: Demand Indices of Exporters in the Manufacturing Sector in India

Year	Mean (Across Firms)	Median (Across Firms)
2006	4.29%	4.24%
2007	4.45%	4.14%
2008	2.12%	2.60%
2009	-0.67%	-0.91%
2010	4.61%	4.74%
2011	3.96%	4.04%
2012	3.06%	3.16%
2013	3.03%	3.06%

Note: The reported demand indices are constructed as detailed in the methodology in Equation 2.3.
Source: Authors calculations using *Prowess*, *Comtrade* and World Bank's *DataBank*.

Further, to verify if the year 2009 is indeed the outlier with negative demand-side shocks, I plot the year-wise distributions of the demand index. As can be seen from the distributions, the majority of the negative shocks are in 2009 and some in 2008. In all the regressions here on, I include the demand index as a control and drop the industry-year effects.[32] As before, the year fixed-effect λ_t control for shock(s) to aggregate demand and credit conditions in India as well as the importing countries over time, including bilateral exchange rate fluctuations.

[32] The industry-year fixed effects will otherwise partially absorb the demand-side effects.

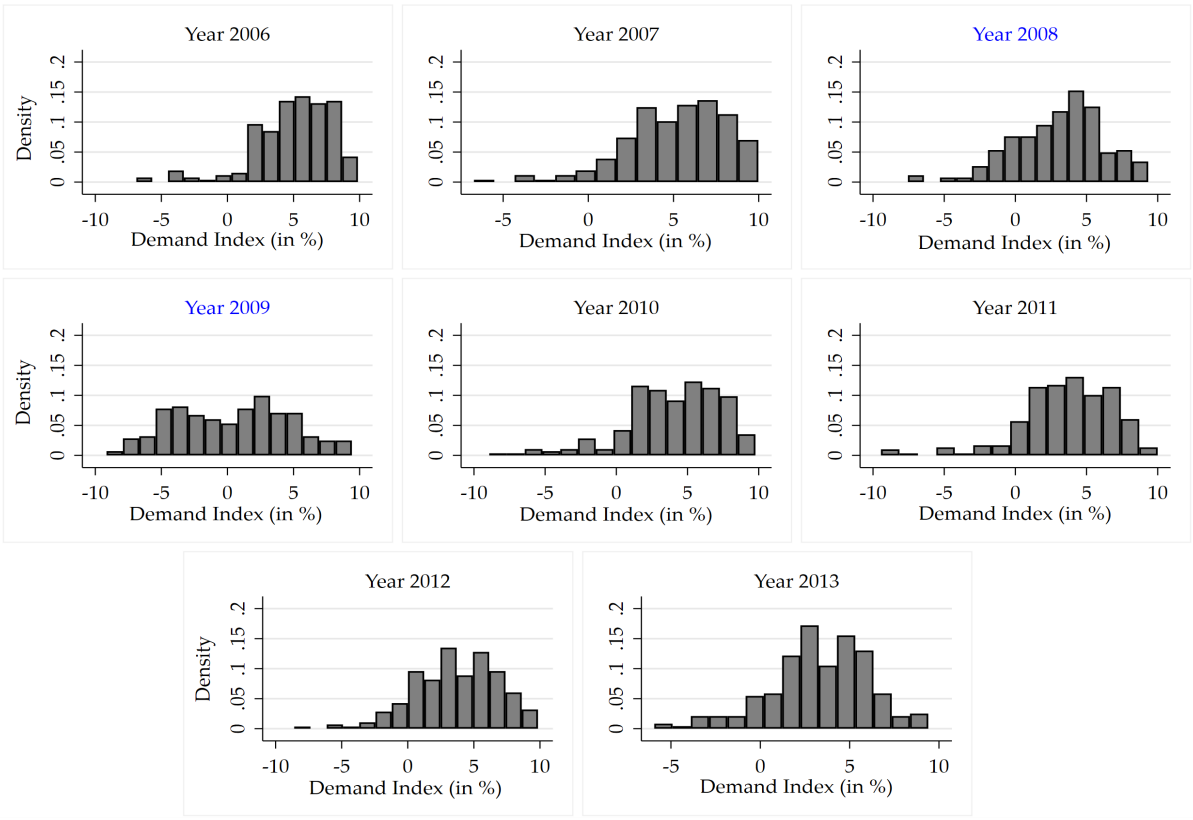


Figure 2.2: Distribution of Average Demand Indices for Exporting Firms from 2006-2013.
Source: Author's calculations using *Prowess*, *Comtrade* and World Bank's *DataBank*.

$$\log(\text{exports})_{ijt} = \beta_0 + \beta_1 \times \mathbb{1}(\text{Subsidized}_{ijt}) \times \text{Demand Index}_{jt} + \beta_2 \times \mathbb{1}(\text{Subsidized}_{ijt}) + \beta_3 \times \text{Demand Index}_{jt} + \mathbf{X}'_{ijt}\delta + \eta_i + \lambda_t + \epsilon_{ijt} \tag{2.4}$$

I re-estimate the impact of the subsidies controlling for the demand indices. The results are reported in Table 2.4. The growth of exports of the subsidized firms is approximately 5.1% higher than the control firms, and the effect is increasing in the demand index.[33] In other words, the subsidy seems to be more effective in years

[33] It should be noted that the coefficient of 0.051 translates to $e^{0.051} - 1 = 0.0523$, i.e., about 5.23%. I will refrain from making these calculations each time as long as the coefficients are

with stronger demand from importer countries, as reflected in the coefficient on the interaction of the subsidized firms and the demand index. Demand-side factors play a role in determining the effectiveness of the subsidies.

Table 2.4: Impact of the Export Subsidies: Controlling for Demand Shocks

$\textbf{log(exports)}_{ijt}$	Coefficient
Subsidized_{ijt}	0.051**
	(0.021)
$\text{Subsidized}_{ijt} \times \text{Demand Index}_{jt}$	0.012***
	(0.003)
Demand Index_{jt}	0.036**
	(0.017)
$\log(\text{assets})_{ijt-1}$	0.56***
	(0.041)
$\text{EBITDA Ratio}_{ijt-1}$	1.05***
	(0.228)
$\log(\text{TFPR})_{ijt-1}$	1.54***
	(0.037)
Number of Observations	6,134
Firm Controls	Yes
Firm and Year Fixed Effects	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the baseline estimates of the impact of the export subsidy program from 2007 to 2013 on the exports of firms, corresponding to Equation 2.4. The dependent variable is the deflated log of exports. The base year is the financial year 2006-2007, before the program was introduced. Firm-level controls for size, profitability and productivity are one-period lagged log of total assets, EBITDA scaled by total assets, and log of TFPR, respectively. Productivity is calculated following Asker et al. (2014). Firm and year fixed effects, as well as industry-year fixed effects are included. All firm-level variables are deflated using industry-specific deflators.

small. At coefficient value of 0.1 or 10%, this difference is $e^{0.1} - 1 = 0.1051$, i.e., 10.51%.

I also estimate the average marginal effect of the subsidy, which is depicted in Figure 2.3. It is interesting to note that as the demand index approaches 0 and then to negative weighted growth, the average marginal effect is no longer statistically significant. This implies that there is evidence of a positive impact of the subsidies only until a certain threshold of demand-side conditions. The coefficients on firm-level variables corresponding to size, profitability and productivity, are all positive and statistically significant at the 1% level of significance.

I also report the year-wise coefficients using the same specification as Equation 2.2 with year-wise interactions for the subsidized indicator variable in Table 2.11 in Appendix 2.C. The year-wise coefficients are statistically significant in all years barring the year 2009, i.e., the only year with a negative demand index in the data.

