What Happens to Quantity Transmission When Monetary Policy Transmission Through Prices is Mandated for Small Firms?*

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Abstract

Using a unique policy experiment in India where the central bank mandated banks to pass on policy rates almost one-to-one to small firms, we examine the relationship between the sensitivities of lending rates (price) and loan amounts (quantity) to policy rate cuts. We find that the two are negatively related: a 1% change in price sensitivity changes the quantity sensitivity by 12 basis points on the opposite side. In other words, when banks are forced to pass on policy rate cuts, they expand credit less than before in response to a similar rate cut. In terms of the mechanism, we show that banks have to incur monitoring expenses that increase with loan size while lending to small firms. Thus, in the absence of a mandate, banks use a part of the additional margin available to increase monitoring expenditure and credit supply. A mandate to pass on rate cuts constrains the ability of banks to increase monitoring expenditure and, consequently, reduce credit expansion in response to policy rate cuts. Firm-level investments and local-level economic growth also respond relatively slowly to policy rate cuts in a regime with increased interest rate transmission.

Keywords: Monetary Policy Transmission, Interest Rate, Benchmarking

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1 Introduction

How does a central bank mandate that exogenously increases the sensitivity of lending rates to policy rates ("price sensitivity") for small firms impact the sensitivity of loan amounts to policy rates ("quantity sensitivity")? The answer to this question is important as it will likely help better understand monetary policy transmission to small firms facing financial constraints. It is also likely to throw light on the relationship between price and quantity sensitivities for small firms. Because the two sensitivities are determined in equilibrium and can be influenced by other endogenous factors, it is hard to determine the relationship between the two in most extant settings.

We attempt to answer the above question using a unique policy experiment in India where the central bank exogenously altered the price sensitivity by forcing banks to use an interest rate benchmark directly linked to the policy rate while pricing loans to small firms. We use this exogenous change in price sensitivity to understand the transmission of monetary policy changes to small firms and also to study the impact of an exogenous change in price sensitivity on quantity sensitivity when the policy rates are reduced. We focus on policy rate cuts and not rate increases as the immediate pre- and the immediate post-period surrounding the regulation that we study involved rate cuts and not rate increases. Thus, we cannot use this exogenous shock to price sensitivity to examine the impact of policy rate increases.

An exogenous increase in price sensitivity could lead to a reduction in quantity sensitivity in response to a policy rate cut when banks face an upward-sloping marginal cost curve with respect to loan quantity for constrained firms (Ottonello and Winberry (2020), Mahoney and Weyl (2017), Agarwal et al. (2015)) and the rate cut constraints the ability of banks to incur such expenditure. The reason for the upward-sloping marginal cost curve could range from incrementally higher monitoring costs to a higher probability of default on larger loans (Bryan et al. (2024)). For instance, when the policy rate is reduced, a bank that does not reduce rates as much will be able to increase lending more than a bank that reduces rates fully in line with the policy rate. This is because the former bank can incur additional costs without compromising on its margins. In other words, increasing lending by incurring additional monitoring expenditure while keeping the overall profit margin largely unchanged could be an optimal response to a policy rate cut for some banks. In sum, under the above channel, when banks are forced to pass on policy rate cuts to borrowers, they expand lending less than under a regime where there is no such force.

However, if the increased price sensitivity in response to policy rate cuts eats mostly into

banks' markups and forces them to charge a price close to the competitive price[1], then an exogenous increase in price sensitivity could increase quantity sensitivity. Banks with power may find it more profitable to expand lending in response to a policy rate cut when they are mandated to pass through the price cuts and, hence, no longer optimize on price. In other words, lending could expand more for a given rate cut under a regime where price pass-through is mandated than a regime where banks are free to decide on the quantum of pass-through. The above contrasting possibilities make a case for an empirical examination of the relationship between price and quantity sensitivity to monetary policy changes.

The economic setting for our study is provided by an order issued by the Indian Central Bank (Reserve Bank of India or RBI) relating to benchmarks to be used by banks for pricing of loans to small firms starting October 1, 2019. The RBI believed that banks were not fully transmitting changes in policy rates to lending rates, especially in the case of small borrowers, under the existing regime where the loan pricing benchmark was based on marginal costs (Acharya (2017)). Therefore, they introduced a new regime, named the external benchmark lending rate (EBLR), which mandated price transmission.[2] The EBLR regulations require banks to use either the policy rate itself or the yield on short-term treasury security as a benchmark for pricing loans to small firms and retail borrowers. Even the spreads charged by banks are linked to the borrowers' credit assessment under the new regime. Thus, banks cannot easily adjust the spreads to offset the change in the benchmark rate. In compliance with the order, all banks used the policy rate as the benchmark for pricing loans to small firms.

Effectively, under EBLR, any change in policy rate directly and almost mechanically got transmitted to lending rates for small firms. Thus, price sensitivity in the post-EBLR period is exogenously determined. Therefore, the setting can be used to study how the sensitivity of loan amounts to policy rate cuts changes when interest rate cuts are passed on.

For identification, we use the fact that the benchmarking requirements were applicable only for banks and not for non-banks. Limiting the sample to small firms subject to the EBLR rules, we compare banks' and non-banks' price and quantity sensitivity before and after the EBLR regime by following the spirit of the identification used in Tantri and Vishen (2024). By creating a loan level panel and including firm $\times$ time fixed effects, we effectively compare within a firm and across lenders. We do not use the strategy of comparing Micro, Small, and Medium Enterprises (MSME) and non-MSME firms using the discontinuities provided by the MSME definition, as there were other interventions targeted at MSMEs

[1]This is akin to restricting the pricing power of a monopolist to get close to a competitive price using price caps (Dobbs (2004), Deneckere et al. (1997), Earle et al. (2007))

[2]See: `https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=11677&Mode=0`

during the COVID-19 period, which coincides with our EBLR period.[3]

There could be concerns about differences between banks and non-banks, especially those varying with the EBLR regime for reasons other than EBLR, causing our results. For instance, a concern could be that banks and non-banks have different capital adequacy ratios, and these differences could have increased during the EBLR regime due to the pandemic. Therefore, our results could be driven by differential responses to monetary policy based on the capital adequacy ratio and not due to EBLR. To address these concerns, we include the variable representing the capital adequacy ratio and the interaction between the above variable and monetary policy changes in all our regressions. Thus, any differential sensitivity due to differential changes in capital adequacy should be absorbed by these variables. We do this with all major observable differences.

We start our empirical analysis with a first-stage test. We find that a 1 percentage point cut in the policy rate is associated with a 1.7 percentage points differentially higher cut in lending rates by banks vis-a-vis non-banks in the post-EBLR period. Our result holds even when we include lags to policy rates within an impulse response framework. Thus, increased price sensitivity does not merely represent an increased speed of transmission but an overall increase in transmission.

Our main result is that an attempt to mandate the transmission of interest rates reduces credit expansion in response to policy rate cuts. We find that for a one percentage point decrease in policy rates, the loan amount expands by 20.4% lower in the post-mandate period than in the pre-mandate period. In other words, lower rates come with a lesser loan amount after the mandate than before. We do not find a pre-existing trend of decline in quantity sensitivity. Thus, our results are not due to continuation of pre-existing trends.

In the second part of the paper, we investigate the mechanism at work. We investigate whether forced pass-through of policy rate cuts crowd out monitoring expenses necessary to increase the supply of loans. We produce several pieces of evidence in line with the above mechanism. First, monitoring plays a bigger role when the loan is unsecured. Therefore, we expect the negative relationship between price and quantity sensitivity to be higher for unsecured loans. We find the above result. Second, we conjecture that unrated firms require a higher level of monitoring and, hence, are likely to be more impacted by increased price sensitivity, leading to changes in monitoring expenses. Our results are in line with the above hypothesis. Third, we also hypothesize that bank-firm pairs engaged in relationship banking

[3]Micro, Small, and Medium Enterprises (MSME) firms are defined according to the MSME Development Act of 2006. Before June 1, 2020, MSMEs were classified by investment in plant & machinery: under INR (Indian Rupee) 100 million for manufacturing and under INR 50 million for services. After June 1, 2020, MSMEs are defined by investment in plant & machinery below INR 500 million and turnover not exceeding INR 2,500 million. For a detailed comparison, see Table A1 of the online appendix.

are likely to be more impacted by the event. Relationship banking is based on the superior screening and monitoring ability of the lender. It is also well known that relationship lenders shield against financial frictions and intertemporally smooth price and quantity to make the loan terms incentive compatible for both the lenders and the borrowers (Petersen and Rajan (1995)). Our conjecture is that a restriction on price transmission is likely to adversely impact the relationship lenders' ability to smooth the loan terms and thus impact quantity transmission. We find this result as well. Fourth, we expect the results to be stronger in regions with more banking competition as there is less scope to adjust rents in such cases. Firms operating in such regions are more likely to adjust monitoring costs. We find the above result.

Finally, we develop a direct empirical measure of monitoring. We expect expenses relating to travel and communication and employee expenses to contain monitoring expenses. Our reasoning is that a higher level of monitoring is likely to require a higher level of employee travel to borrowers' business locations and a higher level of expenditure on communication due to frequent interactions with the borrowers. Consistent with our expectations, we find that monitoring expenses move less in line with the policy rates under the EBLR regime.

We then look at the heterogeneous impact on banks and firms. We expect banks with relatively higher duration of their deposits to be impacted more as they cannot easily cut down their interest costs in response to a reduction in interest income in the post-EBLR period. We find the above result in data: a one standard deviation increase in deposit duration is associated with a 49% decrease in the sensitivity of loan quantities to policy rates.

From the firm side, we find that investments of small firms having a higher proportion of bank credit become less sensitive to changes in policy rates. Thus, when policy rates are reduced, bank-dependent firms expand investments significantly lower than other firms. Investigating the macroeconomic impact, we find that the sensitivity of credit growth to policy rate changes is lower under the EBLR regime than before in districts having a relatively higher presence of small and medium firms subject to the intervention. We use district-level lending data provided by the RBI for the above test.

In the final part of the paper, we attempt to rule out alternative explanations and conduct robustness tests. First, we use the credit bureau data to show the external validity of our findings in the sample of retail borrowers. Second, we examine large borrowers who are not subject to EBLR. Here, we do not find any differential change in price and quantity sensitivity of non-banks and banks to policy rate changes in the EBLR regime when compared to before. Third, we also conduct several other placebo tests. Finally, we split our post-EBLR period into COVID and post-COVID periods and find that the results are qualitatively similar in

the post-COVID period as well. Given the above results, other endogenous factors, including COVID-related interventions, are unlikely to explain our results.

This paper contributes to the literature that investigates the role of financial frictions in the transmission of monetary policy and the consequent real effects (Bemanke and Gertler (1989); Bernanke and Gertler (1995); Bernanke et al. (1996)). Some of the well-known frictions include imperfect substitutability between deposits and bonds (Stein (1995); Kashyap and Stein (2000); Kashyap et al. (1993); Jiménez et al. (2012)), lending depending on bank and firm net worth due to information asymmetry and agency issues (Kiyotaki and Moore (1997); Holmstrom and Tirole (1997); Gertler and Gilchrist (1994); Bernanke et al. (1996); Jiménez et al. (2014); Bolton and Freixas (2006); Bhardwaj et al. (2022)) and market power of banks and deposit franchises arising due to that (Drechsler et al. (2017, 2021)). Most of the frictions are known to amplify the transmission of monetary policy. Even the recent literature has shown that these additional effects due to financial frictions persist despite development in financial markets and show up even in a sample of large US firms (Ottonello and Winberry (2020); Gürkaynak et al. (2022); Cloyne et al. (2023); Jeenas (2023))

To our knowledge, this literature has not investigated the relationship between price and quantity transmissions in a financially constrained environment. Therefore, it is hard to predict what will happen to quantity transmission when price transmission is mandated. The fact that both of these are determined in equilibrium is a challenge that is difficult to surmount normally. We attempt to overcome the above challenge using an exogenous change in price transmission. We find that an attempt to increase price transmission reduces quantity transmission. We argue that banks face an upward-sloping marginal cost curve for loans to constrained firms. A mandate to pass on policy rate cuts constraints the ability of banks to incur such expenditure and expand lending.

We also contribute to the broader literature on relationship banking that investigates the ways and means through which banks finance informationally opaque small firms (Boot (2000)). These papers show that banks have to incur monitoring costs, and such costs could be upward-sloping with loan amounts due to a lack of collateral from the borrower (Rajan (1992); Boot and Thakor (2000); Bharath et al. (2011); López-Espinosa et al. (2017); Li and Strahan (2021); Paravisini et al. (2023)). For the same reason, loan defaults or loss-given defaults also could be upward-sloping. Due to considerations of moral hazards induced by high interest rates, banks generally recover these costs by inter-temporarily adjusting interest rates and margins (Petersen and Rajan (1995)). We add to these findings by showing that flexibility in terms of pricing is necessary to extend relationship loans. Curtailment of this flexibility by regulatory intervention could constrain relationship lending.

2 Institutional Details

2.1 Monetary Policy Implementation in India

The Reserve Bank of India (RBI or the central bank) is the institutional body that sets the monetary policy in India. The primary mandate of the RBI in conducting the monetary policy is to maintain price stability. The repo rate is the RBI's primary tool to implement monetary policy. It is the fixed interest rate at which commercial banks can borrow reserves from the central bank by pledging eligible securities as collateral. These repo transactions are short-term, ranging from overnight to thirty days, after which the borrowing bank repurchases the pledged securities from the RBI.

On a day-to-day basis, the RBI strives to ensure a smooth transmission of its monetary policy by maintaining the interbank lending rate (call rate) within a tight corridor around the repo rate. It conducts appropriate auctions of securities to influence the call rate. The auction it conducts to absorb (release) reserves and raise (reduce) rates in the interbank market is known as the variable rate reverse repo auction (variable rate repo auction).

In the past, the central bank has expressed concerns about the slow transmission of monetary policy on several occasions. The statements from central bank officials indicate that they were particularly worried about slow or lack of transmission of rate cuts to small firms.[4] Accordingly, the central bank implemented several policy measures to improve monetary policy transmission. Starting July 1^{st} 2010, they introduced the base rate system where banks were required to use a benchmark linked to their costs (Tantri and Vishen (2024)). They modified the system further from April 1^{st} 2016 and asked banks to use marginal cost of funds instead of average costs while deciding their benchmark rates. However, several internal reports of the central bank indicated that despite these changes, the transmission of monetary policy changes into lending rates remained slow and incomplete.[5]

2.2 The External Benchmarks Lending Rate (EBLR) Framework

With a view to improving the transmission of monetary policy changes, the central bank decided to introduce the External Benchmarks Lending Rate (EBLR) regime starting October 1, 2019. Under the EBLR framework, it mandated commercial banks to benchmark all new floating-rate retail loans and floating-rate loans extended to Micro and Small Enterprises to one of three prescribed external benchmarks: the RBI repo rate, the Government of India's three-month Treasury Bill yield, or the Government of India's six-month Treasury

[4]See: https://www.rbi.org.in/commonman/English/scripts/Notification.aspx?Id=786

[5]See: https://rbi.org.in/scripts/PublicationReportDetails.aspx?ID=878. Also see: https://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/01SP111217CBEF9077A25C48329B484120A3EF9B2F.PDF

Bill yield.[6] The scope of the framework was subsequently expanded to include Medium Enterprises, effective April 1, 2020.

