Credit expansion and diligent banks

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ABSTRACT

This paper studies the effect of credit expansion on firm capital allocation, banks stability, and aggregate productivity and employment. We exploit a quasi-experimental setting generated by a regulatory change in India's PSL program eligibility cutoff. Comparing profiles of firms around the cutoff, we find that the credit expansion targets financially constrained firms and firms with a higher pre-treatment rate of return. We provide evidence of banks' significance in funneling the resources to those firms.

We also document that banks reacted to the credit expansion with a sturdy balance sheet that was not accompanied by more risk-taking. In particular, banks acting on the policy change responded with a lower NPA and higher Tier 1 capital adequacy ratio. Finally, on an aggregate level, we show that credit expansion decreased the dispersion in the marginal product of capital across firms and increased aggregate employment.

JEL Codes: D22, G28

Keywords: Democratization of credit, SMEs, banking regulation, capital allocation, credit expansion.

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1 Introduction

Credit expansion has been increasingly credited to contribute to economic growth (Duval et al. (2019), Bai et al. (2018), Larrain and Stumpner (2017), Karlan and Zinman (2010)). Higher economic growth can result from a demand-led credit expansion, in which financially constrained firms demand more finance to unlock their productive projects, or from a supply-led credit expansion, in which banks reallocate resources to the more profitable and potentially productive firms. Recent studies underline the unexploited potential of financially constrained firms (Ersahin et al. (2020), and Krishnan et al. (2014)). This paper uses a policy change in India that generates a quasi-experimental setting to show the banks' role in efficiently reallocating capital in the economy.

Interestingly, there is very little empirical evidence on banks' role in reallocating capital between firms and whether it is tied to higher banks' risk-taking or better aggregate outcomes. This paper fills this gap in the literature by exploiting a quasi-experimental setting generated by a 2015 regulatory change to India's Priority Sector Lending (PSL) program. The regulatory change made a new, narrow set of medium-sized (from INR 50 to 100 million firm size) manufacturing firms suddenly eligible for the PSL lending program. Since the regulatory change was largely unexpected and no other "policy nudges" simultaneously affected the credit markets of medium-sized manufacturing firms, it created a sharp discontinuity in firm credit availability.

Using firm-level data, we exploit this setting by comparing otherwise almost identical firms that face different credit availability levels. The firms above the eligibility cutoff (INR 100 million in firm size) retain their pre-2015 lending environment. However, the otherwise identical firms directly below the eligibility cutoff receive a positive shock to their credit availability as they become eligible for a program mandating banks to commit a 40 % of their commercial lending activity to the PSL sector.[1] Here, we follow the standard regression discontinuity (RD) design and confirm that the credit expansion increases firms' borrowing at the cutoff. We peel the layers of this relationship and

[1]Alternative ways to meet the Bank's PSL target exist, but they are either limited to a particular asset class or costly, which ultimately makes the PSL target of 40% binding among most of the banks (Banerjee and Duflo (2014)).

study which firms are affected more by this credit expansion. First, banks choose to lend to firms traditionally considered more financially constrained (high pre-reform financial dependence, high pre-reform asset-growth, and young) at the expense of less financially constrained firms (low pre-reform financial dependence, low pre-reform asset-growth, and old). Second, we find evidence of greater credit supply to firms with high pre-reform profitability (high ROA, PBDITA-Profit, and Cash-Profit), but no significant change in credit supply to firms with low pre-reform profitability.

Next, we show that firms with features desired by banks (profitability) are primarily at the receiving end of the credit expansion. In particular, banks lend more to highly profitable firms (regardless if financially constrained or not), with no significant change in lending levels to unprofitable firms (again, regardless if financially constrained or not). It underlines the role of banks in allocating capital in the economy. Although financially constrained firms are expected to demand more finance, our results show that the supply side (represented by banks) is the leading actor of reallocating capital in the economy. Banks select and unlock profitable projects only for the more profitable among the financially constrained firms. And those firms ultimately receive the bulk of the banks' lending.

Further empirical evidence lends to banks' importance as the actors distributing the capital in the economy. Namely, comparing the borrowing from non-bank sources for firms marginally below the cutoff to those marginally above the cutoff, we find no evidence of a substitution effect between bank credit and non-bank credit. Had there been a general shock in demand for finance, we would have observed an increase in both Bank and non-bank borrowing. Stable non-bank borrowing supports a conjecture that any effect on firms borrowing or aggregate outcomes (the dispersion in the marginal product of capital across firms or aggregate employment) stems from banks' choices to supply credit.

Using bank-level data, we study if banks relax their lending policies by relaxing their credit supply as well. In general, the idea behind PSL is that banks presented with equally profitable opportunities choose the one eligible for the program (Ananth and Mor (2012)). In practice, banks can decide to lend more liberally to the PSL sector to

avoid penalties related to a missed PSL target. Overall, our results point toward diligent banking practices. In particular, banks lending more extensively to the newly eligible firms exhibit a higher Tier 1 capital adequacy ratio, lower gross NPA to advances, higher provisioning coverage ratio, and at the same time, a higher credit deposit ratio.

Using aggregate data, we explore the timing of the reform and the variation of the share of newly eligible firms across industries. First, we estimate the effect of credit expansion on dispersion in return to capital across firms. We measure this dispersion by the within-industry variance of the marginal product of capital. Our results show that a larger share of the newly eligible firms in an industry is associated with lower dispersion in return to capital. For example, an industry in the top quartile with the most newly eligible firms, but bottom quartile most disperse returns to capital, following the reform closes its gap by 33% to the top quartile industries with the least disperse returns to capital. Second, as suggested by Whited and Zhao (2021), within-industry distortions in the debt-equity ratio contribute to lower productivity and are not optimal. Thus, we study if the credit expansion also reduced a misallocation of financial liabilities measured as the within-industry variance of firm leverage. We also observe an increase in aggregate sales, profit, innovation (R&D), assets (total and fixed), and aggregate employment, and aggregate salaries.

The paper relates to several different strands of the extant literature. First, we contribute to the literature on credit expansion and economic development. So far, the evidence on the effectiveness of the policy interventions on asset allocation is mixed. For instance, Banerjee and Duflo (2014) find no evidence that directed credit is being used as a cheaper substitute. Instead, the credit being used to finance more production leads them to conclude that many firms were credit constrained.

On the other hand, Bhue et al. (2019) find that small-firm lending mandates inhibit firm growth. They report that firms, which became newly eligible for directed lending showed slow investment, sales and power consumption. Our paper contributes to this strand of literature by providing a comprehensive picture of the impact of credit expansion on asset allocation to SMEs. We uncover diligent banking. In particular, the

PSL program stimulated banks to channel assets toward more profitable firms and those considered financially constrained, which potentially unlocks profitable projects in the economy. Moreover, we show that the driving force behind the capital allocation are banks.

Second, we contribute to the growing academic literature on the democratization of credit. Assunção et al. (2013) document that extending credit to more risky borrowers led to a rise in delinquencies and defaults. On the other hand, (Campello and Larrain, 2016) find that, when reforms in Eastern Europe made secured debt transactions more flexible by allowing movable assets to be considered as collateral, firms with more movable assets gained access to credit markets. Subsequently, they borrowed, invested, and hired more. These firms also became more efficient and profitable and increased their share of fixed assets. We show that the democratization of credit to the more profitable firms and firms commonly thought of as financially constrained decreases the misallocation of capital in the economy. It also unlocks productive projects in the sector of the economy formerly deprived of financing.

The remainder of the paper is organized as follows: in the next Section, we lay out the details of the PSL program in India. In Section 3 we discuss the unique matched dataset encompassing firm financials and credit risk items, and in Section 4 we present our research design. The implications of the credit expansion are covered in Section 5. We discuss whether it is supply or demand-driven, and its significance for banking stability and, in the aggregate, the dispersion in the marginal product of capital across firms and aggregate employment. Section 7 offers concluding remarks.

2 Institutional background

The Priority Sector Lending (PSL) in India was formalized in 1972. The implementation followed in 1974, when banks were given five years to raise their share of priority sector in their advances to 33% (Chakrabarty (2012)). Currently, the share is set at 40%. Since then, numerous changes and reforms of the PSL program have followed. In this paper,

we focus on a particular regulatory change on 23. April 2015 that affected lending to *medium*-sized manufacturing firms (with investment in plant and machinery between INR 50 and 100 million) done by commercial banks.[2] The regulatory change involves the fact that, until 2015, loans to *micro* and *small* manufacturing enterprises were eligible for PSL program, but loans to *medium* sized manufacturing firms were not. In 2015, the PSL firm size cutoff was raised suddenly to INR 100 million and added the *medium*-sized firms into the PSL sector. The PSL firm size cutoff's raising generated a quasi-natural experiment for our research. While there have been instances of PSL cutoff changes in the past, the magnitude of this change and its timing makes it a significant yet unanticipated event.

Our empirical identification relies on the fact that not all firms are eligible for the PSL program. In particular, with the 2015 reform, a firm with (the original value of) investment in plant and machinery in the neighborhood of the INR 100 million cutoff, is eligible for PSL program depending on whether such investment is marginally above or marginally below the 100 million cutoff. This sharp discontinuity in elibility for the PSL program naturally yields us two groups of firms that should otherwise be very similar but only differ in their eligibility status.

One more rule was formalized in 2015, which relates to eligibility criteria for the PSL program. It states that firms can avail themselves of their PSL status up to three years after they grow beyond the size limit that qualifies them for the PSL program. The rationale behind this rule is to remove the disincentive for firms to grow because they enjoy PSL status should they remain below the cutoff.

An implication of a firm becoming eligible for the PSL program is that this eligibility

[2]In 2015, the PSL regulation changed in a few additional ways. For example, social infrastructure and renewable energy were added to the existing PSL categories: agriculture, micro and small enterprises (medium added in 2015), export credit, education, housing, and other. Next, sub-targets were introduced for some sectors e.g., out of 40% net credit to PSL sector, 7.5% to be lent to micro firms, whether in manufacturing (firms with investment in plant and machinery up to INR 2.5 million) or services (firms with investment in equipment up to INR 1 million). Such sub-targets aimed to prevent crowding out smaller, more vulnerable borrowers. Also, the distinction between direct and indirect lending to agriculture was removed. Foreign banks with more than 20 branches were asked to gradually move towards the same PSL target as domestic commercial banks. Additionally, trading in PSL certificates enabled banks to reach their PSL targets without lending to the PSL sector outside of their expertise. And, banks were to calculate their net credit quarterly rather than annually. However, none of those additional changes impact our analysis, as they do not concern manufacturing firms' INR 100 million cutoff.

can be considered as a shock to the firm's credit availability. Banks are expected to give priority to the PSL loans while choosing amongst equally profitable opportunities (Ananth and Mor (2012)) for "the greater national interest." Some banks embed such priority rules into their internal lending policies. For example, Oriental Bank of Commerce India devised procedures that the denial of a PSL loan can be taken only by the next higher sanctioning authority (O.B.C. India (2015)).

Moreover, current PSL regulation stimulates the PSL lending formally through PSL targets. Currently, the target is set at 40% of Adjusted Net Bank Credit or credit equivalent amount of off-balance sheet exposure, whichever is higher. Loans to any PSL cathegory contribute to the Bank's PSL target, which includes any advances by banks to medium-sized manufacturing firms from INR 50 to 100 million.