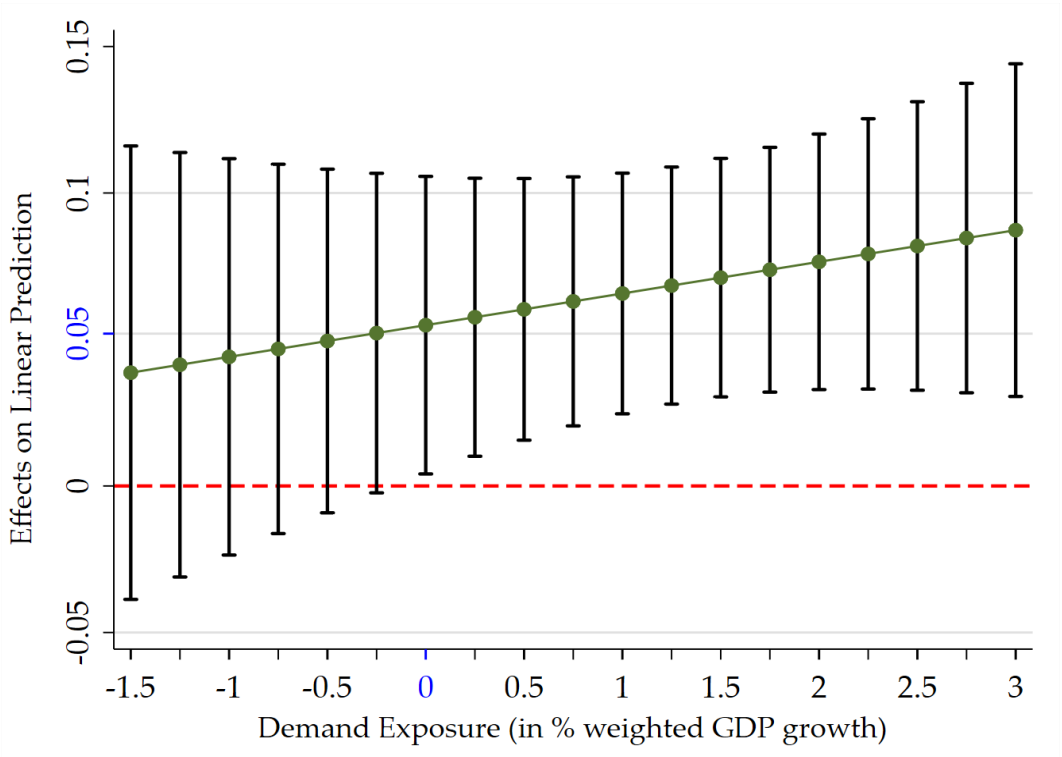


Figure 2.3: Average Marginal Effects of Export Subsidy (95% Confidence Intervals).
Source: From author's calculations using the regression estimates reported in Table 2.4.

4.3 FIRM CHARACTERISTICS

The studies that are the most relevant for drawing implications for export outcomes employing firm-level analyses are Manova (2012) and Chaney (2016). These studies embed credit constraints into the heterogenous firm-level model of Melitz (2003) and find that firm productivity is very closely positively associated with exporting decisions as the more productive (or profitable) firms tend be less credit constrained. For firms that cross the initial barrier of becoming an exporter, the role of their firm-level financial characteristics has a more ambiguous implication at the intensive margin of export volumes, a priori, i.e., if exporting *volumes* are increasing in the proxies for credit constraints, namely, productivity, size and profitability. Muûls (2008) incorporates both external and internal constraints in a Melitz type set-up and finds results similar to that of Manova (2012), where both the extensive and the intensive margins of trade are affected by credit constraints.

To the extent that the financial risks associated with exporting activity are persistent and intense, and that credit constraints do not disappear even for exporting firms, any policy change that relaxes the credit constraints of exporters will improve the performance of the relatively credit constrained firms more than their relatively less constrained counterparts. The two other important variables measuring firms' financial conditions (and hence the credit constraints) commonly used as proxies are short-term liquidity and external finance dependence, as measured by the liquidity ratio and firm leverage (Egger and Kesina (2014)). In this section, I investigate how export growth of firms in my sample is related to these financial variables, and if there is an incremental effect on subsidized firms. Following the empirical literature, I also include interactions with an indicator of access to foreign borrowings and firm-age as one of the variations of the regression.[34] The access to foreign sources of funds

[34] I include triple interactions whenever feasible but none of the coefficients on the triple interaction terms are statistically significant. Hence, I omit presenting those coefficients in the results.

capture the (partial) dependence on foreign external finance. In normal times, such funding should cushion a liquidity crunch in the domestic capital markets but after the global financial crisis there was a significant and persistent drop in foreign sources of finance for economies around the world (Chor and Manova (2012)). While the exposure of Indian banks to foreign capital markets was limited, firms dependent on foreign sources of funds could have been negatively affected.[35]

The main findings are reported in Table 2.5. From column (1) through (3), we can see that the subsidy has a positive and statistically significant impact on firm exports and this effect is increasing in the demand index. The effect of the subsidy varies from 4.1% to 5.2% across the three models, where I account for different measures of financial constraints. The interaction terms with firm size and firm productivity reveal that firms that are larger and more productive benefit less from the subsidy compared to their counterparts. These results agree with implications from the credit constraints theory, that the relatively smaller and less productive firms benefit more from a credit subsidy policy that relaxes credit constraints. These two measures (firm size and productivity) are also positively correlated for firms in my sample, as reported in Figure 2.6 in Appendix 2.C.[36] These results also hold when I include interactions year by year.[37] The positive and highly statistically significant coefficient on the firm profitability interaction term indicates that the ability of firms to generate profits remains a clear indicator of performance.

[35] I use foreign currency borrowings as a proxy for foreign sources of finance. This includes the sum of all secured foreign currency borrowings as reported in *Prowess* such as loans taken from foreign banks, loans takes from Indian branches of foreign banks, loans taken from foreign financial institutions, and loans taken from International Development Institutions.

[36] The firms in my sample exclude small and micro firms and the productivity calculations are also based on the subset of firms which do not qualify as micro or small per the official definition of firm size in India.

[37] Results from the regression including year by year interactions are presented in Table 2.12 of Appendix 2.C.

Next, I introduce alternate financial constraints indicators, the leverage and liquidity ratio. According to the estimated coefficients, higher debt dependence is negatively related to export growth and subsidized firms with relatively higher debt dependence benefit relatively more. However, the magnitude of these coefficients is too small to consider them to be economically meaningful. Short-term liquidity is positively related to the growth of firm exports, but there is not enough evidence to support that subsidized firms with higher short-term liquidity are affected differently.

Finally, I do not find any effect of access to foreign sources of finance or firm age. The results pertaining to access to foreign sources of funds complement those of Chakraborty (2018) (albeit for a subset of the firms) who finds no evidence of foreign sources of finance affecting exports of manufacturing firms during the recession years.

4.4 BANK RELATIONSHIPS

Strong bank relationships is important indicator of the strength of credit ties (Petersen and Rajan (1994)), which ultimately influence credit availability for firms. Even in the presence of financial constraints, stronger bank relationships are associated with higher credit access. The commonly used measures of the strength of bank relationships are duration of the relationship with the main bank and the number of banks associated with a firm. The theoretical basis of a positive impact of a higher bank count is debated in the literature. Firms may build multiple bank relationships to protect themselves against hold-up rents inherent among exclusive bank relationships. So, higher number of bankers are an indicator of the ability of banks to overcome the bargaining power of its bank. Moreover, having multiple bankers may in itself be a signal of a healthy firm.[38] At the same time, association with multiple banks could also be correlated with weak firm-bank relationships with the main bank.

[38] I control for size, profitability and productivity in the regression, so any effect of the bank relationship variable is after controlling for firm-specific variables.

