BRANCHING OUT IN BANKING DESERTS: DO CREDIT CONSTRAINED FIRMS GAIN?

Nirupama Kulkarni* **Kanika Mahajan†** **S. K. Ritadhi‡**

January 15, 2024

Does financial deepening increase capital investment by credit-constrained firms? We exploit India's nationwide bank expansion policy in 2005 that incentivized banks to open branches in "underbanked" districts. Using establishment-level data in a regression discontinuity design, we find substantial increases in capital expenditures and credit growth of manufacturing establishments in underbanked districts post intervention. Establishments likely to face credit constraints — small and young establishments, and establishments not owned by publicly listed corporations — drive the effects. The mechanism is increased physical proximity of lenders to small, informationally opaque borrowers. Financial deepening by bringing lenders closer to borrowers can relax credit constraints in economies with imperfect credit markets.

JEL Codes: E22, E58, G21, D24

Keywords: Bank Branch Expansions, Credit Constraints, Small and Micro-Enterprises

*CAFRAL, Reserve Bank of India, India. Email: nirupama.kulkarni@cafral.org.in.

†Ashoka University. Email: kanika.mahajan@ashoka.edu.in.

‡Ashoka University. Email: sk.ritadhi@ashoka.edu.in.

Non-Technical Summary

This research explores the impact of a banking policy in India, known as the Branch Authorisation Policy (BAP) of 2005, on small and medium enterprises (SMEs), particularly those facing credit constraints. The BAP incentivized banks to expand into underbanked regions by making the approval of their annual expansion plans conditional on increased financial intermediation in such areas. The study employs a regression discontinuity design, using an arbitrary threshold to identify underbanked districts, and examines the effects of the policy on credit access and capital investment by SMEs.

The paper focuses on the Indian context, where micro and small enterprises constitute a significant portion of registered manufacturing establishments, with a substantial percentage facing credit constraints. The BAP encouraged banks to open new branches and increase credit to farm activities, rural borrowers, and small and micro-enterprises in underbanked districts. Private banks, in particular, responded disproportionately to the policy, with a notable increase in branches and manufacturing credit.

Using establishment-level data, the study employs a differences-in-differences design to investigate the impact of increased private bank credit on capital investment by manufacturing establishments, especially those in underbanked districts. The findings reveal a significant increase in capital spending for establishments in underbanked districts compared to those in non-underbanked districts. The effects are concentrated among smaller establishments employing under 25 workers, as well as small and young establishments, suggesting a targeted alleviation of credit constraints.

The paper explores potential channels through which the policy affected SMEs, including the physical proximity of banks, increased staffing by banks, and the comparative advantage of lenders in serving small borrowers. The results indicate a reduction in the minimum distance to private banks for smaller establishments in underbanked districts, suggesting improved access. Additionally, the study finds evidence of increased staffing by private banks in these areas, with a focus on officers responsible for loan processing and branch management.

The distributional implications of financial deepening are also examined, showing that the increase in capital investment is primarily driven by smaller and younger establishments, particularly those not publicly listed. The findings highlight the importance of private banks in catering to the financial needs of credit-constrained SMEs and underscore the role of physical proximity in enhancing credit access.

In terms of broader outcomes, the research indicates a positive impact on establishment

profitability over the long term, while the effects on output and employment are more nuanced. The study contributes to the literature by offering causal evidence on how bank expansions, especially those led by private banks, can alleviate credit constraints for SMEs and stimulate capital investment.

1 Introduction

Recent research shows that small and medium enterprises (SMEs) constitute a key part of the economy, accounting for over half of formal employment in developing countries (Ayyagari et al., 2014). Large SME presence is also associated with higher per capita GDP growth (Beck et al., 2005a). However, SMEs, along with micro-entrepreneurs, are also more likely to be credit constrained (Banerjee and Duflo, 2014; Beck et al., 2005b; De Mel et al., 2008). Existing studies highlight the role played by high costs of information and monitoring, combined with low collateral, as key barriers restricting these firms' access to credit (Banerjee and Duflo, 2010). There is however limited evidence on policies at-scale which can improve SMEs' credit access through a relaxation of these barriers. We answer this question by exploiting a novel bank expansion policy in India to examine whether greater ease of access to banking institutions affect capital investment by credit-constrained SMEs.

India forms an ideal context to study this question. Micro and small enterprises are ubiquitous, comprising over 80% of registered manufacturing establishments with 74.3% of these facing credit constraints (World Bank Enterprise Data). The financial system, too, is bank-dependent: between 2001 and 2011, less than 15% of registered manufacturing establishments were owned by publicly listed corporations. Against this background, we examine the impacts of the Branch Authorisation Policy (BAP) of 2005, which incentivised banks to expand operations in under-served regions. Specifically, under the BAP, India's central bank – the Reserve Bank of India (RBI) – made its approval of banks' annual expansion plans conditional on their financial intermediation in "underbanked" districts.[1] A district was deemed underbanked if its bank branch density in 2005 was less than the prevailing national average. While no specific targets were provided, banks were encouraged to expand operations in these districts by opening new branches, and increasing credit to farm activities, rural borrowers and small and micro-enterprises.

The use of an arbitrary threshold lends itself to causal identification using a regression discontinuity (RD) design. Importantly, the policy was announced in the latter half of 2005 and used bank branch information from March 2005, and population data from 2001 to classify districts as underbanked. This limited the ability of lenders and local governments to manipulate districts' assignment to underbanked ("treatment") status. We use a McCrary test (McCrary, 2008) to formally rule out selective sorting of districts into

[1] In addition to currency management and monetary policy, the RBI also serves as the banking regulator in India. Districts form the third tier of administration in India, below states.

treatment, and also verify pre-treatment district observables to vary smoothly around the discontinuity threshold. We document an increase in financial intermediation in underbanked districts in response to the policy, driven primarily by private banks. We identify 5 additional private bank branches in underbanked districts in the post-treatment period (a 25% increase), accompanied by a 12% increase in private bank manufacturing credit, with no increase in government-owned banks or credit.[2] The disproportionate response by private banks is not unexpected when considering that over 60% of underbanked districts (and 45% of districts overall) had no private bank presence prior to 2005. These results are broadly consistent with prior findings of Young (2017) and Khanna and Mukherjee (2021).

We then examine whether the expansion in private bank manufacturing credit affected capital investment using data from the Annual Survey of Industries (ASI) – a large nationally representative survey of registered manufacturing establishments in India. The ASI provides annual data on establishment capital, fixed assets, raw materials, output, workers hired, and wages. The ASI also provides district and establishment identifiers between 1998 and 2014. We use these to construct an 11 year establishment-level panel (2001-2011), with treatment status being determined by whether the establishment was located in an underbanked district. Importantly, while the dataset by definition is restricted to registered establishments, the median establishment size in the year 2000 was 15 employees, and two-thirds of establishments hired less than 20 employees, allowing us to identify the distributional effects of banking expansions across small and micro enterprises.

We exploit the time-variation in the onset of the BAP and the panel structure of the establishment data to combine the RD design with a differences-in-difference (DiD) design. Similar to Grembi et al. (2016) and Cingano et al. (2016), our empirical strategy compares establishment outcomes across underbanked and non-underbanked districts, before and after the policy intervention, for establishments located in districts within a narrow neighbourhood of the discontinuity threshold. The inherent discontinuity in districts' assignment to underbanked status ensures the comparability of treatment and control units prior to the policy intervention. We empirically confirm that pre-treatment manufacturing outcomes were statistically indistinguishable across these two sets of districts within a narrow window around the discontinuity threshold.

[2]Government-owned banks dominate the banking landscape in India, accounting for over 60% of the credit disbursed and the majority of bank branches. These banks had also led the initial expansion in branch banking to areas lacking financial infrastructure in the period between 1969 and 1990, after the nationalization of the 14 largest banks (Burgess and Pande, 2005).

Our primary outcome of interest is capital expenditures by manufacturing establishments, defined as investments in plant and machinery. We identify a 6 percentage point increase in capital spending (equivalent to INR 1.8 million) for establishments in underbanked districts, relative to observationally equivalent manufacturing establishments in non-underbanked districts. Our preferred specification uses establishment and industry-year fixed effects, along with establishment and district-level covariates. The use of industry-year fixed effects restricts the comparison of manufacturing investment to establishments in the same broad industry category and year, with the identifying variation stemming from differences in districts' underbanked status. An event-study specification documents the absence of differential pre-treatment trends in capital spending in underbanked districts, but a sharp uptick following the BAP. The increase in manufacturing investment in underbanked districts is also accompanied by higher credit growth. While we cannot distinguish across sources of credit, these findings are consistent with the aggregate increase in manufacturing credit by private banks in underbanked districts.

Our results are robust to alternate functional forms and definitions of the outcome variable. We also verify that our results are unaffected by the choice of bandwidth. We also show robustness to the exclusion of any individual state or industry, making it unlikely that the identified treatment effect is emanating from confounding state or industry-specific policies, the timing of which were also correlated with the BAP. Using a placebo test, we confirm a null effect upon restricting the sample to 2005: the period prior to the BAP.

We next explore the distributional implications of financial deepening and assess whether the increase in manufacturing investment in underbanked districts was driven by enterprises most likely to be credit-constrained. A large literature has shown credit constraints are likely to bind for smaller firms (Beck et al., 2008; Clark et al., 2004; Galindo and Micco, 2007). Consistent with this, we find the increase in capital spending and credit growth to be concentrated amongst establishments employing under 25 workers. Further, motivated by Hadlock and Pierce (2010) and Criscuolo et al. (2019), we find the increase in capital investment and credit growth in underbanked districts to be driven by small *and* young establishments. These establishments witnessed 12 (30) percent higher capital spending (credit growth) following the policy intervention, relative to comparable establishments in control districts. Similar conclusions are drawn if establishment fixed assets are used to measure establishment size. Notably, the positive treatment effects are concentrated amongst establishments satisfying the administrative classification of small-scale industries. Consistent with the inference of Farre-Mensa and Ljungqvist (2016) that being unlisted is a necessary condition for firms to be financially constrained, we also find the positive impact on capital investments and credit growth to be concentrated among establishments owned by corporations which are not publicly listed.

We examine five potential channels that can explain the increase in manufacturing investment in underbanked districts by smaller establishments: namely, the physical proximity of lenders to borrowers; increased staffing by banks to facilitate financial intermediation; comparative advantage of creditors in lending to small borrowers; reductions in the cost of credit due to lender competition; and aggregate demand. In the absence of granular establishment location identifiers in the ASI, we use data from the Economic Census (EC) to explore the first channel. The EC is an enumeration of all business establishments in India, conducted once every 8 years, and provides geographic identifiers at the granular level of Census tracts. As the 2011 population Census provided pincodes for select rural Census tracts, we are able to map a subset of manufacturing establishments in the EC to the nearest private bank branch. Compared to manufacturing establishments in non-underbanked districts, the minimum distance to private banks declined by 5 kilometres (33 percent) in underbanked districts. Importantly, the effects are driven by relatively smaller manufacturing establishments employing between 5 and 25 workers. In contrast, the minimum distance to private banks for establishments employing in excess of 25 workers remained comparable across underbanked and non-underbanked districts.

Aggregating the minimum distance to private banks at the district level, we find the increase in establishments' capital spending and credit growth to be driven by underbanked districts with relatively low (below median) distance to private bank branches. While the flexibility accorded to banks to choose locations within underbanked districts warrants that we interpret the latter finding as suggestive, it supports the overall explanation that the expansion in private bank branches reduced the physical distance between private banks and small manufacturing enterprises, leading to higher credit growth and capital investment. While we cannot ascertain whether physical proximity improved information acquisition or monitoring, these findings nevertheless underline the local nature of credit markets for small borrowers (Aggarwal and Hauswald, 2010; Nguyen, 2019).

Along with the physical proximity of brick-and-mortar branches to manufacturing establishments, we also find the BAP to have affected the staffing decisions of lenders. Using proprietary data on branch-level officers and employees, we identify underbanked districts to have 35 additional private bank officers, and 50 additional private bank employees. Officers are typically responsible for processing loan applications and overall branch management, with the role of loan officers deemed critical to the collection of subjective "soft" information for small borrowers (Aggarwal and Hauswald, 2010; Chen et al., 2022). The fact that two-thirds of the aggregate increase in private bank staffing was driven by bank officers signifies that private lenders were investing in necessary human capital to engage in financial intermediation in underbanked districts.

For the third channel, we exploit proprietary data on banks' lending portfolios. We find the increase in capital investment in treated districts to be driven by districts witnessing entry by a private bank transacting with a relatively high (above median) share of small manufacturing borrowers in the pre-treatment period. As district-specific unobservable factors could have influenced banks' entry decisions, this finding also needs to be interpreted with caution but points to the role of lenders' comparative advantage in transacting with small borrowers in explaining the increase in capital investment.

Using establishment-level data on total interest payments, and proprietary data on branch-level lending rates, we rule out that the expansion in private bank credit came through reductions in the cost of credit due to heightened lender competition. Finally, we draw from Mian and Sufi (2014) and show that the increase in capital investment in underbanked districts was undertaken by establishments in both tradable and non-tradable industries. If financial deepening boosted local demand for manufacturing products and the increase in manufacturing investment arose solely through this channel, we would have expected the treatment effects to be driven exclusively by establishments producing non-tradables.

Lastly, we examine whether the identified increase in capital spending following the BAP affected establishment output, profitability and employment. Surprisingly, we find a muted impact of the BAP on establishment output and profits over the medium term. As capital investments can have a lagged effect on production technologies and profits, we extend our sample to 2014 and identify a positive treatment effect on establishment profitability over the long-run. Manufacturing establishments in underbanked districts were 5 percentage points more likely to report positive profits over the long-term. We also identify a non-significant 7 percent increase in manufacturing output over the long-term. This indicates that the benefits from capital investment in terms of output and profitability might manifest only over the long-term. We however do not find an increase in employment at enterprise level, showing that capital is used to invest in technology that is likely to be labor saving.

In terms of aggregate effects at the district level, we find the BAP to have positively affected the number of establishments operating in underbanked districts, with no corresponding increase in exits. This points to the positive impact of financial deepening on firm entry. Consistent with higher firm entry, we show evidence pointing to an aggregate increase in manufacturing workers in these districts, although the coefficient is imprecisely estimated.

Our study contributes to four broad stands of literature. First, we directly extend the literature studying the impact of financial development on credit allocation. Prior work by Jayaratne and Strahan (1996), Bai et al. (2018), Bruhn and Love (2014), and Fonseca and Matray (2022) documents the impact of banking expansions on economic growth, employment, capital, poverty and entrepreneurship. While Jayaratne and Strahan (1996) and Bai et al. (2018) find improvements in lending quality in response to increased competition, Bruhn and Love (2014) shows how access to credit histories from existing retail partners facilitates banks' selection of creditworthy borrowers. Fonseca and Matray (2022) documents physical distance to banks, proxied by lack of banking services in the pre-treatment period, as the key friction limiting firm expansion and consequently labor demand. In contrast, our paper is the first to causally show that increasing physical proximity to banking institutions, particularly private banks, can spur credit uptake and investment by manufacturing firms. In general, this literature has largely focused on expansion in government banking. Private banks are more aligned with market forces, have profit-maximizing motives, superior corporate governance, and are less susceptible to political capture. Consequently, our paper shows that private banks too can be appropriately incentivized to engage in financial intermediation in under-served areas. Additionally, we show that private bank-led financial deepening alleviated credit constraints through higher credit disbursement to small and young enterprises. This is unaccompanied by higher costs of credit, or a deterioration in credit quality: two typical downsides from excessive risk-taking by private lenders.