Alternative ways to meet a bank's PSL target exist, but they are either limited in a scope to a predefined financial instrument or they are costly. For example, to make up for the shortfall in its PSL target, a bank can buy PSL certificates (which are issued by banks who have excess PSL) or finance trades receivables on the TReDS platform. In the second case, banks can enroll themselves on this online exchange and provide finance to fulfill any registered firm's working capital needs via the platform, and this qualifies as PSL. If the Bank is still unable to meet its PSL target, it is mandated to lend the shortfall amount to government organizations such as NABARD, SIDBI, MUDRA etc., which cater to rural development or help small businesses. The interest rate on these contributions is usually relatively low and set by RBI. This is why a bank may look at this option as a last resort to fill their PSL target, since lending to PSL eligible firms is priced at market prices. Moreover, failure to meet the PSL target weights on granting regulatory clearances and approvals by RBI. Thus, Banerjee and Duflo (2014) reports that in the early 2000s, the 40% PSL target was binding among most of the banks.

3 Data

Our primary data source is Prowess database, a large database of Indian firms[3] collected by the Centre for Monitoring the Indian Economy (CMIE). The Prowess database provides detailed information on the firm's balance sheet items, including a detailed breakdown of assets and liabilities. Importantly, since the CMIE database covers a significant proportion of the Indian economy,[4] many small and medium firms are included in the original sample. Also, Prowess has been increasingly used in published research including Lilienfeld-Toal et al. (2012), Vig (2013), Banerjee and Duflo (2014), Gopalan et al. (2016), Kahraman and Tookes (2017), and Chopra et al. (2020).

We impose four data filters. First, we require a non-missing value of the gross value of *Plant and Machinery* and *Bank Borrowings*. The *Plant and Machinery* data item is essential in determining our forcing variable, *firm size*. The firm size is defined according to MSMED Act 2006 as the investment in plant and machinery minus certain costs as defined in the S.O.1722 (E) Notification issued under MSMED Act 2006. Here, we follow the MSMED Act 2006 as close as possible, and we measure the *firm size* as the gross value of plant and machinery, excluding the gross value of land and building.[5]

As of the 2015 reform, the *firm size* definition includes a time clause. Within this clause, any firm is eligible for the PSL program up to three years after growing past the INR 100 million PSL eligibility cutoff. Thus, as of the 2015 reform, our forcing variable is set at the minimum value of the *firm size* over the three-year window. In particular, it is the minimum value of the *firm size* from the most recent financial statement or the three previous financial statements.

Second, we retain only Private Ltd. and Public Ltd. firms corresponding to 98.89%

[3]Prowess contains information on traded, non-traded, public, and private firms.

[4]Bau and Matray (2020) reports that CMIE represents about 70% of the economic activity of the organized industrial sector of India and 75% of the corporate tax revenue.

[5]The S.O.1722 (E) Notification issued under MSMED Act 2006 stipulates further items to be excluded (for example, the cost of stores, spares, tools consumed, or the cost of installation of plant and machinery). However, the Prowess database does not provide sufficiently detailed information for all the specific items. Potentially, this measurement error can move some of the treated firms to the control group. Thus, the estimate of treatment effect might be noisier and might be downward biased. Either way, if we find a significant estimate of the treatment effect we are after, it is the lower bound of the actual treatment effect.

Table 1: Summary statistics. This table presents summary statistics for the local sample of firms within the ± INR 40 million of the PSL eligibility cutoff for the period from 23. April 2015 through 1. July 2020. The sample contains firms operating in manufacturing sectors specified in the first schedule to the Industries (Development and Regulation) Act (1951). All variables are annual. Panel A presents statistics for the forcing variable *firm size* [million INR]. The *firm size* is defined according to MSMED Act 2006 in terms of investment in plant and machinery less of the value of land and buildings. The 2015 update to the MSMED Act 2006 rules allows firms to remain eligible for PSL up to three years after growing past the INR 100 million PSL eligibility cutoff. For the concerned firms, which grow past the cutoff but remain eligible as per this rule, we take the minimum *firm size* observed over the past three years. Panel B presents statistics for the dependent variables. *Bank Borrowing* [million INR] is the outstanding amount of funds received from banks. *Borrowing* [million INR] is the outstanding amount of total borrowings of a firm. *Non-Bank Borrowing* [million INR] is the *Borrowing* less *Bank Borrowing*. *Default Dummy* takes a value of one if a firm is downgraded to a Default rating (D) on any of the rated debt recorded in CMIE in the current year. *Interest* is the interest expense over *Borrowing*. *Bank Charges and Commissions* is the charges levied by banks over the *Bank Borrowing*. Lastly, Panel C presents statistics for the covariates. *Financial Dependence* is the industry-median over firm's share of capital expenditures not financed with internal cash flows. *Delta Assets* is total assets in the current year over total assets in the previous year. *Age* is the number of years elapsed from the incorporation year. *ROA* is the PBDITA (profits before depreciation, interest, tax, and amortization) over total assets. *PBDITA Profit* is the PBDITA over sales, and *Cash Profit* is the cash profit (profit after tax adjusted for the effect of non-cash transactions) over sales.

	N	Mean	Median	*SD*	Min	Max
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Firm size according to MSMED Act 2006 and updates (forcing variable)						
Firm size [million INR]	694	92.19	86.30	23.23	60.40	139.90
Panel B: Dependent variables						
Bank Borrowing [million INR]	694	219.93	97.25	386.18	0.10	4,594.80
Borrowing [million INR]	694	351.18	164.50	559.12	0.20	5,681.50
Non-Bank Borrowing [million INR]	694	131.25	45.95	262.17	-40.60	2,374.50
Default Dummy	377	0.02	0.00	0.14	0.00	1.00
Interest	667	0.19	0.10	1.65	0.00	40.83
Bank Charges and Commissions	379	0.31	0.02	3.18	0.00	59.00
Panel C: Covariates						
Financial Dependence	694	-0.90	-0.86	0.43	-3.61	0.11
Delta Assets	644	1.07	1.05	0.19	0.59	2.76
Age	694	33.93	30.00	14.46	16.00	122.00
ROA	691	0.10	0.10	0.11	-0.74	0.60
PBDITA Profit	688	0.04	0.08	0.89	-22.63	0.66
Cash Profit	688	-0.16	0.04	3.18	-78.63	0.50

of the CMIE database and drop the remaining legal forms (Associations/Federations, Co-operatives, etc.). Third, the sample is restricted to manufacturing sectors specified in the first schedule to the Industries (Development and Regulation) Act (1951).

Lastly, we limit our analysis to a local sample of small to medium firms within the ±

INR 40 million neighborhood of the eligibility cutoff. This decision is driven by the fact that only firms with *firm size* between INR 50 million and INR 100 million became newly treated following the reform. Moreover, the firms below INR 50 million were treated before 2015 for an extended period without the time clause, which would have allowed them to grow out of the size category and remain eligible for the PSL program. Thus, the behavior of firms around the old INR 50 million cutoff resembles the lifting of the size constraint rather than the sudden shock to credit availability. Therefore, we limit the local sample to ± INR 40 million from the PSL eligibility cutoff to exclude them from our analysis.

The sample runs from the 1. January 2010 to 1. July 2020, when another major reform of the PSL program was introduced. We have 694 firm-year observations with 296 unique firms during the treatment period and 2,266 firm-year observations with 675 unique firms during the entire sample period. Table 1 gives an overview of the firms in the local sample during the treatment period. Firms borrow on average INR 220 million from banks, which constitutes about two-thirds of the overall borrowings. About 2% of firms go into default on an annual basis and the cost of debt is substantial and on average reaches 19% interest expenditures relative to total borrowing and 31% of *Bank Charges and Commissions* levied by banks over the *Bank Borrowing*. The average firm in our local subsample does not operate in a financially dependent environment depicted by negative *Financial Dependence* index, it grows at at a 7% rate and is 34 years old.

Throughout the analysis, firms can move in and out of the treatment and control groups, which is shown in Figure 1. To become newly eligible for the PSL program, a firm in the control group can increase its qualifying costs to move it below the PSL cutoff. A firm may also purchase new land, which can move it below the PSL cutoff. A firm may also decide to disinvest its plant and machinery, which again can move it below the PSL cutoff. On the other hand, a treated firm can grow out of the PSL program by investing more in the plant and machinery. Figure 1 illustrates a time series of firms newly eligible for the PSL program and newly ineligible ones. Reassuringly, apart from the reform of the PSL cutoffs in April 2015 that caused the large jumps in the number of eligible firms,

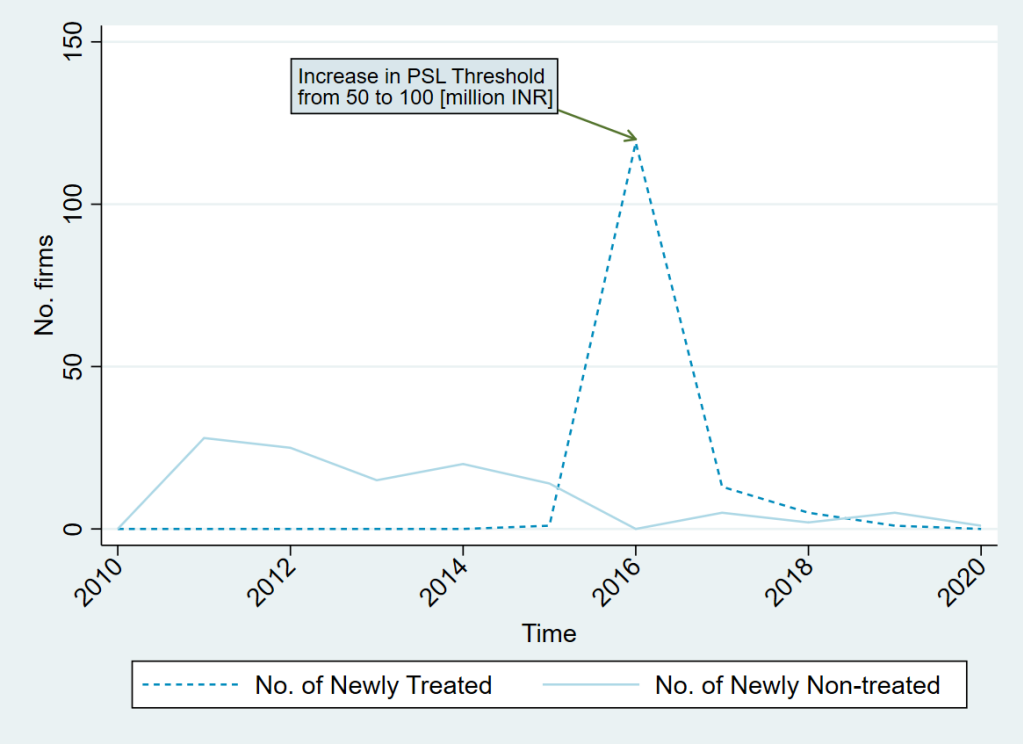


Figure 1: Number of newly eligible firms and newly ineligible firms. The figure presents a number of firms that become newly eligible and a number of firms that become newly ineligible for the Priority Sector Lending (PSL) in our local sample of firms within the ± INR 40 million of the PSL eligibility cutoff. We have 694 firms in the treatment period and 1,572 in the pre-treatment period. We count the firm towards the treatment period if its reporting date is after 23. April 2015, which is the date that the PSL eligibility threshold was raised from 50 to 100 [million INR]. About 99 out of 100 firms report their financial statements in March.

there is a steady flow between the groups of eligible and ineligible firms. Moreover, the growth of firms seems to take over the incentive to remain small and under the cutoff as the outflows from the eligible group are consistently above the inflows into the eligible group.