Because the EBLR regulation was applicable specifically to the Micro, Small, and Medium enterprises (MSMEs), we restrict our sample to MSMEs in our main tests. We use the MSME definition as per the Micro, Small, and Medium Enterprises (MSME) Development Act of 2006. As per the act, manufacturing (service) firms with an investment of INR 100 (50) million and below in plant and machinery (equipment) are considered MSMEs.[7] The limits were revised to INR 250 million for manufacturing and service firms, and an additional criteria of INR 2500 million in sales was also added. Thus, the definition of MSMEs is time-varying in our sample period. We tabulate the pre and post-2020 MSME definitions in Table A1 of the online appendix.

The new framework marked a significant departure from previous regimes by mandating the use of external reference rates rather than internally determined benchmarks. The framework stipulates that banks must adopt a uniform external benchmark within each loan category.

Further, the new framework regulates the spread as well. The credit risk premium component of the spread should be linked to the borrower's credit risk profile, and may undergo change only when there is a significant change in the credit assessment of the borrower. Furthermore, the framework allows banks to revise their operating costs, which is another significant component of spreads, only once every three years. The above restrictions aim to prevent banks from using spread adjustments to neutralize the impact of policy rate changes. We have reproduced the RBI circular that mandated EBLR in section B of the online appendix.

Our preliminary analysis using the MCA data shows widespread adoption of the EBLR. We find that close to 70% of the new loans issued to MSMEs under the EBLR regime are benchmarked to the repo rate, 21.4% are benchmarked to marginal costs, and 6.53% are benchmarked to the base rate. For the remaining 2.07%, we are unable to ascertain the benchmark used as the descriptions in the database are not clear. The EBLR regime was mandatory only for banks. Accordingly, we find that only in 4.17% of the MSME loans do non-banks use an external benchmark when banks had to use an external benchmark.

[6]Note that a large proportion of loans issued in India are floating rate loans (Acharya (2017), Das (2015)).
[7]INR is an abbreviation for Indian Rupee.

3 Hypothesis

This paper focuses on understanding the likely impact of a mandated transmission of policy rate cuts on the responsiveness of loan amounts to monetary policy. As stated in the Introduction, based on the findings of the extant literature on monetary policy transmission in the presence of financial frictions, it is difficult to ascertain the impact ex-ante. A case can be made for both an increase or a decrease in quantity sensitivity when price sensitivity increases.

The relationship banking theory(Rajan (1992); Boot and Thakor (2000); Petersen and Rajan (1995)) posits a banking system where banks make substantial fixed and variable investments in understanding and monitoring opaque borrowers. Banks are required to continuously monitor relationship borrowers to ensure effort and optimal project selection. Thus, their investments in expertise and monitoring allow the banks to lend in environments in which agency and information frictions exist. It is possible that the higher the loan amount, the higher the required spending on monitoring, leading to an upward-sloping marginal cost of lending (Ottonello and Winberry (2020)).

Given the above description, the interest rate charged by a bank can be divided into three components: cost of funds, monitoring costs, and markup. Of course, the optimal markup depends on the elasticity of demand faced by the bank. Here, we assume that the policy rate largely determines the cost of funds. Monitoring costs are linked to the quantity of lending and, therefore, are determined in equilibrium based on equilibrium quantity.

We can now analyze what happens to lending rates and quantity when policy rates go down. Banks are likely to re-optimize and choose a different level of quantity and markup in response. Depending on the shape of the demand curve and the power of the bank, different possibilities are likely to emerge. One possibility is that banks expand lending by increasing monitoring costs and do not change markups by much. There is also a possibility of banks using the extra margin mostly to shore up markups, and lending does not respond much.

What happens to lending when regulators force the banks to pass on the rate cuts? Such a mandate can lead to a lower responsiveness of lending to policy rate if the mandate disproportionately reduces monitoring expenses rather than markups at the new equilibrium. In other words, for a similar level of rate cuts, lending expansion is lower under the mandated regime than before. By contrast, if the mandate mostly eats into monopoly rents and does not reduce banks' ability to incur monitoring costs (Dobbs (2004), Deneckere et al. (1997)), lending response to policy rate cuts either may not change or even increase under the mandate. The eventual outcome crucially depends on the structure of the banking market and the behavior of banks and can be discerned only through an empirical investigation.

4 Data

Our empirical analysis draws upon three primary datasets: the loan-level data from the Ministry of Corporate Affairs (MCA), the firm-year level financial data from the Prowess database maintained by the Center for Monitoring Indian Economy (CMIE), and the regulatory and macroeconomic data from the Reserve Bank of India (RBI). We provide a detailed description of each dataset below.

The MCA dataset is at the loan level and contains information on interest rates. However, the dataset is limited to only secured loans. Therefore, we use the MCA database for tests relating to interest rates. We construct the dataset at the loan level using the loan contracts data obtained from the MCA. The MCA database contains information on secured borrowings by Indian firms. This dataset is particularly comprehensive due to the statutory requirement under The Companies Act (2013) that mandates the registration of all secured loans with charge creation.[8] We procure the raw loan contract files from the MCA for a fee per firm. We had a budget constraint for the project. Therefore, we selected a random sample of 6000 firms for which we procured the loan-level data from the MCA. These contract files contain detailed information about borrower and lender identities, loan disbursement dates, amounts, interest rates, repayment schedules, and any subsequent modifications in the loan contracts.

The MCA dataset does not have information on borrower and bank financials. We obtain this information from the Prowess database maintained by the CMIE. We merge the two databases using the Corporate Identification Number (CIN) for firms and identify 4,025 unique firms that are common in both datasets. We use this dataset for tests relating to interest rates. Further, some of the control variables we use represent time-varying bank-level characteristics. We obtain the data on these variables from the Prowess database for the lenders mentioned in the MCA database. As there is no unique identifier for lenders in the MCA loan-level database, we implement a fuzzy matching technique followed by manual verification to merge the lender names with the prowess database. Subsequently, we cross-referenced with the RBI's official list to classify lenders as either banks or non-banks.

We present the sample construction details in Table 1. The sample period for our analysis is between the financial years 2017 to 2023.[9] The pre-intervention period ranges from April 1st, 2016 to October 1st, 2019. The post-intervention is after October 1, 2019. Out of the 4,025 unique borrowers, 1,477 are MSMEs. The dataset contains 19,624 loan-level

[8] A charge, as defined per the Companies Act, is a right created by the borrower on its assets and properties in favor of a lender. The charge date denotes the date of loan filing to the government to create a charge on the loan.

[9] The Indian financial year starts in April and ends in March.

observations. Out of these, 3,462 loans are borrowed by MSMEs. There are 46 banks and 30 non-banks.

We use data from CMIE prowess and not MCA data for tests involving loan amounts, while we use the MCA data for tests involving interest rates. This is because, for each firm-year pair, the CMIE Prowess database provides information about their total loans, loans from banks, and loans from non-banks. Further, the dataset includes unsecured loans as well. By contrast, the MCA dataset covers only the secured loans. However, the CMIE prowess dataset does not identify the lender who issued a specific loan and does not have information on interest rates. We organize this data at a firm-lender type-year level. Lender type here refers to banks and non-banks. Thus, every firm year has two observations, one representing banks and the other non-banks.

There are 38,697 unique firms in the Prowess database. To identify whether a firm is an MSME, as per the official definition, we need information on investments in plant and machinery and revenue. Information on these variables is available for 29,168 firms. Of these, 16,133 are MSME firms. Of the MSME firms, 3,900 have positive new borrowings from both banks and non-banks. The above sample results in 10,848 observations in our firm-lender type-year level panel.

The prowess database provides data related to borrowings for firms. As explained in section 5, the EBLR framework was applicable to retail loans as well. Therefore, to establish the external validation of our thesis on retail loans we obtain the data on retail loans at the customer-lender type level from a large credit bureau in India. The above database provides us with the masked unique identifier of the customer, the lender type that lets us differentiate between banks and non-banks, the date on which the loan was issued, and the date on which the loan was fully repaid.

We collect the monetary policy and regulatory data from the RBI's website. The RBI reports repo rates at daily frequencies. We compute the weighted average monthly and yearly repo rates for our sample period, weighing the daily repo rate by the number of days for which that repo rate persisted. Additionally, we obtain two key regulatory datasets from the RBI: a comprehensive list of banks and non-banks, and aggregate lending data at the district-year level.

4.1 Summary Statistics

In Table 2, we summarize all dependent and explanatory variables used in the paper. We present the number of observations, mean, median, the first and the 99th percentile for all variables. The sample is limited to MSME firms. Panel A summarizes the loan-level data.

The average interest rate is close to 9%, and the average loan amount is close to INR 122 million. Panel B summarizes firm-year level variables used as controls in our firm-year level tests. On average, the firms are profitable, with an average leverage ratio of around 40% and positive investments. The average borrowings from banks per year (INR 268 million) is lower than the average borrowings from non-banks (INR 337 million).

Panels C and D summarize the lender-year-level variables that we use in our lender-year level and firm-lender-year level tests. The banks have an average return on assets of 5% and a gross NPA ratio of 5%. Non-banks appear slightly less healthy, with an average return on assets of 4.5% and a gross NPA ratio of 5.2%. Panel D summarizes the lender-firm-year level variables. These variables represent the time-varying strength of bank-firm relationships. Finally, Panel E presents the summary of the monetary policy rate- the repo rate. We define the main variables in Table A2 of the online appendix.

5 Empirical Strategy

As elaborated in section 2.2 above, the EBLR regulation specifically applied to lending by banks to MSME firms, mandating that interest rates for these loans be tied to an external benchmark. Thus, a potential identification would involve comparing the effects of monetary policy transmission between the MSME firms and large firms. However, this approach faces two significant complications, introducing endogeneity concerns.

First, the post-EBLR period coincides with the COVID-19 pandemic, during which the government and regulators implemented a series of interventions specifically targeting MSME firms. These interventions included the Emergency Credit Line Guarantee Scheme (ECLGS) and a moratorium on loan repayments.[10] Thus, the government measures provided additional liquidity and risk buffers specifically for MSMEs, which could affect their cost of credit independently of the EBLR. Therefore, these interventions potentially confound the differential impact of the EBLR on monetary policy transmission to MSME firms if we compare MSMEs with non-MSMEs. Even the use of a sharp cutoff at MSME definitions is unlikely to help as these other interventions also vary at these cutoffs.

Second, as discussed in Section 2, while the EBLR mandate specifically targeted MSME lending, the regulation did not restrict them from using external benchmarking for other loans. We find in our data that banks often extended this practice to their floating-rate loan portfolio, including loans to large borrowers.[11] Given the above limitations, the comparison

[10] ECLGS was a scheme launched by the government of India to incentivize lenders to provide credit of up to Rs. 3 lakh crore to MSMEs at low cost during the COVID crisis.

[11] Table A3 of the online appendix provides data related to the usage of the EBLR framework by lenders for MSMEs versus large borrowers.

between MSME firms and large firms could potentially obscure the true impact of the EBLR regulation on monetary policy transmission.

Therefore, we employ an identification strategy that uses the fact that EBLR regulation did not apply to non-banks and makes a comparison between banks and non-banks within the sample of MSME firms. This strategy is more appropriate for the following two reasons. First, our comprehensive review of regulatory interventions of the COVID period reveals that while various relief measures were implemented for MSMEs, none created differential treatment between banks and non-banks in terms of lending practices or interest rate setting mechanisms. Particularly, interventions such as the ECLGS and loan moratoriums were uniformly applicable across all types of lending institutions. Further, unlike banks that extensively adopted EBLR for lending to MSME firms, non-banks continued to use their existing benchmarking frameworks.[12]

However, a potential concern could be that the firms that borrow from banks and non-banks can be systematically different. To alleviate the above concern, we include firm $\times$ time fixed effects in our panel specifications. The fixed effects absorb time-varying and time-invariant shocks to the cross-section of firms. Thus, we make comparisons within each firm across banks and non-banks (Khwaja and Mian (2008)).

A second concern is related to systematic differences between banks and non-banks. As we describe in detail in Section 5.1, we rule out the mechanical continuation of pre-existing trends causing our results. Thus, differential pre-trends due to pre-existing differences cannot explain our results.

However, the worry could be about the time-varying impact of systematic differences between banks and non-banks. For instance, size is one difference between banks and non-banks. Suppose, for some reason, the transmission of monetary policy changed differently for large and small financial institutions. In that case, it may be argued that our results would have manifested even in the absence of the EBLR regime, as non-banks are systematically smaller than banks.

To address this concern, we first make a list of observable differences between banks and non-banks following Acharya et al. (2020). These characteristics are lenders' size, non-performing assets to total assets ratio, capital adequacy ratio, and return on assets. We include the interactions of these variables with the indicator variable representing the EBLR regime. We also include the triple interaction between the variables representing the observable differences, the indicator variable representing the EBLR regime, and monetary policy

[12]Refer to Table A4 of the online appendix for data related to the usage of the EBLR framework by banks and non-banks. Banks used the EBLR framework in approximately 66% of loans in our dataset, while non-banks used the framework in only 3% of loans.

changes. In our firm-time-lender type panels, we consider the average characteristics of the lender-types in a year.

The double and triple interaction terms described above are likely to absorb the impact of observable differences varying with the EBLR and also those that differentially vary after the EBLR regime in response to policy changes.

5.1 First Stage: Policy Rate Transmission to MSME Interest Rate

Our empirical analysis begins with a first-stage test examining the effectiveness of the EBLR regime in the transmission of monetary policy rates to lending rates for MSME firms. As discussed in Section 3, we expect banks to show a differentially higher transmission of policy rates to lending rates on loans issued to MSME borrowers.