Importantly, unlike Bruhn and Love (2014), private banks in our context had negligible operations in underbanked areas prior to the BAP. This further underlines how physical proximity can facilitate financial intermediation to borrowers with high costs of screening and monitoring, even in the absence of long-standing information networks. Here, as we show, investments in human capital by lenders to acquire information through the hiring of officers plays an important role. Consequently, our paper relates to the literature examining how monitoring and screening costs, proxied by distance to bank branches, affect financial intermediation (Greenwood et al., 2010; Ji et al., 2021).[3] Second, the emphasis on physical distance between lenders and small informationally opaque borrowers also re-

[3]Our focus on private banks and credit constraints also serves as the point of distinction from Chakraborty et al. (2021) who study a later reform aimed at expanding bank branches in relative smaller urban centres to show how increased lender competition disciplines government-owned banks.

lates our paper to the literature documenting the local nature of credit markets (Aggarwal and Hauswald, 2010; Berger and Udell, 1995; Chen et al., 2015; Nguyen, 2019; Petersen and Rajan, 1994). Unlike Nguyen (2019), which studies how bank closures affect small business loans, our paper identifies the impact of banking expansions. While we cannot distinguish whether increased physical proximity improves lenders' information collection or ex-post monitoring, our findings resonate with Petersen and Rajan (2002), who suggest a lowering of credit market frictions when borrowers' physical distance from financial institutions reduce. Recent work by Aggarwal and Hauswald (2010), Gilje et al. (2016), Hollander and Verriest (2016), Liberti and Petersen (2019), Chen et al. (2022) and Chernenko et al. (2022) also show the cost of information acquisition to be increasing in distance, and impeding resource allocation for financially constrained firms (Giroud and Mueller, 2015).

Third, with the increase in capital investment and credit growth being driven by small and young establishments, and those not publicly listed, our paper also adds to the literature on how financial deepening can alleviate financial constraints. Related work by Fafchamps and Schündeln (2013) shows that small firms in high potential growth sectors gained from adequate local banking infrastructure, while Larrain and Stumpner (2017) finds that capital account liberalization in Eastern Europe increased investments for firms in sectors dependent on external finance.[4] Our paper differs from these by offering direct causal evidence on how bank expansions affect capital spending by credit-constrained establishments, and uncovering reduction in physical distance to lenders as the principal mechanism.

Lastly, in the Indian context, our paper joins a growing body of work studying the economic impacts of the BAP. We extend the work of Young (2017) by focusing on the distributional aspects of financial deepening, and also identify the mechanisms through which financial deepening affects manufacturing investment.[5] Other studies on financial deepening in India by Burgess and Pande (2005), Kochar (2011) and Gupta and Dehejia (2021) focus on the massive state-directed push by government-owned banks in the 1980s and consider outcomes such as poverty, income distribution and labor reallocation from self-

[4]Qin and Kong (2022) show that increased loan access through branches of a single bank which specialized in small and medium income businesses in China increased entrepreneurship in regions with a larger number of branches. Since the bank in question specialized in lending to smaller firms, the evidence cannot be generalized to general bank expansions.

[5]Young (2017) showed that the BAP-induced increase in private bank branches positively affected farm credit and nightlights-based measures of economic activity. Khanna and Mukherjee (2021) also exploits the same policy intervention to show how bank branches served as a coping mechanism when districts faced an aggregate negative shock to cash supply. Cramer (2022) uses the same policy intervention to show the impact of financial deepening on health outcomes.

employment to salaried work. Our study distinguishes itself through its focus on private bank expansions, its impact on manufacturing investment for credit constrained firms, and highlighting physical distance as the key friction in accessing formal credit markets.

The remainder of the paper is organized as follows: Section 2 outlines the Branch Authorisation Policy; Section 3 formally details our empirical strategy and data sources; Section 4 presents our key findings; Section 5 explores potential mechanisms explaining our results; and Section 6 reports aggregate effects of financial deepening.

2 Background: Policy Intervention

Prior to 1991, India's banking industry was dominated by government-owned banks. In the era of "social banking" between 1970 and 1991, the central bank oversaw a massive expansion of government-owned bank branches, which has been the subject of multiple studies (Burgess and Pande, 2005; Gupta and Dehejia, 2021; Kochar, 2011).[6] With the onset of economic liberalization in 1991, the central bank formally abandoned the rule-based branching policy in 1993 and allowed commercial banks to open branches as determined by market forces. In 2005, the RBI revisited its stance and unveiled the Branch Authorisation Policy (BAP) in an effort to expand financial infrastructure in under-served regions.

2.1 Branch Authorisation Policy, 2005

The "liberalised" Branch Authorisation Policy of 2005 simplified the process for opening new branches, but also accorded greater weightage to branches opened in hitherto "underbanked" areas (RBI, 2005). Unlike the social banking era, the policy did not provide an explicit rule on the number of new branches to be opened; neither was it targeted to establish brick-and-mortar branches in banking deserts. Instead, the RBI used an incentive-based design, where banks were directed to submit annual branch expansion plans, detailing the number of bank branches it intended to open in the coming year. For every branch proposed, the bank had to furnish details on the specific location, the number of bank branches presently operating in that area, and the volume of deposits and loans expected in the first year of operation. The RBI committed to meeting bank officials within 4 weeks of the bank's submission of the annual expansion plan. The final approval

[6] The branch expansion was enabled by large-scale nationalization of existing private banks, such as the one in 1969. Under social banking, banks were required to open 4 additional branches in "underbanked" areas, for every branch opened in a "banked" area.

of the plan would occur after the meeting with central bank regulators, and the bank had one year in which to establish the proposed branches (RBI, 2005).

The implicit nudge provided in the BAP was that the overall expansion plan of banks would be favorably received, conditional on banks expanding their operations in underbanked areas. Specifically, the policy document noted that while evaluating proposals for bank expansion, weightage would be accorded to "the nature and scope of banking facilities provided by banks to common persons, particularly in underbanked areas (districts), actual credit flow to the priority sector, pricing of products and overall efforts for promoting financial inclusion." (RBI, 2007) Furthermore, the RBI noted that it would assess "compliance with not only the letter of the regulations but also whether the bank's activities are in compliance with the spirit and underlying principles of the regulations." (RBI, 2007) [7]

To classify regions as "underbanked", the RBI followed a simple rule based on districts' bank branch density in 2005. For each district, the RBI computed branches per capita using the district's population from the 2001 Census, and the number of commercial bank branches in operation on March 31, 2005. This was compared to "national" branches per capita for the country; districts were classified as "underbanked" if their branches per capita was smaller than the national branches per capita. Formally,

where $BranchPC_d$ is the number of bank branches in district d, scaled by district population in millions and $\overline{BranchPC}$ is the national bank branches per million persons. Using this rule, the RBI published in September 2005 a list of 386 "underbanked" districts, which remained fixed over subsequent years.[8]

As data prior to 2005 was used to determine whether a district was underbanked, districts could not plausibly select into "underbanked" status. There is no anecdotal evidence of advance intimation of the policy, which could have influenced banks to open branches prior to 2005 in underbanked districts. Empirically, Figure 1 confirms using the McCrary test (McCrary, 2008) the absence of any selective sorting of districts into treatment and control status around the national average threshold. This allows us to use the national

[7] For instance, annual branch expansion plans of banks now had to be accompanied by a statement depicting the distribution of operational bank branches in underbanked districts, as well as semi-urban and rural centres (RBI, 2007).

[8] While the rule for classifying districts as underbanked was followed for the vast majority of districts, the RBI amended this rule for a total of 9 districts in 2006. Thus, 6 districts were classified as underbanked, even though their branch density exceeded the national average, while 3 districts were not classified as underbanked, even though their branch density fell below the national average. For addition details, see RBI's master circular on branch authorisation, issued on August 3, 2005 (available at `https://rbi.org.in/Scripts/BS_CircularIndexDisplay.aspx?Id=2408`).

average branch density – $\overline{BranchPC}$ – as an arbitrary threshold in the spirit of a RD design to causally identify the impact of the branch expansion policy.

With $\overline{BranchPC}$ serving as the discontinuity threshold for a district's underbanked status, the running variable of interest – $Runvar_d$ – is defined as:

$$Runvar_d = BranchPC_d - \overline{BranchPC} \tag{1}$$

Districts are underbanked if $Runvar_d < 0$ or the district's bank branch density in 2005 was less than the national average. Figure 2 shows the distribution of $Runvar_d$, with a significant mass of districts around the threshold 0. For instance, 304 districts (211 underbanked and 93 non-underbanked) fell within a bandwidth of 20 around the discontinuity threshold. Reducing the bandwidth to 15 (10) results in 231 (156) districts lying within the neighbourhood of 0. The presence of a large set of districts around the discontinuity threshold provides both statistical power to detect treatment effects, and also limits concerns regarding the external validity of our findings. Appendix Figure A1 shows that underbanked districts were geographically dispersed across the country.

Finally, while the policy applied to both state-owned and private banks, we expect private banks to be disproportionately affected owing to their limited operations in districts classified as underbanked. At the beginning of 2005, 45% of Indian districts lacked a private bank branch, while 60% of "underbanked" districts had no operations by private banks. On the contrary, government-owned banks had branches across all districts. This made the BAP binding on private banks, which were also mandated by the policy to have at least 25% of their branches in semi-urban or rural centres. Aggregate trends in Appendix Figure A2 point to higher private bank branch openings after adoption of the BAP: the median private bank branch density increased from 0.66 branches to 2.85 branches (per million population) between 2005 and 2010. The fraction of districts without a private bank branch also fell below 20% by 2010.

3 Data and Empirical Strategy

This section describes the primary datasets used in the paper and the empirical strategy to causally identify the impact of the bank branch expansion on manufacturing investment.

3.1 Data

We use data from three major sources: the Annual Survey of Industries, the Economic Census, and the Basic Statistical Returns.

3.1.1 Manufacturing Establishment Data

We use data from the Annual Survey of Industries (ASI) to identify the impact of bank branch expansion under the BAP on manufacturing investment. The ASI is a nationally representative survey undertaken every year by the National Sample Survey Organisation (NSSO), covering registered manufacturing enterprises in India. The unit of observation is the manufacturing establishment (and not the firm). The ASI has two components: a census component whereby establishments employing over 100 workers are covered every year, and a survey component, whereby the ASI uses a stratified random sample each year to survey establishments employing less than 100 workers.[9] The ASI by design excludes enterprises not registered under either the Factories Act, 1948 or the Companies Act, 1956, making it a dataset pertaining exclusively to registered enterprises.[10]

The ASI provides rich data on fixed capital, plant and machinery, raw materials, output, workers employed and wages paid. Additional information on loans and interest payments are also provided, although there is no information on the source of credit. The ASI includes establishment identifiers for all years but provides district identifiers only between 1998 and 2007. District identifiers allow us to determine whether an enterprise was located in an underbanked ("treated") district. We use the procedure outlined in Martin et al. (2017) to construct our primary sample: a decade long unbalanced establishment-level panel between 2001 and 2011, covering over 10,000 unique manufacturing establishments. As the BAP was initiated in 2005, this provides us with 4 years of data prior to the intervention, and 6 years post-intervention. We use data till 2011 for the main analyses since the RBI introduced a new branching policy that year, encouraging banks to open branches in relatively small urban centres.[11]

Our primary outcome of interest is capital expenditures, defined as the difference between the closing and the opening value of an establishment's plant and machinery in a year, scaled by the average value of the establishment's plant and machinery during the year. Specifically, for establishment i in year t, we define capital expenditures as:

[9] Such establishments are typically surveyed once every 3 years.
[10] These two legal statutes governs the operations of registered enterprises in India.
[11] See Chakraborty et al. (2021) for details on the new policy.

$$Capex_{it} = \frac{Plant_{i,t} - Plant_{i,t-1}}{0.5 \times Plant_{i,t-1} + 0.5 \times Plant_{i,t}} \quad (2)$$

where $Plant_{i,t}$ is establishment i's value of plant and machinery in period t, net of depreciation. The principal advantage of formulating capital spending in this manner is that the variable is bounded between -2 and 2, reducing sensitivity to outliers (Berton et al., 2018). We opt to focus on plant and machinery as our primary measure of manufacturing capital as it captures establishments' productive assets. However, we confirm robustness to using aggregate fixed assets (land and buildings, in addition to plant and machinery) as our measure of capital. In addition to capital investment, we also consider other outcomes such as credit growth, output, and workers employed. All growth variables are defined as per equation (2). All nominal (INR) values are deflated to 2011 values using a wholesale price index deflator for manufacturing commodities and top-coded at the 1% level to limit the influence of outliers.

Appendix Table B1 presents summary statistics from the ASI for our primary sample: establishments situated in districts located within a narrow window around the discontinuity threshold. Similar to most firm-level data, Appendix Table B1 documents a large right tail for a number of variables of interest. The average establishment has plant and machinery (fixed assets), net of depreciation, worth INR 29 (40) million, but the median establishment machinery (fixed assets) is INR 1.2 (3.2) million. Similarly, while the mean establishment size in terms of hired workers is 90, the median establishment size is 20. Two-thirds of the establishments satisfied the administrative criterion of "micro" enterprises, while another quarter qualified as "small".[12] Over 80% of the establishments satisfied the definition of small-scale industries, making them eligible for subsidized bank credit.[13] The median establishment age is 14 years and 14 percent of establishments were owned by publicly listed corporations.

Average annual capital expenditures, net of depreciation, during this period equaled -.002, – signifying a net reduction in plant and machinery values in an year. The 75th percentile value is 0.03. This implies that the median establishment did not engage in any capital spending during the year to offset the depreciation in the value of plant and machinery. Capital expenditures are inherently lumpy, and we define a binary variable

[12]We use administrative definitions for classifying establishments as micro, small, medium and large enterprises. In 2005, establishments with plant and machinery worth less than INR 2.5 million were classified as micro-enterprises; between INR 2.5 and 5 million as small enterprises; between INR 5 and 10 as medium enterprises; and exceeding INR 10 million as large enterprises. We use pre-treatment maximum values of establishment plant and machinery to classify enterprises into these 4 categories.

[13]Small-scale enterprises are those whose investment in plant and machinery do not exceed INR 10 million.

$AnyCapex_{it}$ to equal one if the closing value of plant and machinery exceeded the opening value, or $Capex_{i,t} > Capex_{i,t-1}$. Attesting to the inherently lumpy nature of capital investments, we see that only a fourth (third) of the establishments engaged in any positive investment in plant and machinery (fixed assets), net of depreciation, in a given year.