4 Empirical specification

Our empirical strategy uses the fact that the eligibility for the PSL program depends on *firm size*. A reform in 2015 raised a PSL eligibility cutoff in *firm size* from INR 50 million to INR 100 million. Firms marginally below the new cutoff became eligible for the program, while firms marginally above the cutoff did not. This differentiation based on a sharp cutoff creates a discontinuity in the firm's ease of borrowing from banks.

We exploit this eligibility cutoff in a regression discontinuity (RD) design (for example

Lee and Lemieux (2010), and Calonico et al. (2014)) to estimate the casual effect of relaxing borrowing constraints for firms. The RD design uses the fact that a known cutoff ($\bar{x}$) determines the treatment status of the firm i, that is, whether the firm is eligible for the program or not. The cutoff is along the forcing variable x_i, which in our design is given by *firm size*. Then, at the cutoff $\bar{x}$ the local average treatment effect τ_{RD} of being marginally eligible for the program can be identified as:

$$\tau_{RD} = \tau_{RD}(\bar{x}) = \mathbb{E}[Y_i(1) - Y_i(0)|X_i = \bar{x}] \tag{1}$$

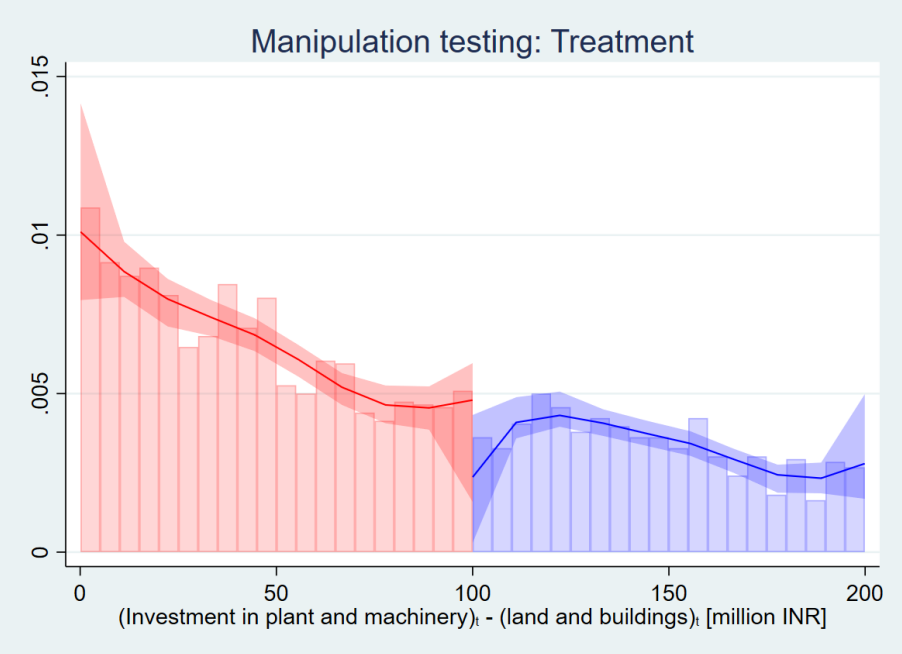
where $Y_i(1)$ and $Y_i(0)$ denote the outcome variable per firm with and without treatment respectively. The local average treatment effect (τ_{RD}) is then estimated using local polynomial methods at the cutoff $\bar{x}$.

We start the analysis with a "local" sample of firms in the neighborhood of ± INR 40 million of the PSL eligibility cutoff and use a mean squared error (MSE)-optimal bandwidth selection procedure according to Calonico et al. (2014) to further limit our "local" sample. Next, we follow Calonico et al. (2014) in the estimation of the local discontinuity in the neighborhood of the cutoff and compute the robust, bias-corrected, and conventional estimates of the local treatment effect. The robust and bias-corrected estimates differ in value from the conventional estimates due to the bias-correction procedure implemented according to Calonico et al. (2014). Moreover, although the robust and bias-corrected estimates have the same value, their standard errors are different. We rely mainly on robust estimates for inference. Graphs are plotted for the conventional estimates.

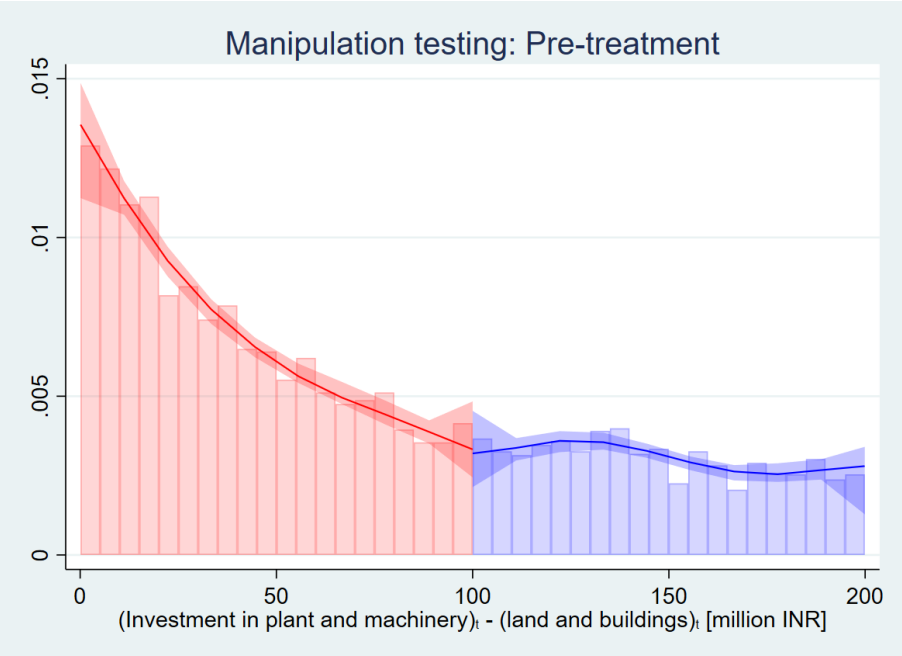
The basic idea of the RD design is that firms cannot precisely control whether they fall into an eligible or ineligible category. This means that there is an exogenous variation in the treatment status. Based on the four facts listed below, it is reasonable to assume that even though firms have some control over their *firm size*, its exact value around the INR 100 million cutoff cannot be manipulated with precision.

Firstly, the 2015 reform of PSL cutoff was largely unanticipated.[6] Secondly, the

[6]With the exception of a temporary cutoff increase in November 2013, which was addressing low



(a) Firm distribution in treatment period



(b) Firm distribution in pre-treatment period

Figure 2: Firm size distribution and manipulation tests. Firms are sorted into treatment and control based on the *firm size* defined in Table 1. To some extend firms might manipulate their *firm size*, through adjusting their *current investment in plant and machinery less of the value of land and buildings*. The figure plots the density of the *current investment in plant and machinery less of the value of land and buildings* within INR ±100 million of the cutoff. Panel (a), shows density for the treatment period (reporting dates from 23. April 2015 to 1. July 2020) and Panel (b) shows density for the pre-treatment period (reporting dates from 1. January 2010 to 22. April 2015). We test for manipulation using the Cattaneo et al. (2018) manipulation testing with local polynomial density estimation (analogous to McCrary (2008)). We use the local polynomial order of 3. The manipulation test does not reject the null hypothesis of no bunching below the cutoff (during treatment period: T= -0.86, and p-value = 0.39; during pre-treatment period: T= -0.33 and p-value = 0.74).

economic growth and was reversed soon after in March 2014 by the RBI (Business Standard (2013)).

2015 reform introduces a rule under which firms retain their PSL status for three years after they grow above the INR 100 million cutoff. The new rule significantly reduces the incentive for firms to manipulate their *firm size* during our 5-year sample treatment window (reporting dates from 23. April 2015 to 1. July 2020). For the concerned firms, which grow past the cutoff but remain eligible, we set their *firm size* equal to the minimum *investment in plant and machinery less of the value of land and buildings* observed over the past three years, which leads us to the third point. Firms can manipulate only their *current* investment in plant and machinery less of the value of land and buildings. In Figure 2 we test for manipulation of this *current* value. Panel (a) plots the density of the *current investment in plant and machinery less of the value of land and buildings* within INR ±100 million of the cutoff during the treatment. A visual examination suggests that there is no substantial change in the distribution following the 2015 reform and that there is no bunching of firms below the INR 100 million cutoff. For comparison, Panel (b) plots the *firm size* distribution of firms for the pre-treatment period. Lastly, a manipulation test does not reject the null hypothesis of no bunching below the cutoff (T= -0.86, and p-value = 0.39). This result suggests that during our time window, firms cannot precisely manipulate the assignment to the program and the variation in *firm size* is approximately randomized around the cutoff.

Importantly, our identification rests on the assumption that baseline covariates have the same distribution in the neighborhood of the cutoff. In principle, if a discontinuity in the baseline covariates exists at the cutoff, the random assignment of firms into eligible and ineligible for the program might not be warranted. Table 2 and Figure 3 presents RD estimates for $Financial\ Dependence$, $Asset\ Growth$, Age, ROA, $PBDITA\ Profit$, and $Cash\ Profit$ and Figure 3 illustrates them graphically. We find no discontinuity in the baseline covariates ($Financial\ Dependence$, $Asset\ Growth$, ROA, $PBDITA\ Profit$, and $Cash\ Profit$) unrelated to bank borrowings. We find discontinuity in Age during the treatment period, but no such discontinuity exists in the pre-treatment period. This result follows organically from the fact that becoming newly eligible for the program relaxes the firm's financial constraints allowing more entrants to the market. It also

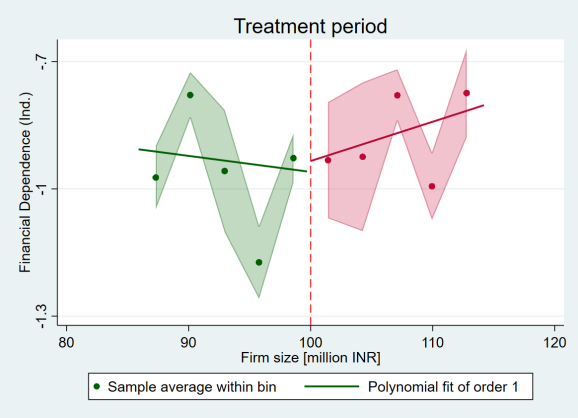
Table 2: Validity of the regression discontinuity design (RDD) - covariates test. There is no significant discontinuity at the INR 100 million cutoff in the firm's characteristics unrelated to bank borrowings (*Financial Dependence*, *Asset Growth*, *Age*, *ROA*, *PBDITA Profit*, and *Cash Profit*) We find discontinuity in the *Age* covariate during the treatment period but not in the pre-treatment period (unreported result). This table reports local linear estimates (robust, bias-corrected, and conventional) of the regression coefficient following the bias-corrected procedure in Calonico et al. (2017). The running variable of the estimation is *firm size* defined in Table 1. The optimal bandwidth (BW) is selected in accordance to Calonico et al. (2017) around the PSL eligibility cutoff. The observations are pooled for the treatment period (reporting dates from 23. April 2015 to 1. July 2020). We use triangular kernel function to construct the local-polynomial estimator. The order of the local-polynomial used to construct the point-estimator is $p = 1$. The order of the local-polynomial used to construct the bias-correction is $q = 2$. Standard errors are reported in parenthesis. Significance levels are denoted by *** at 99% level, ** at 95% level, and * at 90% level.