To examine the thesis, we estimate the following specification using loan-level panel data limited to MSME borrowers. Our analysis utilizes the merged dataset, which combines loan data from MCA with the Prowess database. The sample period is 2017 to 2022.

$$\begin{aligned} Y_{ijt} =& \beta_0 + \beta_1 \cdot (Post_t \times Bank_j \times Repo_{m-1}) + \beta_2 \cdot (Post_t \times Bank_j) + \beta_3 \cdot (Bank_j \times Repo_{m-1}) \\ &+ \beta_4 \cdot (Post_t \times Repo_{m-1}) + \beta_5 Repo_{m-1} + \beta_6 Post_t + \beta_7 X_{jt} + \gamma_{it} + \delta_{ij} + \epsilon_{ijt} \end{aligned} \tag{1}$$

The dependent variable Y_{ijt} is the interest rate charged by lender j to firm i on a loan issued on date t. $Repo_{m-1}$ is the weighted average repo rate for the previous month. The variable $Post_t$ takes a value of 1 after the RBI implemented the EBLR framework, which became effective on October 1, 2019, and 0 for the period before that. The bank indicator $Bank_j$ is set to 1 if the lender is a bank and 0 if it is a non-bank. We use the firm $\times$ year (γ_{it}) and firm $\times$ lender (δ_{ij}) fixed effects, as described in Section 5. We double-cluster the standard errors at firm and time levels. The control variables included in X_{jt} are as listed in section 5 above. Additionally, we include the outstanding loan between the lender-firm pair in the previous year as a control variable to factor in the time-varying bank-firm relationship. We also include the interaction of the control variables with $Repo_{m-1}$.

The key interaction term of our interest $Post_t \times Bank_j \times Repo_{m-1}$ assesses whether there is a differential transmission of the repo rate to the interest rate between banks and non-bank lenders in the post-regulation period. According to our hypothesis, we expect the coefficient to be positive and statistically significant, indicating that banks exhibit a stronger transmission of repo rate changes to lending rates in the post-regulation period than non-bank lenders.

Table 3 presents the regression estimates. Columns (1) and (2) show the results with a

sample limited to MSME borrowers. We include bank-year level control variables described in Section 5 and their respective interactions with *repo* in column (2). We also include firm $\times$ year and firm $\times$ lender-level fixed effects in all columns.

For exposition, consider column (1) of the table. The coefficient on the triple interaction term is positive and statistically significant. The magnitude of the coefficient implies that a 1 percentage point decline in repo rate is associated with 1.7 percentage point higher decline in interest rates on loans issued by banks vis-a-vis non-banks in the post-EBLR period. This suggests that banks showed stronger transmission of repo rate cuts to lending rates compared to non-banks.

We exploit the fact that banks were not mandated to extend the EBLR regulation to non-MSME borrowers to conduct a placebo test. We do not expect the policy rate transmission to increase for non-MSME borrowers. To test the thesis, we estimate the same specification 1 using a sample limited to non-MSME firms. We present the results in columns (3) and (4) of Table 3. We include bank-year level control variables and their respective interactions with *repo* in column (4). The effects observed are considerably smaller. The triple interaction term has a coefficient that is statistically indistinguishable from zero in the saturated specification in column (4).

Pre-trend: We also plot the average interest rates separately for banks and non-banks along with the policy rate in figure 1. We plot the figures separately for loans to MSMEs and non-MSMEs in panels A and B, respectively. We find no differential transmission of policy rates to interest rates in the pre-EBLR period. On the other hand, in the post-EBLR period, we find that the banks' interest rates respond more to policy rates in the case of MSME borrowers. However, we do not observe any effect post-EBLR in the case of non-MSME borrowers. The results are consistent with our formal regression analysis, which is shown above.

Impulse Response: We use a distributed lag framework to analyze how interest rates respond to changes in policy rates over time. This approach helps study the speed and magnitude of monetary policy transmission across banks and non-banks in the pre and post-EBLR periods. The results are shown in figure 2. For banks, the pre-EBLR period shows no significant pass-through, with all statistically insignificant coefficients until the fourth month. In the post-EBLR period, the response is much stronger and occurs immediately in the first month. Non-banks display different patterns. The pre-EBLR period shows volatile but insignificant transmission, while the post-EBLR period shows muted responses. These results suggest that EBLR significantly improved the overall monetary policy transmission through the banking channel, but there was no differential change in transmission for non-banks.

5.2 Policy Rate Transmission to MSME Borrowing

Having established a differential increase in the transmission of policy rates to interest rates of banks, we proceed to test our main question related to lending. As per the thesis described in section 3, the consequence of a forced transmission of policy rates to interest rates for transmission to lending is ambiguous. Therefore, we investigate the differential transmission of policy rates to borrowing by MSMEs from banks after the EBLR regime. To examine the hypothesis, we use the total borrowings and bank borrowings of firms from the Prowess database. We estimate the non-bank borrowing by deducting bank borrowings and borrowings from related parties from the total borrowings.

Having obtained firms' bank and non-bank borrowings, we create a firm-lender type-time panel of firms' borrowings. The dimension lender type identifies banks and non-banks. Next, we estimate the following regression specification after limiting the data to MSME borrowers. The sample spans 2017 to 2023. During this period, the lagged policy rates either went down or remained unchanged.

$$\begin{aligned} Y_{ijt} = \beta_0 + \beta_1 \cdot (Repo_{t-1} \times Post_t \times Bank_j) + \beta_2 \cdot (Repo_{t-1} \times Post_t) + \beta_3 \cdot (Repo_{t-1} \times Bank_j) \\ + \beta_4 \cdot (Post_t \times Bank_j) + \beta_5 \cdot Repo_{t-1} + \beta_6 \cdot Post_t + \beta_7 \cdot X_{jt} + \gamma_{it} + \alpha_j + \epsilon_{ijt} \end{aligned} \tag{2}$$

The dependent variable Y_{ijt} is the natural logarithm of borrowing amount by firm i from lender-type j in year t. $Repo_{t-1}$ is the weighted average repo rate in the previous year. The weighted average repo rate is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. As the RBI-mandated EBLR became effective for SMEs on October 1, 2019 and for Medium firms on April 1, 2020, the variable $Post_t$ takes a value of 1 after the year 2020 and 0 for the years before that. The bank indicator $Bank_j$ is set to 1 if the borrowing is from a bank and 0 if the borrowing is from a non-bank. The key interaction term of our interest $Post_t \times Bank_j \times Repo_{t-1}$ assesses whether there is a differential transmission of policy rates to lending amounts by banks compared to non-bank lenders in the post-regulation period.

We use the firm $\times$ year (γ_{it}) and lender type (α_j) fixed effects, as described in section 5. We double-cluster the standard errors at firm and year levels. The control variables included in X_{jt} are as listed in section 5 above. Additionally, we include the outstanding loan between the lender type-firm pair in the previous year as a control variable to factor in the time-varying bank-firm relationship. We also include the interaction of the control variables with $Repo_{t-1}$.

Table 4 presents the estimates of the above regression. Columns (1) & (2) present the

estimates for samples limited to MSME firms. In Column (2), we include lender type-year level control variables and their respective interactions with *repo* in the specifications. Consider Column (1) of the table. The coefficient of Post × Bank × Lag repo is positive and statistically significant. The coefficient of 0.186 implies that in the post-mandate period, the transmission of policy rates to bank borrowing of MSME firms significantly weakened. When the repo rate decreases by one percentage point, expansion in MSME borrowing through banks reduces by 20.4%, compared to non-bank borrowing. The results are even more pronounced when we include control variables in Column (2).

Thus, the mandatory pass-on of policy rates during periods of rate reductions results in a slower expansion of bank lending in the EBLR regime than before.

As a placebo test, we hypothesize that there will be no significant difference in monetary policy transmission between banks and non-banks for non-MSME lending. To test the thesis, we estimate specification 2 using a sample limited to non-MSME borrowers. We present the results in columns (3) and (4) of Table 3. The coefficient of the triple interaction term is statistically insignificant and cannot be distinguished from zero. The result suggests that the policy rate transmission to borrowing did not reduce for non-MSME firms. The above results are consistent with the thesis that banks expand lending relatively less in response to cuts in policy rates.

Impulse Response: We use a distributed lag framework to analyze how borrowing amounts respond to changes in policy rates, similar to the interest rate section. The results are shown in Figure 3. For banks, borrowing volumes in the pre-EBLR period show a negative response to policy rates in the first year after the policy rate change. However, in the post-EBLR period, borrowing volumes do not show a significant response to policy rates. In the case of non-banks, we do not observe any contrasting change in transmission post-EBLR. These results are consistent with the formal regression analysis. The EBLR regime resulted in a decline in the transmission of policy rates to borrowing in the case of banks but not in the case of non-banks.

6 Mechanism

Next, we investigate the mechanism that drives the results presented in Section 5.2. As discussed in Section 3, a possible explanation for the reduced quantity transmission is the inability of banks to increase monitoring costs due to the EBLR rule. We attempt to tease out the proposed mechanism by exploiting cross-sectional variations across firms and loan characteristics in lenders' incentives to monitor.

6.1 Unsecured versus Secured Borrowings

Unsecured loans rely heavily on the lender's monitoring efforts to manage credit risk. In contrast, secured loans are backed by collateral and provide lenders with a fallback option in the event of a default by the borrower. Therefore, monitoring costs play a bigger role in lending decisions in the case of unsecured lending (Benmelech et al. (2024); Jackson and Kronman (1978)). Hence, we expect the reduction in lending expansion in response to policy rate cuts post-EBLR mandate to be higher in the case of unsecured lending.

To investigate the above thesis, we split the bank and non-bank borrowings into secured and unsecured borrowings. To measure unsecured borrowing, we combine data from two sources. We obtain total bank and non-bank borrowings from the Prowess database and secured borrowings from the Ministry of Corporate Affairs (MCA) database. The difference between these two amounts gives us the unsecured borrowing for each firm-year observation in our sample for both banks and non-banks. We create firm-lender type-time panels separately for unsecured and secured borrowings with data limited to MSME borrowers. We then estimate regression specification 2 using the above data.

We present the results in Table 5. In columns (1) and (2), we present the results for unsecured loans, while in columns (3) and (4) we present the results for secured lending. We include bank-year level control variables listed in section 5.2 and their respective interactions with $Repo_{t-1}$ in the even-numbered columns. We also include firm $\times$ year and lender-type fixed effects in all columns. Consider column (1) of the table. The coefficient on the triple interaction term is 0.129 and significant at the 10% level. The magnitude indicates that when the repo rate decreases by one percentage point, the borrowings from banks expand differentially less by 13.7% compared to the non-banks post-EBLR mandate. When we include control variables in column (2), the triple interaction coefficient strengthens to 0.178 and becomes significant at the 1% level.

We observe a markedly different pattern for secured loans, shown in columns (3) and (4). The triple interaction term is statistically insignificant in both specifications, indicating no differential transmission of monetary policy through the bank channel for secured loans in the post-EBLR period.[13] This suggests that the differential change in the transmission of monetary policy to borrowings from banks is primarily occurring through the unsecured lending channel in the post-EBLR period. The results are consistent with the thesis that the decline in the transmission of policy rate cuts to lending is mediated through monitoring costs.

[13]A test for the difference between the coefficients in the two regressions reveals that the difference is statistically significant.

6.2 Rated versus Unrated Borrowers

The next cross-section that we exploit to support our proposed mechanism is the firms' rating status. The lack of a credit rating in unrated firms increases information asymmetries between the borrower and the lender, making monitoring more critical for such firms (Amiram et al. (2018)). Hence, if the monitoring cost is the mediating mechanism, we expect the results to be more pronounced for ex-ante unrated borrowers. To test this thesis, we collect credit rating data on firms from the Prowess database. We classify a firm as 'rated' if it has at least one credit rating in the pre-EBLR sample period. Firms without any credit ratings during this period are classified as unrated. We then estimate equation 2 separately for the two samples for the period FY 2017 to FY 2023.

Table 6 presents the estimates of the above regression. Columns (1) & (2) represent the results for firms without credit ratings. Columns (3) & (4) present the results for firms with credit ratings. Columns (2) & (4) include the bank-year level control variables listed in section 5.2 and their respective interaction with $Repo_{t-1}$. The sample is limited to MSME borrowers.

Consider column (1) of the table. The coefficient on the triple interaction term is positive and statistically significant at the 5% level. The magnitude of the coefficient indicates that when the repo rate decreases by one percentage point, the borrowings from banks expand differentially less by 33.3% compared to the non-banks post-EBLR mandate. When we include control variables in column (2), the triple interaction coefficient remains positive and statistically significant. For rated firms, shown in columns (3) and (4), we observe that the coefficient on the triple interaction term is lower at 0.165 in column (3). This indicates a smaller magnitude of differential lending behavior for rated firms. A t-test of the difference between the coefficients in the two samples reveals that the difference is statistically significant. The above finding supports monitoring cost as the mechanism mediating the relationship between transmission to lending and transmission to prices.

6.3 Relationship Banking

A well-established fact in the literature is that relationship lenders possess higher monitoring and screening ability. They are able to overcome borrower moral hazard by intertemporally smoothening loan terms (Petersen and Rajan (1995)). However, a mandatory pass-through of the policy rates potentially blunts the ability of lenders to extend such terms by constraining their monitoring expenses. Therefore, if the monitoring cost channel plays the central role in the decline in transmission of policy rate cuts to lending quantity, we expect the decline in transmission to be higher in firms that participate in relationship borrowing. To test the

thesis, we create a measure of relationship lending in the spirit of Tantri and Vishen (2024).

We construct a composite measure of the ex-ante relationship to capture the multifaceted nature of the lender-firm relationship. This measure has three independent dimensions: the bank's industry-specific lending expertise (Boot and Thakor (2000), Paravisini et al. (2023)), its branch presence in the firm's geographical area (Bolton et al. (2016), Agarwal and Hauswald (2010)), and the intensity of past lending interactions between the bank and the firm (Bharath et al. (2011)). The analysis utilizes data from the MCA loan-level dataset, Prowess database, and RBI data for bank branch locations, covering the pre-EBLR period.

The first dimension measures a bank's industry-specific lending expertise. We consider a bank to possess industry-specific lending expertise when a significant proportion of its loan book is in that given industry. Using the MCA loan-level dataset, we calculate the proportion of a bank's lending in each industry relative to its total loan book as of the year 2020. Industry classification for a firm is determined using 2-digit National Industrial Classification(NIC) codes obtained from the Prowess database. For each bank, we divide the industries into two groups: 1) industries in which banks' exposure is above the median value of industry exposure in the sample; and 2) industries in which banks' exposure is below the median value of industry exposure in the sample. The respective bank is said to be an expert in the industries belonging to the first group. Specifically, we create an indicator variable that takes a value of one for bank-industry pairs in which the bank has expertise in the corresponding industry and zero otherwise.