While the ASI does not record the source of credit, it collects data on outstanding loans for establishments. Based on closing and opening values of outstanding establishment loans, we find annual loan growth to be 4 percent or INR 1.2 million.[14] The median establishment however saw no loan growth. Along the extensive margin, 38% of establishments had closing values of outstanding loans in excess of opening values, reflecting a net increase in outstanding credit. Despite being registered establishments, almost a fourth of the establishments had no outstanding credit during the year.[15] Entry into credit markets in a year is also limited – 2.5% of establishments reported having no outstanding credit at the beginning of the accounting period, but a positive loan balance at the end of the accouting year (classified as new loans). Using interest payments undertaken by establishments during the year, the cost of credit for the median establishment is 14%, while the average cost of credit is 24%.[16]

The ASI separately reports three categories of workers: hired workers, contractual workers, and supervisors. The former involve workers engaged in manufacturing tasks and directly hired by the establishment. These workers are eligible for social security benefits, mandatory bonus, and protected from dismissal in large firms by stringent labor laws. Contract workers are manufacturing workers hired on contractual terms by the establishment, and ineligible for the benefits and job security available to hired workers. Finally, supervisors are employees not directly involved in manufacturing tasks but responsible for overall management and supervision. We use the number of supervisors (as a share of total employees) as a measure of the establishment's managerial capital, and the number of hired workers on the establishment's payroll to measure establishment size. The median (average) establishment had 20 (89) hired workers, 0 (27) contract workers, and 2 (10) supervisors. The ratio of supervisors to total employees, used as a measure of managerial capital, was 0.11, or about 1 supervisor for every 10 employees.

[14] Average annual outstanding loans in this period equaled INR 27.9 million.

[15] We classify an establishment to have no outstanding credit if it reports no outstanding loans for both the opening and closing values in a year.

[16] We use the ASI data on annual interest expenses and scale it by opening value of outstanding loans to impute the rate of interest.

3.1.2 Economic Census

The Economic Census (EC) is an enumeration of all business establishments operating in India. It is typically conducted once every 8 years and covers all sectors of the economy. The two most recent ECs pertain to the years 2013 and 2005 respectively.[17] While there is very limited information on establishment performance and characteristics, the EC does provide granular geographic identifiers for establishments, in addition to establishment size. The EC geographic identifiers can be mapped to Census tracts using the SHRUGS database constructed by Asher et al. (2021). As select rural Census tracts were also mapped to pincodes in the 2011 decennial Census, the EC permits the mapping of establishments to pincodes. We use this information to map rural EC establishments to the nearest private bank branch to test whether the BAP affected manufacturing establishments' distance to the nearest private bank branch.

3.1.3 Basic Statistical Returns

We use data from the Basic Statistical Returns (BSR), hosted by the RBI, to assess the impact of the BAP on bank branches, deposits, loans, interest rates, non-performing assets, and staffing decisions. The publicly available BSR data provides annual aggregates of district-level deposits and loans for commercial banks. The data is disaggregated by bank ownership and sectoral allocation of credit, allowing us to compare branch openings and credit disbursement across underbanked and non-underbanked districts, and also by bank group. To gauge new branch openings, we use publicly available information on commercial bank branch opening dates between 2001 and 2011. We also aggregate proprietary branch-level data on interest rates, employment, and non-performing loans to the district level. Results using the BSR data are detailed in Appendix A.

3.2 Empirical Strategy

The use of an arbitrary threshold – national average bank branch density – to classify districts as "underbanked" lends itself to causal identification using a RD design. If districts are unable to manipulate their treatment status (evident from Figure 1), and pre-treatment district covariates vary smoothly on either side of the threshold, we can causally identify the impact of the branch expansion policy on manufacturing investment, using estab-

[17] The data for the EC conducted in 2020 has not yet been released.

lishments in non-underbanked districts as a valid counterfactual for "treated" establishments in underbanked districts. We also exploit the inherent time-variation in the onset of the BAP to combine the RD design with a DiD design (effectively, a "differences-in-discontinuity" design postulated in Grembi et al. (2016)). The DiD framework allows us to exploit the panel structure of the establishment-level data and condition on establishment fixed effects. This allows us to flexibly partial out time-invariant unobserved establishment characteristics such as accounting standards, or local networks, which can affect establishments' access to credit. While it is plausible that such unobservable establishment characteristics would be "balanced" across underbanked and non-underbanked districts within a narrow window of the threshold, using a differences-in-discontinuity framework enables us to explicitly account for them using establishment fixed effects.

Akin to a DiD design, our empirical strategy compares establishment outcomes before and after the policy intervention across underbanked and non-underbanked districts. In the spirit of a RD design, we also restrict the comparison of establishment outcomes to establishments operating in districts within a narrow window of the discontinuity threshold. Our primary estimating equation takes the form:

$$Y_{ijdt} = \alpha_i + \delta_{jt} + \beta Underbanked_d \times Post_t + f(Runvar_d) + \gamma \mathbf{X}_{ijdt} + \epsilon_{ijdt} \quad (3)$$

where Y is the outcome of interest for establishment *i*, operating in industry *j*, located in district *d*, and year *t*. α_i denotes establishment fixed effects, while δ_{jt} denotes industry-year fixed effects, corresponding to the 2-digit industry (*j*) in which the establishment operates. This restricts the comparison of establishment outcomes to the same broad industry category and year. **X** includes establishment and district time-varying covariates. We control for a quadratic in firm age, and flexibly account for establishment size by including five bins of establishment size, interacted with year dummies.[18] Pre-treatment district demographic and economic covariates from 2004, interacted with a post-treatment indicator, are also included.[19]

$Underbanked_d$ is a dummy equaling 1 if establishment *i* is located in a district classified

[18] Establishment size is measured using the average number of workers hired between 2001 and 2005. Five establishment size bins are used: less than 10 workers, 10-25 workers, 25-50 workers, 50-100 workers and more than 100 workers.

[19] The covariates considered are population density; labor force participation and unemployment rate; fraction of self-employed, salaried and causal workers; fraction of workers employed in farm, manufacturing, trade, construction and services sectors; fraction of adults with secondary or higher education; fraction of rural population; gender ratio; fraction of Muslim population; logged per capita household consumption. The covariates are sourced from National sample Survey (2004-05) employment-unemployment household survey.

as "underbanked". Local variation in establishments' exposure to the treatment arises through the variation in districts' underbanked status at the discontinuity threshold. *Post* is a dummy equaling 1 for years after 2005, when the BAP comes into effect. Similar to the RD design, we include a linear polynomial in the running variable, $f(Runvar)$, interacted with the post-treatment and underbanked indicators (Cingano et al., 2016; Grembi et al., 2016).[20] This ensures that the treatment effect (β) is estimated at the discontinuity threshold, where establishments in underbanked ("treatment") and non-underbanked ("control") districts are most comparable. Standard errors are clustered by district, the level at which our treatment varies. Regressions are weighted with establishment-specific weights provided by the ASI.[21]

Conditional on the smoothness of pre-treatment covariates around the discontinuity threshold, establishments in non-underbanked districts serve as a valid counterfactual for establishments in underbanked districts. To ensure the pre-treatment comparability of treatment and control units, we restrict our primary sample to establishments in districts located within a neighbourhood of 15 (bank branches per million persons) around the discontinuity threshold. The bandwidth is selected using the data-driven optimal bandwidth method of Calonico et al. (2020).[22] We also show robustness to a range of alternate bandwidths between 10 and 20 bank branches per capita.

A causal interpretation of β is subject to the standard assumption in a DiD specification: namely enterprise outcomes across underbanked and non-underbanked districts should have evolved comparably in the absence of the policy intervention. While the counterfactual is fundamentally untestable, we use an event-study framework to test whether outcomes of interest exhibited parallel trends across underbanked and non-underbanked districts prior to the BAP. Specifically, we estimate: Equation (**??**) estimates the treatment effect corresponding to each year in the sample, with 2005 ($k = -1$) – the year in which the BAP was announced – serving as the benchmark year. If establishment outcomes were comparable across underbanked and non-underbanked districts prior to the BAP, then $\beta_k = 0 \; \forall \; k \in \{-5, ..., -2\}$.

[20]Namely, we include $Runvar_d \times Post_t$ and $Runvar_d \times Underbanked_d \times Post_t$ in all our specifications. Establishment fixed effects results in the omission of $Runvar_d$ and its interaction with the underbanked indicator.

[21]The weights equal the inverse of the sampling probability. For establishments surveyed every year, the assigned weight is 1.

[22]In the absence of a prescribed method for computing the optimal bandwidth in specifications combining a RD design with a DiD ("differences-in-discontinuity specification), we use the optimal MSERD bandwidth for the year 2011, using the method of Calonico et al. (2020). For the sake of comparison, the optimal bandwidth used by Young (2017) to study the same policy intervention is 13, while Khanna and Mukherjee (2021) uses an optimal bandwidth of 20.

3.3 Pre-Treatment Covariate Balance

Before discussing our main findings, we empirically confirm that underbanked and non-underbanked districts were "balanced" along pre-treatment observable characteristics. This would substantiate the validity of the RD design, and attest to the comparability of treatment and control units. Appendix Figures B1 and B2 undertake covariate balance checks using pre-treatment district covariates from the nationally representative household employment-unemployment survey, conducted in 2004-05 by the NSSO (also referred to as the National Sample Survey (NSS) 2004-05 in this paper). These include demographic factors such as population, urbanization and education, as well as employment characteristics and household consumption. Visually, there is no evidence of any discontinuity across the 18 covariates within a narrow window of the discontinuity threshold, and the discontinuity estimates are also not statistically significant. Appendix Figures B3 and B4 replicate this exercise for pre-treatment establishment-level manufacturing outcomes.[23] Similar to the district covariates, we find no evidence of any significant differences in manufacturing outcomes across underbanked and non-underbanked districts in the pre-treatment period. Appendix Tables B2-B5 confirm these results using linear regressions.[24] Collectively, Appendix Figures B1-B4 and Tables B2-B5 affirm that within a narrow window of the discontinuity threshold and prior to the policy intervention, a) underbanked districts were observationally equivalent to non-underbanked districts; and b) manufacturing outcomes were statistically indistinguishable across underbanked and non-underbanked districts.

4 Results

We now present our key findings. First, we document the impact of the BAP on financial intermediation in underbanked regions. Next, we identify the impact of the policy intervention on manufacturing investment. Subsequently, we explore the distributional aspects of the policy and explore mechanisms explaining the observed findings.

[23]For manufacturing establishments, we collapse the pre-treatment data by computing within-establishment averages between 2000 and 2004.

[24]We regress the observable characteristic of interest on the underbanked indicator, conditional on a linear polynomial in the running variable and state fixed effects. Establishment-level regressions also includes 2-digit industry fixed effects.

4.1 Financial Deepening in Underbanked Districts

We use district-level data from the BSR and the differences-in-discontinuity design discussed in Section 3.2 to identify the impact of the BAP on bank branches and financial intermediation in previously under-served regions. As our unit of observation is the district, we estimate specification (3) using district and year fixed effects. District fixed effects allow us to flexibily control for time-invariant observable and unobservable district characteristics affecting banks' choice of location. All specifications restrict the sample to a bandwidth of 15 (bank branches per million persons) around the discontinuity threshold, with the standard errors being clustered by district.

Column (1) of Table 1 shows that relative to observationally equivalent non-underbanked districts, the average underbanked district had 5 additional private bank branches following the BAP. The coefficient is statistically significant at the 1% level and unchanged upon adding district-level covariates, interacted with the post-treatment indicator (column (2)). The coefficient is sizeable in magnitude and reflects a 25 percent increase in the number of private bank branches, when compared to the pre-BAP mean in non-underbanked areas. Columns (3)-(6) of Table 1 show that the BAP had little impact on bank branches for state-owned banks and regional rural banks. The latter is particularly reassuring as regional rural banks were exempted from the policy and the coefficients serve as a placebo check. Columns (7) and (8) show that underbanked districts had between 7 and 10 additional bank branches in the post-treatment period, driven primarily by the increase in private banks.[25] Compared to the "social banking" era, a conservative back of the envelope calculation indicates that the BAP's impact was approximately a fourth of the impact of the state-driven push to expand banking infrastructure in rural unbanked locations between 1970 and 1990.[26] The expansion in bank branches in underbanked districts following the BAP is consistent with the findings of Young (2017), Khanna and Mukherjee (2021) and Cramer (2022)

A causal interpretation of the point estimates in Table 1 is subject to the assumption that banking outcomes across underbanked and non-underbanked districts would have been comparable in the absence of the policy intervention. While the counterfactual cannot

[25] Relative to the 149 bank branches in the average non-underbanked district between 2001 and 2005, this quantifies as an increase of 5.88 percent.

[26] Burgess and Pande (2005) notes that around 30,000 bank branches were opened over a 20 year period between 1969 and 1990. This equates to approximately 84 new branches opened per district over a 2 decade period. The number needs to be interpreted with caution as a number of these districts were subsequently divided into smaller districts during the 1990s, so the aggregate average effects of the social banking program most likely reflect an upper bound.

be observed, the event-study plot in Figure 3 confirms the absence of any significant differential pre-treatment trend in private bank branch expansion in underbanked areas. Consistent with the fact that banks had to establish proposed branches within a year of approval of their expansion plan, there is a sharp increase in private bank branches in underbanked districts following the policy intervention in 2005, which persists till the end of our sample period in 2011.

The BAP clearly stated that the central bank would be assessing compliance with the policy both in terms of bank branches opened, and the volume of financial intermediation undertaken by banks in underbanked areas. To this effect, Panel A of Appendix Table A1 uses the differences-in-discontinuity specification to identify the impact of the BAP on credit disbursement by private banks. The outcome variable in the odd-numbered columns is the amount of outstanding credit; in even-numbered columns, the number of loan accounts. To account for large values of credit disbursement and a number of 0s in the pre-2005 period owing to limited operations by private banks, we use an inverse hyperbolic sine transformation of the outcome variable.

Columns (1) and (2) point to a positive treatment effect on private bank credit disbursement, although the point estimates are noisy (p-values .159 and .113). Columns (3) and (4) identify a positive treatment effect on private bank credit for manufacturing activities, with the intensive margin coefficient being significant at the 5% margin, and the extensive margin coefficient at the 10% margin. We use the proprietary BSR data in columns (5) and (6) to identify a positive and significant treatment effect for priority sector lending undertaken by private banks. This shows that private banks responded to the BAP by expanding their physical presence in underbanked areas through bank branches, and expanding credit to the priority sector.[27] Finally, columns (7) and (8) consider loans issued to manufacturing establishments within the priority sector. We identify a positive treatment effect along the extensive margin, significant at the 10% level (p-value .064), while the intensive margin coefficient is positive, albeit statistically non-significant (p-value .103).

Recent research recommends interpreting coefficient magnitudes from an inverse hyperbolic sine transformed outcome variable with caution when the raw outcome variable has a substantial mass at 0. In this regard, Appendix Table A2 re-estimates the impact of the BAP on credit disbursement by private banks with the credit outcomes in levels. The findings are qualitatively similar, but the coefficients are imprecisely estimated. Nonetheless, we identify an aggregate INR 1.2 billion additional outstanding loans from private banks in underbanked districts (p-value .09), a fifth of which is accounted for by manufactur-

[27] These are loans issued to rural village industries, as well as small and micro-enterprises.

ing credit (p-value .203). Relative to the pre-BAP mean in non-underbanked districts, the treatment effect amounts to a 12 percent increase in private bank manufacturing credit. Approximately 70 percent of this was accounted for by private bank credit to small and micro-enterprises in underbanked areas [column (7)].