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome	Fin. Dep.	Asset Growth	Age	ROA	PBDITA Profit	Cash Profit
Robust	-0.01	-0.05	-16.10**	-0.01	0.03	-0.46
	(0.16)	(0.06)	(6.88)	(0.05)	(0.08)	(0.61)
Bias-corrected	-0.01	-0.05	-16.10***	-0.01	0.03	-0.46
	(0.14)	(0.05)	(6.19)	(0.04)	(0.05)	(0.59)
Conventional	-0.03	-0.04	-15.15**	-0.00	0.02	-0.57
	(0.14)	(0.05)	(6.19)	(0.04)	(0.05)	(0.59)
Observations	694	644	694	691	688	688
Eff. N: Left of c	148	99	126	142	151	186
Eff. N: Right of c	56	32	48	54	58	88
BW (h)	14.26	9.97	12.76	13.94	14.68	19.19

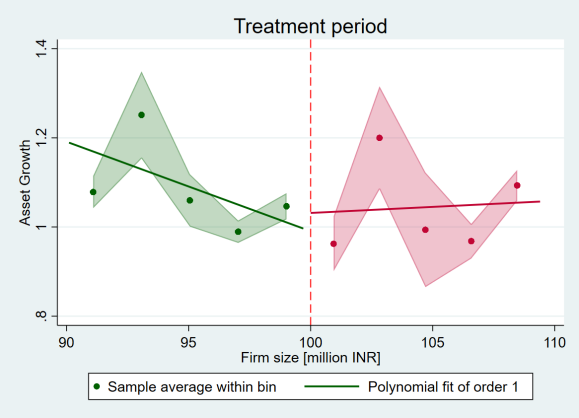
allows existing firms to get a firm foothold in the market and qualify for the coverage in CMIE database, making the "local" sample of eligible firms younger than the "local" sample of ineligible firms. In general, the results indicate that any discontinuity at the cutoff results from the targeted extension of the PSL program as opposed to being a result of general characteristics of the firms in the neighborhood of the cutoff.

Also, in Table 2 the results in columns (4) to (6) on profitability are of particular interest. They provide evidence against the alternative hypothesis that relaxing credit constraints following the 2015 reform allowed small and medium firms to invest in profitability-enhancing processes, which attracted more bank financing. However, firms did not respond by improving their profitability in the short term. This observation seems to rule out the endogenous loop, potentially fueling the increase in bank financing for more profitable firms.

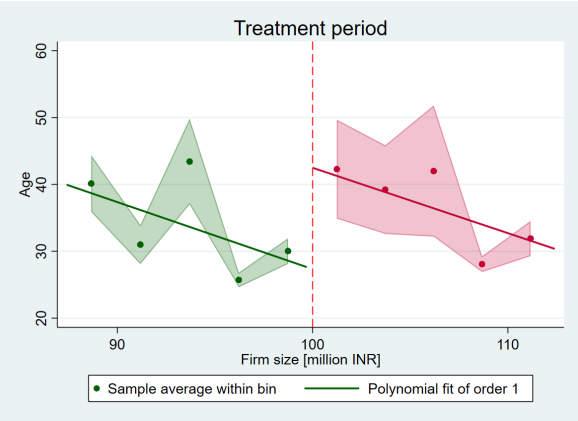
On top of exploring the targeted nature of the 2015 reform that incentivizes bank



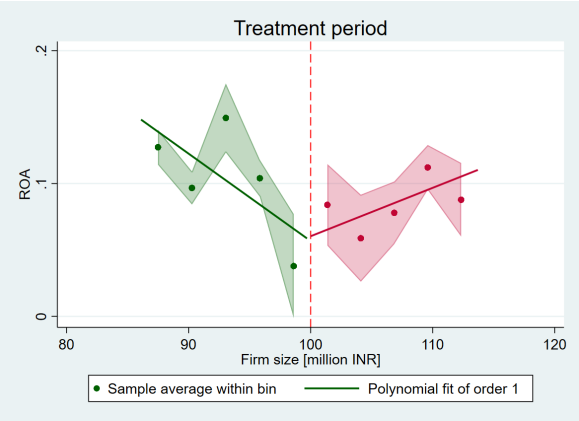
(a) Financial constraints: Fin. Dep.



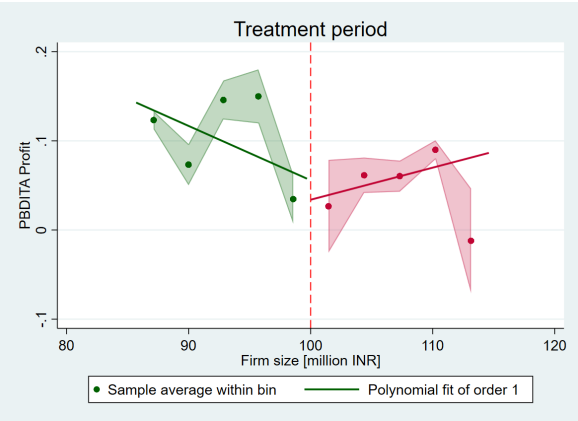
(b) Financial constraints: Asset Growth



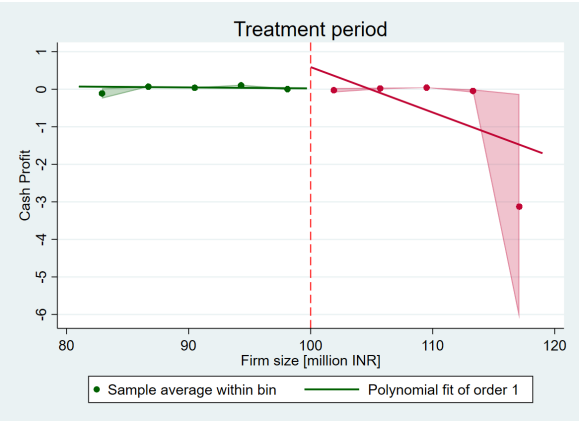
(c) Financial constraints: Age



(d) Profitability: ROA



(e) Profitability: PBDITA Profit



(f) Profitability: Cash Profit

Figure 3: Covariates test. There is no significant discontinuity at the INR 100 million cutoff in the firm's characteristics unrelated to bank borrowings (*Financial Dependence*, *Asset Growth*, *ROA*, *PBDITA Profit*, and *Cash Profit*). We find discontinuity in the *Age* covariate during the treatment period but not in the pre-treatment period (unreported result). Firms eligible for the program are represented by green color. Shaded area depicts 65% confidence interval. The observations are pooled for the treatment period (reporting dates from 23. April 2015 to 1. July 2020).

lending to the firms from INR 50 million to INR 100 million, we also investigate its timing. The 2015 PSL reform was announced and implemented after 23. April 2015. Therefore, we should not observe any significant effects before the reform if the identified

effects are due to the introduction of new incentives to lend to medium firms. We present those results throughout our baseline analysis.

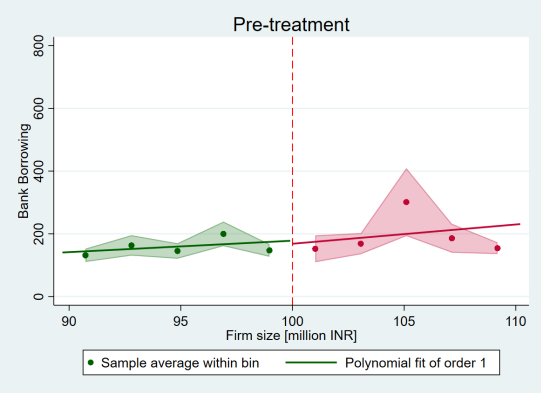
5 Results

We aim to show a causal effect of credit expansion on firm capital allocation, banks stability, and aggregate productivity and employment. The credit expansion came in 2015 due to a reform of the PSL program in India. The PSL program mandates a large portion of the bank credit portfolio to be dedicated to the PSL sector. From 2015, manufacturing firms below INR 100 million became eligible for the PSL program. To gauge firm capital allocation, we use this eligibility cutoff to study firms' responses marginally below the cutoff to firms' responses marginally above the cutoff.

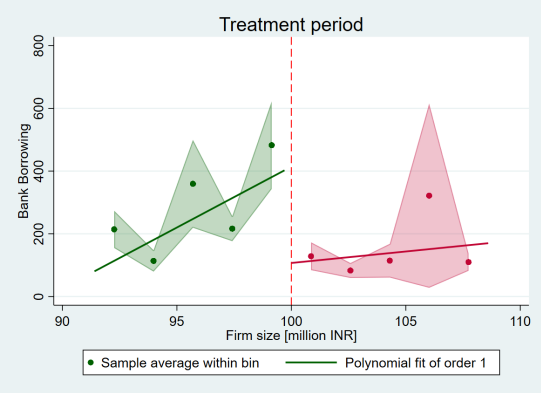
First, we provide evidence that credit expansion increases firm borrowings and, in particular, firm borrowings from banks. In the second step, we investigate which populations of firms drive the increase in bank borrowings and find that more (pre-treatment) profitable firms and financially constrained firms are the primary beneficiaries of credit expansion. Second, we establish if the credit expansion is supply or demand-driven. In other words, if banks or firms are the primary initiators of the reallocation of capital in the economy. We document that firms with features desired by banks (profitability) are the primary recipients of credit expansion, suggesting that supply-side forces more strongly affect capital reallocation.

Next, we find evidence that higher borrowing is not accompanied by an increase in interest paid on bank debt or higher bank charges. The latter can be interpreted as evidence of market failure in the SME credit market, which was partially alleviated by the PSL program. Banks price the new loans issued under the PSL program at the market price, and the price happened to be the same as equivalent non-PSL loans.