Table 2.5: Impact of the Export Subsidies: Controlling for Financial Constraints

log(exports)$_{ijt}$	(1)	(2)	(3)
Subsidized$_{ijt}$	0.045**	0.041**	0.052**
	(0.021)	(0.016)	(0.025)
Subsidized$_{ijt}$ × Demand Index$_{jt}$	0.016**	0.024**	0.013**
	(0.007)	(0.011)	(0.011)
Firm-level Determinants			
Subsidized$_{ijt}$ × 𝟙(>Median Firm Size)	-0.044**		
	(0.017)		
Subsidized$_{ijt}$ × 𝟙(>Median Return on Assets)	0.068***		
	(0.004)		
Subsidized$_{ijt}$ × 𝟙(>Median Productivity)	-0.025**		
	(0.011)		
Financial Constraint Indicators			
Leverage Ratio$_{ijt-1}$		-0.0014**	
		(0.0005)	
Liquidity Ratio$_{ijt-1}$		0.025**	
		(0.011)	
Subsidized$_{ijt}$ × 𝟙(>Median Leverage)		0.0012**	
		(0.0006)	
Subsidized$_{ijt}$ × 𝟙(>Median Liquidity)		0.005*	
		(0.003)	
Subsidized$_{ijt}$ × 𝟙(Access to Foreign Capital)			-0.008
			(0.024)
Subsidized$_{ijt}$ × 𝟙(>Median Firm Age)			0.037*
			(0.021)
Number Of Observations	6,134	5,896	5,896
Firm Controls	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. The leverage ratio is the debt-to-equity ratio and the liquidity ratio is the current ratio. Access to foreign funds includes foreign borrowings including loans from foreign banks, from foreign branches of Indian banks, from foreign institutions and from international development organizations. All other variables are the same as in Table 2.4.

I exploit the variation in the firm-bank matched data both in terms of the characteristics of the firm-bank relationship as well as the ownership type of the banks.

Since the export credit subsidy under study works through a direct interest rate subsidy on short-term loans, exporting firms with stronger relationships are expected to have better access to subsidized loans. Moreover, in the Indian context, where the public sector banks are often used as a catalyst to push the government's policies, exporters with ties with state-owned banks may benefit relatively more. In the sample of firms in this paper, the median relationship duration, the median banker count and the median public sector banker count are 7, 3 and 0.75, respectively.[39] To test these hypotheses, I introduce an interaction term of the subsidy indicator and the bank relationship indicators into the model.

Table 2.6: Impact of the Export Subsidies: Controlling for Bank Relationships

log(exports)$_{ijt}$	(1)	(2)	(3)
Subsidized$_{ijt}$	0.049**	0.050**	0.052**
	(0.024)	(0.023)	(0.025)
Subsidized$_{ijt}$ × Demand Index$_{jt}$	0.011**	0.011*	0.013*
	(0.005)	(0.004)	(0.007)
Subsidized$_{ijt}$ × Long Relationship Duration$_i$	0.056**		
(Above the median duration)	(0.025)		
Subsidized$_{ijt}$ × High Banker(s) Count$_i$		0.067*	
(Above the median # bankers)		(0.034)	
Subsidized$_{ijt}$ × Public Sector Bankers (PSB)$_i$			0.003
(Above the median # PSBs)			(0.024)
Number Of Observations	5,293	5,293	5,293
Firm Controls	Yes	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the estimates of the impact of the export subsidy program by bank relationships, averaged over the sample period. For firms that report more than one bank per firm-year, the duration is based on the median duration among the matched firm-bank pairs, that occurred in adjacent years. For the number of bankers measure, I count the median number of bankers of firms across the sample period. For the bank ownership measure, I compute the median of the proportion of state-owned banks. All firm-level variables are the same as in Table 2.4.

[39] These averages are calculated taking means across the entire sample period from 2006-2013.

In column (1) of Table 2.6, in addition to the controls used in the baseline regression, I include the interaction of the long relationship duration dummy and the subsidy indicator. Similarly, in columns (2) and (3), I include interaction terms to account for the count of banks and for public sector banks. I find strong evidence that subsidized firms with relatively longer bank relationships benefit more. In terms of the magnitude, there is an almost equal impact (5.6%) longer bank relationships as that of being subsidized. The coefficients on the other relationship indicators are positive but not statistically significant.[40]

4.5 FISCAL BENEFITS

In addition to the export credit subsidies, Indian exporters enjoy access to other export incentives, subsidies and duty drawbacks[41] provided by the state and central government. These are in the form of production subsidies, tax exemptions, duty drawbacks and government-funded grants. There are a few empirical studies that have investigated the effectiveness of fiscal benefits in exporting behavior and export performance (Bernard and Jensen (2004), Görg et al. (2008)). Whether existing fiscal benefits complement the export credit subsidy is an interesting question. For my sample of firms, I observe fiscal benefits enjoyed by exporters to the extent that they are captured as *cash-benefits*. This variable captures duty drawbacks, excise rebates, production subsidies, duty concessions and tax exemptions.[42] Many studies have also examined the performance of state-owned exporting enterprises with reference to government grants and subsidies (Girma et al. (2009)). To account for firm ownership, I

[40] I can not include the bank relationship indicator variables in columns (1) through (3) by themselves since they are time-invariant and will be completely absorbed by the firm fixed effects. I repeat this regression with each of the interactions constructed year by year. The results are close to the results in Table 2.6, which estimates a common subsidy effect.

[41] A duty drawback can take the form of refunds, reductions and waivers, in full or in part, of customs duties collected upon importing materials or goods which are subsequently exported.

[42] I use the one-period lagged variable to reduce the risk of simultaneity bias.

include an interaction of ownership type of firm.[43] Zia (2008) puts forth a *connectedness* theory with reference to large export firms' relationship with their banks. These connections could be a cause of entrenched support from banks and the government. In Section 4.4, I do not find evidence that firms with ties with primarily public sector banks have any differential benefit. However, the effect could exist for firms that are owned by the state. So, I include indicators of state-ownership and fiscal benefits as explanatory variables in the regression model. The results are reported in Table 2.7. In Figure 2.4, I plot the year by year effect of access to other fiscal benefits for the subsidized firms and find that the effect is statistically significant at the 5% level of significance for all but the years 2008 and 2009.

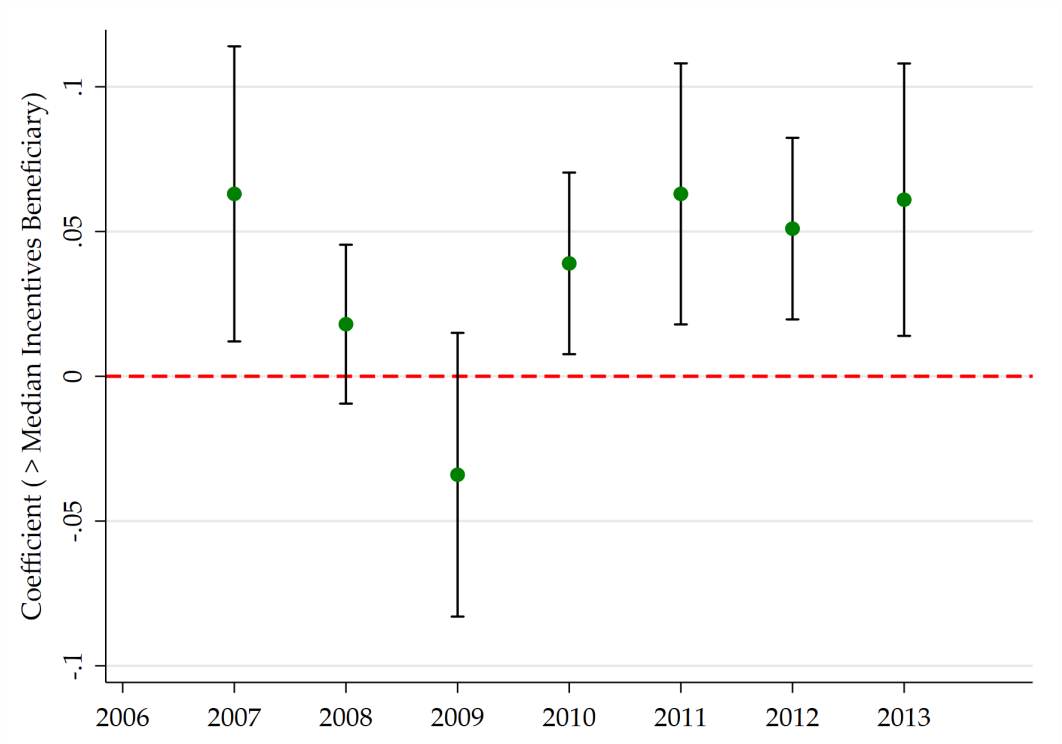


Figure 2.4: Coefficients of >Median Incentives Beneficiary (95% Confidence Intervals). *Source:* From author's calculations using the regression estimates reported in Table 2.13.