Appendix Figure A3 shows event-study plots estimated using specification (**??**), which identifies the average annual treatment effect of the BAP on private bank credit. The coefficients are benchmarked to the year 2005 – the year in which the BAP was announced, and the vertical lines denote 95% confidence intervals. Consistent with our identifying assumption, there is no evidence of differential pre-treatment trends in aggregate private bank credit, or private bank manufacturing credit across underbanked and non-underbanked districts. There is an increase in both total private bank credit, and private bank manufacturing credit following the policy intervention, which becomes statistically significant at the 5% level in the final three years of our sample period (2009-11). Similar to the muted impact of the BAP on the expansion of state-owned banks in underbanked areas, Panel B of Appendix Table A1 shows that financial intermediation by state-owned banks too remained unaffected in response to the BAP. This limit concerns that the increased credit disbursement by private banks identified in Panel A of Appendix Table A1 emanated from a secular expansion of bank lending in these districts in response to increased demand.

Our empirical strategy compares private bank credit before and after the policy intervention, across underbanekd and non-underbanked districts. This makes it challenging to ascertain whether the expansion in private bank credit to under-served regions came at the cost of credit expansions in non-underbanked areas. Aggregate trends in the top row of Appendix Figure A4 shows an increase in private bank credit across both underbanked and non-underbanked areas, with a sharper increase in manufacturing credit in underbanked districts following the BAP in 2005. This partially limits concerns that the expansion in private bank credit to underbanked regions was driven by a substantial reallocation of credit from non-underbanked areas. The RD plot in the top-left panel of Appendix Figure A5 further supports this contention: while the private bank credit-deposit ratio is significantly larger in underbanked districts, the average credit-deposit ratio is 0.51.[28] As the average credit-deposit ratio in underbanked districts was less than 1 in 2010, it implies that private banks could have supplied the additional credit in treated areas through local deposits, and would not be required to reallocate credit from other regions through internal capital markets.

[28]The mean credit-deposit ratio for private banks in non-underbanked districts in 2010 was 0.29. The RD coefficient is 0.22 (p-value .004)

4.2 Bank Branch Expansion and Manufacturing Investment

We exploit the time variation in the onset of the BAP and the panel structure of the ASI to combine a DiD approach with a sharp RD design to causally identify the impact of financial deepening on manufacturing investment. Our primary outcome of interest is investment in plant and machinery, defined in equation (2). Unless otherwise specified, all estimates are undertaken using the sample of establishments located in districts within a bandwidth of 15 around the discontinuity threshold.

Column (1) of Table 2 shows a parsimonious specification including only establishment and year fixed effects, and identifies a near 5 percentage point increase in manufacturing investment, with the coefficient being statistically significant at the 5% level. Column (2) replaces the year fixed effects with 2-digit industry-year fixed effects, with little impact on the point estimate. The industry-year fixed effects absorb industry-specific time-varying demand and productivity shocks common to all establishments operating within the broad industry category and year. This implies comparing manufacturing investment for enterprises operating in the same broad industry and year. Column (3) adds establishment-specific covariates, including a quadratic in establishment age, and also dummies for establishment size, interacted with year dummies.[29] Column (4) further includes district covariates, interacted with a post-treatment indicator. This increases the coefficient magnitude slightly and improves its precision to the 1% level. Column (5) replaces the quadratic in establishment age with age fixed effects, while column (6) replaces the 2-digit industry-year fixed effects with 3-digit industry-year fixed effects, limiting our comparison to an even smaller set of establishments in each year. The coefficient corresponding to $Underbanked_d \times Post_t$ is stable in terms of both magnitude and statistical significance in all the above specifications.

Our preferred specification is column (4) of Table 2 which includes establishment, 2-digit industry-year, and establishment size-year fixed effects, along with establishment and district covariates. The point estimates suggests that the average manufacturing establishment in an underbanked district witnessed a 6 percentage point increase in capital expenditures in the post-treatment period, relative to manufacturing establishments in observationally equivalent non-underbanked districts. Compared to the pre-treatment mean in control regions, this implies an additional INR 1.8 million investment in plant

[29]We include 5 dummies for establishment size, based on the pre-treatment average number of workers hired. We also consider the following establishment specific covariates: a dummy for whether the establishment is located in a rural area; a dummy for whether the establishment uses computers for accounting; and dummies for ownership type.

and machinery for establishments in underbanked districts in the post-treatment period.[30] This reflects a substantial increase when considering that the median value of establishment plant and machinery in the pre-treatment period was INR 0.9 million in non-underbanked districts.

Appendix Table B6 considers alternate functional forms and outcomes of interest. Column (1) shows that our results are robust to measuring capital expenditures as the logged difference between closing and opening values of net plant and machinery. Section 3.1.1 discusses the lumpiness of capital spending and notes that less than a fourth of the establishments undertook any positive capital spending in a given year. To this effect, the outcome of interest in column (2) is a binary equaling 1 if the closing value of establishment net plant and machinery exceeded the opening value in a year, and 0 otherwise. We find that the treatment increased establishments' likelihood of engaging in any positive capital spending by 5 percentage points – a 20% increase. With 57 manufacturing establishments operating in the pre-treatment period in the average non-underbanked district, this implies that approximately 3 additional establishments engaged in positive spending on plant and machinery in the post-treatment period in underbanked districts. Columns (3)-(5) show that the results are comparable if we use net fixed assets to measure capital spending. In line with higher capital spending, columns (6)-(7) also identify a positive impact on the use of raw materials.

We next verify whether the observed increase in capital spending is accompanied by increased credit access for manufacturing establishments. Appendix Table B7 reports the impact of the BAP on manufacturing establishments' access to credit. An important caveat is that while the ASI reports outstanding loans, it does not separate establishment credit across bank and non-bank sources, or by bank group. Consequently, our outcomes compare aggregate credit growth for establishments across underbanked and non-underbanked districts. We would expect this to increase if credit from private banks supplemented other credit sources and enabled establishments to undertake higher capital spending.

The outcome variable in column (1) of Appendix Table B7 is credit growth, defined as in equation (2), using the opening and closing values of outstanding loans, while column (2) measures credit growth as the logged difference in closing and opening values of outstanding loans in a year. We identify a positive and statistically significant increase for

[30] In the pre-treatment period, the mean establishment value of plant and machinery (average of net opening and closing values) equaled INR 29.8 million for establishments in non-underbanked districts, located within a bandwidth of 15 around the discontinuity threshold. A 6 percentage point increase thus amounts to INR 1.82 million higher spending on plant and machinery.

both outcomes. Column (1) shows a 13 percentage point increase in credit growth for manufacturing establishments in underbanked districts – equivalent to INR 3.7 million – about twice the increase in capital spending. With 140 manufacturing establishments operating in the average underbanked district, the coefficient points to a INR 513 million increase in aggregate manufacturing credit. As Section 4.1 identified an increase in manufacturing credit from private banks equivalent to INR 278 million, it suggests that the BAP induced increase in private bank manufacturing credit accounted for approximately 54 percent of the aggregate increase in manufacturing credit in under-served areas.

Column (2) of Appendix Table B7 shows that our results are similar if we measure credit growth as a logged differences. Columns (3)-(5) show that the increase in credit is primarily along the intensive margin, with little impact of the treatment on entry of manufacturing establishments into credit markets. Lack of information on loan applications made by manufacturing establishments preclude us from assessing whether this was due to a lack of demand, or a denial by lenders to extend credit to such establishments. Column (6) finds no impact of the policy intervention on the aggregate cost of credit facing manufacturing establishments.

Figure 4 presents event study plots, identifying the average annual treatment effect for three key outcomes of interest: capital expenditures, the likelihood of any positive capital spending, and credit growth. To ensure consistency with our preferred baseline specification, we include establishment, 2-digit industry-year and size-year fixed effects, as well as establishment and district-level controls. Standard errors are clustered by district and the sample is restricted to establishments located in districts within a bandwidth of 15 around the discontinuity threshold. Figure 4 lends support to our identifying assumption and finds all three outcomes of interest to exhibit comparable trends across underbanked and non-underbanked districts prior to 2005. In the aftermath of the BAP, there is a visible jump in the point estimates. For capital expenditures (top-left panel), the coefficient estimates are positive and statistically significant at the 5% level for the years 2007, 2008 and 2009, while they are statistically significant at 10% level for the remaining post-treatment years. The increase in credit growth (top-right panel) begins in 2006 and is the largest for the years 2008-11, coinciding with the expansion in manufacturing credit from private banks in underbanked districts (Appendix Figure A3). The presence of parallel trends and the sharp uptick in capital investments and credit growth following the onset of the BAP allows us to assign a causal interpretation to the baseline findings in Table 2.

4.2.1 Robustness Checks

We subject our baseline results to a number of robustness checks. Table 3 shows that our results are unchanged if we do not weight the specifications with establishment-specific weights (column 1); or two-way cluster standard errors by district and industry (column 2). Column (3) excludes the 9 districts for which the RBI did not precisely follow the assignment rule laid out in equation (**??**). The results are unaffected by this sample restriction.

All specifications till now restrict the primary sample till 2011 due to a new branching policy unveiled that year (discussed in Section 3.1.1). Column (4) relaxes this restriction and uses data till 2014, and finds the long-term impact on manufacturing investment to be comparable to the medium term effects. Column (5) undertakes a placebo test by restricting the sample to 2005 – the year of introduction of the BAP – and defines the post-treatment period as starting from 2002.[31] The point-estimate obtained using this pseudo-treatment is attenuated towards 0, assuaging concerns that the identified treatment effect can be attributed to an overall positive trend in manufacturing investment, coinciding with the timing of the policy intervention.

Our preferred specification uses a bandwidth of 15 (bank branches per million persons) around the discontinuity threshold. We choose this using the data-based optimal bandwidth selection methods recommended by Calonico et al. (2020).[32] Figure 5 shows that our findings are invariant to alternate bandwidth choices. Specifically, we re-estimate our baseline specification for bandwidths between 10 and 20 and plot the coefficients in Figure 5. For all 20 bandwidths, the coefficient estimate is between .03 and .06, and only 3 out of 20 coefficients are statistically insignificant at the 10% level (the largest p-value being .13).[33] This affirms that our results are not contingent on any specific bandwidth. The most conservative bandwidth of 10 identifies a 5 percentage point increase in manufacturing investment in underbanked districts, with the coefficient being significant at the 5% level.

Appendix Figure B5 plots the coefficients obtained from using a cross-sectional RD spec-

[31] This provides us with 4 years of pre-treatment data, and 3 years of post-treatment data.

[32] The optimal MSERD bandwidth using a cross-sectional RD specification for the year 2012 is 14.359. The outcome of interest is capital expenditures in plant and machinery, and the RD specification controls for 3-digit industry fixed effects, state fixed effects, establishment and district covariates. Standard errors are clustered by district.

[33] The first coefficient in Figure 5 is estimated using a bandwidth of 10. Subsequent specifications are re-estimated after incrementally increasing the bandwidth by 0.5. The last specification uses a bandwidth of 20.

ification for each year between 2001 and 2011, using optimal MSERD data driven bandwidths suggested by Calonico et al. (2020). The largest MSERD bandwidth in Appendix Figure B5 is 14.359; the smallest, 6.590.[34] Even for the smallest MSERD bandwidth (in 2008), we identify a 3 percentage point increase in capital spending for manufacturing establishments in underbanked districts (p-value 0.16). Consistent with the event-study plot in Figure 4, the increase in capital spending for manufacturing establishments in underbanked districts is evident only after 2005, once the BAP comes into effect. 5 out of 6 post-treatment coefficients are positive and comparable in magnitude to the coefficients obtained in Figure 4, with 4 being statistically significant at the 5% margin or better.

Figure 6 shows that our findings are not driven by any single state or industry. We establish this by re-estimating our baseline specification after dropping one state/industry at a time. As seen from both panels of Figure 6, the coefficients are not sensitive to the exclusion of any single state or industry – all the coefficient estimates remain positive, centred around 0.06, and statistically significant at the 10% level or better. This reassures us that the positive treatment effect on manufacturing investment was not driven by some confounding state or industry-specific place-based policy, the timing of which also coincided with the policy intervention of interest.

4.3 Distributional Impacts of Bank Branch Expansion

Our baseline results show that districts witnessing an expansion in financial infrastructure see higher capital investment and credit growth for registered manufacturing establishments. We now explore distributional implications to assess whether financial deepening also resulted in an alleviation of credit constraints. We begin by exploring treatment heterogeneity by establishment size. To avoid any contamination of establishment size by the policy intervention, we compute establishment size using the average number of workers hired between 2001 and 2004 and classify establishments as "large" or "small" based on the median establishment size in the pre-treatment period (16 workers).[35] Using

[34] All cross-sectional specifications include a linear polynomial in the running variable, state and 3-digit industry fixed effects, and establishment and district covariates. All specifications are weighted using a triangular kernel and establishment-specific weights. Standard errors are clustered by district.

[35] Specifically, we use the pre-treatment median establishment size for establishments located in non-underbanked districts and within a bandwidth of 15 around the discontinuity threshold.

this classification, we estimate the triple-difference specification:

$$Y_{ijdt} = \alpha_i + \delta_{jt} + \pi_1 Underbanked_d \times Post_t + \pi_2 Underbanked_d \times Large_i \times Post_t + f(Runvar_d) + \gamma \mathbf{X}_{ijdt} + \epsilon_{ijdt} \quad (4)$$

The double-difference coefficient π_1, in Equation (4), compares capital investments across underbanked and non-underbanked districts for smaller establishments. The triple difference coefficient (π_2) identifies the differential effect on capital spending within underbanked districts for larger establishments.

Columns (1) and (5) of Table 8 estimate treatment heterogeneity in capital expenditures and credit growth across "large" establishments, respectively. We find positive and significant coefficients on the double-difference term (π_1). The triple interaction coefficient (π_2) is negative, albeit statistically significant only for credit growth. We cannot reject the null of $\pi_1 + \pi_2 = 0$ for credit growth, pointing to comparable growth in outstanding loans for large manufacturing establishments across underbanked and non-underbanked districts.

Columns (2) and (6) use thresholds of 10, 25, 50 and 100 workers to identify treatment heterogeneity within each establishment bin. The double difference coefficient shows that establishments employing less than 10 workers in underbanked districts witnessed 8 (27) percentage point higher capital spending (credit growth) post-treatment, relative to those in non-underbanked districts. The triple interaction coefficients are all negative, albeit imprecisely estimated.[36] For capital expenditures, the sum of the double and triple interaction terms differ significantly from 0 for establishments employing between 10 and 25 workers (p-value: .068). Manufacturing credit growth in underbanked districts however is driven primarily by the smallest establishments employing less than 10 workers, followed by those employing 10-25 workers.