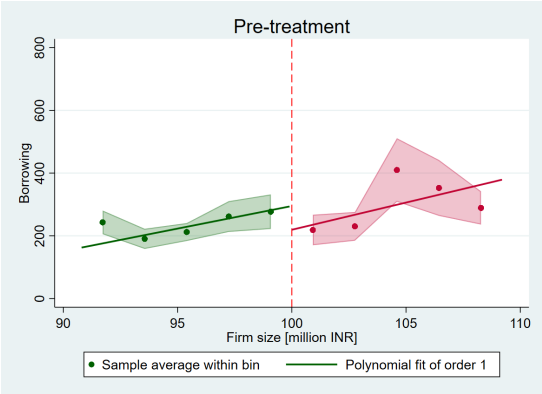
In further analysis, we dive into the banks' responses to the credit expansion. Using bank level data, we find no support that the policy-mandated credit expansion induced less diligent banking practices. In particular, banks lending more extensively to the newly



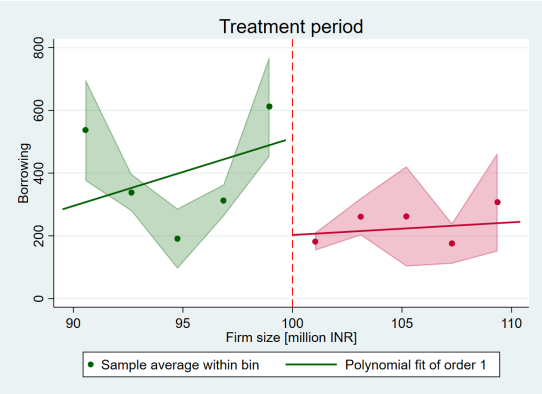
(a) Pre-Treatment: Bank Borrowings



(b) Treatment: Bank Borrowings



(c) Pre-Treatment: Borrowings



(d) Treatment: Borrowings

Figure 4: Credit expansion to medium-sized firms. Firms borrow significantly more from banks once they become eligible for the program. Eligible firms are firms below the INR 100 million of *firm size* cutoff after the reform (reporting dates from 23. April 2015 to 1. July 2020) and are illustrated with a green color. This figure plots the bank borrowings (Panel (a) and (b)), and the total borrowings (Panel (c) and (d)) as a function of *firm size*. No significant increase in bank borrowing is observed prior to the reform (Panel (a) and (c)). Shaded area depicts 65% confidence interval.

eligible firms exhibit a higher Tier 1 capital adequacy ratio, lower gross NPA to advances, higher provisioning coverage ratio, and at the same time, a higher credit deposit ratio.

Lastly, using aggregate data, we estimate the effect of credit expansion on the within-industry variance of the marginal product of capital, the within-industry variance of firm leverage, and changes in aggregate sales, profit, innovation (R&D), assets (total and fixed), aggregate employment, and aggregate salaries.

Overall, our results suggest that the reform removes barriers to financing for medium-sized firms. The increase in funding to profitable and financially constrained firms taps into profitable projects and investment opportunities, which effectively improve the asset allocation in the economy.

We begin by providing graphical evidence of the credit expansion over the sample

Table 3: Credit expansion to medium-sized firms. This table shows that firms borrow significantly more from banks, if they are eligible for the program. Column (2) shows a discontinuity in bank borrowings and column (4) shows a discontinuity in total borrowings at the INR 100 million *firm size* cutoff after the reform (reporting dates from 23. April 2015 to 1. July 2020). Columns (1) and (3) show no discontinuity in the pre-treatment period (reporting dates from 1. January 2010 to 22. April 2015). The table reports local linear estimates (robust, bias-corrected, and the conventional) of the regression coefficient following the bias-corrected procedure in Calonico et al. (2017). The running variable of the estimation is *firm size* defined in Table 1. The optimal bandwidth (BW) is selected in accordance to Calonico et al. (2017) around the eligibility cutoff. We use triangular kernel function to construct the local-polynomial estimator. The order of the local-polynomial used to construct the point-estimator is $p = 1$. The order of the local-polynomial used to construct the bias-correction is $q = 2$. Standard errors are reported in parenthesis. Significance levels are denoted by *** at 99% level, ** at 95% level, and * at 90% level.

Outcome	Bank Borrowings		Borrowings	
	Pre-Treatment	Treatment	Pre-Treatment	Treatment
	(1)	(2)	(3)	(4)
Robust	25.07	**347.54*** **	104.15	**361.51** **
	(67.97)	**(132.28)**	(95.35)	**(167.49)**
Bias-corrected	25.07	**347.54*** **	104.15	**361.51** **
	(57.41)	**(113.52)**	(83.04)	**(141.67)**
Conventional	9.70	**307.01*** **	75.69	**309.15** **
	(57.41)	**(113.52)**	(83.04)	**(141.67)**
Observations	1,572	694	1,572	694
Eff. N: Left of c	197	87	178	110
Eff. N: Right of c	176	35	159	40
BW (h)	10.39	8.68	9.26	10.61

period. Panel (a) and (c) of Figure 4 plot the average bank borrowing by firm size for the pre-treatment period (reporting dates from 1. January 2010 to 22. April. 2015). . Panel (b) and (d) of Figure 4 for the treatment (reporting dates from 23. April 2015 to 1. July 2020).

Figures on the left support our RD design that there is no discontinuity in the borrowing levels in the neighborhood of the eligibility cutoff during the pre-treatment period. The bank borrowing is visually indistinguishable below and above the cutoff, and the RD test confirms this result in columns (1) and (3) in Table 3. Notably, the lack of discontinuity in the pre-treatment period reaffirms that the policy change was largely unanticipated and that no other credit market incentives were in place, potentially distorting our results.

The situation changes following the 2015 reform. Figures on the right in Figure 4 illustrate that firms classified as medium-sized that are marginally below the cutoff show significantly higher bank borrowings than firms marginally larger than the eligibility

cutoff. This discontinuity is also confirmed in columns (2) and (4) in Table 3.

5.1 Profitable firms

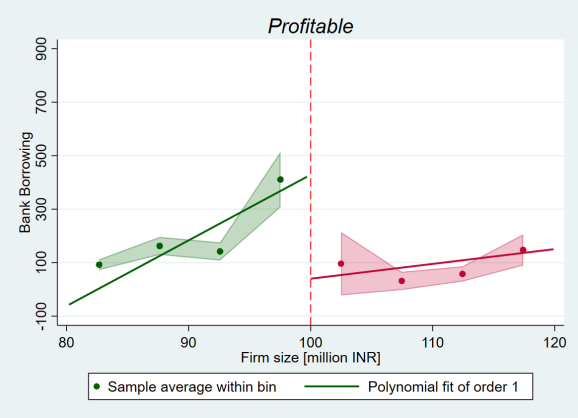
Having confirmed that extending the pool of eligible firms increases their borrowing, we dive into which firms are targeted by the loosened credit flow. This subsection addresses the borrowing outcomes for firms with high profitability vs. low profitability. We split the sample into high and low firms based on their pre-treatment profitability. Firms qualify for the high (low) profitability if their ROA, PBDITA Profit or Cash Profit are in the top (bottom) quartile of the annual median distribution in any of the pre-treatment years. We use our RD design on those populations of firms, with bank borrowings as the dependent variable.

Figure 5 together with the accompanying point estimates in Table 4 Panel A suggests that it is the firms with high profitability, which borrow more. Reassuringly, firms with low profitability before the reform do not differ in borrowing levels. The results consistently indicate that the lending issued under the program is received by the better performing firms with a history of high profitability.

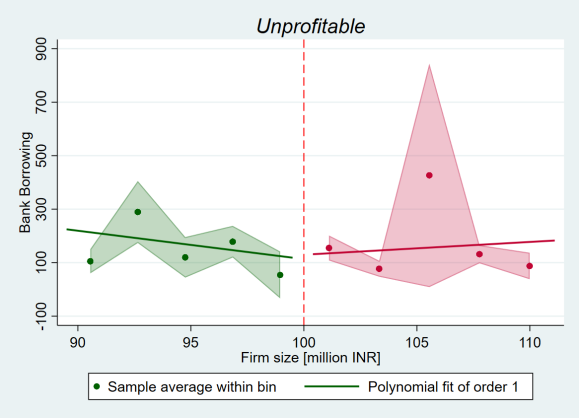
5.2 Financially constrained firms

In this subsection, we dissect the view commonly present in the recent literature that financially constrained firms are driving the economic growth post-credit expansion. The distinguishing feature of financially constrained firms is the presence of a profitable investments opportunity, which due to market failure does not receive financing. Thus, if the PSL program is unable to overcome the market failure and stimulate banks to lend to financially constrained firms, banks may need to turn to non-constrained borrowers to fill their targets. Potentially this expands the pool of less profitable investments and results in a further misallocation of capital.

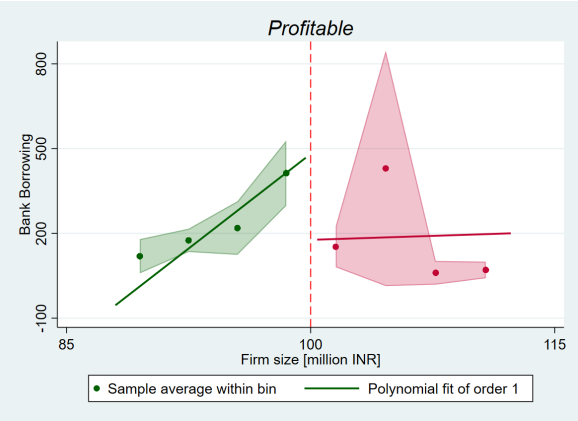
Why would financially constrained SMEs forgo the benefits of the PSL program? International Finance Corporation (2018) indicates that SMEs in India are highly dependent on informal sources of financing. These correspond to 84% of SME finance and



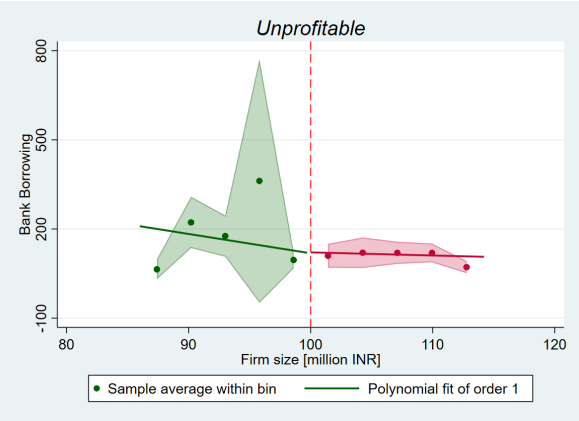
(a) *High*-ROA firms



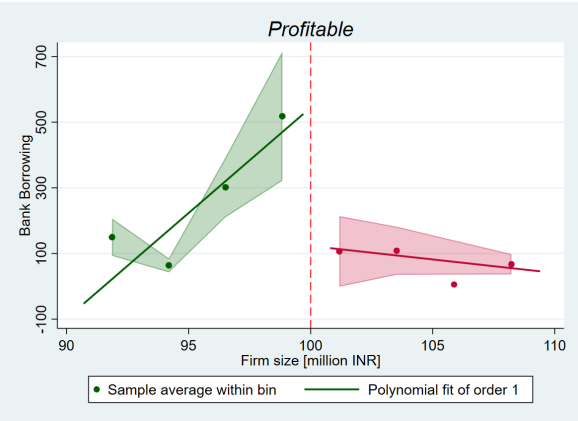
(b) *Low*-ROA firms



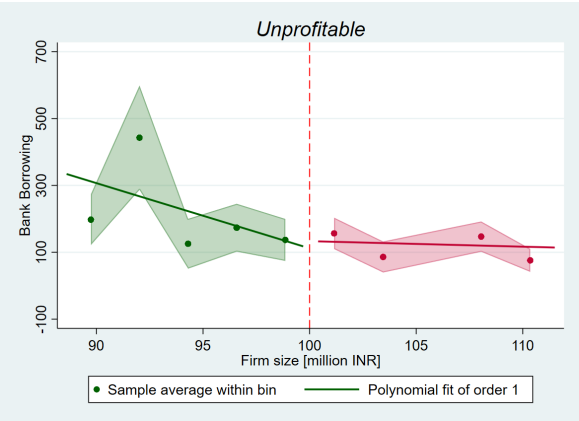
(c) *High*-PBDITA-Profit firms



(d) *Low*-PBDITA-Profit firms



(e) *High*-Cash-Profit firms



(f) *Low*-Cash-Profit firms

Figure 5: Credit expansion to profitable firms. Highly profitable firms (figures (a), (c), (e) on the left) receive significantly more bank borrowing after becoming eligible for the program. The boost in borrowings from banks is not observed for unprofitable firms (figures (b), (d), (f) on the right). Firms eligible for the program are all firms below the INR 100 of *firm size* cutoff and are illustrated with a green color. Shaded area depicts 65% confidence interval. The observations are pooled for the treatment period (reporting dates from 23. April 2015 to 1. July 2020).