[43] Private domestic firm ownership is the reference category with which state-owned and foreign-owned firms' performance is compared.

From the results in Table 2.7, I find that firms' export growth is increasing in the fiscal benefits (primarily in the form of export incentives) enjoyed by firms. Subsidized firms with an above average level of export incentives benefit more by about 6% in export growth terms. This means that existing exporter beneficiaries benefit relatively more than those that enjoy below average benefits. The above the average cut-off in the data is almost the same as breaking down exporting firms based on whether or not they enjoy fiscal benefits. Thus, the two export support policies seem complementary in terms of their impact on export growth. In column (2), after controlling for firm-level determinants size, productivity and profitability, I find that the state-owned subsidized firms exhibit higher export growth compared to privately held domestic firms. The coefficient on the interaction with foreign-owned status is not statistically significant.

4.6 EXPORT PARTICIPATION DECISION

In this section, I examine whether the presence of short-term export subsidies matters for the decision to export for manufacturing firms in India. I verify the same using a latent variable model accounting for firm-level effects and year effects.

$$Y^*_{ijt} = \mathbf{Z}'_{\boldsymbol{ijt}}\boldsymbol{\beta} + \eta_i + \epsilon_{ijt} \tag{2.5}$$

$$Y_{ijt} = \mathbb{1}[Y^*_{ijt} > 0] \tag{2.6}$$

$$\text{Prob}\left(Y_{ijt} = 1 \mid \boldsymbol{Z_{ijt}}, \eta_i\right) = \text{Prob}\left(Y^*_{ijt} > 0 \mid \boldsymbol{Z_{ijt}}, \eta_i\right) = G(\boldsymbol{Z_{ijt}}\boldsymbol{\beta} + \eta_i) \tag{2.7}$$

where Y^*_{ijt} is the latent variable and Y_{ijt} is an indicator variable for the exporting status. The model can account for unobserved heterogeniety η_i, which constitutes the time-invariant firm-specific effects. $\boldsymbol{Z_{ijt}}$ comprises firm-level controls, the subsidy eligibility indicator $\mathbb{1}(\text{Subsidized}_{ijt})$ and year effects. $G(.)$ is the logistic cumulative

Table 2.7: Impact of the Export Subsidies: Controlling for Other Fiscal Benefits

$\textbf{log(exports)}_{ijt}$	(1)	(2)
Subsidized_{ijt}	0.055**	0.053**
	(0.022)	(0.023)
$\text{Subsidized}_{ijt} \times \text{Demand Index}_{jt}$	0.014***	0.013**
	(0.003)	(0.005)
$\log(\text{assets})_{ijt-1}$	0.646***	0.641***
	(0.171)	(0.210)
$\text{EBITDA Ratio}_{ijt-1}$	0.912***	0.921***
	(0.242)	(0.244)
$\log(\text{TFPR})_{ijt-1}$	1.376***	1.56***
	(0.246)	(0.088)
Fiscal Benefits		
$\text{Fiscal Benefits}_{ijt-1}$	0.043***	
	(0.011)	
$\text{Subsidized}_{ijt} \times \mathbb{1}(>\text{Median Incentives Beneficiary})$	0.061**	
	(0.028)	
Firm Ownership		
$\text{Subsidized}_{ijt} \times \text{State-owned}_{i}$		0.057**
		(0.026)
$\text{Subsidized}_{ijt} \times \text{Foreign-owned}_{i}$		-0.021
		(0.074)
Number Of Observations	6,134	6,134
Firm Controls	Yes	Yes
Firm and Year Fixed Effects	Yes	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. The explanatory variable included is the log of fiscal benefits as described in Section 4.5. All other variables are the same as in Table 2.4.

distribution function. To examine the impact of the subsidies on the extensive margin, I first estimate a *random effects logit* model which assumes that the fixed effects are uncorrelated with the observed variables. Next, I relax the assumption on the correlation between the fixed effects and the observed variables and estimate a *conditional logit* model which is equivalent to a *fixed effects type logit*. To test whether the fixed effects estimator or the random effects estimator is more suitable, I run the Hausman

test. I also estimate the model using alternative financial variables to proxy for financial constraints. Since the subsidy announcements of the program being studied are made at the beginning of a financial year and are applicable only to that current year, I do not expect the scheme's impact to be persistent and hence do not expect to find a statistically significant effect on the exporting decision of firms.[44]

The result of the logit model and its variants are presented in Table 2.8. In column (1), I estimate a random effects model controlling for firm-level variables, namely firm size, firm productivity and firm profitability. Based on the theoretical and empirical literature, these firm-level covariates are the key determinants of exporting behavior.[45] The coefficients on size, productivity and profitability are statistically significant at the 1% level. These results support the widely accepted hypothesis that firms more prone to credit constraints are less likely to export. Hence, the export decision is positively associated with determinants of lower credit constraints. The coefficient on the subsidy indicator is positive but statistically insignificant. As expected, this subsidy scheme does not have an effect at the extensive margin of exports, i.e. on the exporting decision of firms. The results are similar for the fixed effects. The LR test reveals that the panel estimator is statistically different from the pooled logit estimator, implying that it is inappropriate to ignore panel variance. The low p-value associated with the Hausman test implies that the fixed effects estimator is more suitable vis-a-vis the random effects estimator.[46] In columns (3) and (4), I estimate the conditional logit model with an alternate set of firm-level variables that are proxies for financial constraints, and fiscal incentives measured at the firm level. While these factors are important for existing exporters, they are not significant in the model for

[44] Since there is evidence of lobbying efforts made by specific industry boards during the years 2008 and 2009, it can not be claimed that the announcements are entirely unanticipated. This makes is likely that in certain years firms were aware of the subsidy approvals a quarter in advance. Subsidy eligibility announcements were not made for more than one financial year.

[45] Firm age is a key determinant, but being time-invariant, is dropped from the regressions.

[46] We reject the null hypothesis that the unobserved individual level effects are uncorrelated with the other covariates included in the regression.

the export participation decision. The coefficient on the fiscal incentives measure is positive and statistically significant but is close to zero in magnitude.

Table 2.8: Impact of the Export Subsidies: Export Participation Decision

Exporting Status	(1)	(2)	(3)	(4)
Subsidized_{ijt}	0.261	0.667	0.552	0.466
	(0.214)	(0.517)	(0.625)	(0.319)
$\log(\text{assets})_{ijt-1}$	0.814***	0.827***	1.826***	0.921***
	(0.110)	(0.211)	(0.046)	(0.125)
$\log(\text{TFPR})_{ijt-1}$	1.063***	0.460***		0.448***
	(0.126)	(0.148)		(0.151)
$\text{EBITDA Ratio}_{ijt-1}$	0.363**	0.111		0.177
	(0.166)	(0.154)		(0.219)
$\text{Leverage Ratio}_{ijt-1}$			0.003	
			(0.005)	
$\text{Liquidity Ratio}_{ijt-1}$			0.009	
			(0.012)	
$\text{Fiscal Incentives}_{ijt-1}$				0.0006**
				(0.0003)
Firm-level Effects	Random Effects	Fixed Effects	Fixed Effects	Fixed Effects
LR Test $(\bar{\chi}^2)$	9372.150			
$\text{Prob} \geq \bar{\chi}^2$	0.000			
Hausman Test (χ^2)		8.120		
$\text{Prob} \geq \chi^2$		0.002		
Number Of Observations	5,119	5,091	5,091	5,091
Firm Controls	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors reported are reported in parenthesis. This table reports the coefficients from estimating logit models, where the dependent variable is an indicator variable of whether or not the firm exports in a a given year. Columns (1) and (2) report results from random effects and fixed effects logit estimation, respectively. Column (3) replaces the firm profitability ratio and productivity with the leverage and short-term liquidity ratio. Column (4) adds the fiscal incentives measure to the specification in column (2). All firm-level variables are the same as in Table 2.4. The results of the logit models re-estimated with jackknifed errors are similar and have not been reported here (available on request).