Columns (1)-(2) and (5)-(6) of Table 8 show that manufacturing investment and credit growth in underbanked districts was driven by relatively smaller establishments for whom credit constraints are also most likely to bind. While firm size is widely used as an indicator of being credit-constrained, employment decisions are endogenous: firms can choose to remain small either because it is optimal, or in response to market distortions. This is particularly relevant in the Indian context as size thresholds have been extensively employed to determine firms' eligibility for subsidized credit (Banerjee and Duflo, 2014). To

[36]The triple interaction coefficients estimating heterogeneity for establishments employing between 10 and 25, and 25 and 50 workers are attenuated towards 0 for capital expenditures, signifying no evidence of a differential effect.

this effect, we consider heterogeneity across both establishment size and age (Criscuolo et al., 2019; Hadlock and Pierce, 2010). The intuition is that younger firms require time to scale up and are initially small due to operational and logistical constraints (including limited credit availability).

Columns (3) and (7) of Table 8 split our sample into 4 mutually exclusive groups: small and young (omitted category); small and old; large and young; and large and old. We use the pre-treatment median establishment size to classify establishments as small or large. Establishments are classified as young if their operations started after 1992.[37] Consistent with Criscuolo et al. (2019), columns (3) and (7) show that the positive treatment effects are driven by establishments which are both small *and* young, with the triple interaction coefficients for both columns being negative.[38] Overall, capital expenditures and credit growth for small and young establishments in underbanked districts were 13 and 31 percentage points higher in the post-treatment period.

Farre-Mensa and Ljungqvist (2016) argue that firm size and age capture life-cycle effects of firms, and are inaccurate measures of financial constraints. Instead, they recommend firms' listing status as a more appropriate signal for being financially constrained.[39] We use information on the establishment's organization to create the binary variable *Listed* if the establishment is owned by a corporation which is publicly listed. Consistent with credit constrained establishments increasing their capital investments in areas witnessing financial deepening, columns (4) and (8) show that the positive treatment effects on capital investment and credit growth are driven entirely by establishments which are *not* publicly listed.

We check the robustness of these findings to other definitions of firm size. Columns (1)-(3) of Appendix Table B8 show comparable findings if pre-treatment establishment fixed assets are used to determine establishment size. In particular, columns (2) and (3) use administrative definitions based on the value of establishment plant and machinery to show that the treatment effects are concentrated amongst small establishments, and establishments qualifying as small-scale industries. This echoes Banerjee and Duflo (2014), who document that a relaxation in the administrative cutoff for small-scale industries resulted in the alleviation of credit constraints. The point estimates in column (3) show that

[37]We use this year as the cutoff as a major overhaul of the Indian economy was undertaken in 1991, encouraging private competition. Using this cutoff implies that establishments classified as young were at most 13 years old at the time of the policy intervention.

[38]When comparing the sum of the double and triple interaction coefficients, we identify a positive impact for capital spending (credit growth) for large and young (small and old) establishments.

[39]In Farre-Mensa and Ljungqvist (2016), being publicly unlisted is a necessary condition for being financially constrained, but not a sufficient condition.

such establishments in underbanked districts increased their capital investments in plant and machinery by an additional INR 0.13 million after the BAP. Comparable results are obtained in Appendix Table B9, columns (1)-(3) when the outcome of interest is credit growth.

Column (4) of Appendix Table B8 considers heterogeneity by establishments' tangible assets. Tangible assets refer to the value of land and building owned by the establishment, often used as collateral to secure credit. If locational proximity to borrowers aids information collection, we would expect a lesser role for collateral in loan covenants (Fisman et al., 2017). Column (4) offers partial support for this hypothesis: while the triple interaction coefficient identifying treatment heterogeneity across establishments with high (above-median) ex-ante collateral values is not significantly different from 0, the uninteracted coefficient corresponding to establishments with low collateral is positive and statistically significant at the 5% level. This signifies that the ability to offer collateral in the form of immovable physical assets was not a necessary condition for undertaking capital investment in underbanked districts. Credit growth in underbanked districts was driven by establishments with relatively low collateral values (Appendix Table B9, column 4). Finally, column (5) of Appendix Tables B8 and B9 show the positive treatment effects on manufacturing investment and credit growth to be driven by individual proprietorships and family owned enterprises, which again are likely to be smaller and face binding credit constraints.[40]

Collectively, we see that manufacturing investment and credit growth in underbanked districts was concentrated amongst smaller establishments – particularly, small and young establishments, and establishments not publicly listed. An extensive literature studying the finance-growth nexus shows that these establishments are also most likely to face binding credit-constraints. Consequently, our results support the contention that the expansion in local financial infrastructure aided the alleviation of credit-constraints and allowed these enterprises to invest in productive capital. Higher credit growth for small and young establishments, and establishments not publicly listed points to credit allocation towards firms with limited "hard" information, and for whom the collection of "soft" information would be critical for effective financial intermediation (Aggarwal and Hauswald, 2010; Liberti and Petersen, 2019). We discuss this channel in greater detail while exploring mechanisms explaining the increase in capital spending and credit

[40] The ASI precludes the linking of establishments to parent firms but does provide broad ownership categories. We use individual proprietorships and family-owned enterprises as our benchmark category and explore treatment heterogeneity across establishments classified as partnerships, private limited companies, government-owned/aided enterprises and public limited (listed) companies.

growth for smaller establishments.

4.4 Quality of Credit Intermediation

Our baseline results document a higher disbursement of manufacturing credit from private banks in underbanked districts following the BAP. This is accompanied by increased capital spending and credit growth amongst registered manufacturing establishments, driven by establishments most likely to face binding credit constraints. Relative to government banks, private banks are considered to have superior loan officer incentives, corporate governance, and adhere to profit-maximizing motives. They are also less susceptible to political capture. This leads us to examine how the expansion in private bank credit in underbanked districts affected the overall quality of financial intermediation. While enhanced career incentives for loan officers and the lack political interference can improve borrower quality through better screening and monitoring, an increased appetite for risk can also lead to higher loan delinquency.

Following Jayaratne and Strahan (1996), we use loan delinquency as a proxy for lending quality and compare non-performing loans (as a fraction of total loans) across underbanked and non-underbanked districts. As loan delinquency is often a function of time, we compare the share of non-performing loans in March 2016 – a decade after the policy intervention – using RBI's proprietary data on branch-level non-performing assets.[41] Using a cross-sectional RD specification, the top-right panel of Appendix Figure A5 finds no difference in the share of non-performing loans across underbanked and non-underbanked districts at the discontinuity threshold.[42] While this does not point to an improvement in the quality of financial intermediation by private banks, it also rules out that the expansion in private bank credit was accompanied by a deterioration in lending quality.

Next, we use ASI's establishment-level data to identify whether the increase in manufacturing investment was concentrated amongst productive establishments. A key role of banks is to shape societal allocation of resources by selecting firms which receive financing (Bai et al., 2018). While we cannot distinguish across sources of credit, an increase in capital expenditures by enterprises with relatively high ex-ante creditworthiness would

[41]We aggregate the branch-specific share of non-performing loans to the district by computing loan-weighted averages of branch NPAs.

[42]We opt for a cross-sectional sharp RD specification as a number of districts had no private bank operations in the prior to 2005, which leads to the share of non-performing loans being undefined in such instances.

be consistent with the contention that private banks were more effective at allocating credit to borrowers of higher quality. It would also be consistent with the overall findings of Table 2, as we would expect financial deepening to affect manufacturing investment only if firms had projects with net positive returns.

We use four pre-treatment measures of firm quality: namely marginal product of capital, output per worker, pre-treatment interest rates, and interest coverage ratio. The first two measures proxy for establishment quality, while the last two capture credit risk and delinquency. Appendix Table B10 broadly supports the explanation that the increase in manufacturing investment in underbanked districts was driven by creditworthy establishments. We identify a positive coefficient on the triple interaction term corresponding to establishments with higher marginal product of capital (column 1), and negative coefficients for establishments facing higher ex-ante interest rates (column 3), and establishments whose interest payments exceeded annual sales at least once between 2001 and 2005 (columns 4). The double-difference coefficients in the latter two instances are positive and significant at the 1% level, signifying that the increase in manufacturing investment in underbanked districts was driven by establishments with low cost of borrowing, and no record of delinquency in the medium-term prior to the treatment. These findings are also consistent with the absence of any aggregate increase in non-performing loans for private banks in underbanked districts. There is however no evidence of treatment heterogeneity across establishments with relatively high pre-treatment output per worker (column 2): contrary to expectations, the triple interaction coefficient is negative, albeit statistically non-significant, and the double interaction coefficient suggests that capital spending was also undertaken by establishments with relatively low pre-treatment output per worker.[43]

4.5 Output and Profitability

Our empirical findings identify a positive impact of bank branch expansion on manufacturing investment and credit growth. This is driven by establishments most likely to face binding credit constraints. There is also suggestive evidence that credit was allocated towards establishments of better quality. We now identify the impact of the BAP on manufacturing output, profitability and employment. If capital investments are productivity enhancing, we would expect the BAP to also increase manufacturing output and profits. Capital spending can also increase profitability without affecting output by lowering the

[43] This could also reflect relatively lower capital investment by bigger firms in underbanked districts since bigger firms are also more likely to have higher labor productivity or output per worker.

cost of production. Effect on employment at firm level can be ambiguous depending on whether capital and labour are substitutes, or complementary.

Appendix Table B11 shows the impact of the treatment on the reported value of output and establishment profits. Profits are defined as output, net of depreciation and input costs, where the latter takes into account interest expenses and labour costs. As profits can be negative, we use an inverse hyperbolic sine transformation to measure establishment profits. Since the measurement of inputs and labour costs can be noisy, we also define a binary indicator equaling 1 if the establishment reported positive profits during the year. Columns (1)-(3) suggest that output and profitability was unaffected by the policy intervention. Contrary to our expectations, the point estimates are negative, albeit imprecisely estimated. It is however possible that output and profits respond to capital investments with a lag, and the restriction of the sample to 2011 hinders our ability to detect an effect. In columns (4)-(6), we extend the sample to 2014 and identify long-run treatment effects on output and profits. While the coefficients remain insignificant, the point estimates for profits are now positive. We explore this further in columns (7)-(9) using the full sample, but splitting the post-treatment period into two: between 2006 and 2010, and from 2011 to 2014. For all three outcomes of interest, the treatment effect for the 2011-2014 period is positive, and statistically significant at the 5% level for the binary measure of profits. Specifically, column (9) shows that establishments in underbanked districts are 5 percentage points more likely to report positive profits during this period – a 6 percent increase in profitability.[44] Column (7) points to a near 8 percent increase in establishment output between 2011 and 2014, although the confidence intervals are too wide to reject a null effect.

Overall, Appendix Table B11 shows that capital investments positively affect enterprise performance, especially in terms of profitability, but the returns accrue only over the long-term. Appendix C examines in greater detail the short and medium-term impact of capital investment on manufacturing output. Drawing from the literature on managerial capital, we find positive treatment effects on output over the medium term, but only for establishments with relatively high managerial capital. This also holds among the more credit constrained enterprises. The findings affirm to the critical role played by managerial capital in firm operations. We find no significant effect of financial deepening on firms' labor demand: if anything, the evidence points to a reduction in the number of contractual workers hired by establishments. When considering that labour costs did not increase following the BAP, this indicates that enterprises were possibly substituting labor with

[44] In the pre-treatment period, 83 percent of establishments reported positive profits in control districts. The treatment effect is computed as $.048/.83 = .06$

capital. The results are discussed in detail in Appendix Section C.1 and C.2.

5 Mechanisms

This section explores plausible mechanisms explaining the increase in manufacturing investment and credit growth in smaller establishments in response to financial deepening. We consider five channels: physical proximity of lenders to borrowers; increased staffing by lenders to collect borrower information; creditors' specialization in lending to small manufacturers; increased lender competition lowering the cost of credit; and aggregate demand.

5.1 Distance to Manufacturing Establishments

Screening and monitoring costs incurred by lenders are typically increasing in distance (Aggarwal and Hauswald, 2010; Chen et al., 2022; Chernenko et al., 2022; Gilje et al., 2016; Hollander and Verriest, 2016). Physical proximity to borrowers aids in the collection of "soft" information which is not easily substitutable (Nguyen, 2019), and critical with regard to small unlisted borrowers for whom there is limited "hard" information (Aggarwal and Hauswald, 2010; Liberti and Petersen, 2019). A reduction in the cost of information acquisition can improve both the volume, and the quality of information collected by lenders (Chen et al., 2022). Thus, physical proximity can reduce the costs of financial intermediation, contributing to higher credit disbursement towards informationally opaque borrowers. Consequently, we test whether the BAP reduced the physical distance between lenders and manufacturing establishments in underbanked districts.[45]

The empirical challenge here is that while bank branch addresses are publicly listed, the ASI only provides location identifiers at the level of district. This precludes us from testing whether the policy reduced establishments' distance to private banks in underbanked districts. We overcome this by using data from the Economic Census (EC), which allows us to map a subset of rural business establishments to pincodes. We combine this with the mapping of bank branches to pincodes, and compute the minimum Euclidean distance of establishments to private and government-owned bank branches.[46]

[45]Despite the banking expansion, if new bank branches are concentrated around existing branches, it would not result in a reduction in the distance between bank branches and establishments.

[46]We use the dataset compiled by Agarwal et al. (2021) to obtain pincodes of private bank branches in India. Agarwal et al. (2021) scrape the physical addresses of over 120,000 bank branches operating in

We use the 2013 EC and a cross-sectional RD specification to test whether manufacturing establishments' average distance to private banks was significantly lower in underbanked districts. We begin by aggregating the establishment-level data to the district and compare the median establishment-private bank distance across underbanked and non-underbanked districts. As the ASI covers only registered manufacturing establishments, and the EC provides no information on establishments' registration status, we exclude manufacturing establishments employing less than 5 workers.[47] The left panel of Figure 7 restricts the sample to districts within a window of 15 (bank branches per million persons) around the discontinuity threshold and identifies a significant reduction in the median distance to private banks in underbanked districts. Specifically, the median distance to private banks for manufacturing establishments declined by 6 kilometres (km) in underbanked districts (relative to a mean distance of 13 km in non-underbanked districts). The right panel of Figure 7 shows no corresponding impact for establishments' distance to government-owned banks.

We next use the establishment-level data from the EC to verify the aggregate findings of Figure 7. This allow us to control for establishment characteristics such as industry of operation, and also explore heterogeneity by establishment size. We estimate local linear regressions of the form:

$$DistPvtBank_{ijds} = \alpha_s + \delta_j + \beta Underbanked_d + f(Runvar_d) + \gamma X_{id} + \epsilon_{ijds} \tag{5}$$

The unit of observation in Equation (5) is establishment *i*, located in district *d* of state *s*, and operating in industry *j*. The outcome of interest is the minimum distance to a private bank branch. We include state and industry fixed effects (α_s and δ_j) along with controls for establishment ownership and additional pre-treatment district covariates. $f(Runvar_d)$ denotes a linear polynomial in the running variable, and its interaction with the *Underbanked* indicator. The coefficient of interest is β, comparing the minimum distance to private banks across manufacturing establishments in underbanked and non-underbanked districts at the discontinuity threshold. The sample is restricted to establishments employing at least one worker and located in districts within a neighbourhood of 15 around the discontinuity threshold. Standard errors are clustered by district.[48]

India in 2016. We use the pincodes of bank branches which began operation prior to 2012, and obtain the latitude and longitude of the centroid of each pincode, which is then used to compute the Euclidean distance between two pincodes.