For the second dimension, we construct a measure of geographical proximity to assess whether a bank has a branch presence in the district where a firm's registered headquarters is located (Bolton et al. (2016)). Proximity between a bank's branch and firm reflects the ease of access and the potential strength of the lender-firm relationship. We use data about the districts in which firms' headquarters are located from Prowess and combine it with the banks' branch location data from the RBI. We calculate the ratio between the number of branches of the respective bank and the total number of banks in the district as of the year 2020 to capture the density of that bank's presence in that district. For each district, we calculate the median branch presence ratio across all banks and then classify them accordingly: banks with above-median ratios are designated as having high district exposure, while those with below-median ratios are classified as having low district exposure.

To create the measurement along the third dimension, we assess the intensity of past lending interactions between a bank and a firm by identifying firm-bank pairs that engaged in more than two loan transactions during the five years preceding 2020. We create an indicator variable where a value of 1 represents firm-bank pairs with more than two transactions, and a value of 0 represents pairs with two or fewer transactions.

Thus, we create three indicator variables, each for one dimension, as described above. We merge the three indicator variables with the firm-bank level panel based on the prowess data on firms' bankers. We merge the first measure based on the industry to which the corresponding firm belongs. We merge the second measure based on the district in which the corresponding firm is headquartered. The third measure is at the firm-bank level, so merging is straightforward. We then sum up the three indicator variables to arrive at an overall 'relationship' score. The highest possible score is 3 (when all three indicator variables are 1), and the lowest is 0 (when all indicator variables are 0). We classify firm-bank pairs with scores above the median score as relationship pairs. Finally, we identify firms that have at least one relationship bank based on the above measure.

We then estimate regression specification 2 separately for firms with at least one relationship bank and firms with no relationship bank. Table 7 presents the estimates of the above regression. Columns (1) & (2) represent the results for firms that are involved in relationship borrowing. Columns (3) & (4) present the results for firms that are not involved in relationship borrowing. Columns (2) & (4) include the control variables listed in section 5.2 and their respective interaction with $Repo_{t-1}$. The sample is limited to MSME borrowers.

Consider column (1) of the table. The coefficient of Post × Bank × Lag repo is positive and statistically significant at the 10% level. The coefficient is positive and statistically significant at the 1% level in column (2) when we include control variables and their respective interactions with *repo*. This indicates that when the repo rate decreases by one percentage point, banks expand lending differentially less by 69% than non-banks in the post-EBLR period in the case of firms with relationship banks.

For non-relationship borrowers, shown in columns (3) and (4), we observe a markedly different pattern. The triple interaction coefficient (Post × Bank × Lag repo) is 0.025 in column (4), suggesting an economically smaller impact for non-relationship borrowers. This suggests that the reduced transmission of monetary policy through bank lending during easing is substantially stronger for relationship borrowers in the post-EBLR period, with coefficients roughly 20 times larger than for non-relationship borrowers. A t-test of the difference between the coefficients in the two samples reveals that the difference is statistically significant. The results are consistent with our thesis that the decline in transmission to loan quantity is significantly higher in the case of MSME borrowers who participate in relationship borrowing.

6.4 Bank competition

As stated in Section 3, a lender faces a trade-off between monitoring cost and margin when setting interest rates. The trade-off exists only in cases where lenders have significant market power. In highly competitive markets, banks can afford not to pass on policy rate cuts only when they incur monitoring expenses and increase lending. They cannot use the rate cuts to increase margins. Therefore, any force to pass on policy rate cuts will likely impact the banks' ability to incur monitoring expenditure and expand lending more in such markets compared to markets with less competition. Thus, if the monitoring cost is the channel responsible for lower transmission to lending quantity in the post-EBLR period, we expect the decline in transmission to be higher in regions with ex-ante high banking competition.

We test the above thesis by identifying regions with high banking competition. To identify such regions, we obtain the district-level count of bank branches as of the year 2020 from the RBI website. We then calculate the ratio between the number of bank branches of the respective banks and the total bank branches in the district. We take a square of the above ratio and add the squares at the district level. The above calculation gives us the Herfindahl-Hirschman Index (HHI) of bank presence in the district, measuring the concentration of banks in that district. Then, we divide the district into two groups: 1) districts above the median value of HHI (high concentration) and 2) districts below the median value of the HHI (low concentration). We classify districts above the median HHI as low-competition districts and those below the median as high-competition districts. We then estimate equation 2 separately for districts with high banking competition and districts with low banking competition.

We present the results in Table 8. Columns (1) & (2) present the results for districts with high banking competition. Columns (3) & (4) present the results for districts with low banking competition. Columns (2) & (4) include the bank-year level control variables listed in section 5.2 and their respective interactions with $Repo_{t-1}$.

Consider column (1) of the table. The coefficient of Post $\times$ Bank $\times$ Lag repo is positive and statistically significant. The magnitude of the coefficient indicates that when the repo rate decreases by one percentage point, banks expand lending differentially less by 65% compared to non-banks in the post-EBLR period in the high-competition districts. The coefficient stays positive and statistically significant in column (2) when we include control variables.

In the regions with low banking competition, shown in columns (3) and (4), the results are significantly weaker. The triple interaction coefficient (Post $\times$ Bank $\times$ Lag repo) is, in fact, negative but statistically insignificant in column 3. The magnitude of the coefficient is 0.031 in column 4, which is 15 times lower than in high-competition regions. A t-test

of the difference between the coefficients in the two samples reveals that the difference is statistically significant. Consistent with our proposed mechanism, the decline in transmission is significantly stronger in regions with high banking competition.

6.5 Direct Effect on Monitoring Costs

We also directly test the change in the sensitivity of monitoring costs to policy rates under the EBLR regime. If the proposed mechanism described in Section 3 is at play, we expect a reduction in the sensitivity of monitoring costs to policy rates post-EBLR mandate.

To test the thesis, we need to measure monitoring expenses. Unfortunately, no precise measure of monitoring can be created using the current set of disclosures. Nevertheless, we create a proxy for monitoring expenses based on accounting heads under which expenses relating to monitoring are likely to be included. Monitoring of borrowers by banks is likely to involve (i) frequent visits to borrowers' places of business and (ii) repeated communication with the borrowers. Therefore, we expect employee travel and communication expenses to be higher when banks increase monitoring. Accordingly, we add up travel and communication expenses to arrive at a proxy for monitoring expenses. The communication expenses component includes expenditures on telecommunications, postal services, internet connectivity, and IT costs such as software development and IT-enabled services. This granularity enables us to capture both traditional and technology-driven monitoring efforts by lenders. We then create a measure of monitoring as the ratio between monitoring expense to total expense. We next estimate the following regression specification using the bank-year level panel.

$$\begin{aligned} \mathrm{Y}_{jt} = \beta_0 &+ \beta_1 \cdot (\mathrm{Bank}_j \times \mathrm{Post}_t \times \mathrm{Repo}_{t-1}) + \beta_2 \cdot (\mathrm{Bank}_j \times \mathrm{Post}_t) + \beta_3 \cdot (\mathrm{Bank}_j \times \mathrm{Repo}_{t-1}) \\ &+ \beta_4 \cdot (\mathrm{Post}_t \times \mathrm{Repo}_{t-1}) + \beta_5 \cdot \mathrm{Bank}_j + \beta_6 \cdot \mathrm{Post}_t + \beta_7 \cdot \mathrm{Repo}_{t-1} + \beta_8 \cdot X_{jt} + \alpha_j + \lambda_t + \epsilon_{jt} \end{aligned} \tag{3}$$

The dependent variable in our empirical model, Y_{jt}, represents the measure of monitoring cost for lender j in year t. The rest of the variables are as defined in equation 2. The triple interaction term, $(\mathrm{Bank}_j \times \mathrm{Post}_t \times \mathrm{Repo}_{t-1})$, represents the differential sensitivity of monitoring costs to policy rates. The model also includes bank fixed effects α_j and time fixed effects λ_t. We cluster the standard errors at the lender and year level. We expect banks' monitoring expenses and policy rates to be negatively related in the pre-EBLR period. Therefore, a positive coefficient on the triple interaction term represents a decline in sensitivity.

Table 9 presents the estimates of the above regression. Columns (1) & (2) present the

results where the dependent variable is the ratio between monitoring expense and total expense. Consider column (1) of the table. The coefficient on the double interaction term $bank \times repo$ is negative, indicating a negative relation between monitoring and benchmark rate for banks in the pre-EBLR period. On the other hand, the coefficient on the triple interaction term is positive and statistically significant. The coefficient indicates that when the repo rate decreases, banks are able to expand their monitoring expense differentially less compared to non-banks in the post-EBLR period. When we include control variables and their interaction with the lagged policy rate in column (2), the triple interaction coefficient remains positive and statistically significant.

We present the results with an alternative measure of monitoring - the natural logarithm of the ratio between monitoring expense and number of employees - in columns (3) and (4). Column (4) includes the control variables and their interaction with $Repo_{t-1}$. The results are qualitatively the same as above. The results support the thesis that the sensitivity of monitoring costs to policy rates reduces significantly for banks. It is consistent with our proposed mechanism.

7 Impact on Banks and Firms

7.1 Duration of deposit

Banks can at least partially offset the loss from forced interest rate cuts in response to policy rate cuts by proportionately cutting the deposit rates. However, banks with more long-term deposit contracts have less room to make such adjustments. Therefore, such banks are likely to cut monitoring expenses more than other banks and consequently expand lending at a slower pace in response to a policy rate cut. In line with the above argument, we hypothesize that banks with a relatively higher deposit duration are likely to be more impacted in terms of their quantity transmission when policy rates are cut.

We estimate the deposit duration of banks using data from the Prowess database on the amount of deposits of various maturities. The Prowess database reports the amount of deposits in various ranges of deposit maturities. We first calculate the mid-point of each of the ranges. We then calculate the weighted average of the maturities, weighing the midpoint of each range by the amount of deposit corresponding to that range. For instance, let us say a bank has an INR 100 deposit with a maturity between 0 to 90 days and an INR 200 deposit with a maturity between 91 to 180 days. Then, the average duration of the deposits of the bank is (100*45 + 200*135)/300 = 105 days. We then convert the duration to years by dividing the duration in days by 365 or 105/365 years in the above example. Having

calculated the duration of deposits for each bank, we estimate the following specification using a bank-level panel spanning 2017 to 2023.

$$\begin{aligned} Y_{jt} =& \beta_0 + \beta_1(Duration_j \times Post_t \times Repo_{t-1}) + \beta_2(Duration_j \times Post_t) + \beta_3(Post_t \times Repo_{t-1}) \\ &+ \beta_4(Duration_j \times Repo_{t-1}) + \beta_5 Duration_j + \beta_6 Post_t + \beta_7 Repo_{t-1} + \beta_8 X_{j,t} + \alpha_j + \gamma_t + \varepsilon_{jt} \end{aligned} \tag{4}$$

Where Y_{jt} is the INR amount of lending by bank j in year t. The variable $Duration_j$ is the average deposit duration of the bank as of the year 2020, expressed in years as defined above. The rest of the variables are as defined in equation 2. We also include bank fixed effects α_j and year fixed effects γ_t. The coefficient of interest is β_1, which represents the differential change in transmission in banks with high duration of deposits. We expect the transmission of policy rates to decline in banks with a high duration of assets or the coefficient to be positive.

We present the results in Table 10. We include the bank-level control variables ($X_{j,t}$) listed in section 5 and their interactions with the lagged policy rate in column (2). We indeed find that the coefficient on the interaction term is positive and statistically significant. A one standard deviation increase in duration is associated with a 49% lower transmission in the post-EBLR period.

7.2 Sensitivity of Firms' Investment

Our findings in Section 5.2 indicate that the transmission of monetary policy to borrowing by MSME firms is weaker through banks compared to non-banks in the post-EBLR period during monetary expansion. The above differential transmission to borrowing from banks versus non-banks motivates our thesis related to potential heterogeneous real effects across firms based on their pre-existing banking relationships. Specifically, we hypothesize that firms with greater ex-ante exposure to banks at the time of the EBLR mandate would face stronger constraints on their investment when policy rates are cut due to the weakened pass-through of accommodative monetary policy through the banking channel. This prediction stems from the fact that bank-dependent firms would have limited ability to substitute alternative funding sources, making their investments more vulnerable to reduced monetary transmission through banks. To test this real effect, we examine whether MSME firms that had higher bank exposure when the EBLR regime was implemented experienced a decline in the response of investments to policy rates compared to their counterparts with lower bank dependence.

We use the gross annual addition to firms' gross property, plant, and equipment (PPE)

from the Prowess database as the measure of investment. We calculate the firms' exposure to banks by calculating the ratio of borrowing from banks to total borrowing in the financial year 2020. Firms with above-median ratios are classified as high-bank exposure firms, while those below the median are classified as low-bank exposure firms. The data are constructed at a firm-year level. We employ the following regression framework to analyze the thesis.

$$\begin{aligned} Y_{it} = \beta_0 &+ \beta_1 \cdot (\text{Repo}_{t-1} \times \text{Post}_t \times \text{Bank Exp}_i) + \beta_2 \cdot (\text{Repo}_{t-1} \times \text{Bank Exp}_i) \\ &+ \beta_3 \cdot (\text{Repo}_{t-1} \times \text{Post}_t) + \beta_4 \cdot (\text{Post}_t \times \text{Bank Exp}_i) \\ &+ \beta_5 \cdot Post_t + \beta_6 \cdot \text{Repo}_{t-1} + \beta_7 \cdot \text{Bank Exp}_i + \beta_8 \cdot X_{it} + \alpha_i + \lambda_t + \epsilon_{it} \end{aligned} \tag{5}$$

The dependent variable here is the natural logarithm of the gross addition in PPE value for a firm i in a given year t. As the panel is at the firm-year level, we calculate the lagged repo $Repo_{t-1}$ as the weighted average repo rate for the previous year. Since the RBI-mandated EBLR became effective on October 1, 2019, the variable $Post_t$ takes a value of 1 after the financial year 2020 and 0 for the years before that. The bank dependence indicator $BankExp_i$ is set to 1 if the firm has high bank exposure as per the definition stated above and 0 otherwise. The three-way interaction term ($\text{Post}_t \times BankExp_i \times \text{Repo}_{t-1}$) assesses whether there is a differential effect on transmission of policy rate cuts to investments for bank-dependent firms in the post-regulation period. The regression includes firm fixed effects (α_i) and time fixed effects (λ_t). We include a vector of time-varying firm-level control variables X_{it} and their interactions with $Repo_{t-1}$ in columns (2) and (4). We follow Ottonello and Winberry (2020) and include the following control variables: firm size (measured by the natural logarithm of lagged total assets), firm profitability (measured by return on assets), firm liquidity (measured by current ratio) and firm leverage (measured by the debt-to-assets ratio). We double-cluster the standard errors at the firm and year levels.