include family, friends, moneylenders, and chit funds. Only 13% of financing flows from the banking sector. Financially constrained SMEs may have a relationship with the informal lenders and stick to it out of habit. They may also be opposed to formal sources

Table 4: Credit expansion to profitable firms. This table shows that profitable firms (column (1), (3), (5)) receive significantly more bank borrowing after becoming eligible for the program. The table reports local linear estimates (robust, bias-corrected, and conventional) of the regression coefficient following the bias-corrected procedure in Calonico et al. (2017). The dependent variable is bank borrowings. The running variable of the estimation is *firm size* defined in Table 1. The observations are pooled for the treatment period (reporting dates from 23. April 2015 to 1. July 2020). The optimal bandwidth (BW) is selected in accordance to Calonico et al. (2017) around the eligibility cutoff. We use triangular kernel function to construct the local-polynomial estimator. The order of the local-polynomial used to construct the point-estimator is $p = 1$. The order of the local-polynomial used to construct the bias-correction is $q = 2$. Standard errors are reported in parenthesis. Significance levels are denoted by *** at 99% level, ** at 95% level, and * at 90% level.

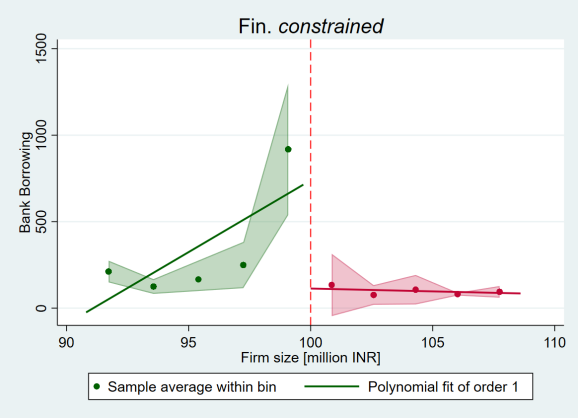
Outcome	Bank Borrowings					
	ROA		PBDITA Profit		Cash Profit	
	High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)
Robust	**412.04*** **	-23.27	**356.64** **	-17.52	**471.72** **	-46.66
	(141.22)	(77.14)	**(159.86)**	(61.51)	**(198.34)**	(72.91)
Bias-corrected	**412.04*** **	-23.27	**356.64** **	-17.52	**471.72*** **	-46.66
	(118.45)	(62.50)	**(141.23)**	(54.96)	**(168.61)**	(64.41)
Conventional	**388.69*** **	-16.37	**304.17** **	-3.00	**421.49** **	-21.36
	(118.45)	(62.50)	**(141.23)**	(54.96)	**(168.61)**	(64.41)
Observations	276	275	269	272	254	252
Eff. N: Left of c	82	39	63	35	50	32
Eff. N: Right of c	27	28	15	34	11	21
BW (h)	20.14	11.19	12.31	14.76	9.77	11.63

of finance because of recent bad experiences (loan denial or default). Alternatively, banks might continue with their old preferences impairing access to finance for financially constrained SMEs because of their lack of historical records on credit rating, balance sheet, or a generally more opaque nature.

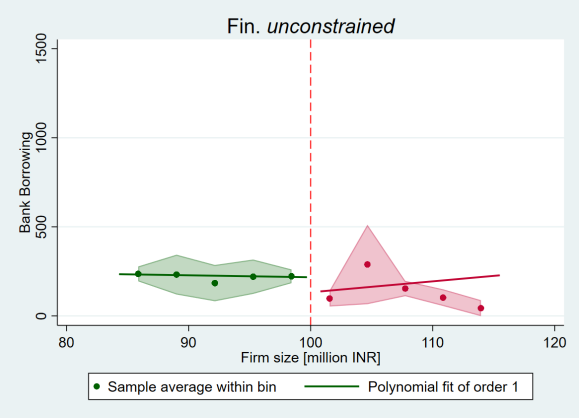
Figure 6 and the corresponding point estimates in Table 5 show that this is an unlikely explanation and that banks choose to lend to firms traditionally considered as more financially constrained (i.e. young) at the expense of less financially constrained firms (i.e. old).

6 Is the capital reallocation demand or supply led?

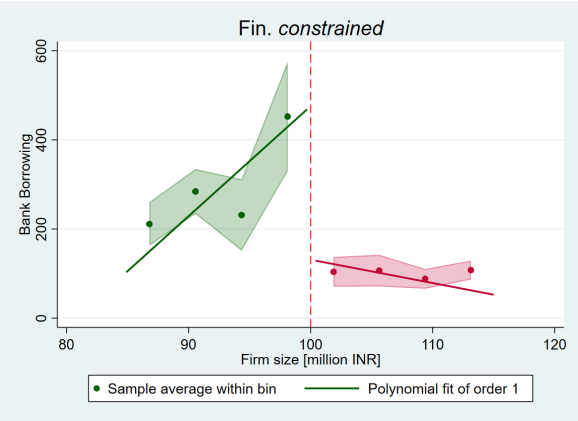
The economic development following credit expansion might be due to financially constrained firms demanding more financing to unlock their profitable projects or from banks



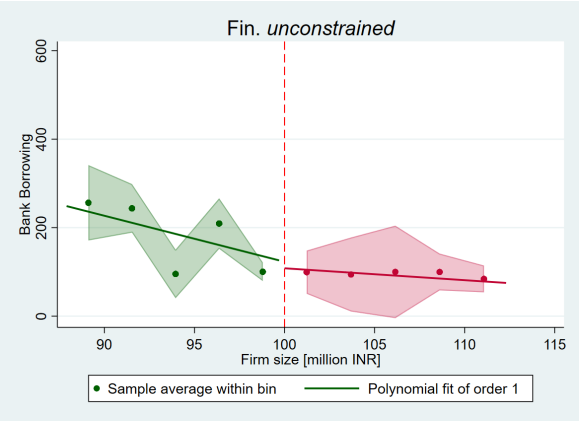
(a) Firms in industries with *high* financial dependence



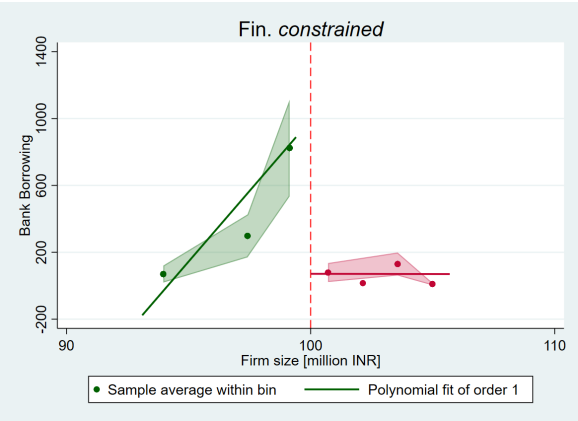
(b) Firms in industries with *low* financial dependence



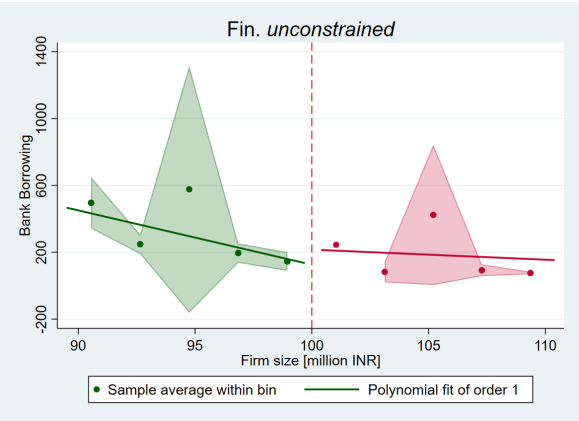
(c) *High*-asset-growth firms



(d) *Low*-asset-growth firms



(e) Young firms



(f) Old firms

Figure 6: Credit expansion to financially constrained firms. Financially constrained firms (figures (a), (c), (e) on the left) receive significantly more bank borrowing after becoming eligible for the program. The boost in borrowings from banks is not observed for financially unconstrained firms (figures (b), (d), (f) on the right). Firms eligible for the program are all firms below the INR 100 of *firm size* cutoff and are illustrated with a green color. The observations are pooled for the treatment period (reporting dates from 23. April 2015 to 1. July 2020). Shaded area depicts 65% confidence interval.

funneling the credit to more profitable firms. In this subsection we document the role of banks in allocating credit between firms in the economy. In particular, we split firms into four categories depending on their demand for financing and the bank's willingness to

Table 5: Credit expansion to financially constrained firms. This table shows that financially constraint firms (column (1), (3), (5)) receive significantly more bank borrowing after becoming eligible for PSL program. The table reports local linear estimates (robust, bias-corrected, and conventional) of the regression coefficient following the bias-corrected procedure in Calonico et al. (2017). The dependent variable is bank borrowings. The running variable of the estimation is *firm size* defined in Table 1. The observations are pooled for the treatment period (reporting dates from 23. April 2015 to 1. July 2020). The optimal bandwidth (BW) is selected in accordance to Calonico et al. (2017) around the cutoff of INR 100 million. We use triangular kernel function to construct the local-polynomial estimator. The order of the local-polynomial used to construct the point-estimator is $p = 1$. The order of the local-polynomial used to construct the bias-correction is $q = 2$. Standard errors are reported in parenthesis. Significance levels are denoted by *** at 99% level, ** at 95% level, and * at 90% level.