[47]In the pre-treatment period, establishments employing less than 5 workers comprised the bottom decile of the ASI's distribution of workers.

[48]This effectively excludes establishments where the owner is also the sole worker, or self-employed manufacturing enterprises. As such establishments are also most likely to be unregistered, this sample

Column (1) of Table 5 shows a 4.5 km reduction in the minimum distance to a private bank in underbanked districts – a 30 percent decline.[49] Columns (2)-(4) show heterogeneity by establishment size. We find the decline in distance to the nearest private bank branch to be strongest for establishments employing between 5 and 25 workers.[50] There is however no significant reduction in the distance to private banks for larger establishments hiring in excess of 25 workers (column 4), or establishments' distance to government-owned banks (columns 5-8).

Finally, using Equation (4) we show that the increase in capital spending and credit growth is driven by establishments located in districts where establishments are in close proximity to private banks. We compute the within-district median establishment-private bank distance from the EC and define the binary variable *High Dist. Pvt. Bank* to equal one if the within-district median distance exceeds the median value across all districts.[51] Columns (1) and (4) of Table 6 confirm that the increase in capital spending and credit growth is driven by establishments operating in underbanked districts where the median establishment-private bank distance is relatively small. The triple interaction coefficient corresponding to *High Dist. Pvt. Bank* is negative and large for both capital expenditures and credit growth, and statistically significant for capital expenditures.

If information acquisition is a key friction for financial intermediation and physical proximity to borrowers aids the acquisition of information by lenders, then this channel is likely to be most beneficial for smaller informationally opaque firms. Consistent with this hypothesis, columns (2) and (5) of Table 6 show higher manufacturing investment and credit growth for relatively smaller establishments (less than 25 workers) in underbanked districts with a relatively low establishment-private bank distance. In contrast, columns (3) and (6) identify no impact of the policy intervention on capital spending and credit growth for larger establishments (hiring more than 50 workers), irrespective of whether they were located in districts where the distance to private banks was smaller.

While underbanked and non-underbanked districts are observationally equivalent within a narrow window around the discontinuity threshold, the entry of private banks in underbanked districts is likely to suffer from selection, as banks were free to enter any underbanked district. Additionally, since we can only map rural establishments to bank

restriction makes the EC more comparable to the ASI.

[49]The mean establishment-private bank distance in non-underbanked districts is 13.42 km.

[50]Conditional on employing at least one worker, establishments employing at least 25 workers constitute the top decile of EC establishments. The set of establishments employing between 5 and 25 workers account for 40 percent of EC establishments.

[51]We restrict the sample to establishments employing at least 5 workers to achieve comparability with the ASI.

branches, the findings of Table 6 should be interpreted with caution.[52] Nonetheless, the mapping of manufacturing establishments to private bank branches in the EC shows that the BAP significantly reduced establishments' distance to private bank branches in underbanked districts. Suggestive evidence also shows the increase in manufacturing investment and credit growth to be driven by establishments in treated districts where the distance to private bank branches was relatively small. This indicates that the physical proximity of private banks to borrowers aided credit growth and capital investment for these establishments. While we cannot distinguish whether this was due to the improved screening of borrowers ex-ante, or better monitoring ex-post, the results broadly underline the role of local credit markets in facilitating financial intermediation (Aggarwal and Hauswald, 2010; Nguyen, 2019).

5.2 Increased Staffing by Banks

We next examine whether the BAP affected the staffing decision of banks. If banks were entering underbanked districts to comply with the BAP and engaged in financial intermediation, we would also expect to observe increased hiring of loan officers, responsible for evaluating and processing loan applications. Aggarwal and Hauswald (2010) in particular note the vital role played by loan officers in collecting "soft information" and subjective intelligence with regard to informationally opaque small borrowers. To this effect, we use proprietary data from the BSR to identify the impact of the policy intervention on the staffing decisions of banks across underbanked and non-underbanked districts.

The proprietary BSR data separates bank employees into two categories – officers and clerks. The former comprises of skilled bank employees who are typically hired through competitive examinations and are responsible for overall branch management, and responsible for lending decisions. To this effect, we aggregate the number of officers and employees to the level of district in each year and use our primary empirical specification to identify the impact of the BAP on staffing decisions of private and state-owned banks.

Column (1) of Table 7 shows that private banks in underbanked areas had 35 additional areas in the aftermath of the BAP. This is a near 36 percent increase, relative to the control group mean prior to 2005, and the coefficient is statistically significant at the 1% level. Column (3) shows that in aggregate, private banks had 52 additional employees in under-

[52]The *High Dist. Pvt. Bank* would remain unaffected as long as the distance to private banks from urban establishments was not significantly larger in districts where the distance to private banks for rural establishments was relatively small.

banked districts – a 24 percent increase. The coefficients in columns (1) and (3) indicates that 2 out of every 3 additional employees engaged by private banks in underbanked districts were officers. While we cannot specifically observe loan officers or the actual processing of loan applications by banks, the increased staffing of branches by officers indicate that private banks were investing in the necessary human capital to undertake lending to small borrowers in underbanked districts. Importantly, columns (2) and (4) show no impact of the BAP on staffing levels of state-owned banks, either in terms of officers, or overall employees. The coefficients are a third in magnitude and statistically non-significant. This again underlines that private banks primarily responded to the BAP, through an increase in bank branching, lending activities, and increased staffing of bank branches. If officers engaged in the acquisition of "soft information" and monitoring of relatively smaller manufacturing establishments, it would be consistent with the increase in credit growth and capital spending for these establishments identified in Section 4.3.

5.3 Comparative Advantage of Lenders

We next explore whether specific attributes of entrant banks can explain the increase in manufacturing investment. We examine three attributes in this regard: first, if the district witnessed entry by a small private bank; second, if the district witnessed entry by a private bank specializing in lending to small borrowers; and third, if the district witnessed entry by a private bank specializing in lending to small *manufacturing* borrowers. Each of the above hypothesis essentially tests for comparative advantage of entrant banks in small lender operations, and is motivated from studies showing small banks to possess informational advantages in lending to small borrowers (Bai et al., 2018; Berger et al., 2005; Liberti and Petersen, 2019). Resultantly, we examine whether the increase in capital spending by small and micro-enterprises can be explained by the entry of small private banks in underbanked districts.

We use proprietary bank lending data from the BSR between 2000 and 2005 to classify banks into the above three categories. "Small" banks are defined as those whose aggregate loan portfolio is less than the median loan portfolio during this period. Banks specializing in small loans are defined as those where the average loan size is less than the median loan size across all banks.[53] Banks specializing in lending to small manufacturing enterprises are those which have a relatively high (above median) share of small borrowers within their manufacturing portfolio.

[53]The average loan size is computed as total outstanding loans, divided by total loan accounts.

Column (1) of Table **??** offers weak evidence in support of the first hypothesis. While the triple interaction term corresponding to entry by small private banks is positive, it is statistically insignificant. The sum of the coefficients is positive and significant at 5% level (p-value .013), pointing to a 6 percentage point increase in manufacturing investment in underbanked districts witnessing entry by a small private bank. We find no evidence to support the second hypothesis (column 2), since the triple interaction term for entry by private banks specializing in small loans is negative, large, and statistically significant

Finally, the triple interaction coefficient in column (3) is positive and statistically significant, indicating that the increase in capital spending is undertaken by establishments located in districts which witnessed entry by banks with a relatively high share of small manufacturing loans. This is consistent with the hypothesis that manufacturing investment increased in districts witnessing entry by private banks specializing in lending to small manufacturing establishments. Moreover, the double-difference coefficient in column (3) is attenuated towards 0 and not statistically significant. This affirms no difference in manufacturing investment across underbanked and non-underbanked districts, for the subset of districts not witnessing entry by a private bank specializing in lending to small manufacturing borrowers.

Given the flexibility accorded to banks to locate in underbanked districts, a number of district-specific factors could be correlated with a bank's decision to begin operations in a district in response to the BAP. While all our specifications control for district observables, we cannot rule out unobservable factors determining the entry of select private banks. Nonetheless, columns (1) and (3) of Table **??** offer suggestive evidence consistent with the explanation that the specialization of banks' lending operations matters for capital investment by manufacturing establishments.[54]

5.4 Cost of Credit

An expansion in bank branches can increase competition amongst financial institutions, which in turn can facilitate financial intermediation, both through incumbents' incentive to preserve their market share, and a reduction in the cost of credit (Carlson et al., 2022). Consequently, lender competition can increase capital investments by lowering the marginal cost of capital. If borrowing costs were higher for smaller informationally

[54] As we are comparing lending rates in equilibrium, it is possible that lenders had initially lowered rates but increased competition for credit amongst borrowers had put upward pressure on bank interest rates, resulting in a null result.

opaque firms, it is possible that these firms gained disproportionately from the reduction in lending rates owing to heightened lender competition after the policy. We examine this channel using the proprietary BSR data and compare average lending rates across underbanked and non-underbanked districts in the post-treatment period (2011), using a cross-sectional sharp RD specification.[55] The choice of this empirical strategy is driven by the absence of private banks in almost half of the districts prior to 2005, resulting in the interest rate being undefined in such instances.

The top-left panel of Appendix Figure A5 provides no evidence of a reduction in lending rates of private banks in underbanked vs non-underbanked districts. This holds for state-owned and private banks (bottom-left panel). The discontinuity estimates are small and statistically insignificant. The absence of a change in district-level lending rates is corroborated in the establishment-level data as well. The ASI collects information on annual interest payments made by establishments (irrespective of credit source), which can be used to impute establishment-level interest rates. Consistent with the district-level results, column (6) of Appendix Table B7 and B12 offer no evidence of a decline in overall lending rates or those faced by small establishments in response to the BAP. This makes it unlikely that the increase in manufacturing investment and credit growth in underbanked districts emanted in response to lower borrowing costs from heightened lender competition.

5.5 Aggregate Demand

The final channel examined is aggregate demand. This is particularly relevant given the findings in Young (2017), who showed that the BAP increased farm productivity and economic activity (measured using night-lights). Thus, financial deepening can boost regional economic activity, resulting in higher local demand through general equilibrium effects, which in turn can boost manufacturing investment. If smaller establishments cater to local demand, this can explain the increased capital spending by smaller manufacturing enterprises in underbanked districts.

To assess whether our results are driven by higher local demand, we explore treatment heterogeneity across tradable and non-tradable industries. If the increase in manufacturing investment is solely an upshot of increased local demand, we would expect the

[55] The administrative BSR data provides information on the weighted average lending rate charged by each bank branch. The average lending rate in the district is computed as the loan volume weighted mean across all branches.

treatment effects to be driven by establishments operating in non-tradable industries. We follow Mian and Sufi (2014) and use the geographic dispersion of industries to classify them as tradable and non-tradable.[56] The intuition is that industries with greater geographic dispersion are likely to be non-tradable.

Column (5) of Appendix Table B10 fails to identify treatment heterogeneity across establishments in industries with relatively low geographic dispersion (tradables). The point estimate is positive but the confidence intervals are sufficiently wide to rule out a significant differential effect. The double-interaction term is positive and significant at 10% level (p-value .057), implying that capital spending in underbanked districts increased by 5 percentage points for establishments operating in non-tradable industries. Thus, while we cannot rule out that part of the increase in capital spending was in response to higher local demand, the positive and statistically significant treatment effect for establishments operating in industries with low geographic dispersion indicates that the aggregate demand channel cannot be the sole explanation for our main findings.

6 Aggregate Effects of Bank Branch Expansion

In this section, we estimate the aggregate effects of financial deepening due to the BAP. This allows us to identify the impact of bank branch expansions on firm entry, closures, and aggregate employment. Section 3.1.1 mentions that our primary sample only includes establishments which were observed at least once before, and after the policy intervention. This limits our ability to identify whether the bank branch expansion affected the entry or exit of establishments. For instance, if bank entry also facilitated the entry of new establishments, resulting in higher capital spending, the current results would be an under-estimate of the true impact of financial deepening on manufacturing investment.

We examine this by aggregating the establishment-level data to the district-industry (3-digit) level and use the following specification:

$$Y_{jdt} = \alpha_d + \delta_{jt} + \beta Underbanked_d \times Post_t + f(Runvar_d) + \gamma \mathbf{X}_{dt} + \epsilon_{jdt} \quad (6)$$

[56] We use data from the Economic Census of 2005 for this exercise. The Economic Census provides total number of workers hired by every business establishment, irrespective of their registration status, allowing us to obtain aggregate estimates of employment at the industry-district level. We first compute the share of manufacturing workers for a specific industry within each district (as share of total manufacturing employment for that industry). We next sum the square of these shares within industries to construct industry-specific measures of geographic dispersion.

The unit of observation in Equation (6) is the district-industry (3 digit-level) pair (dj), observed in year t. We continue to use our difference-in-discontinuity specification and include district fixed effects (α_d) to absorb district-specific time-invariant factors affecting the outcomes of interest. We include industry-year fixed effects (3-digit industry), limiting our comparison to outcomes within similar industry groups in the same year, with the identifying variation arising from changes in districts' underbanked status. The sample is restricted to districts within a bandwidth of 15 from the discontinuity threshold; standard errors are clustered by district.

We find an increase at district-level in the three main outcomes of our interest – capital expenditures, fraction of establishments undertaking any positive capital spending, and credit growth (columns (1)-(3) of Table 9). Capital expenditures are again limited to plant and machinery. The aggregate district-level findings are consistent with the establishment-level results: there is a 5.4 percentage point increase in capital investments, and a 3.3 percentage point increase in the fraction of establishments engaging in capital spending. This corresponds to an aggregate INR 18 million increase in capital investments for establishments in underbanked districts (in the average 3-digit industry) in the post-treatment period. Credit growth too increases by 10 percentage points, signifying an increase in outstanding loans in underbanked districts, equivalent to INR 33 million.

Columns (4)-(6) consider total output, employment and revenue productivity. While the point estimates are positive, the confidence intervals are too wide to rule out a null effect. For employment, the coefficient suggests a 12 percent increase in the hiring of workers, although the coefficient is only significant at 15% level (p-value: .141). Relative to the pre-treatment mean in non-underbanked districts, this amounts to an additional 120 workers employed in the average industry in underbanked districts. Finally, we identify a positive and significant effect on the total number of establishments currently operating (column 7). There is however no impact on the fraction of establishments closed (column 8). In the absence of establishment closures, an increase in total establishments points to higher aggregate entry in underbanked districts in response to the policy intervention. Compared to the dependent variable mean in non-underbanked districts, the coefficient signifies 2 additional establishments operating in each 3-digit industry in underbanked districts in the post-treatment period. Overall, Table 9 shows that the BAP resulted in higher aggregate manufacturing investment and credit growth in underbanked districts. This is accompanied by higher entry of manufacturing establishments. We also find suggestive evidence supporting higher aggregate manufacturing employment in response to an expansion in financial infrastructure and manufacturing credit in these districts.