Table 11 presents the estimates of the above regression. Columns (1) & (2) represent the results for MSME firms, while Columns (3) & (4) present the results for non-MSME firms. Columns (2) & (4) include the control variables and their interactions with lagged policy rates as described above. Consider column (1) of table 11. The coefficient on the interaction term Post × Bank Exp × Lag repo is positive and statistically significant. When we include control variables in column (2), the triple interaction coefficient remains positive and statistically significant.

To examine whether this effect is unique to MSME firms, we analyze non-MSME firms in columns (3) and (4). The triple interaction coefficients are small and statistically insignificant, suggesting that the investment patterns of non-MSME firms do not differ between bank

and non-bank borrowers following monetary policy changes in the post-EBLR period. A t-test of the difference between the coefficients in the two samples reveals that the difference is statistically significant.

The above results support our hypothesis that the EBLR mandate, which primarily affects MSME lending by banks, leads to a differentially lower transmission of policy rate cuts to firm investments. The reduced sensitivity of investments to monetary policy changes for bank-dependent MSME firms is consistent with our earlier findings on lending quantity.

8 Macro Impact

8.1 District-level Credit Growth

We test whether the decline in transmission of rate cuts to MSME firms aggregates up to the regional level credit growth. We obtain the district-level borrowing for India from the RBI's website. Because the dataset used for this test is different from our main dataset, the test also serves as an external validation of our results. We use the following specifications to test whether the transmission of policy rates to lending is lower in districts that are more exposed to MSME borrowers. To create the measure of districts' exposure to MSME firms, we obtain the number of MSMEs at the district level from the Government of India's Udyam database.[14] The database provides the current counts of MSME firms. Therefore, the inherent assumption is that the current distribution of MSME firms across the districts is representative of their distribution during our sample period. We collect the district-level GDP data from the website of the Ministry of Statistics and Program Implementation (MoSPI). We normalize the number of MSME firms by district GDP. Districts are then classified into two groups: those with above-median MSME-to-GDP ratios and those with below-median ratios. We define the former group as districts with high-exposure to MSME firms and the latter group as districts with low-exposure to MSME firms. We then estimate the coefficients using district-year-level panel data.

$$\begin{aligned} Y_{kt} =& \beta_0 + \beta_1(Repo_{t-1} \times Post_t \times MSME_Exp_k) + \beta_2(Repo_{t-1} \times Post_t) + \beta_3(Post_t \times MSME_Exp_k) \\ &+ \beta_4(Repo_{t-1} \times MSME_Exp_k) + \beta_5 Post_t + \beta_6 MSME_Exp_k + \beta_6 Repo_{t-1} + \alpha_k + \delta_t + \varepsilon_{kt} \end{aligned} \tag{6}$$

Where the dependent variable Y_{kt} is the year-on-year growth in borrowing in district k in year t. We include district-level fixed effects, α_k, and year-level fixed effects, δ_t. The variable

[14] https://dashboard.msme.gov.in/udyam_dist_wise.aspx?stid=36

$MSME_exp$ takes a value of one for districts with high exposure to MSME firms as defined above and zero otherwise. The rest of the variables are the same as equation 2. We present the estimates in column (1) of Table 12. We find that the coefficient on the triple interaction term is positive and statistically significant at 10% level. A positive coefficient indicates a decline in transmission of policy rate cuts in districts with high exposure to MSME firms.

We also estimate a regression involving double interaction between *repo* and *post* within the two sub-samples of districts - with high and low exposure to MSMEs - separately. We find that the coefficient on post × repo is positive and statistically significant in the districts with high exposure to MSME firms but statistically insignificant in the districts with low exposure to MSME firms. Overall, the estimates indicate that credit growth expansion in response to policy rate cuts is lower in the post-EBLR period in districts with high exposure to small firms.

9 Robustness Tests

9.1 External Validation on Retail Loans

As specified in section 5, the EBLR framework was also applicable to retail loans. Our main analysis so far has focused on commercial loans because of the detailed availability of data on interest rates and the identification of borrowers of commercial loans. To test the external validation of our findings on retail loans, we use the data obtained from a large credit bureau, as alluded to in section 4.

Using the credit bureau data, we construct a panel of outstanding loans at the borrower-lender type-year level, where lender-type identifies banks or non-banks. We start with all the borrower-lender type pairs with an outstanding relationship at the beginning of 2017. We add a new borrower-lender type to the panel whenever a customer borrows from that specific lender type and drop the pairs from the panel when the customer fully repays to that lender type.

Equipped with the above borrower-lender type-year panel, we estimate regression specification 2. The data is available until 2022. Therefore, we limit our sample to the years 2017 to 2022 for this test. The dependent variable is the natural logarithm of the new loan amount in that particular year between the lender and the borrower. Since there are many years in which there is no borrowing between the customer-lender type level, we estimate a poisson model. We present the results in column (1) of Table A5 of the online appendix. We find that the coefficient on the triple interaction term – post × repo × bank - is positive and statistically significant, consistent with our main thesis that the transmission of the

policy rate to lending declines for banks compared to non-banks in the post-EBLR period. The coefficient remains positive and statistically significant when we estimate OLS model in column (2).

9.2 Endogenous differences between banks and non-banks

A concern could be that banks and non-banks are subject to different time-varying shocks. Since our treatment is at the lender level, we can not factor in these time-varying shocks by including bank × year fixed effects. Therefore, to alleviate the above concern, we include a set of lender characteristics listed in section 5, along with their respective interactions with the policy rate as described in the above sections. The inclusion of interaction between the control variables and policy rate ensures that any time-varying shock that causes a differentially lower transmission of policy rates based on the lenders' observable characteristics is factored in the regression specification.

We even use a tighter specification that includes control variables × policy rate × post. We present the results corresponding to equations 1 and 2 in Tables A6 and A7 of the online appendix, respectively. Our results remain robust and qualitatively unchanged.

9.3 Placebo Tests

As elaborated in sections 5.1 and 5.2, our tests involving non-MSME borrowers show no differential transmission of either interest rate or lending by banks in the EBLR regime. We conduct more placebo tests by defining false post-EBLR years. We designate 2016, 2017, 2018, and 2019 as false implementation years in different tests and re-estimate equation 2 using a three-year pre-period and three-year post-period window around each of these years. We present the results in Table A8 of the online appendix. We do not find a positive coefficient on the interaction term in any of the specifications. Hence, our results appear to be driven by the EBLR regulation and not by any other endogenous factors.

9.4 COVID interventions

A concern could be that our results are driven by the COVID-19 related interventions that coincide with our post-EBLR period. As stated in section 5, almost all the COVID-19 interventions were targeted towards small firms. We exploit the cross-sectional variation within small firms (MSME firms) in exposure to EBLR. Thus, our empirical strategy is plausibly orthogonal to the COVID-19 interventions. Moreover, we do a comprehensive study of interventions and do not find any intervention targeted specifically towards banks

or non-banks. Hence, there is a very low likelihood of such interventions affecting our estimates.

Nevertheless, we conduct a robustness test where we split the post-EBLR period into two parts: 1) post-EBLR but before 2021, which is the COVID period, and 2) after 2021, which is the post-COVID period. We then estimate equations 1 and 2 with two triple interactions terms $COVID \times repo \times bank$ and $post - COVID \times repo \times bank$. We present the results in Tables A9 and A10 of the online appendix, respectively. We find that across specifications, the coefficients on the triple interaction terms are positive and statistically significant in both COVID and post-COVID periods.

10 Conclusion

Most known accounts of monetary policy transmission involve changes in policy rates leading to changes in lending rates, thereby impacting the demand for loan quantity. Given that the responsiveness of lending rates and loan amounts to policy rate changes are determined in equilibrium, it is difficult to determine how a mandated transmission of policy rates is likely to impact the equilibrium loan amount, given the current level of understanding relating to the relationship between price and quantity transmissions. This paper attempts to answer the above question using a unique policy experiment in India where the central bank forced banks to pass on policy rate changes. In particular, we focus on understanding what happens to the expansion of loan amounts in response to policy rate cuts when banks are forced to pass on the policy rate cuts to borrowers.

We find that an attempt by the central bank to increase the transmission of policy rates to constrained firms leads to a reduction in the transmission of loan amounts when the policy rate is reduced. Banks face an upward-sloping marginal cost curve for lending to constrained firms due to monitoring costs increasing with the loan amount, which is the mechanism at work. The relative stickiness of deposit rates also adds to the change in sensitivities. Firm-level investments and local-level credit growth also become less sensitive to policy rates due to reduced quantity sensitivity of small firms.

Our paper has implications for regulatory policies aimed at increasing the transmission of monetary policy changes to lending rates. It has been observed that banks are slow to pass on policy rate changes, especially during a crisis. Our findings show that any attempt to increase the transmission by force is likely to make things worse by lending becoming less sensitive to policy rate cuts than before.

A chief limitation of our study is that we cannot give a complete picture of the relationship between price and quantity transmissions as we observe only rate cuts but not rate increases

before and after the event. Further, we do not have a precise measure of monitoring: we depend on cross-sectional variations linked to monitoring and accounting expenses that are likely to proxy monitoring. Nevertheless, it is reasonable to assume that the findings of this paper contribute to our understanding regarding the relationship between quantity and price transmission to small firms when the policy rates are cut and the likely mechanism behind it.

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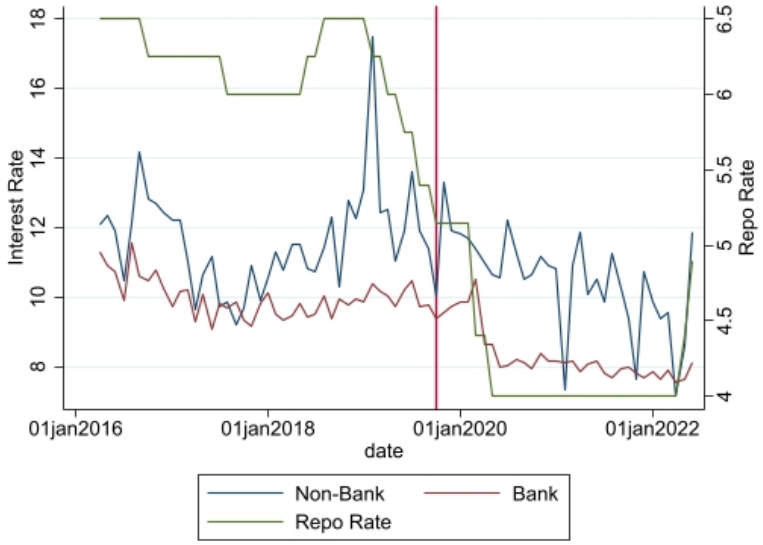
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Figure 1: Pre-Trend for MSME and Non-MSME Firms

Figure 1: In this figure, we show the pre-trends of interest rates to MSME and non-MSME firms. Panel A presents the interest rate trends for MSME firms, while Panel B shows the corresponding trends for non-MSME firms. For each panel, we plot the average interest rates charged by banks (blue line) and non-banks (red line) alongside the RBI's repo rate (black line) as a benchmark. This visualization allows us to compare lending rates across different types of financial institutions and examine how they respond to changes in the policy rate.

(a) MSME Firms



(b) Non-MSME Firms

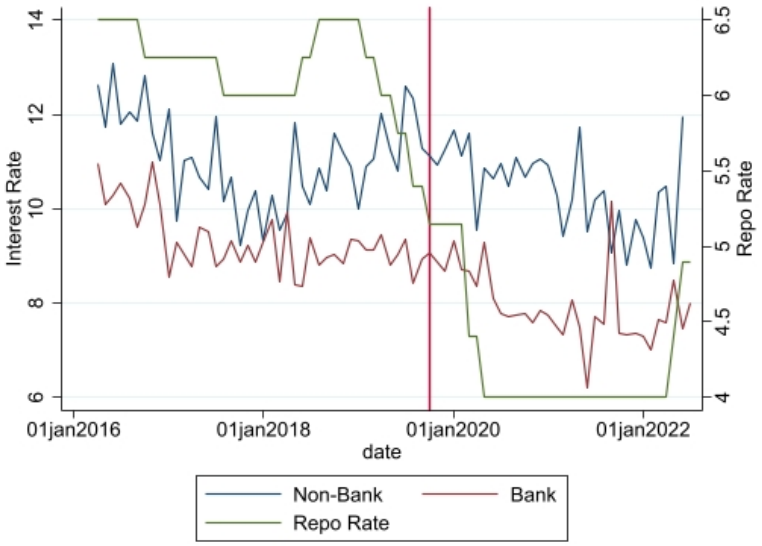


Figure 2: Interest Rate to MSME firms by Banks and non-banks

Figure 2: This figure illustrates the impulse response of interest rates for MSME firms to changes in the repo rate, categorized by lender type (banks and non-banks) and regulatory regime (pre- and post-EBLR implementation). The analysis is based on data from MSME loans issued after April 1, 2016. In Panel A (B), the coefficients from regressions estimating the impact of lagged repo rate changes on interest rates charged by banks (non-banks) during the pre-MCLR period are plotted. Panels C (D) depict the corresponding coefficients for banks (non-banks) in the post-MCLR period. The vertical axis in each panel represents the estimated impact of repo rate changes, while the horizontal axis displays lagged months (0 to 4).