5 ROBUSTNESS

I perform various checks to test the sensitivity of the estimates obtained in Section 4 on a year by year basis. These are checks to ensure that the estimate I obtain for the impact of the subsidy is not statistically different across the time-period. In addition, I check for few other reasons for concern.[47]

Demand-side Controls. I introduce the demand index to account for demand-side shocks in the estimations. I also replace this measure with industry-year trends as a robustness check. The magnitude of those coefficients is slightly higher as compared to the estimates in Table 2.4.

Attrition Bias. This is not a concern in the export markets as firms exiting the sample without reappearing are few. Since *Prowess* does not track the entry and exit of firms, I study the financial variables (profits, assets and sales) to check if firms skipping a few years in the sample are systematically related. I do not find any pattern in the data that might suggest the presence of such a bias. Less than 4% of the firms in my sample exit permanently during the sample period.

Short-term Liquidity Measure. The current ratio is the most commonly used liquidity measure in the literature. However, in the event that short-term obligations need to be paid off immediately, the current ratio could overestimate a firm's short-term financial strength since it includes the less liquid inventory stock. This stock can not always be easily and quickly turned into cash at short notice. Hence, I replace the current ratio with the *quick ratio*, which excludes inventory stock, as an alternative measure to evaluate short term liquidity position of manufacturing firms. Re-estimating the model using the *quick ratio* leads to similar results.

Excluding the Energy Sector. A common check in similar trade-related studies is to drop the energy sector, comprising coke, refined petroleum and nuclear

[47] I report results from select checks in Appendix 2.C.

fuel. Since the sample period includes years of high volatility in global energy prices which might be the sole driver of the drop in related exports. This is an important check to the extent that this industry level shock is not captured by industry-year fixed effects. This corresponds to dropping NIC two-digit code 6: Crude petroleum and natural gas, and code 19: Manufacture of coke and refined petroleum products, for which there are only 8 and 58 observations, respectively. The results are reported in Table 2.14. The coefficient on the subsidized indicator is larger and still statistically significant. Thus, dropping the energy sector does not alter my baseline findings.

Final Caveats. While the results in this paper suggest that there is a positive impact of an export credit subsidy on medium and large manufacturing firms, the more consequential impact of the subsidies, perhaps, could be found (or not) for small and micro firms, especially with respect to employment growth. However, studying the effect on employment or the effect on small firms is beyond the scope of this paper due to data limitations. Future research should try to find appropriate methods and data to analyze the impact of credit subsidy programs on employment generation, while extending the analysis to small firms. In addition to extensive data, this will require disentangling credit supply-side factors due to eligibility to the directed lending program. It should be noted that this empirical study is not a comprehensive cost-benefit assessment of whether the total sum of tax-payer funds invested in credit subsidies produced an economically significant impact on export transaction volumes in the aggregate. The analysis uses data only for medium and large manufacturing firms. Absent any information on destination and prices of exports, important aspects of exporting activity such as expansion to more markets and changes in quality and variety, can not be possibly studied. More extensive data on exporting firms must be collected if the government aims to undertake a thorough assessment of the impact of export credit support.

6 CONCLUDING REMARKS

This paper evaluates the impact of an export-credit subsidy program at the intensive margin of exports as well as for the export participation decision of manufacturing sector firms in India. I exploit the year-wise variation in eligibility to the subsidy to estimate the effect of the policy on subsidized firms, while controlling for demand-side shocks as well as firm- and sector-level differences.

I find that the range of estimates of the impact of subsidies varies between 5-8% in difference-in-differences terms compared to non-subsidized exporters. There is no evidence suggesting that the subsidies are effective in the event of a substantial drop in world demand as that experienced during the year after the global financial recession, thus, suggesting the limited usefulness of credit support as a policy tool during a major downturn. Moreover, the impact of credit subsidies is higher for firms already enjoying fiscal benefits, implying a complementary effect of pre-existing benefits. Larger and more productive firms benefit to a lesser extent than their counterparts, although the positive impact of the subsidy is higher for the more profitable firms. Firms' financial health indicators such as liquidity and leverage do not have any differential effect on the subsidized firms. Finally, I find that the strength of bank relationships is an important indicator, when measured by the duration of the firm-bank relationship, and subsidized firms with longer relationships benefit relatively more. I do not find any impact on export participation of firms. This is not unexpected given the short-term and unanticipated nature of the subsidy scheme.

These results have policy implications not only in India, but in other developing economies that implement similar policies. A broader question in this context is whether export promotion policies are a useful tool for counter cyclical economic policy during and after major recessions, or if, instead, resources should be invested in reviving the domestic sector.

APPENDIX

APPENDIX

2.A VARIABLE DEFINITIONS

Balance sheet variables of firms are available from the *Prowess* database. Data on country-specific GDP and exports are sourced from from World Bank's *DataBank*. Product- and country-wise exports series are downloaded from *UN Comtrade*.

1. **Gross sales:** include income earned from sales of goods in the domestic and the overseas market, as well as indirect taxes such as excise duty, sales tax, VAT, rates and taxes, turnover tax, service tax, etc.
2. **Net sales:** are gross sales net of indirect taxes.
3. **Total assets:** sum of all current and non-current assets held.
4. **Total liabilities:** includes all sums owed to shareholders (share capital and reserves & surpluses), lenders (secured and unsecured loans, and all current liabilities and provisions), and deferred tax liability.
5. **Current liabilities:** are the liabilities or debts owed to suppliers, vendors, banks and others, which must be paid within one year.
6. **Total borrowings:** are the total sum of domestic and foreign borrowings.
7. **Foreign bank loans:** comprise loans taken from foreign banks, loans takes from Indian branches of foreign banks, loans taken from foreign financial institutions, and loans taken from International Development Institutions.
8. **Short-term bank loans:** are the outstanding value of secured and unsecured bank borrowings for a period of less than 12 months.

9. **Long-term bank loans:** are the outstanding value of secured and unsecured bank borrowings for beyond 12 months.
10. **Raw materials:** comprise raw materials, stores & spares as well as purchase of finished goods used in production.
11. **Wages and salaries:** are periodic payments made to the employees, including workers and managers, for the services rendered.
12. **EBITDA ratio:** the ratio of earnings before interest, taxes, depreciation and amortization, scaled by lagged deflated assets, also, called return on assets.
13. **Current ratio:** is a liquidity ratio of current assets divided by current liabilities, and determines a firm's ability to meet its short term obligations, i.e., to pay off its short-term liabilities.
14. **Quick ratio:** is a more stringent liquidity ratio of quick assets divided by current liabilities. Quick assets differ from current assets mainly in that they do not include inventory.
15. **Leverage ratio:** is the debt-to-equity ratio which measures the relative proportion of shareholders' equity and debt used to finance a company's assets, or in other words, the proportion of borrowed funds to own funds. It is calculated by dividing the firm's total debt by shareholder's equity (net worth) comprising equity capital and reserves.
16. **Fiscal Benefits:** are the direct and measurable cash benefits, subsidies, concessions, and exemptions given by the central, state or local governments. They include export incentives including duty draw back, sales tax and VAT benefits, other fiscal benefits and production subsidies.
17. **Export of goods:** is the value of the goods exported by a firm reported on Free on Board basis, i.e., when an exporter delivers goods *free on board*, he pays all charges involved in getting them actually aboard the ship.
18. **Total forex earnings:** are the firm's foreign exchange earnings and outgo

during a financial year and may come from one of the following: export of goods and services, earnings from dividend and interest, and deemed exports.