Outcome	Bank Borrowings					
	Fin. Dep.		Asset growth		Age	
	High	Low	High	Low	Young	Old
	(1)	(2)	(3)	(4)	(5)	(6)
Robust	**693.97*** **	100.92	**335.21** **	-4.92	**1,054.79** **	-148.01
	(245.67)	(76.30)	**(161.93)**	(66.41)	**(503.90)**	(146.47)
Bias-corrected	**693.97*** **	100.92	**335.21** **	-4.92	**1,054.79*** **	-148.01
	(213.80)	(69.04)	**(137.38)**	(59.98)	**(396.97)**	(131.57)
Conventional	**625.65*** **	84.45	**344.66** **	14.72	**919.24** **	-90.37
	(213.80)	(69.04)	**(137.38)**	(59.98)	**(396.97)**	(131.57)
Observations	301	247	282	309	233	248
Eff. N: Left of c	34	73	69	57	21	53
Eff. N: Right of c	21	21	28	19	10	15
BW (h)	9.88	15.73	15.12	12.81	7.11	11.30

supply it. A firm is classified into a high demand and high supply category if its demand for financing and bank's willingness to supply financing is high in the pre-treatment period, etc. We test if such a firm obtains more bank financing in the treatment period. If our setup is correct, the expectation is that, in an equlibrium, a high-demand-high-supply firm receives more bank financing. Analogously, we should observe no change in bank financing for a low-demand-low-supply firm.

The decisive information comes from the categories where either demand or supply is the driving force in the market. If a low-demand-high-supply firm obtains more bank financing, it is suggestive that the supply side has a decisive role in allocating the resources in the economy in the PSL regime. However, if a high-demand-low-supply firm obtains more bank financing, it is suggestive that the demand side has a decisive role (see also Table 6.

In Table A1 we show that firms with features desired by banks (profitability) are

Table 6: Capital reallocation: demand or supply led?. We split firms into four categories depending on their demand for financing and the bank's willingness to supply the financing. A firm is classified into a high demand and high supply category if its demand for financing and bank's willingness to supply financing is high in the pre-treatment period, etc. We test if such a firm obtains more bank financing in the treatment period. If our setup is correct, the expectation is that a high-demand-high-supply firm receives more bank financing. Analogously, we should observe no change in bank financing for a low-demand-low-supply firm. The conclusive information comes from the categories where either demand or supply is the driving force in the market. If a low-demand-high-supply firm obtains more bank financing, it is suggestive that the supply side has a decisive role in allocating the resources in the economy in the PSL regime. However, if a high-demand-low-supply firm obtains more bank financing, it is suggestive that the demand side has a decisive role.

Outcome		Bank borrowings	
		Supply	
		High	Low
		(1)	(2)
Demand	High	(+) → uninformative (0) → uninformative (−) → something else	**(+) → strong D** (0) → uninformative (−) → weak S
	Low	**(+) → strong S** (0) → uninformative (−) → weak D	(+) → something else (0) → uninformative (−) → uninformative

primarily at the receiving end of the credit expansion. In particular, banks lend more to highly profitable firms (regardless if financially constrained or not), with no significant change in lending levels to unprofitable firms (regardless if financially constrained or not). It underlines the role of banks in allocating capital in the economy.

6.1 Non-bank borrowing

Next, we are interested if the reform cleanly identifies the credit expansion. For example, firms with constraints on their access to bank financing may turn to other more expensive forms of financing. Once they become eligible for the program, they may substitute this more expensive form of financing with bank borrowings. The cost of such non-bank credit might be hidden in a higher interest rate but also in terms of lending.

In Table 8 and Table 9 we study a discontinuity at the cutoff for the non-bank borrowings, interest rate, and bank charges. In column (1) of Table 8, we see that one of

Table 7: Capital reallocation: demand or supply led? We split firms into four categories depending on their financial dependence (*high* financial dependence and *low* financial dependence related to the firm's demand for financing) and their ROA (*high* ROA and *low* ROA related to banks' supply of finance for such firm). The table reports robust local linear estimates of the regression coefficient following the bias-corrected procedure in Calonico et al. (2017). The dependent variable is bank borrowings. The running variable of the estimation is *firm size* defined in Table 1. The observations are pooled for the treatment period (reporting dates from 23. April 2015 to 1. July 2020). For all regressions, the bandwidth (BW) is set at 30.00 around the cutoff of INR 100 million. We use the triangular kernel function to construct the local-polynomial estimator. The order of the local-polynomial used to construct the point-estimator is $p = 1$. The order of the local-polynomial used to construct the bias-correction is $q = 2$. Standard errors are reported in parenthesis. Significance levels are denoted by *** at 99% level, ** at 95% level, and * at 90% level. For details of the RDD estimation please refer to the Appendix A.

Outcome			Bank borrowings	
			Supply	
			ROA	
			High	Low
Panel A: Financial Dependence				
Demand	Fin. Dep.	High	**1,026.05****	6.34
			(439.83)	(134.50)
		Low	**746.11***	-30.38
			(424.38)	(88.11)
Panel B: Asset Growth				
	Asset Growth	High	**359.75****	48.26
			(174.68)	(165.39)
		Low	**87.00***	18.77
			(49.34)	(77.19)
Panel C: Age				
	Age	Young	**1,305.94*****	193.82
			(392.60)	(156.90)
		Old	**671.60***	-22.33
			(405.09)	(165.98)

the outcomes of the reform is no shift in the way firms finance their investments. Firms marginally eligible for the program resort to borrowings from other sources than banks with the same propensity following the reform in 2015. Moreover, in columns (2) and (3)

of Table 9, we find no evidence of higher interest rates or bank charges as they borrow more. Remarkably, the last two results are of great importance because they indicate that bank financing is indeed a matter of market failure in the SME credit market. If appropriately stimulated, banks do lend to SMEs, and they do it at the market prices.

Lastly, results in column (1) of Table 9 show that there is no significant change in credit risk outcomes. We measure the credit risk outcomes by a one-year default rate. The one-year default rate measures the rate at which firms with credit rating "C" or higher are downgraded to credit rating "D" (default) within a one-year time window. The data suggest no change in default rate once firms become eligible for the program.

From a policy perspective, this is an important finding. The common fear of opponents of credit market interventions is that in an economy with many market failures, policymakers by trying to resolve some market failures end up reducing welfare (theory of second-best by Lipsey and Lancaster (1956)). The PSL program aims at reducing the market failure in SMEs access to finance. Such relaxing SMEs financial constraints can lead to debt overhand (Myers (1977), Krugman (1988)), or raising non-performing loans (The Economist (2008)). An investigation, however, into the default risk of the newly eligible firms shows no difference in failure rates following the reform.

6.2 Diligent banking

To deepen our understanding of the banks' role in asset allocation in the economy, it is helpful to detail some facts about their financial intermediation strategies. Table 10 shows that enlarging the contracting space of banks to newly eligible borrowers improves banks' soundness. We estimate here a difference-in-difference specification, in which we investigate if banks with a larger share of the newly eligible PSL borrowers, measured as a ratio of the number of the newly eligible PSL borrowers over a total number of borrowers, exhibit more sound risk measures. In particular, banks lending more extensively to the newly eligible firms show a higher Tier 1 capital adequacy ratio, lower gross NPA to advances, higher provisioning coverage ratio, and at the same time, a higher credit deposit ratio.

Table 8: Non-bank borrowing. This table shows no discontinuity in the non-bank borrowing following the PSL reform. The table reports local linear estimates (robust, bias-corrected, and conventional) of the regression coefficient following the bias-corrected procedure in Calonico et al. (2017). The dependent variable is *non-bank borrowing*. The running variable of the estimation is *firm size* defined in Table 1. The observations are pooled for the treatment period (reporting dates from 23. April 2015 to 1. July 2020). The optimal bandwidth (BW) is selected in accordance to Calonico et al. (2017) around the eligibility cutoff. We use triangular kernel function to construct the local-polynomial estimator. The order of the local-polynomial used to construct the point-estimator is $p = 1$. The order of the local-polynomial used to construct the bias-correction is $q = 2$. Standard errors are reported in parenthesis. Significance levels are denoted by *** at 99% level, ** at 95% level, and * at 90% level.

	(1)
Outcome	Non-bank borrowings
Conventional	39.23
	(61.41)
Bias-corrected	36.13
	(61.41)
Robust	36.13
	(75.26)
Observations	694
Eff. N: Left of c	126
Eff. N: Right of c	49
BW (h)	13.01

6.3 Credit expansion and reduction in capital misallocation

Although credit expansion to medium-sized firms appears beneficial, the subsidies and credit market "policy nudges" come with their own perils. Proponents of credit expansion argue that the policy intervention is merited by the market failure in the SMEs credit market. It is well known that from the lender's perspective, SMEs are small hence less profitable, and opaque hence riskier. This explains why banks may be unenthusiastic in lending to SMEs.[7] For example, the International Finance Corporation (2017) states that globally 41% of SMEs face some form of financial constrain with the finance gap reaching 55%. Other merits of the policy intervention include increased investment into value-enhancing projects (Denis and Sibilkov (2009), Lemmon and Roberts (2010), or Almeida and Campello (2007)), in innovative projects (Hottenrott and Peters (2012)), and increased total factor productivity Krishnan et al. (2014).

Opponents of credit market interventions argue that these policies proved consistently

[7]In many international markets, the stock market, even though relatively developed, remains still an inadequate source of financing for small businesses (see for example The Economist (2008)).

Table 9: Credit expansion, credit risk and cost of debt. This table shows no discontinuity in the default rate, interest rate and bank charges following the PSL reform. The table reports local linear estimates (robust, bias-corrected, and conventional) of the regression coefficient following the bias-corrected procedure in Calonico et al. (2017). The dependent variables are: *default rate* in column (1), *interest rate* in column (2), and *bank charges/bank borrowings* in column (3) . The running variable of the estimation is *firm size* defined in Table 1. The observations are pooled for the treatment period (reporting dates from 23. April 2015 to 1. July 2020). The optimal bandwidth (BW) is selected in accordance to Calonico et al. (2017) around the eligibility cutoff. We use triangular kernel function to construct the local-polynomial estimator. The order of the local-polynomial used to construct the point-estimator is $p = 1$. The order of the local-polynomial used to construct the bias-correction is $q = 2$. Standard errors are reported in parenthesis. Significance levels are denoted by *** at 99% level, ** at 95% level, and * at 90% level.

	(1)	(2)	(3)
Outcome	Default Dummy	Interest rate	Bank charges / Bank borrowings
Robust	0.09	0.72	0.03
	(0.08)	(0.67)	(0.04)
Bias-corrected	0.09	0.72	0.03
	(0.06)	(0.62)	(0.03)
Conventional	0.07	0.59	0.01
	(0.06)	(0.62)	(0.03)
Observations	377	667	379
Eff. N: Left of c	64	80	29
Eff. N: Right of c	18	26	9
BW (h)	9.26	8.15	5.77

to be ill-guided and created inefficient capital allocation in the economy (Bertrand et al. (2007), The Economist (2008)). Adding the fact that historically subsidized loans have a high tendency to turn bad (The Economist (2008), Kanz (2016) provides evidence in the household credit market), and the idea of a mandated credit expansion that may further worsen the Bank's loan portfolio does not look very appealing. Moreover, interventions in SMEs credit markets can create a disincentive for SMEs to grow as firms cling to their subsidized SME-status (Mohan (2002), Martin et al. (2017), and Bhue et al. (2019)). They can also motivate banks to crowd out the smaller, more financially starved SME borrowers in favor of the larger SME borrowers (Kale (2017)).