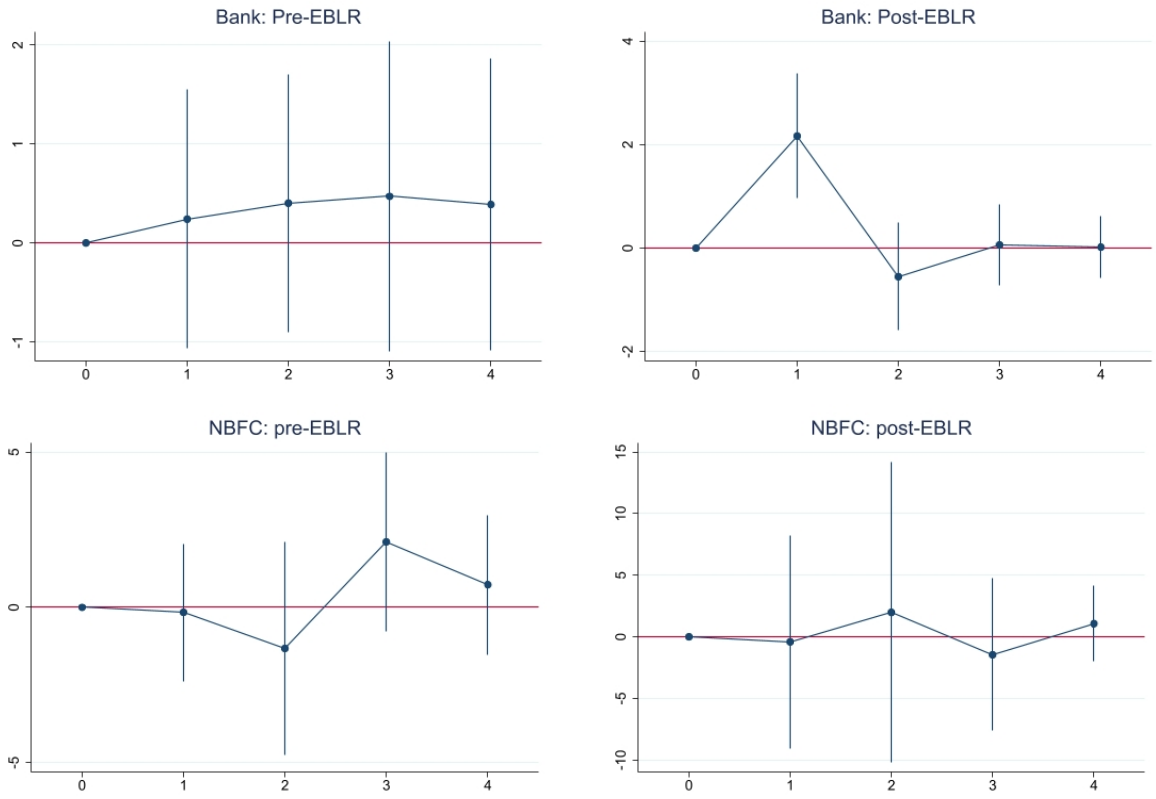


Figure 3: Borrowing by MSME firms from Banks and non-banks

Figure 3: This figure illustrates the impulse response of borrowing amount for MSME firms to changes in the repo rate, categorized by lender type (banks and non-banks) and regulatory regime (pre- and post-EBLR implementation). The analysis uses data from MSME loans issued after April 1, 2016. In Panel A (B), we plot the coefficients from regressions estimating the impact of lagged repo rate changes on borrowing from banks (non-banks) during the pre-MCLR period. In Panel C (D), we depict the corresponding coefficients for banks (non-banks) in the post-MCLR period. For each panel, the vertical axis represents the estimated impact of repo rate changes, while the horizontal axis shows lagged years (0 to 3).

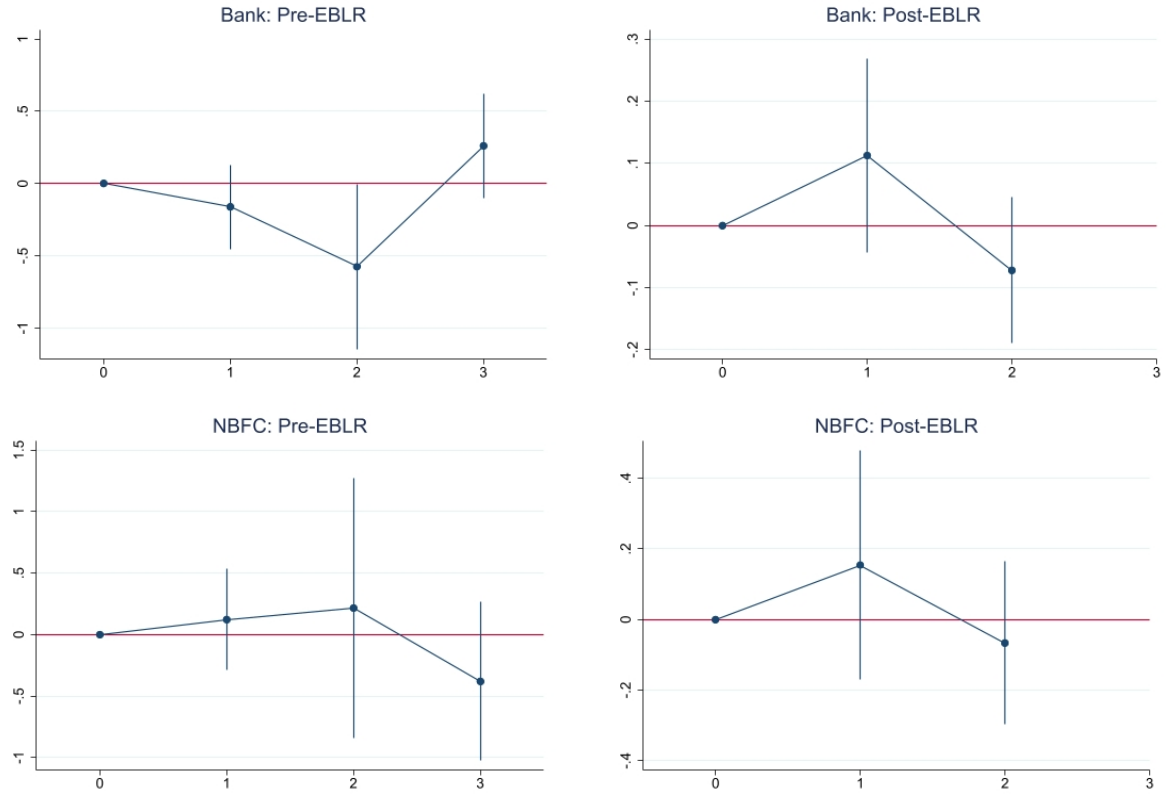


Table 1: Sample Construction

In this table, we present the sample construction. The sample spans the years 2017 to 2023. In panel A, we present the sample construction for the loan-level panel constructed using the MCA database. In panel A, we present the sample construction for the firm-lender type-year-level panel constructed using the MCA database.

Panel A: Loan Level Data	
Sample Period	FY 2017 to FY 2023
Number of Unique Firms with Interest Rate Data from MCA	4,025
Number of MSME Firms in the MCA Dataset	1,477
Number of Non-MSME Firms in the MCA Dataset	2,096
Number of banks in the MCA Dataset	46
Number of non-banks in the MCA Dataset	30
Number of unique observations (at loan level) in the MCA Dataset	19,624
Number of unique observations (at loan level) for MSME firms	3,462
Number of unique observations (at loan level) for non-MSME firms	12,006

Panel A: Borrowing Data	
Sample Period	FY 2017 to FY 2023
Number of Firms in Initial Sample from the Prowess Database in the sample period	38,697
Number of unique MSME firms in the sample period	16,133
Number of unique MSME firms with positive new borrowings from both banks and non-banks	3,900
Number of unique firm-year observations corresponding to MSME firms	5,424
Number of unique firm-lender type-year observations for MSME firms in the sample period	10,848

Table 2: Descriptive Statistics

In this table, we report the descriptive statistics related to key variables. The sample spans the years 2017 to 2023 and is restricted to MSME firms in panels A and B. In panel A, we present the descriptive statistics for loan-level variables. In panel B, we present the descriptive statistics for firm-year level variables. In panel C and , we present the descriptive statistics for bank and NBFC-year level variables, respectively. In panel E, we present the descriptive statistics for firm-lender-year level variables. Finally, in panel F, we present the summary for the time series variable. We define the variables in Table A2 of the online appendix.

Variables	N	Mean	Median	SD	1st %ile	99th %tile
Panel A: Loan level: MSME firms						
Interest Rate	4,386	9.331	9.000	2.258	4.800	16.000
Loan Amount (INR mn)	4,386	122	10	577	0.4	2000
Panel B: Firm-year level: MSME firms						
Borrowing from banks (INR mn)	5,424	268	16	4,445	0.1	2190
Borrowing from non-banks (INR mn)	5,424	337	8	7,266	0.1	2782
Unsecured Borrowing - banks (INR mn)	5,424	191	6	3,883	0	1313
Unsecured Borrowing - NBFCs (INR mn)	5,424	310	6	7,248	0	2337
Total Assets (INR mn)	5,424	4,832	418	83,489	10	41891
ROA	5,418	0.059	0.067	0.249	-0.337	0.275
Leverage	5,424	0.414	0.352	0.660	0.006	1.649
Addition to PPE	4,503	133	9	2,233	0.1	1132
Panel C: Bank-year level						
Monitoring expense/Total expense %	239	2.147	1.055	3.12	0.196	13.686
Monitoring expense/Employees (INR mn)	239	391	54	768	0	3271
GNPA/Assets %	196	5.034	2.777	6.534	0.005	41.55
CRAR	230	27.755	15.680	32.793	9.500	133.590
ROA	239	0.028	0.055	0.093	-0.344	0.093
Total Assets (INR mn)	239	312,985	53,726	752,450	720	3,623,715
Panel D: non-bank-year level						
Monitoring expense/Total expense %	3,968	3.338	2.114	4.209	0.037	20.833
Monitoring expense/Employees (INR mn)	3,968	74	3	390	0	1365
GNPA/Assets %	1,321	5.234	2.132	9.774	0.000	58.370
CRAR	1,788	42.200	28.560	31.420	8.880	133.940
ROA	3,954	0.045	0.069	0.858	-0.226	0.373
Total Assets (INR mn)	3,954	66,015	1,623	349,668	26	1,294,490
Panel E: Firm-Lender Relationship						
Outstanding with banks (INR mn)	17,788	340	51	1986	0	6392
Outstanding with non-banks (INR mn)	11,665	486	21	3455	0	11143
Panel F: Time Series - Monthly						
Repo rate	84	5.398	5.95	1.014	4	6.75

Table 3: Interest Rates

This table presents results for the differential transmission of the repo rate to the interest rate for firms in the RBI-mandated post-repo benchmark period. The dependent variable is the loan level interest rate of a firm as captured from the MCA database. The explanatory variable is the average repo rate in the previous month. Post is an indicator variable; it is 1 after RBI mandated the repo benchmarking, applicable from 1st October 2019. Bank is an indicator variable; it is 1 if the lender is a bank and 0 otherwise. The data are organized at a loan level for the sample period 2017-2023. Columns (1) & (2) show the results for all the MSME firms in the sample. Columns (3) & (4) show the results for all the non-MSME firms. MSME firms are defined according to the Government of India's guidelines. Before June 1, 2020, MSMEs were classified by investment in plant & machinery: under INR 100 million for manufacturing and under INR 50 million for services. After June 1, 2020, MSMEs are defined by investment in plant & machinery below INR 500 million and turnover not exceeding INR 2,500 million. We include Firm × Year and Firm × Lender fixed effects in all the models and columns. Columns (2) and (4) have the control variables included in the model. The standard errors reported in parentheses are robust, clustered at the firm & year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Interest rate			
	MSME		Non-MSME	
	(1)	(2)	(3)	(4)
Post × Bank × Lag_repo	1.694**	2.164***	0.562**	0.501
	(0.776)	(0.743)	(0.231)	(0.290)
Bank × Lag_ repo	-0.094	0.068	-0.159	-0.211
	(0.314)	(0.525)	(0.213)	(0.300)
Post × Lag_repo	0.218	-0.325	-0.396	-0.290
	(0.663)	(0.683)	(0.250)	(0.307)
Post × Bank	-9.408**	-11.792***	-2.859**	-2.767
	(3.990)	(3.850)	(1.377)	(1.695)
Lag_repo	0.438	0.476	0.533**	0.683
	(0.290)	(0.000)	(0.223)	(0.529)
Post	-0.607	2.174	1.882	1.560
	(3.530)	(3.672)	(1.484)	(1.792)
Observations	1,819	1,732	11,191	10,605
R-squared	0.902	0.896	0.841	0.845
Control variables	No	Yes	No	Yes
Firm × Year F.E.	Yes	Yes	Yes	Yes
Firm × Lender F.E.	Yes	Yes	Yes	Yes

Table 4: Borrowing

This table presents results for the differential transmission of the repo rate to the total borrowing amount of firms in the RBI-mandated post-repo benchmark period. The data are organized at firm-lender type-year level and span the sample period 2017 to 2023. The dependent variable is the natural logarithm of the total borrowing amount of a firm in the given financial year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. The weighted average repo rate is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. Post is an indicator variable. It is 1 after the financial year 2020, corresponding to the period after the RBI mandated external benchmarking of floating rate loans effective October 1, 2019, and 0 for years before that. Bank is an indicator variable; it is 1 if the lender is a bank and 0 for non-banks. Columns (1) & (2) show the results for all the MSME firms in the sample. Columns (3) & (4) show the results for all the non-MSME firms. MSME firms are defined according to the Government of India's guidelines. Before June 1, 2020, MSMEs were classified by investment in plant & machinery: under INR 100 million for manufacturing and under INR 50 million for services. After June 1, 2020, MSMEs are defined by investment in plant & machinery below INR 500 million and turnover not exceeding INR 2,500 million. We include Firm × Year and Lender type fixed effects in all the models and columns. Columns (2) and (4) have the control variables included in the model. The standard errors reported in parentheses are robust, double-clustered at the firm & year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log(borrowing)			
	MSME		Non-MSME	
	(1)	(2)	(3)	(4)
Post × Bank × Lag_repo	0.186**	0.228***	-0.074	-0.001
	(0.076)	(0.008)	(0.081)	(0.015)
Bank × Lag repo	-0.175**	-0.075***	-0.080	-0.215***
	(0.065)	(0.012)	(0.078)	(0.009)
Post × Bank	-1.025*	-1.165***	0.486	-0.118
	(0.524)	(0.038)	(0.562)	(0.077)
Observations	10,848	9,684	14,168	12,918
R-squared	0.732	0.762	0.746	0.787
Control variables	No	Yes	No	Yes
Firm × Year F.E.	Yes	Yes	Yes	Yes
Lender type F.E.	Yes	Yes	Yes	Yes