19. **GDP growth:** the annual growth rate of GDP at market prices based on constant local currency, where aggregates are based on constant 2010 USD.
20. **Export growth:** the annual growth rate of exports of goods and services based on constant local currency, where aggregates are based on constant 2010 USD.

2.B INSTITUTIONAL DETAILS

EXPORT CREDIT POLICY DETAILS

First Scheme 2007

1. Handlooms
2. Textiles
3. Readymade garments
4. Jute[48]
5. Carpets
6. Leather products
7. Handicrafts
8. Engineering goods
9. Processed agri.products[49]
10. Marine products
11. Sports goods
12. Toys
13. Solvent extracted de-oiled cake
14. Plastics and linoleum
15. Gems and jewelry

Second Scheme 2008, 2009

1. Handlooms
2. Textiles
3. Carpets
4. Leather products
5. Handicrafts
6. Marine products
7. Gems and jewelry

Third Scheme 2010

1. Handlooms
2. Textiles (8 tariff lines)
3. Jute (1 tariff line)
4. Carpets
5. Leather (1 tariff line)
6. Handicrafts
7. Engineering goods (54 lines)

Fourth Scheme 2011

1. Handlooms
2. Carpets
3. Handicrafts

Fifth Scheme - Part(i) 2012

1. Handlooms
2. Readymade garments
3. Carpets
4. Handicrafts
5. Engineering goods[50] (134 lines)
6. Processed Agricultural Products
7. Sports Goods
8. Toys

Fifth Scheme - Part(ii) 2013[51]

1. Handlooms
2. Textiles (6 tariff lines)
3. Readymade garments
4. Jute
5. Carpets
6. Leather products
7. Handicrafts
8. Engineering goods (134+101 tariff lines)
9. Processed agricultural products
10. Marine products
11. Sports goods
12. Toys
13. Solvent extracted de-oiled cake
14. Plastics and linoleum
15. Gems and jewelry

Subsidy Scheme Withdrawn 2014

[48] All Jute categories amount to the same categories of both raw and yarn including floor coverings.
[49] Category includes processed cashew, coffee and tea products.
[50] 134 tariff lines added for the period January 2013 to March 2014.
[51] The interest rate on the subsidy was raised from 2% to 3% in this last scheme.

Table 2.9: NIC 2008 Two-Digit Industry Classification

S.No.	Industry Title
1	Crop and animal production, hunting and related
2	Forestry and logging
3	Fishing and aquaculture
5	Mining of coal and lignite
6	Extraction of crude petroleum and natural gas
7	Mining of metal ores
8	Other mining and quarrying
9	Mining support service activities
10*	Manufacture of food products
11	Manufacture of beverages
12*	Manufacture of tobacco products
13*	Manufacture of textiles
14*	Manufacture of wearing apparel
15*	Manufacture of leather and related products
16*	Manufacture of wood and products of wood and cork
17*	Manufacture of paper and paper products
18	Manufacture of printing and reproduction of recorded media
19	Manufacture of coke and refined petroleum products
20	Manufacture of chemicals and chemical products
21	Manufacture of basic pharmaceutical products
22*	Manufacture of rubber and plastics products
23*	Manufacture of other non-metallic mineral products
24*	Manufacture of basic metals
25*	Manufacture of fabricated metal products
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
31	Manufacture of manufacture of furniture
32	Other manufacturing

Notes: Firms in the *Prowess* database are mapped to detailed NIC (National Industrial Classification) industries. This list can be found at the website of the Ministry of Statistics and Programme Implementation, Government of India. The industries that are starred (*) have been identified as labor-intensive industries by in a report of the Indian Council for Research on International Economic Relations prepared by Das et al. (2009). This list omits non-manufacturing industries.

Table 2.10: Harmonized Commodity Description and Coding System

HS Code	Commodity Description
1	Live animals
2	Meat and edible meat offal
3	Fish and crustaceans, molluscs and other aquatic invertebrates
4	Dairy produce, birds eggs, natural honey
5	Products of animal origin, not elsewhere specified
6	Live trees and other plants
7	Edible vegetables and certain roots and tubers
8	Edible fruit and nuts, peel of citrus fruit or melons
9	Coffee, tea, spices
10	Cereals
11	Products of the milling industry, malt, starches, inulin
12	Oil seeds and oleaginous fruits
13	Lac, gums, resins and other vegetable saps and extracts
14	Vegetable plaiting materials, vegetable products nes
15	Animal or vegetable fats and oils
16	Preparations of meat, of fish or of crustaceans
17	Sugars and sugar confectionery
18	Cocoa and cocoa preparations
19	Preparations of cereals, flour, starch or milk, bakers' wares
20	Preparations of vegetables, fruit or nuts
21	Miscellaneous edible preparations
22	Beverages, spirits and vinegar
23	Residues and waste from the food industries
24	Tobacco and manufactured tobacco substitutes
25	Salt, sulfur, earths and stone, plastering materials
26	Ores, slag and ash
27	Mineral fuels, mineral oils and products of their distillation
28	Inorganic chemicals
29	Organic chemicals
30	Pharmaceutical products
31	Fertilizers
32	Tanning or dyeing extracts
33	Essential oils and resinoids, perfumery, cosmetic or toilet preparations
34	Soap, organic surface-active agents
35	Albuminoidal substances, modified starches, glues, enzymes
36	Explosives, pyrotechnic products, matches
37	Photographic or cinematographic goods
38	Miscellaneous chemical products
39	Plastics and articles thereof
40	Rubber and articles thereof
41	Raw hides and skins (other than fur skins) and leather
42	Articles of leather, saddlery and harness

Continued on next page

Table 2.10 – *Continued from previous page*

HS Code	Commodity Description
43	Fur skins and artificial fur, manufactures thereof
44	Wood and articles of wood, wood charcoal
45	Cork and articles of cork
46	Manufactures of straw, of esparto or of other plaiting materials
47	Pulp of wood or of other fibrous cellulose material
48	Paper and paperboard, articles of paper pulp, of paper or of paperboard
49	Printed books, newspapers, pictures and other products of the printing industry
50	Silk
51	Wool, fine or coarse animal hair, horsehair yarn and woven fabric
52	Cotton
53	Other vegetable textile fibers, paper yarn and woven fabric of paper yarn
54	Man-made filaments
55	Man-made staple fibers
56	Wadding, felt and non-wovens, special yarns, twine, cordage, ropes
57	Carpets and other textile floor coverings
58	Special woven fabrics, tufted textile fabrics, lace, tapestries, trimmings
59	Impregnated, coated, covered or laminated textile fabrics
60	Knitted or crocheted fabrics
61	Articles of apparel and clothing accessories, knitted or crocheted
62	Articles of apparel and clothing accessories, not knitted or crocheted
63	Other made up textile articles, sets, worn clothing and worn textile articles
64	Footwear, gaiters and the like, parts of such articles
65	Headgear and parts thereof
66	Umbrellas, sun umbrellas, walking sticks, seat sticks, whips, riding-crops
67	Prepared feathers and down and articles made of feathers or of down
68	Articles of stone, plaster, cement, asbestos, mica or similar materials
69	Ceramic products
70	Glass and glassware
71	Natural or cultured pearls, precious or semi-precious stones
72	Iron and steel
73	Articles of iron or steel
74	Copper and articles thereof
75	Nickel and articles thereof
76	Aluminum and articles thereof
78	Lead and articles thereof
79	Zinc and articles thereof
80	Tin and articles thereof
81	Other base metals, cermets, articles thereof
82	Tools, implements, cutlery, spoons and forks, of base metal
83	Miscellaneous articles of base metal
84	Machinery and mechanical appliances, parts thereof
85	Electrical machinery and equipment and parts thereof, sound recorders
86	Railway or tramway locomotives, rolling-stock and parts thereof