7 Conclusion

Using firm level panel data from registered manufacturing sector enterprises in India and exploiting a bank branch expansion policy in 2005 that led to an increase in private bank branches and credit in underbanked districts, we find an increase in capital investment and credit growth by manufacturing firms located in the targeted regions. The increase is driven by small and young firms, which are more likely to be credit constrained. At the same time, we do not find a reduction in credit quality. We test various mechanisms that can explain our findings and find evidence in support of two main channels.

First, we find a reduction in physical distance between small borrowers and lenders in underbanked areas after the policy. This is accompanied by greater staffing of officers who are responsible for lending decisions in these bank branches. Given that small borrowers are also more likely to be informationally opaque, our results suggest that increased proximity to banks enabled gathering of soft information on these borrowers and better screening by private banks. Second, we find that the increase is driven by banks which specialize in lending to small manufacturing units. Taken together, these results show that a reduction in physical proximity to banking institutions can reduce frictions in the credit market, specifically for the credit constraint firms, by lowering information and monitoring costs. Thus, increased access to banking has distributional consequences with smaller firms, having higher returns to capital, benefiting more from increased access to bank branches.

References

Sumit Agarwal, Meghana Ayyagari, Yuxi Cheng, and Pulak Ghosh. Road to stock market participation. *Available at SSRN 3897168*, 2021.

Sumit Aggarwal and Robert Hauswald. Distance and private information in lending. *Journal of Financial Economics*, 23(7):2757–2788, 2010.

Sam Asher, Tobias Lunt, Ryu Matsuura, and Paul Novosad. Development research at high geographic resolution: an analysis of night-lights, firms, and poverty in india using the shrug open data platform. *The World Bank Economic Review*, 35(4):845–871, 2021.

Meghana Ayyagari, Asli Demirguc-Kunt, and Vojislav Maximovic. Who creates jobs in developing countries? *Small Business Economics*, 43:75–99, 2014.

John (Jianqui) Bai, Daniel Carvalho, and M. Phillips, Gordon. The impact of bank credit on labour reallocation and aggregate industry productivity. *Journal of Finance*, 73(6): 2787–2836, 2018.

V. Banerjee, Abhijit and Esther Duflo. Giving credit where it is due. *Journal of Economic Perspectives*, 24(3):61–80, 2010.

V. Banerjee, Abhijit and Esther Duflo. Do firms want to borrow more? testing credit constraints using a directed lending program. *The Review of Economic Studies*, 81(2): 572–607, 2014.

Thorsten Beck, Asli Demirguc-Kunt, and Ross Levine. Smes, growth, and poverty: Cross-country evidence. *Journal of Economic Growth*, 10(3):199–229, 2005a. ISSN 13814338, 15737020. URL http://www.jstor.org/stable/40216076.

Thorsten Beck, Asli Demirguc-Kunt, and Vojislav Maximovic. Financial and legal constraints to growth:does firm size matter? *Journal of Finance*, 60(1):137–177, 2005b.

Thorsten Beck, ASLI Demirguc-Kunt, Luc Laeven, and Ross Levine. Finance, firm size, and growth. *Journal of money, credit and banking*, 40(7):1379–1405, 2008.

Allan N. Berger, Nathan H. Miller, and Rajan Raghuram G. Petersen, Mitchell A., and C. Stein, Jeremy. Does function follow organizational form? evidence from the lending practices of large and small banks. *Journal of Financial Economics*, 76(2):237–269, 2005.

Allen N Berger and Gregory F Udell. Relationship lending and lines of credit in small firm finance. *Journal of business*, pages 351–381, 1995.

Fabio Berton, S. Presbitero, Andrea, and Matteo Richardi. Banks, firms and jobs. *Review of Financial Studies*, 31(6):2113–2156, 2018.

and Mahajan Aprajit and McKenzie David and Roberts John Bloom, Nicholas. Why firms in developing countries have low productivity? *American Economic Review: Papers and Proceedings 2010*, 100(2):619–623, 2010.

Nicholas Bloom, Aprajit Mahajan, David Mckenzie, and John Roberts. Does management matter? evidence from india. *Quarterly Journal of Economics*, 128(1):1 – 51, 2013.

Nicholas Bloom, Erik Brynjolfsson, Lucia Foster, Ron Jarmin, Megha Patnaik, Itay Saporta-Eksten, and John Van Reenen. What drives differences in management practices? *American Economic Review*, 109(5):1648 – 1683, 2019.

M. Bruhn, Dean Karlan, and Antoinnete Schoar. What capital is missing in developing countries? *American Economic Review: Papers Proceedings*, 100:629 – 633, 2010.

M. Bruhn, Dean Karlan, and Antoinnete Schoar. The impact of consulting services on small and medium enterprises: Evidence from a randomized trial in mexico. *Journal of Political Economy*, 126(2):635 – 687, 2018.

Miriam Bruhn and Inessa Love. The real impact of improved access to finance: Evidence from mexico. *The Journal of Finance*, 69(3):1347–1376, 2014.

Robin Burgess and Rohini Pande. Do rural banks matter? Evidence from the Indian social banking experiment. *American Economic Review*, 95(3):780–795, 2005.

Sebastian Calonico, Matias D Cattaneo, and Max H Farrell. Optimal bandwidth choice for robust bias-corrected inference in regression discontinuity designs. *The Econometrics Journal*, 23(2):192–210, 2020.

Mark Carlson, Sergio Correia, and Stephen Luck. The effects of banking competition on growth and financial stability: Evidence from the national banking era. *Journal of Political Economy*, 130(2):462–520, 2022.

Indraneel Chakraborty, Apoorva Javadekar, and Rodney Ramcharan. The real effects of bank branching: Evidence from india. *University of Miami Business School Research Paper No. 3805031*, 2021.

Dequi Chen, Yujing Ma, Xiumin Martin, and Roni Michaely. On the fast track: Information acquisition costs and information production. *Journal of Financial Economics*, 143 (2):794–823, 2022.

Yehning Chen, Rachel J Huang, John Tsai, and Larry Y Tzeng. Soft information and small business lending. *Journal of Financial Services Research*, 47(1):115–133, 2015.

Sergey Chernenko, Isil Erel, and Robert Prilmeier. Why do firms borrow directly from non-banks? *Review of Financial Studies*, 35(11):4902–4947, 2022.

Federico Cingano, Marco Leonardi, Julian Messina, and Giovanni Pica. Employment protection legislation, capital investment and access to credit: evidence from italy. *The Economic Journal*, 126(595):1798–1822, 2016.

Ximena Clark, David Dollar, and Alejandro Micco. Port efficiency, maritime transport costs, and bilateral trade. *Journal of development economics*, 75(2):417–450, 2004.

Fe Cramer, Kim. Bank presence and health. *Unpublished Working Paper*, 2022.

Chiara Criscuolo, Ralf Martin, G. Overman, Henry, and John Van Reneen. Some causal effects of an industrial policy. *American Economic Review*, 109(1):48–85, 2019.

Suresh De Mel, David McKenzie, and Christopher Woodruff. Returns to capital in microenterprises: Evidence from a field experiment. *The quarterly journal of Economics*, 123 (4):1329–1372, 2008.

Marcel Fafchamps and Matthias Schündeln. Local financial development and firm performance: Evidence from morocco. *Journal of Development Economics*, 103:15–28, 2013.

Joan Farre-Mensa and Alexander Ljungqvist. Do measures of financial constraints measure financial constraints? *The Review of Financial Studies*, 29(2):271–308, 2016.

Alessandra Fenizia. Managers and productivity in the public sector. *Econometrica*, 90(3): 1063 – 1084, 2022.

Raymond Fisman, Daniel Paravisini, and Vikrant Vig. Cultural proximity and loan outcomes. *American Economic Review*, 107(2):457–492, 2017.

Julia Fonseca and Adrian Matray. The real effects of banking the poor: Evidence from brazil. *NBER Working Paper*, 30057, 2022.

Arturo José Galindo and Alejandro Micco. Creditor protection and credit response to shocks. *The World Bank Economic Review*, 21(3):413–438, 2007.

Erik P Gilje, Elena Loutskina, and Philip E Strahan. Exporting liquidity: Branch banking and financial integration. *The Journal of Finance*, 71(3):1159–1184, 2016.

Xavier Giroud and M. Mueller, Holger. Capital and labour reallocation within firms. *Journal of Finance*, 70(4):1767–1804, 2015.

Greer K. Gosnell, John A. List, and Robert D. Metcalfe. The impact of management practices on employee productivity: A field experiment with airline captains. *Journal of Political Economy*, 128(4):1195 – 1233, 2020.

Jeremy Greenwood, Juan M Sanchez, and Cheng Wang. Financing development: The role of information costs. *American Economic Review*, 100(4):1875–1891, 2010.

Veronica Grembi, Tommaso Nannicini, and Ugo Troiano. Do fiscal rules matter? *American Economic Journal: Applied Economics*, pages 1–30, 2016.

Nandini Gupta and Raghav Dehejia. Financial development and micro-entrepreneurship. *Journal of Financial and Quantitative Analysis*, 57(5):1834–1861, 2021.

Charles J. Hadlock and Joshua R. Pierce. New evidence on measuring financial constraints: Moving beyond the kz index. *Review of Financial Studies*, 23(5):1909–1940, 2010.

Stephan Hollander and Arnt Verriest. Bridging the gap: the design of bank loan contracts and distance. *Journal of Financial Economics*, 119(2):399–419, 2016.

Jith Jayaratne and E. Strahan, Philiip. The finance-growth nexus: Evidence from branch deregulation. *The Quarterly Journal of Economics*, 111(3):639–670, 1996.

Yan Ji, Songyuan Teng, and Robert M Townsend. *Branch expansion versus digital banking: The dynamics of growth and inequality in a spatial equilibrium model*. National Bureau of Economic Research, 2021.

Gaurav Khanna and Priya Mukherjee. Political punishment and financial safety nets: Evidence from india's demonetization. *Unpublished Working Paper*, 2021.

Anjini Kochar. The distributive consequences of social banking: A microempirical analysis of the indian experience. *Economic Development and Cultural Change*, 59(2):251–280, 2011.

Mauricio Larrain and Sebastian Stumpner. Capital account liberalization and aggregate productivity: The role of firm capital allocation. *The Journal of Finance*, 72(4):1825–1858, 2017.

Jose Maria Liberti and A. Petersen, Mitchell. Information: Hard and soft. *Review of Corporate Finance Studies*, 8(1):1–41, 2019.

Kanika Mahajan and Shekhar Tomar. Bridging the miles: Spatial factors in job application and selection. Technical report, Working Paper, 2023.

A. Martin, Leslie, Shanti Nataraj, and E. Harrison, Ann. In with big, out with small: Removing small-scale reservations in india. *American Economic Review*, 107(2):354–386, 2017.

Justin McCrary. Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics*, 142(2):698–714, 2008.

Atif Mian and Amir Sufi. What explains the 2007-2009 drop in employment? *Econometrica*, 82(6):2197–2223, 2014.

Kaivan Munshi and Mark Rosenzweig. Why is mobility in india so low? social insurance, inequality, and growth. Technical report, National Bureau of Economic Research, 2009.

Q. Nguyen, Hoai-Luu. Are credit markets still local? evidence from bank branch closings. *American Economic Journal: Applied Economics*, 11(1):1–32, 2019.

A. Petersen, Mitchell and G. Rajan, Raghuram. Does distance still matter? the information revolution in small business lending. *Journal of Finance*, 57(6):2533–2570, 2002.

Mitchell A Petersen and Raghuram G Rajan. The benefits of lending relationships: Evidence from small business data. *The journal of finance*, 49(1):3–37, 1994.

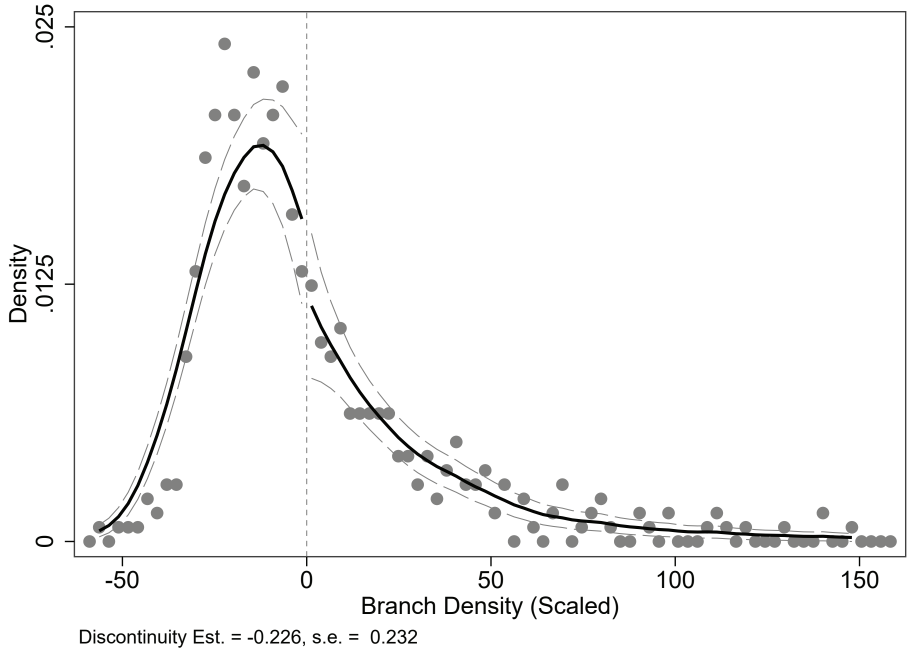
Ni Qin and Dongmin Kong. Access to credit and entrepreneurship: Evidence from china. *Economic Development and Cultural Change*, 71(1):295–331, 2022.

RBI. *Master Circular on Branch Authorisation*. Reserve Bank of India, Mumbai, India, 2005.

RBI. *Master Circular on Branch Authorisation*. Reserve Bank of India, Mumbai, India, 2007.

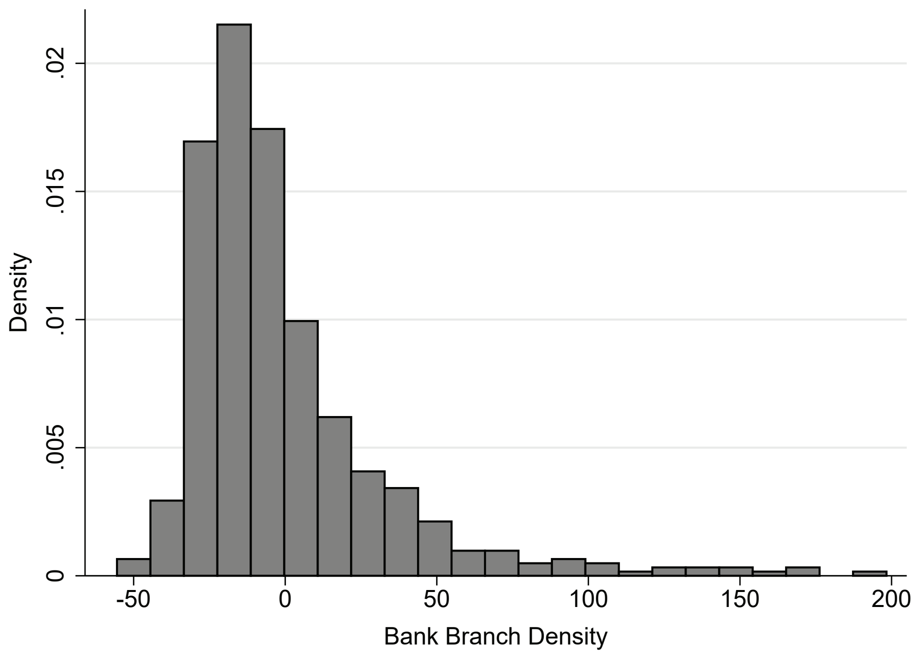
Nathaniel Young. Banking and growth: Evidence from a regression discontinuity analysis. *EBRD Working Paper 2017*, 2017.