Table 5: Unsecured Borrowing

This table presents results for the differential transmission of the repo rate to the borrowing amount of firms in the RBI-mandated post-repo benchmark period. The data are organized at firm-lender type-year level and spans the sample period 2017 to 2023. The dependent variables are the natural logarithm of total unsecured and secured loan amounts of a firm in the given financial year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. The weighted average repo rate is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. Post is an indicator variable. It is 1 after the financial year 2020, corresponding to the period after the RBI mandated external benchmarking of floating rate loans effective October 1, 2019, and 0 for years before that. Bank is an indicator variable; it is 1 if the lender is a bank and 0 for non-banks. Columns (1) & (2) show the results for the unsecured borrowing. Columns (3) & (4) show the results for all the secured borrowing. The sample is restricted to Medium, Small and Micro Enterprises (MSMEs). MSME firms are defined according to the Government of India's guidelines. Before June 1, 2020, MSMEs were classified by investment in plant & machinery: under INR 100 million for manufacturing and under INR 50 million for services. After June 1, 2020, MSMEs are defined by investment in plant & machinery below INR 500 million and turnover not exceeding INR 2,500 million. We include firm × year and Lender type fixed effects in all the models and columns. Columns (2) and (4) have the control variables included in the model. The standard errors reported in parentheses are robust, double-clustered at the Firm & Year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log(unsec_borrowing)		Log(sec_borrowing)	
	(1)	(2)	(3)	(4)
Post × Bank × Lag_repo	0.129*	0.178***	-0.031	0.049
	(0.067)	(0.009)	(0.251)	(0.059)
Bank × Lag repo	-0.139*	-0.054**	0.398**	0.564***
	(0.061)	(0.022)	(0.147)	(0.108)
Post × Bank	-0.721	-0.856***	1.037	1.099**
	(0.468)	(0.069)	(1.475)	(0.409)
Observations	7,986	7,088	1,104	982
R-squared	0.720	0.751	0.707	0.710
Control variables	No	Yes	No	Yes
Firm × Year F.E.	Yes	Yes	Yes	Yes
Lender type F.E.	Yes	Yes	Yes	Yes

Table 6: Borrowing: Rated versus Unrated firms

This table presents the results on the differential transmission of the repo rate to the borrowing amounts of MSME firms with a credit rating compared to those without, during the RBI-mandated post-repo benchmark period. The data are organized at a firm-year-lender type level for the sample period 2017-2023. The dependent variable is the natural logarithm of the total borrowing amount of a firm in the given financial year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. The weighted average repo rate is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. Post is an indicator variable. It is 1 after the financial year 2020, corresponding to the period after the RBI mandated external benchmarking of floating rate loans effective October 1, 2019, and 0 for years before that. Bank is an indicator variable; it is 1 if the lender is a bank and 0 for non-banks. Columns (1) & (2) show the results for all the MSME firms in the sample which are unrated. Columns (3) & (4) show the results for all the MSME firms are rated. We include Firm × Year and Lender type fixed effects in all the models and columns. Columns (2) and (4) have the control variables included in the model. The standard errors reported in parentheses are robust, double-clustered at the firm & year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log(borrowing)			
	Unrated		Rated	
	(1)	(2)	(3)	(4)
Post × Bank × Lag_repo	0.288**	0.261***	0.165**	0.225***
	(0.089)	(0.011)	(0.045)	(0.015)
Bank × Lag repo	-0.320***	-0.170***	-0.088*	-0.002
	(0.067)	(0.041)	(0.041)	(0.023)
Post × Bank	-1.744**	-1.487***	-0.780*	-0.998***
	(0.579)	(0.146)	(0.355)	(0.081)
Observations	5,774	5,068	5,074	4,616
R-squared	0.694	0.727	0.713	0.742
Firm × Year F.E.	Yes	Yes	Yes	Yes
Lender type F.E.	Yes	Yes	Yes	Yes

Table 7: Lending Relationship

This table presents the results on the differential transmission of the repo rate to the borrowing amounts of firms with a banking relationship compared to those without. The relationship measure considers the lender's industry expertise, geographical proximity, and lending history. The data are organized at a firm-year-lender type level for the sample period 2017-2023. The dependent variable is the natural logarithm of the total loan amount borrowed by a firm in the given financial year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. It is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. Post is an indicator variable. It is 1 after the financial year 2020, corresponding to the period after the RBI mandated external benchmarking of floating rate loans effective October 1, 2019, and 0 for years before that. Bank is an indicator variable; it is 1 if the lender is a bank and 0 for non-banks. Columns (1) & (2) show the results for the relationship borrowing. Columns (3) & (4) show the results for all the non-relationship borrowing. The sample is restricted to Medium, Small and Micro Enterprises (MSMEs). MSME firms are defined according to the Government of India's guidelines. Before June 1, 2020, MSMEs were classified by investment in plant & machinery: under INR 100 million for manufacturing and under INR 50 million for services. After June 1, 2020, MSMEs are defined by investment in plant & machinery below INR 500 million and turnover not exceeding INR 2,500 million. We include Firm × Year and Lender type fixed effects in all the models and columns. Columns (2) and (4) have the control variables included in the model. The standard errors reported in parentheses are robust, double-clustered at the firm & year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log(borrowing)			
	Relationship		Non-relationship	
	(1)	(2)	(3)	(4)
Post × Bank × Lag_repo	0.526*	0.591***	0.013	0.025**
	(0.236)	(0.020)	(0.051)	(0.010)
Bank × Lag repo	-0.462**	-0.247***	-0.024	0.043***
	(0.185)	(0.058)	(0.051)	(0.008)
Post × Bank	-3.014*	-3.276***	0.010	0.065
	(1.502)	(0.236)	(0.371)	(0.043)
Observations	3,478	3,134	7,370	6,550
R-squared	0.738	0.764	0.730	0.761
Control variables	No	Yes	No	Yes
Firm × Year F.E.	Yes	Yes	Yes	Yes
Lender type F.E.	Yes	Yes	Yes	Yes

Table 8: Banking Competition

This table presents the results on the differential transmission of the repo rate to the borrowing amounts of firms that are headquartered in regions with high banking competition versus other districts. The data are organized at a firm-year-lender type level for the sample period 2017-2023. The dependent variable is the natural logarithm of the total loan amount borrowed by a firm in the given financial year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. It is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. Post is an indicator variable. It is 1 after the financial year 2020, corresponding to the period after the RBI mandated external benchmarking of floating rate loans effective October 1, 2019, and 0 for years before that. Bank is an indicator variable; it is one if the lender is a bank and 0 for non-banks. Columns (1) & (2) show the results for the areas with high banking competition. Columns (3) & (4) show the results for areas with low banking competition. The sample is restricted to Medium, Small, and Micro Enterprises (MSMEs). We include Firm × Year and Lender type fixed effects in all the models and columns. Columns (2) and (4) have the control variables included in the model. The standard errors reported in parentheses are robust, double-clustered at the firm & year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log(borrowing)			
	High Competition		Low Competition	
	(1)	(2)	(3)	(4)
Post X Bank X Lag_repo	0.500***	0.452***	-0.086	0.031**
	(0.114)	(0.028)	(0.156)	(0.012)
Bank X Lag repo	-0.397***	-0.002	0.010	-0.122***
	(0.053)	(0.012)	(0.154)	(0.010)
Post X Bank	-2.972***	-2.238***	0.643	-0.218**
	(0.655)	(0.097)	(1.079)	(0.070)
Observations	4,716	4,206	5,960	5,328
R-squared	0.738	0.769	0.730	0.761
Control variables	No	Yes	No	Yes
Firm X Year F.E.	Yes	Yes	Yes	Yes
Lender type F.E.	Yes	Yes	Yes	Yes

Table 9: Monitoring by lenders

This table presents the results for the differential transmission of repo rates on the monitoring expenses incurred by lending banks for firms in the RBI-mandated post-repo benchmark period. The data are organized at a lender-year level for the sample period 2017-2023. The dependent variable for columns (1) & (2) is Monitoring Expenses as a fraction of Total Expenses in a given year incurred by a lender. The sum total of communication expenses and travel expenses is considered a proxy for monitoring expenses. The dependent variable in columns (3) & (4) is the monitoring expense per employee for a firm in a given year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. The weighted average repo rate is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. Post is an indicator variable. It is 1 after the financial year 2020, corresponding to the period after the RBI mandated external benchmarking of floating rate loans effective October 1, 2019, and 0 for years before that. Bank is an indicator variable; it is 1 if the lender is a bank and 0 for non-banks. We include lender and year-fixed effects in all the models and columns. Columns (2) and (4) have Control Variables in the model. The standard errors reported in parentheses are robust, double-clustered at the lender & year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log(Monitoring expense/Employee)		Monitoring expense/Total expense	
	(1)	(2)	(3)	(4)
Post X Lag repo X bank	0.354***	0.422***	0.945**	0.512***
	(0.070)	(0.104)	(0.351)	(0.131)
Bank X Lag repo	-0.205**	-0.277***	-0.399	-0.049
	(0.063)	(0.068)	(0.405)	(0.181)
Post X Bank	-1.652***	-2.186***	-4.601*	-2.190*
	(0.459)	(0.622)	(2.368)	(1.027)
Observations	1,367	734	4,072	1,854
R-squared	0.838	0.861	0.750	0.756
Control variables	No	Yes	No	Yes
Lender F.E.	Yes	Yes	Yes	Yes
Year F.E.	Yes	Yes	Yes	Yes

Table 10: Deposit Duration

This table presents the change in the transmission of monetary policy post-EBLR based on the duration of deposits of banks. The data are organized at bank-year level and span the years 2017 to 2023. The dependent variable natural logarithm of the lending amount. The variable *duration* is the weighted average duration of deposits of the respective bank in year 2020. Post is an indicator variable. It is 1 after the financial year 2020, corresponding to the period after the RBI mandated external benchmarking of floating rate loans effective October 1, 2019, and 0 for years before that. Column (2) has control Variables listed in Table 3. We use Bank and Year fixed effects in both the columns. The standard errors reported in parentheses are robust, double-clustered at the bank & year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log lending	
	(1)	(2)
Post X Lag repo X Duration	0.510***	1.024***
	(0.039)	(0.104)
Duration X Lag repo	-0.181***	-0.535***
	(0.008)	(0.118)
Post X Duration	-2.127***	-5.302***
	(0.055)	(0.463)
Observations	220	211
R-squared	0.843	0.857
Control variables	No	Yes
Lender F.E.	Yes	Yes
Year F.E.	Yes	Yes

Table 11: Investments

This table presents results for the differential transmission of the repo rate to the firms' investments in the RBI-mandated post-repo benchmark period. The data are organized at a firm-year level for the sample period 2017-2023. The dependent variable is the natural logarithm of the change in value of property, plant, and equipment by a firm in the given financial year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. The weighted average repo rate is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. Post is an indicator variable. It is 1 after the financial year 2020, corresponding to the period after the RBI mandated external benchmarking of floating rate loans effective October 1, 2019, and 0 for years before that. Bank Exp is an indicator variable; it is 1 for firms with above median exposure to bank borrowing and 0 otherwise. Columns (1) & (2) show the results for all the MSME firms in the sample. Columns (3) & (4) show the results for all the non-MSME firms. MSME firms are defined according to the Government of India's guidelines. Before June 1, 2020, MSMEs were classified by investment in plant & machinery: under INR 100 million for manufacturing and under INR 50 million for services. After June 1, 2020, MSMEs are defined by investment in plant & machinery below INR 500 million and turnover not exceeding INR 2,500 million. We include Firm and Year fixed effects in all the models and columns. Columns (2) and (4) have the control variables included in the model. The standard errors reported in parentheses are robust, double-clustered at the firm and year levels, and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log(Δproperty, plant, and equipment)			
	MSME		Non-MSME	
	(1)	(2)	(3)	(4)
Post × Bank Exp × Lag_repo	0.588**	0.582**	-0.172	-0.101
	(0.203)	(0.207)	(0.176)	(0.168)
Bank Exp × Lag repo	-3.665**	-3.650**	1.193	0.760
	(1.240)	(1.257)	(1.035)	(0.994)
Post × Bank Exp	-3.665**	-3.745**	1.193	0.806
	(1.240)	(1.254)	(1.035)	(0.998)
Observations	3,934	3,929	5,768	5,768
R-squared	0.729	0.731	0.826	0.830
Control variables × Lag repo	No	Yes	No	Yes
Firm F.E.	Yes	Yes	Yes	Yes
Year F.E.	Yes	Yes	Yes	Yes

Table 12: District-level Lending

This table presents results for the differential transmission of the repo rate to district-level lending in the RBI-mandated post-repo benchmark period. The data are organized at a district-year level for the sample period 2017-2023. The dependent variable is the year-on-year growth in borrowing in the district in the given financial year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. The weighted average repo rate is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. Post is an indicator variable. It is 1 after the financial year 2020, corresponding to the period after the RBI mandated external benchmarking of floating rate loans effective October 1, 2019, and 0 for years before that. The variable $MSME_exp$ takes a value of one for districts with high exposure to MSME firms as defined above and zero otherwise. Column (1) shows the results for pooled sample with triple interaction term as the main explanatory variable and includes district and year fixed effects. Column (2) shows the estimates with the sample restricted to districts with above median presence of MSMEs. Column (3) shows the results for sample restricted to districts with below median presence of MSMEs. We include district fixed effects in models of columns (2) and (3). The standard errors reported in parentheses are robust, double-clustered at the district and year levels, and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

All Sample	Log loan		
		MSME exposed	Non-MSME exposed
	(1)	(2)	(3)
Post X Repo X MSME exp	0.580*		
	(0.295)		
Repo X MSME exp	-3.555		
	(1.900)		
MSME exp X Repo	-0.482		
	(0.259)		
Post X Repo		0.570**	-0.004
		(0.213)	(0.160)
Repo		-0.513**	-0.034
		(0.198)	(0.143)
Post		-3.753**	-0.233
		(1.415)	(1.019)
Observations	758	383	375
R-squared	0.327	0.279	0.374
District F.E.	Yes	Yes	Yes
Year F.E.	Yes	No	No

Internet Appendix

A Figures and Tables

Table A1: MSME Definition

MSME Classification - MSME Development Act of 2006			
Criteria based on investment in Plant & Machinery or Equipment (in Millions)			
Classification	**Micro**	**Small**	**Medium**
Manufacturing	Investment < INR 0.25 M	Investment < INR 50 M	Investment < INR 100 M
Services	Investment < INR 1 M	Investment < INR 20 M	Investment < INR 50 M
MSME Classification from 1st July 2020			
Manufacturing & Services	Investment < INR 10 M and Turnover < INR 50 M	Investment < INR 50 M and Turnover < INR 500 M	Investment < INR 250 M and Turnover < INR 2500 M

Table A2: Variable Definition

Variable Name	Definition
Interest rate	It is the reported lending rate for a given loan from the MCA database.
Loan Amount	It is the value of the new borrowing amount of a firm in a given year from the Prowess database.
Borrowing from Banks	It is the value of the new borrowing amount of a firm from commercial banks in a given year from the Prowess database.
Borrowing from non-banks	It is the value of the new borrowing amount of a firm from non-banks in a given year from the Prowess database.
Repo Rate	It is the policy rate at which the central bank lends short-term funds to commercial banks, typically against government securities.
Lag Repo	This represents the lagged value of the weighted average repo rate from the previous month, where each rate is weighted by the number of days it was in effect.
Monitoring Expenses	It is a proxy for the expenses incurred by lenders to monitor the loans. It is calculated as the total communication expenses and travel expenses by the lending bank in a given year.
Property, Plant and Equipment	It is the total value of a firm's gross investment in property, plant and equipment in a given year.
Sales	It is the sum total of all regular gross income generated by a firm from the sale of goods and non-financial services.
MSME Indicator	It is an indicator variable that identifies whether a given firm belongs to medium, small, and micro enterprises or not. The detailed time-varying MSME definition is given in the Table A1.