Continued on next page

Table 2.10 – *Continued from previous page*

HS Code	Commodity Description
87	Vehicles other than railway or tramway rolling stock
88	Aircraft, spacecraft, and parts thereof
89	Ships, boats and floating structures
90	Optical, photographic, cinematographic, measuring, checking, precision
91	Clocks and watches and parts thereof
92	Musical instruments, parts and accessories of such articles
93	Arms and ammunition, parts and accessories thereof
94	Furniture, bedding, mattresses, cushions and similar stuffed furnishing
95	Toys, games and sports requisites, parts and accessories thereof
96	Miscellaneous manufactured articles
97	Works of art, collectors' pieces and antiques
99	Commodities not specified according to kind

2.C FIGURES AND TABLES

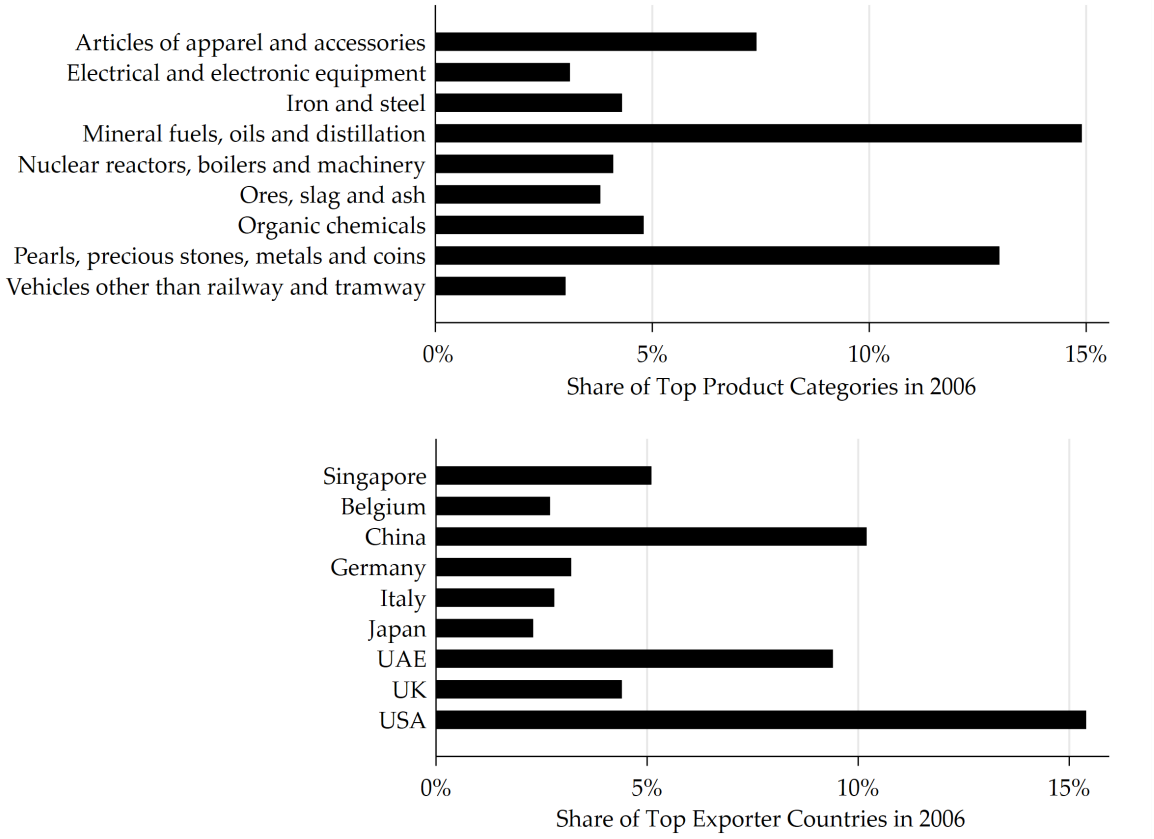


Figure 2.5: Share in India's Exports in 2006 by Top Product Categories and by Country. (Total goods exported from India in 2006: USD 121.2 Billion in current USD.) *Source:* From the author's calculations using the data from *Comtrade* for Trade in Goods.

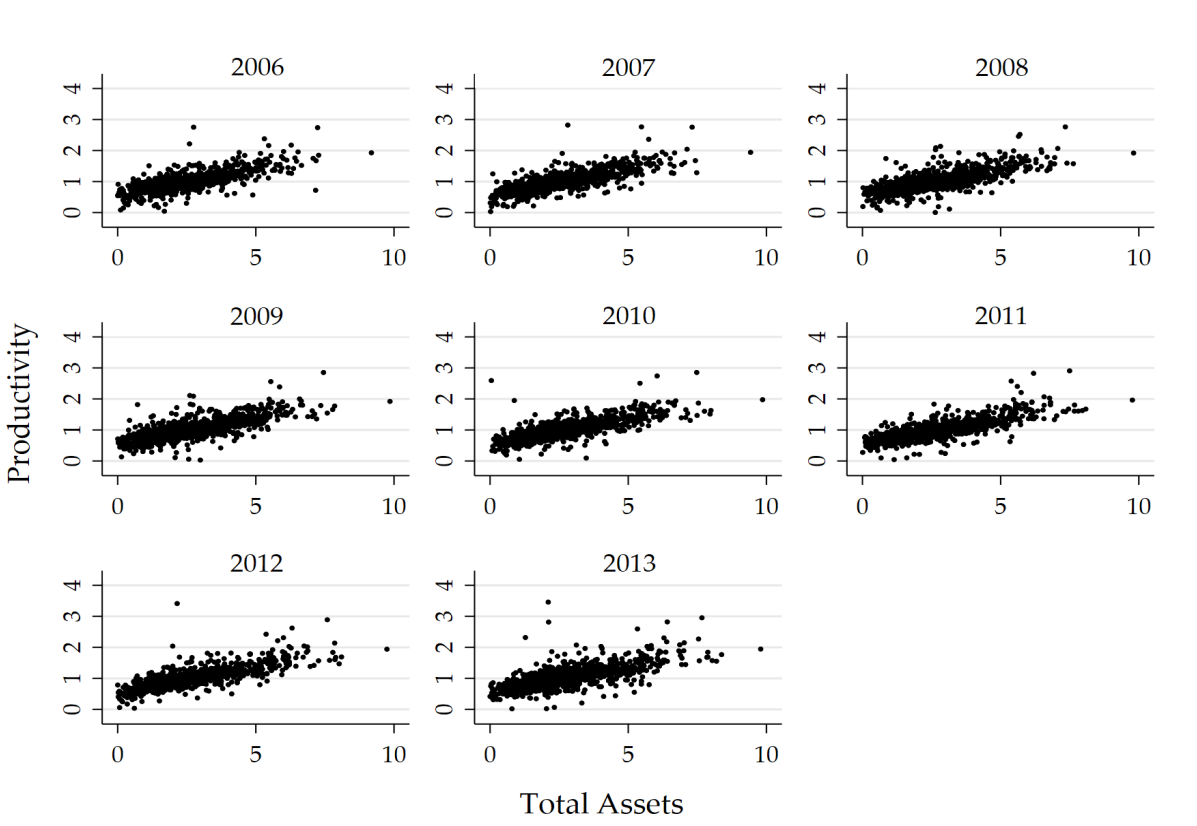


Figure 2.6: Correlation between log(TFPR) and log(total assets) from 2006 to 2013.
Source: Author's calculations using the sample of firms from the *Prowess* database.