Table 11 shows that the worries are unfounded. The credit expansion to newly eligible PSL borrowers reduces the dispersion in return to capital and in leverage, increase in industry-level turnover, profit, and innovation. We present regression results of a difference-in-difference specification with dependent variables: in Column (1) *variance of MPK*, in Column (2) *variance of leverage*, in Column (3) industry-level aggregate *sales*,

Table 10: Credit expansion and bank-level risk measures. This table shows that enlarging the contracting space of banks to newly eligible PSL borrowers, improves banks' soundness. We present regression results of a difference-in-difference specification with dependent variables: in Column (1) *Tier 1 capital adequacy ratio*, in Column (2) *Gross NPA to advances*, in Column (3) *Provisioning coverage ratio*, and in Column (4) *Credit deposit ratio*. Banks with a larger share of the newly eligible PSL borrowers, measured as a ratio of the number of the newly eligible PSL borrowers over a total number of borrowers in $t-2$, exhibit more sound risk measures. All regressions include bank and year fixed effects. The robust standard errors are reported in parenthesis. Significance levels are denoted by *** at 99% level, ** at 95% level, and * at 90% level.

Outcome	Tier 1 capital adequacy ratio (%)	Gross NPA to advances (%)	Provisioning coverage ratio (%)	Credit deposit ratio
	(1)	(2)	(3)	(4)
Share_newly_PSL$_{(t-2)}\times$ Post	**63.32***	**-25.26****	**309.19*****	**46.33*****
	(36.31)	**(11.04)**	**(97.87)**	**(11.56)**
Share_newly_PSL$_{(t-2)}$	-62.94*	13.89**	-229.39***	-4.30
	(35.87)	(6.78)	(57.46)	(4.19)
Share_old_PSL$_{(t-2)}\times$ Post	0.07	-3.04	8.16	0.40
	(6.29)	(2.48)	(9.20)	(4.66)
Share_old_PSL$_{(t-2)}$	-1.60	1.10	-8.32	2.47
	(4.31)	(2.30)	(9.81)	(6.42)
ln(*Total Assets*)	-2.48*	-8.88***	-18.72***	12.33**
	(1.40)	(1.80)	(5.82)	(5.34)
ROA	0.10*	-0.30**	0.40**	-0.44
	(0.06)	(0.15)	(0.18)	(0.91)
Constant	48.81**	130.86***	337.74***	-105.72
	(19.54)	(25.23)	(81.87)	(76.13)
Observations	262	258	268	141
R-squared	0.88	0.82	0.50	0.72
Bank FE	Yes	Yes	Yes	Yes
Y FE	Yes	Yes	Yes	Yes

in Column (4) industry-level aggregate *cash profit*, and in Column (5) industry-level aggregate *R&D*. Industries with a larger share of the newly eligible PSL firms are industries with a higher ratio of the number of the newly eligible PSL firms over a total number of firms. Moreover, table 12 shows that credit expansion to newly eligible borrowers increases the aggregate production inputs (capital and labor).

7 Conclusion

Our paper refines and pushes forward the question originally asked by Banerjee and Duflo (2014): Do firms want to borrow more? We find that credit expansion leads to higher

Table 11: Credit expansion and industry-level outcomes. This table shows that credit expansion to newly eligible PSL borrowers reduces the dispersion in return to capital and in leverage, increase in industry-level turnover, profit, and innovation. We present regression results of a difference-in-difference specification with dependent variables: in Column (1) *variance of MPK*, in Column (2) *variance of leverage*, in Column (3) industry-level aggregate *sales*, in Column (4) industry-level aggregate *cash profit*, and in Column (5) industry-level aggregate *R&D*. Industries with a larger share of the newly eligible PSL firms are industries with a higher ratio of the number of the newly eligible PSL firms over a total number of firms. All regressions include industry and year fixed effects. The robust standard errors are reported in parenthesis. Significance levels are denoted by *** at 99% level, ** at 95% level, and * at 90% level.

Outcome	Var(MPK)_{Ind}	Var(Lev)_{Ind}	Aggregate Sales_{Ind}	Aggregate Cash Profit_{Ind}	Aggregate $\text{R\&D}_{Ind}$
	(1)	(2)	(3)	(4)	(5)
Share_newly_PSL × Post	**-2.80***	**-20.95*****	**2,425.46****	**365.48****	**17.17****
	(1.50)	**(6.89)**	**(1,098.27)**	**(174.19)**	**(7.38)**
Share_newly_PSL	2.36*	10.30	-908.97	-99.79	0.28
	(1.40)	(7.34)	(1,414.07)	(128.74)	(3.11)
Share_old_PSL × Post	-0.33	-1.37	285.56	11.98	-4.05**
	(0.52)	(2.38)	(456.41)	(46.35)	(1.77)
Share_old_PSL	1.42*	0.32	-1,234.64	-50.14	2.53
	(0.82)	(2.48)	(900.23)	(71.76)	(1.76)
Constant	0.50**	0.31	1,436.26***	108.34***	2.28**
	(0.20)	(0.91)	(309.63)	(23.10)	(1.08)
N	204	204	211	211	211
R-squared	0.63	0.32	0.96	0.86	0.78
Ind FE	Yes	Yes	Yes	Yes	Yes
Y FE	Yes	Yes	Yes	Yes	Yes

borrowing, and more efficient capital allocation. The credit supply shock is targeting firms with higher marginal rate of return (higher pre-treatment ROA, PBDITA Profit, and Cash Profit) and are commonly considered financially constrained (younger).

Our empirical design exploits an exogenous variation in firm credit access due to a regulatory change, which created a positive credit supply shock to a narrow set of firms. In particular, the Reserve Bank of India extended the "priority sector lending" program to medium-sized firms (firms with firm size between INR 50 and 100 million), generating a sharp discontinuity in credit access for firms in the neighborhood of the INR 100 million cutoff. Owing to this regulatory change, our identification strategy relies only one few assumptions likely to be satisfied.

Liberalization of credit supply is often viewed by the lens of a theory of second best by

Table 12: Credit expansion and industry-level production inputs. This table shows that credit expansion to newly eligible PSL borrowers increases the aggregated on an industry-level production inputs (capital and labor). We present regression results of a difference-in-difference specification with dependent variables: in Column (1) industry-level aggregate *Total Assets*, in Column (2) industry-level aggregate *Gross Fixed Assets*, in Column (3) industry-level aggregate *Employment*, and in Column (4) industry-level aggregate *Salaries*. Industries with a larger share of the newly eligible PSL firms are industries with a higher ratio of the number of the newly eligible PSL firms over a total number of firms. All regressions include industry and year fixed effects. The robust standard errors are reported in parenthesis. Significance levels are denoted by *** at 99% level, ** at 95% level, and * at 90% level.

Outcome	Aggregate Total Assets$_{Ind}$	Aggregate Gross Fixed Assets$_{Ind}$	Aggregate Employment$_{Ind}$	Aggregate Salaries$_{Ind}$
	(1)	(2)	(3)	(4)
Share_newly_PSL × Post	**2,971.93*** **	**1,966.96*** **	**392.17*** **	**207.89*** **
	(955.70)	**(600.34)**	**(71.79)**	**(46.03)**
Share_newly_PSL	29.31	255.09	-39.71	-20.42
	(915.90)	(504.95)	(56.39)	(37.85)
Share_old_PSL × Post	-33.09	-122.08	-50.13***	-14.90
	(252.24)	(143.78)	(16.73)	(10.47)
Share_old_PSL	-783.54*	-488.77*	-18.30	-11.51
	(460.37)	(283.38)	(29.64)	(17.19)
Constant	1,237.56***	685.59***	94.38***	43.12***
	(171.90)	(118.69)	(14.11)	(7.35)
N	211	211	211	211
R-squared	0.95	0.93	0.88	0.89
Ind FE	Yes	Yes	Yes	Yes
Y FE	Yes	Yes	Yes	Yes

Lipsey and Lancaster (1956). In particular, there is an expectation, that in an economy with many market failures, policymakers by trying to resolve one market failure, in fact reduce welfare. In our setting Indian policymakers aim at reducing the market failure in SMEs access to finance and relax their financial constraints. Such an intervention can lead to debt overhand in firms (Myers (1977), Krugman (1988)), or poor financial intermediation with raising non-performing loans (The Economist (2008)). Our results show that, this story although not inaccurate, might be incomplete. We find that easing the market failure in SMEs access to finance leads to resources being funneled to more efficient firms.

A Appendix A: Reallocation: demand or supply driven?

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Table A1: Capital reallocation: demand or supply driven? RDD details. We split firms into four categories depending on their financial dependence (*high* financial dependence and *low* financial dependence related to the firm's demand for financing) and their ROA (*high* ROA and *low* ROA related to banks' supply of finance for such firm). The table reports robust local linear estimates of the regression coefficient following the bias-corrected procedure in Calonico et al. (2017). The dependent variable is bank borrowings. The running variable of the estimation is *firm size* defined in Table 1. The observations are pooled for the treatment period (reporting dates from 23. April 2015 to 1. July 2020). For all regressions, the bandwidth (BW) is set at 30.00 around the cutoff of INR 100 million. We use the triangular kernel function to construct the local-polynomial estimator. The order of the local-polynomial used to construct the point-estimator is $p = 1$. The order of the local-polynomial used to construct the bias-correction is $q = 2$. Standard errors are reported in parenthesis. Significance levels are denoted by *** at 99% level, ** at 95% level, and * at 90% level.

Outcome				Bank borrowings	
				Supply	
				High	Low
				High ROA	Low ROA
Panel A: Financial Dependence					
Demand	High	High Fin. Dep.	Robust	**1,026.05****	6.34
				(439.83)	(134.50)
			Observations	140	165
			Eff. N: Left of c	70	81
			Eff. N: Right of c	22	45
			BW (h)	30.00	30.00
	Low	Low Fin. Dep.	Robust	**746.11***	-30.38
				(424.38)	(88.11)
			Observations	120	124
			Eff. N: Left of c	61	43
			Eff. N: Right of c	24	41
			BW (h)	30.00	30.00
Panel B: Asset Growth					
Demand	High	High Asset Growth	Robust	**359.75****	48.26
				(174.68)	(165.39)
			Observations	139	142
			Eff. N: Left of c	70	63
			Eff. N: Right of c	24	36
			BW (h)	30.00	30.00
	Low	Low Asset Growth	Robust	**87.00***	18.77
				(49.34)	(77.19)
			Observations	144	176
			Eff. N: Left of c	72	74
			Eff. N: Right of c	26	48
			BW (h)	30.00	30.00

Table A1: – cont.

Outcome				Bank borrowings	
				Supply	
				High	Low
				High ROA	Low ROA
Panel C: Age					
Demand	High	Young	Robust	**1,305.94*** **	193.82
				(392.60)	(156.90)
			Observations	82	91
			Eff. N: Left of c	36	42
			Eff. N: Right of c	17	24
			BW (h)	30.00	30.00
	Low	Old	Robust	**671.60***	-22.33
				(405.09)	(165.98)
			Observations	111	107
			Eff. N: Left of c	62	44
			Eff. N: Right of c	17	36
			BW (h)	30.00	30.00