Table A2: Variable Definition (Continued)

Variable Name	Definition
Total Assets	It is the sum total of all current and non-current assets held by a firm as of the last day of a financial year.
ROA	Return on Assets is calculated by dividing a firm's net income by its total assets in a given year.
Leverage	It is the ratio between the total outstanding borrowing and total assets in a given year for a firm.
Addition to PPE	It is the gross addition (investment) to Property, Plant and Equipment by a firm in a given year.
Total Expenses	It is the sum total of all expenses incurred by a firm in a given year.
Employees	It is the total number of people employed by a given firm in a given year.
GNPA	It is the gross non-performing assets reported by a bank in a given year.
CRAR	Capital Adequacy Ratio is calculated as the ratio of Tier 1 Capital & Tier 2 Capital and Risk-Weighted Assets of a bank in a given year.

Table A3: Interest Rate Benchmark Distribution with Large vs Small Firms

	Post Period			
	Bank-MSME (932)	non-bank-MSME (33)	Bank-Large (1,847)	non-bank-Large (55)
Base Rate	6.22	3.03	2.54	25.45
MCLR	24.46	15.15	76.28	41.82
EBLR	68.24	18.18	20.14	1.82
Others	1.07	63.63	1.02	30.91
	Pre Period			
	Bank-MSME (531)	non-bank-MSME (95)	Bank-Large (1,744)	non-bank-Large (55)
Base Rate	5.27	9.47	4.3	15.79
MCLR	93.6	23.16	93.52	32.33
Others	1.13	67.37	2.18	51.88

Table A4: Interest Rate Benchmark Distribution of Banks vs Non-banks

Post Period		
Benchmark	Banks (3,891)	Non-banks (327)
Base Rate	3.29	14.37
MCLR	32.63	19.88
EBLR	63.2	3.98
Others	0.88	61.77
Pre Period		
Benchmark	Banks (3,103)	Non-banks (520)
Base Rate	4.54	9.62
MCLR	93.78	21.35
Others	1.68	69.03

Table A5: Retail Lending

This table presents results for the differential transmission of the repo rate to the retail lending amount in the RBI-mandated post-repo benchmark period. The data are organized at the borrower-lender type-year level for the sample period 2017 to 2022. The dependent variable is the natural logarithm of the new loan amount extended by the respective lender type to the respective borrower in the given financial year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. The weighted average repo rate is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. Post is an indicator variable. It is 1 after the financial year 2020, corresponding to the period after the RBI mandated external benchmarking of floating rate loans effective October 1, 2019, and 0 for years before that. Bank is an indicator variable; it is 1 if the lender is a bank and 0 for non-banks. Column (1) shows the estimates for a Poisson model. Column (2) shows the estimates for OLS model, with control variables. We include borrower × Year and Lender type fixed effects in all the models and columns. The standard errors reported in parentheses are robust, double-clustered at the borrower & year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log(New loan)	
	Poisson	OLS
	(1)	(2)
Post X Bank X Lag_repo	0.392***	2.920***
	(0.094)	(0.601)
Bank X Lag repo	-0.231**	-1.362**
	(0.094)	(0.493)
Post X Bank	-1.925***	-14.982***
	(0.612)	(3.742)
Observations	81,918	156,686
R-squared		0.613
Control variables	No	Yes
Borrower X Year F.E.	Yes	Yes
Lender type F.E.	Yes	Yes

Table A6: Interest Rates: Control Variables

This table presents results for the differential transmission of the repo rate to the interest rate for firms in the RBI-mandated post-repo benchmark period. The dependent variable is the loan level interest rate of a firm as captured from the MCA database. The explanatory variable is the average repo rate in the previous month. Post is an indicator variable; it is 1 after RBI mandated the repo benchmarking, applicable from 1st October 2019. Bank is an indicator variable; it is 1 if the lender is a bank and 0 otherwise. The data are organized at a loan level for the sample period 2017-2023. Column (1) shows the results for all the MSME firms in the sample. Column (3) shows the results for all the non-MSME firms. We include firm × year and firm × lender fixed effects in all the columns. We also include bank-year level control variables and their respective interactions with *Lag_repo* and *Post* in all columns. The standard errors reported in parentheses are robust, double-clustered at the firm & year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Interest rate	
	MSME	Non-MSME
	(1)	(2)
Post X Bank X Lag_repo	1.715*	0.463
	(0.778)	(0.239)
Bank X Lag repo	11.313**	0.348
	(4.002)	(0.885)
Post X Lag_repo	-0.101	-0.180
	(0.667)	(0.361)
Post X Bank	-9.577*	-2.521
	(4.754)	(1.423)
Lag_repo	-1.713	0.000
	(1.420)	(0.716)
Post	1.428	0.913
	(3.750)	(2.153)
Observations	1,819	1,732
R-squared	0.880	0.875
Control variables	Yes	Yes
Firm X Year F.E.	Yes	Yes
Firm X Lender F.E.	Yes	Yes

Table A7: Lending: Control Variables

This table presents results for the differential transmission of the repo rate to the unsecured borrowing amount of firms in the RBI-mandated post-repo benchmark period. The dependent variable is the natural logarithm of the total borrowing amount of a firm in the given financial year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. The weighted average repo rate is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. Post is an indicator variable. It is 1 after the financial year 2020, corresponding to the period after the RBI mandated external benchmarking of floating rate loans effective October 1, 2019, and 0 for years before that. Bank is an indicator variable; it is 1 if the lender is a bank and 0 for non-banks. The data are organized at a firm-year-lender type level for the sample period 2017-2023. Column (1) shows the results for all the MSME firms in the sample. Column (2) shows the results for all the non-MSME firms. We include firm × year and Lender type fixed effects in all the models and columns. We include bank-year level control variables listed in Table 4 and their respective interactions with *Lag_repo* and *Post* in all columns. The standard errors reported in parentheses are robust, double-clustered at the firm & year levels, and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log(borrowing)	
	MSME	Non-MSME
	(1)	(2)
Post X Bank X Lag_repo	0.186**	-0.074
	(0.076)	(0.081)
Bank X Lag repo	-0.175**	-0.080
	(0.065)	(0.078)
Post X Bank	-1.025*	0.486
	(0.524)	(0.562)
Observations	10,848	14,168
R-squared	0.732	0.746
Control variables	No	No
Firm X Year F.E.	Yes	Yes
Lender type F.E.	Yes	Yes

Table A8: Borrowing: False year placebo

This table presents results for the differential transmission of the repo rate to the unsecured borrowing amount of firms in the RBI-mandated post-repo benchmark period. The sample spans 2013 to 2018 in column 1, 2014 to 2019 in column 2, 2015 to 2020 in column 3, and 2016 to 2021 in column 4. The sample is limited to MSME firms in all columns. The dependent variable is the natural logarithm of the total borrowing amount of a firm in the given financial year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. The weighted average repo rate is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. Post is an indicator variable. It is 1 for the financial year 2016 and onwards in column 1, 2017 and onwards in column 2, 2018 and onwards in column 3, and 2019 and onwards in column 4. Bank is an indicator variable; it is 1 if the lender is a bank and 0 for non-banks. We include Firm × Year and Lender type fixed effects in all the models and columns. The standard errors reported in parentheses are robust, double-clustered at the firm & year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log(borrowing)			
	2016	2017	2018	2019
	(1)	(2)	(3)	(4)
Post X Bank X Lag_repo	-0.230**	-0.249	-0.502	-0.246*
	(0.067)	(0.218)	(0.451)	(0.119)
Bank X Lag repo	0.196***	0.011	0.176**	-0.033
	(0.012)	(0.215)	(0.062)	(0.060)
Post X Bank	1.617**	1.541	3.358	1.420
	(0.493)	(1.649)	(2.758)	(0.722)
Observations	10,266	10,244	10,044	10,388
R-squared	0.751	0.745	0.742	0.731
Firm X Year F.E.	Yes	Yes	Yes	Yes
Lender type F.E.	Yes	Yes	Yes	Yes

Table A9: Interest Rates: Robustness for COVID

This table presents results for the differential transmission of the repo rate to the interest rate for firms in the RBI-mandated post-repo benchmark period. The data is organized at loan level for the sample period 2017-2023. The sample is limited to MSME borrowers. The dependent variable is the loan level interest rate of a firm as captured from the MCA database. The explanatory variable is the average repo rate in the previous month. COVID is an indicator variable; it is 1 after RBI mandated the repo benchmarking and before April 1st 2021, zero otherwise. Post-COVID is an indicator variable; it is 1 for the period after April 1st 2021, and 0 otherwise. Bank is an indicator variable; it is 1 if the lender is a bank and 0 otherwise. The data are organized at a loan level for the sample period 2017-2023. We include firm × year and firm × lender fixed effects in all the columns. We also include bank-year level control variables and their respective interactions with *lag_repo* in column (2). The standard errors reported in parentheses are robust, double-clustered at the firm & year levels and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Interest rate	
	(1)	(2)
Post-COVID × Bank × Lag_repo	0.304***	0.277***
	(0.050)	(0.053)
COVID × Bank × Lag_repo	1.778**	2.204**
	(0.725)	(0.746)
Bank × Lag repo	-0.080	-0.028
	(0.075)	(0.456)
COVID × Lag_repo	0.155	-0.359
	(0.520)	(0.632)
COVID × Bank	-9.878**	-12.027**
	(3.537)	(3.884)
Lag_repo	0.431	0.710
	(0.241)	(1.256)
Post_COVID	-1.528***	-1.452***
	(0.198)	(0.211)
COVID	-0.272	2.371
	(2.659)	(3.328)
Observations	1,182	1,128
R-squared	0.894	0.889
Control variables	No	Yes
Firm × Year F.E.	Yes	Yes
Firm × Lender F.E.	Yes	Yes

Table A10: Lending: Robustness for COVID

This table presents results for the differential transmission of the repo rate to the borrowing amount of firms in the RBI-mandated post-repo benchmark period. The data are organized at a firm-year-lender type level for the sample period 2017-2023. The sample is limited to MSME borrowers. The dependent variable is the natural logarithm of the total borrowing amount of a firm in the given financial year. The explanatory variable Lag Repo is the weighted average yearly repo rate for the previous year. The weighted average repo rate is calculated by weighing the daily repo rate with the number of days for which that repo rate persisted. COVID is an indicator variable; it is 1 after RBI mandated the repo benchmarking and before April 1st 2021, zero otherwise. Post-COVID is an indicator variable; it is 1 for the period after April 1st 2021, and 0 otherwise. Bank is an indicator variable; it is 1 if the lender is a bank and 0 for non-banks. We include firm × year fixed effects in all the models and columns. We include bank-year level control variables listed in Table 4 and their respective interactions with *Lag_repo* in column (2). The standard errors reported in parentheses are robust, double-clustered at the firm & year levels, and adjusted for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Log(borrowing)	
	(1)	(2)
Post-COVID X Bank X Lag_repo	1.368***	7.137***
	(0.026)	(0.005)
COVID X Bank X Lag_repo	4.274***	21.610***
	(0.010)	(0.002)
Bank X Lag repo	-0.175**	-0.625***
	(0.065)	(0.012)
COVID X Bank	-22.981***	-116.607***
	(0.075)	(0.006)
Observations	10,848	9,684
R-squared	0.732	0.762
Control variables	No	No
Firm X Year F.E.	Yes	Yes
Lender type F.E.	Yes	Yes

B RBI's EBLR circular

RBI/2019-20/53
DBR.DIR.BC.No.14/13.03.00/2019-20

September 04, 2019

All Scheduled Commercial Banks (excluding RRBs)
All Small Finance Banks
All Local Area Banks

Madam / Dear Sir,

External Benchmark Based Lending

As you are aware, Reserve Bank had constituted an Internal Study Group (ISG) to examine various aspects of the marginal cost of funds-based lending rate (MCLR) system. The final report of the ISG was published in October 2017 for public feedback. The ISG observed that internal benchmarks such as the Base rate/MCLR have not delivered effective transmission of monetary policy. The Study Group had, therefore, recommended a switchover to an external benchmark in a time-bound manner.

2. As a step in that direction, it was announced in the fifth bi-monthly Monetary Policy Statement for 2018-19 under 'Statement on Developmental and Regulatory Policies' dated December 05, 2018, that all new floating rate personal or retail loans and floating rate loans to Micro and Small Enterprises extended by banks from April 1, 2019 shall be linked to external benchmarks. Subsequently, it was announced in the first bi-monthly Monetary Policy Statement for 2019-20 under 'Statement on Developmental and Regulatory Policies' dated April 04, 2019 to hold further consultations with stakeholders and work out an effective mechanism for transmission of rates. Based on the consultations with stakeholders, it has now been decided to link all new floating rate personal or retail loans (housing, auto, etc.) and floating rate loans to Micro and Small Enterprises extended by banks with effect from October 01, 2019 to external benchmarks.

3. Accordingly, RBI instructions contained in Master Direction on Interest Rate on Advances issued vide DBR.Dir.No.85/13.03.00/2015-16 dated March 03, 2016 are amended as under:

3.1 The existing paragraph No. 7 of the aforesaid Master Direction stands replaced as under:

(a) All new floating rate personal or retail loans (housing, auto, etc.) and floating rate loans to Micro and Small Enterprises extended by banks from October 01, 2019 shall be benchmarked to one of the following:

- Reserve Bank of India policy repo rate

- Government of India 3-Months Treasury Bill yield published by the Financial Benchmarks India Private Ltd (FBIL)

- Government of India 6-Months Treasury Bill yield published by the FBIL

- Any other benchmark market interest rate published by the FBIL.

(b) Banks are free to offer such external benchmark linked loans to other types of borrowers as well.

(c) In order to ensure transparency, standardisation, and ease of understanding of loan products by borrowers, a bank must adopt a uniform external benchmark within a loan category; in other words, the adoption of multiple benchmarks by the same bank is not allowed within a loan category.

3.2 A new paragraph No.8(e) is added to the aforesaid Master Direction as given below:

Spread under External Benchmark

Banks are free to decide the spread over the external benchmark. However, credit risk premium may undergo change only when borrower's credit assessment undergoes a substantial change, as agreed upon in the loan contract. Further, other components of spread including operating cost could be altered once in three years.

3.3 A new paragraph No. 9(ii) is added to the aforesaid Master Direction as given below:

Reset of Interest Rates under External Benchmark

The interest rate under external benchmark shall be reset at least once in three months.