Table 2.11: Impact of the Export Subsidies: Year-by-year Demand Shocks

$\textbf{log(exports)}_{ijt}$	Coefficient
$\text{Subsidized}_{ijt} \times$ Year 2007	0.046***
	(0.015)
$\text{Subsidized}_{ijt} \times$ Year 2008	0.029**
	(0.014)
$\text{Subsidized}_{ijt} \times$ Year 2009	0.034
	(0.024)
$\text{Subsidized}_{ijt} \times$ Year 2010	0.033**
	(0.016)
$\text{Subsidized}_{ijt} \times$ Year 2011	0.044**
	(0.021)
$\text{Subsidized}_{ijt} \times$ Year 2012	0.035**
	(0.016)
$\text{Subsidized}_{ijt} \times$ Year 2013	0.043**
	(0.016)
$\text{Subsidized}_{ijt} \times$ Year 2007 $\times$ Demand Index_{jt}	0.021**
	(0.009)
$\text{Subsidized}_{ijt} \times$ Year 2008 $\times$ Demand Index_{jt}	0.015**
	(0.061)
$\text{Subsidized}_{ijt} \times$ Year 2009 $\times$ Demand Index_{jt}	0.009*
	(0.005)
$\text{Subsidized}_{ijt} \times$ Year 2010 $\times$ Demand Index_{jt}	0.011**
	(0.005)
$\text{Subsidized}_{ijt} \times$ Year 2011 $\times$ Demand Index_{jt}	0.013**
	(0.005)
$\text{Subsidized}_{ijt} \times$ Year 2012 $\times$ Demand Index_{jt}	0.015**
	(0.007)
$\text{Subsidized}_{ijt} \times$ Year 2013 $\times$ Demand Index_{jt}	0.011**
	(0.005)
Demand Index_{jt}	0.031**
	(0.015)
Number of Observations	6,134
Firm Controls	Yes
Firm and Year Fixed Effects	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. All firm-level variables are same as in Table 2.4.

Table 2.12: Year-wise Impact by Firm Characteristics

$\textbf{log(exports)}_{ijt}$	Coefficient
Subsidized_{ijt} × Year 2007	0.048**
Subsidized_{ijt} × Year 2008	0.027**
Subsidized_{ijt} × Year 2009	0.029
Subsidized_{ijt} × Year 2010	0.032**
Subsidized_{ijt} × Year 2011	0.047**
Subsidized_{ijt} × Year 2012	0.053**
Subsidized_{ijt} × Year 2013	0.042**
Subsidized_{ijt} × Year 2007 × Demand Index_{jt}	0.018**
Subsidized_{ijt} × Year 2008 × Demand Index_{jt}	0.014**
Subsidized_{ijt} × Year 2009 × Demand Index_{jt}	0.011*
Subsidized_{ijt} × Year 2010 × Demand Index_{jt}	0.014**
Subsidized_{ijt} × Year 2011 × Demand Index_{jt}	0.016**
Subsidized_{ijt} × Year 2012 × Demand Index_{jt}	0.014**
Subsidized_{ijt} × Year 2013 × Demand Index_{jt}	0.011**
Demand Index_{jt}	0.031**
By Firm Size	
Subsidized_{ijt} × $\mathbb{1}$(>Median Firm Size) × Year 2007	-0.041**
Subsidized_{ijt} × $\mathbb{1}$(>Median Firm Size) × Year 2008	0.019*
Subsidized_{ijt} × $\mathbb{1}$(>Median Firm Size) × Year 2009	0.022
Subsidized_{ijt} × $\mathbb{1}$(>Median Firm Size) × Year 2010	-0.027**
Subsidized_{ijt} × $\mathbb{1}$(>Median Firm Size) × Year 2011	-0.031**
Subsidized_{ijt} × $\mathbb{1}$(>Median Firm Size) × Year 2012	-0.039***
Subsidized_{ijt} × $\mathbb{1}$(>Median Firm Size) × Year 2013	-0.049***

Continued on next page

Table 2.12 – *Continued from previous page*

log(exports)$_{ijt}$	Coefficient
By Return on Assets	
Subsidized$_{ijt}$ × 𝟙(>Median Return on Assets)× Year 2007	0.076***
Subsidized$_{ijt}$ × 𝟙(>Median Return on Assets)× Year 2008	0.029
Subsidized$_{ijt}$ × 𝟙(>Median Return on Assets)× Year 2009	-0.023
Subsidized$_{ijt}$ × 𝟙(>Median Return on Assets)× Year 2010	0.140***
Subsidized$_{ijt}$ × 𝟙(>Median Return on Assets)× Year 2011	0.064***
Subsidized$_{ijt}$ × 𝟙(>Median Return on Assets)× Year 2012	0.065***
Subsidized$_{ijt}$ × 𝟙(>Median Return on Assets)× Year 2013	0.088***
By Firm Productivity	
Subsidized$_{ijt}$ × 𝟙(>Median Productivity) × Year 2007	-0.029***
Subsidized$_{ijt}$ × 𝟙(>Median Productivity) × Year 2008	-0.023*
Subsidized$_{ijt}$ × 𝟙(>Median Productivity) × Year 2009	-0.043*
Subsidized$_{ijt}$ × 𝟙(>Median Productivity) × Year 2010	-0.035***
Subsidized$_{ijt}$ × 𝟙(>Median Productivity) × Year 2011	-0.016**
Subsidized$_{ijt}$ × 𝟙(>Median Productivity) × Year 2012	-0.034***
Subsidized$_{ijt}$ × 𝟙(>Median Productivity) × Year 2013	-0.028***
Number of Observations	6,134
Firm Controls	Yes
Firm and Year Fixed Effects	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at firm level.

Table 2.13: Year-wise Impact by Fiscal Benefits

$\textbf{log(exports)}_{ijt}$	Coefficient
Subsidized_{ijt} × Year 2007	0.048**
Subsidized_{ijt} × Year 2008	0.027**
Subsidized_{ijt} × Year 2009	0.029
Subsidized_{ijt} × Year 2010	0.052**
Subsidized_{ijt} × Year 2011	0.047**
Subsidized_{ijt} × Year 2012	0.053**
Subsidized_{ijt} × Year 2013	0.042**
Subsidized_{ijt} × Year 2007 × Demand Index_{jt}	0.018**
Subsidized_{ijt} × Year 2008 × Demand Index_{jt}	0.014**
Subsidized_{ijt} × Year 2009 × Demand Index_{jt}	0.011*
Subsidized_{ijt} × Year 2010 × Demand Index_{jt}	0.014**
Subsidized_{ijt} × Year 2011 × Demand Index_{jt}	0.010**
Subsidized_{ijt} × Year 2012 × Demand Index_{jt}	0.014**
Subsidized_{ijt} × Year 2013 × Demand Index_{jt}	0.011**
Demand Index_{jt}	0.029**
$\text{Fiscal Benefits}_{ijt-1}$	0.039**
By Fiscal Benefits Received	
Subsidized_{ijt} × 𝟙(>Median Incentives Beneficiary) × Year 2007	0.063**
Subsidized_{ijt} × 𝟙(>Median Incentives Beneficiary) × Year 2008	0.018
Subsidized_{ijt} × 𝟙(>Median Incentives Beneficiary) × Year 2009	-0.034
Subsidized_{ijt} × 𝟙(>Median Incentives Beneficiary) × Year 2010	0.040**
Subsidized_{ijt} × 𝟙(>Median Incentives Beneficiary) × Year 2011	0.063***
Subsidized_{ijt} × 𝟙(>Median Incentives Beneficiary) × Year 2012	0.051**

Continued on next page

Table 2.13 – *Continued from previous page*

log(exports)$_{ijt}$	Coefficient
Subsidized$_{ijt}$ × 𝟙(>Median Incentives Beneficiary) × Year 2013	0.061**
Number of Observations	6,134
Firm Controls	Yes
Firm and Year Fixed Effects	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at firm level.

Table 2.14: Impact of the Export Subsidies: Excluding the Energy Sector

log(exports)$_{ijt}$	Coefficient
Subsidized$_{ijt}$	0.057**
	(0.027)
Subsidized$_{ijt}$ × Demand Index$_{jt}$	0.021***
	(0.004)
Demand Index$_{jt}$	0.029**
	(0.014)
log(assets)$_{ijt-1}$	0.46***
	(0.044)
EBITDA Ratio$_{ijt-1}$	0.89***
	(0.133)
log(TFPR)$_{ijt-1}$	0.52***
	(0.118)
Number of Observations	5,887
Firm Controls	Yes
Firm and Year Fixed Effects	Yes

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are clustered at the firm level. This table reports the baseline estimates of the impact of the export subsidy program from 2007 to 2013 on the exports of firms, corresponding to Equation 2.4. All variables are same as in Table 2.4.

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