Figure 1: Selection of Districts Into Underbanked Status: McCrary Test



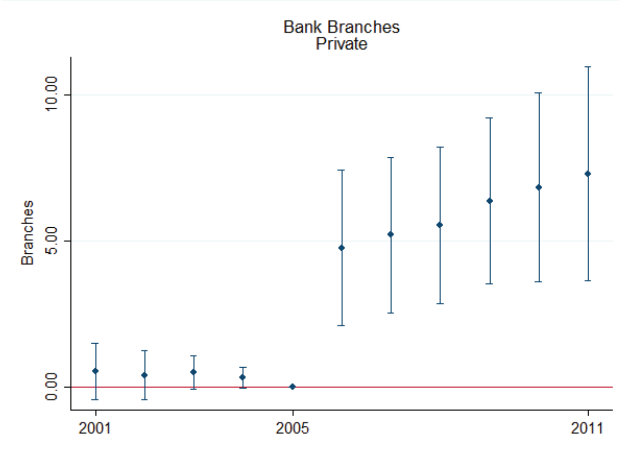
Notes: The above figure tests for bunching of the running variable around the threshold of 0 using the McCrary test (McCrary, 2008). The solid line shows the local polynomial estimate, while the dashed lines show the 95% confidence intervals.

Figure 2: Distribution of Running Variable



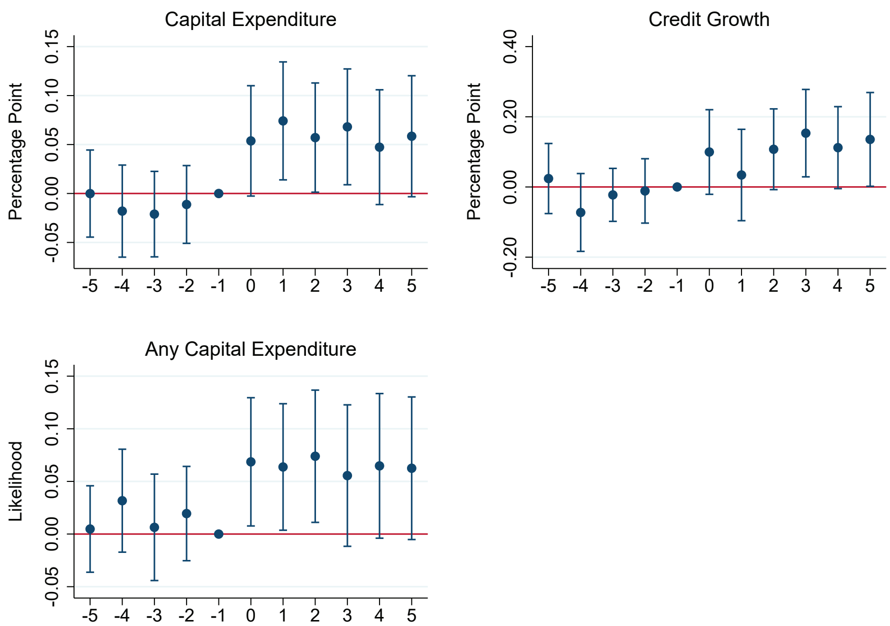
Notes: This figure shows the distribution of the running variable where the running variable is defined at the district level as $Runvar_d = BranchPC_d - \overline{BranchPC}$. *BranchPC* refers to the bank branch density in district *d* in 2005, while $\overline{BranchPC}$ is the national average bank branch density in 2005. Districts are classified as "underbanked" if $Runvar_d < 0$ – located to the left of the threshold 0.

Figure 3: Private Bank Branches in Underbanked Districts: Event Study Plot



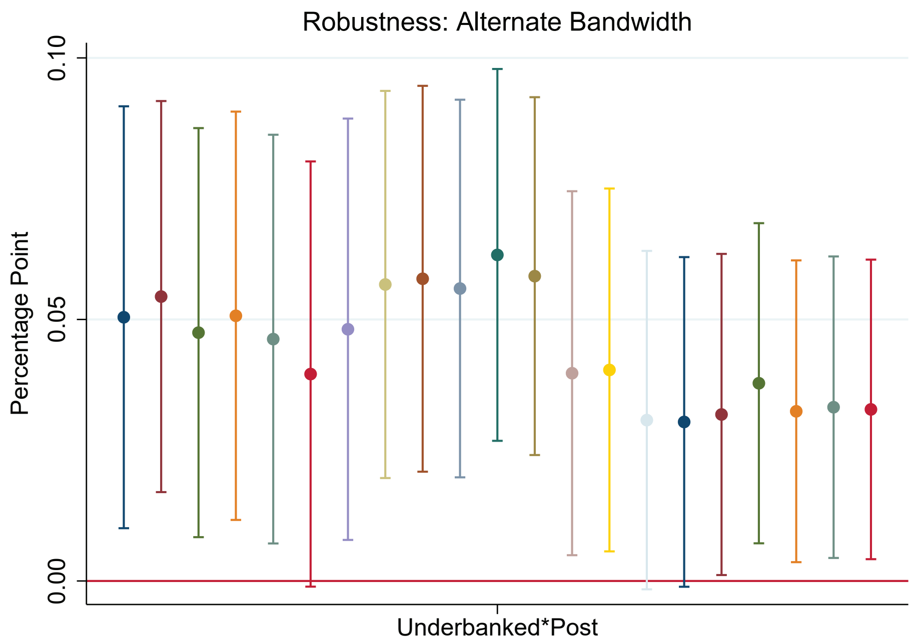
*Notes:*The above figures shows the event-study plots comparing private bank branches across underbanked and non-underbanked districts, before and after the BAP. The unit of observation is the district. The outcome of interest is the number of private bank branches in the district. The year 2005, in which the BAP was introduced, is omitted and forms the reference period. The vertical lines correspond to 95% confidence intervals. All specifications include district and year fixed effects, in addition to district covariates. Standard errors are clustered by district.

Figure 4: Capital Expenditures and Credit Growth in Underbanked Districts: Event-Study Plots



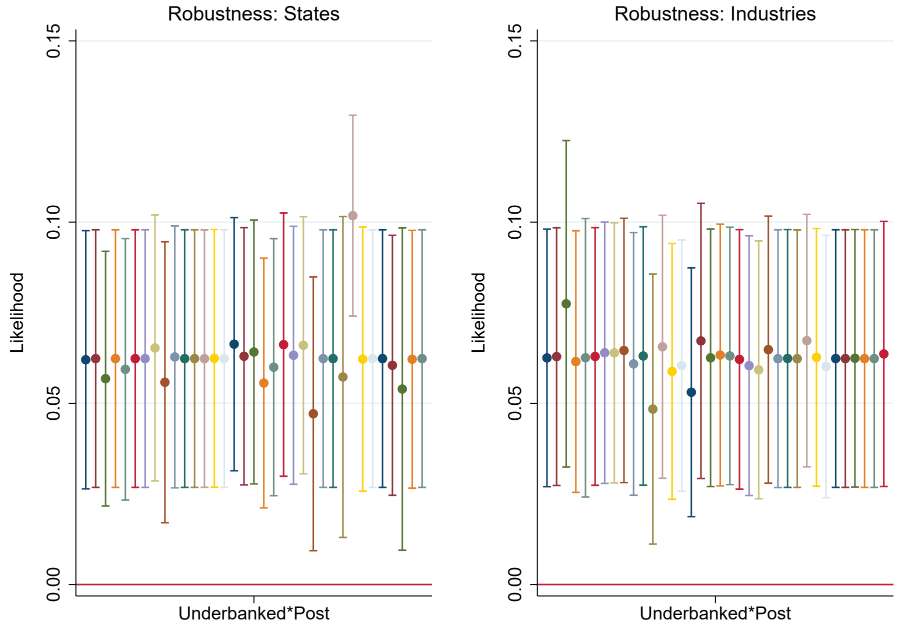
Notes: The above figure presents event-study plots estimating the effect of the BAP on capital expenditures (top left panel), any capital expenditures (bottom left panel), and credit growth (top right panel) in underbanked districts, using a difference-in-discontinuity design. The unit of observation is the manufacturing establishment. Capital expenditures refer to investment in plant and machinery. The solid line represents the average annual treatment effects, and the capped bars denote the 95% confidence intervals. The treatment effects are benchmarked to the year 2005 (omitted time period=-1) – the year in which the treatment is initiated. All specifications include establishment and industry-year fixed effects, a linear polynomial in the running variable interacted with the district underbanked indicator and a post-treatment indicator, establishment and district covariates. All specifications are weighted using establishment-specific weights. The sample in each instance is restricted to districts within a bandwidth of 15 around the discontinuity threshold. Standard errors are clustered by district.

Figure 5: Manufacturing Investment in Underbanked Districts: Robustness to Alternate Bandwidths



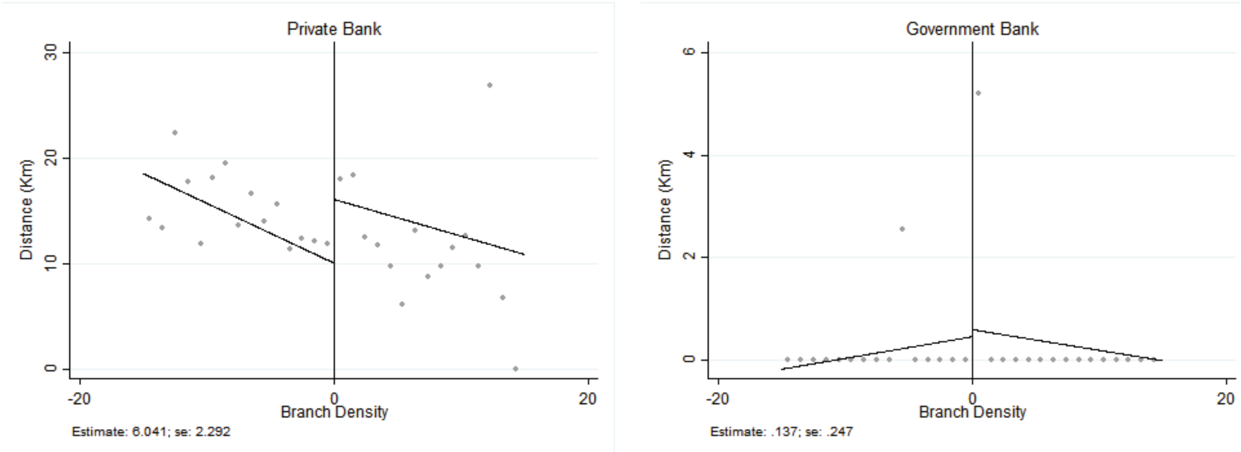
Notes: The above figure shows the robustness of the baseline results to alternate bandwidths. The unit of observation is the manufacturing establishment and the outcome of interest is capital expenditures (investment in plant and machinery). All specifications include establishment and industry-year fixed effects, a linear polynomial in the running variable interacted with the district underbanked indicator and a post-treatment indicator, establishment covariates, and district covariates. All specifications are weighted using establishment-specific weights. The sample in the first specification estimated is restricted to districts within a bandwidth of 10 around the discontinuity threshold; subsequent specifications sequentially increases the bandwidth by 0.5, till the final specification, which equals a bandwidth of 20 around the discontinuity threshold. The vertical lines denote the 95% confidence intervals. Standard errors are clustered by district.

Figure 6: Manufacturing Investment in Underbanked Districts: Robustness to Dropping Individual States and Industries



Notes: The above figures shows the robustness of the baseline results to the dropping of individual states and industries. The unit of observation is the manufacturing establishment and the outcome of interest is capital expenditures (investment in plant and machinery). All specifications include establishment and industry-year fixed effects, a linear polynomial in the running variable, establishment, and district covariates. All specifications are weighted using establishment-specific weights. Specifications are estimated by dropping one state (two-digit industry) at a time. The sample is restricted to districts within a bandwidth of 15 around the discontinuity threshold. The vertical lines denote the 95% confidence intervals. Standard errors are clustered by district.

Figure 7: Minimum Distance of Manufacturing Establishments to Bank Branches



Notes: The above figures compare the minimum distance of business establishments to bank branches across underbanked and non-underbanked districts. The unit of observation is the district. Minimum establishment distances to bank branches are aggregated to the district. Establishment locations are based on the Economic Census of 2013. The sample is restricted to rural manufacturing establishments, hiring at least 5 workers. The left panel shows the minimum distance to private banks; the right panel shows the minimum distance to government-owned banks. The vertical line denotes the national average threshold. Districts to the left of the cutoff are classified as "underbanked". RD coefficients and standard errors, computed using the methodology of Calonico et al. (2020) are shown at the bottom of each figure. RD coefficients are estimated using a linear polynomial and weighted using a triangular kernel. All specifications include state-region fixed effects and the sample is restricted to districts within a bandwidth of 15 around the threshold. Standard errors are clustered by state-region.

Table 1: Bank Branches in Underbanked Districts

	Private Banks		Government Banks		Regional Rural Banks		All Banks	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Underbanked × Post	4.795***	5.653***	1.608	3.697	.361	.555	6.764	9.906*
	(1.659)	(1.442)	(4.264)	(3.778)	(.739)	(.690)	(5.836)	(5.155)
Observations	2505	2505	2505	2505	2505	2505	2505	2505
R^2	.89	.91	.97	.98	.99	.99	.96	.97
Control Mean	18.81	18.81	111.49	111.49	18.47	18.47	148.77	148.77
Covariates	N	Y	N	Y	N	Y	N	Y

Notes: This table compares average bank branches across underbanked and non-underbanked districts. The unit of observation is the district. Columns (1)-(2) estimate the treatment effect for private banks; columns (3)-(4), government banks; columns (5)-(6), regional rural banks; columns (7)-(8), all banks. All specifications include district and year fixed effects, in addition to a linear polynomial in the running variable. Even-numbered columns also include district covariates. The sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table 2: Manufacturing Investment in Underbanked Districts

	Capital Expenditures					
	(1)	(2)	(3)	(4)	(5)	(6)
Underbanked × Post	.046**	.043**	.047**	.062***	.063***	.063***
	(.019)	(.020)	(.020)	(.022)	(.022)	(.022)
Observations	71542	71542	71542	71542	71536	71522
R^2	.37	.38	.38	.38	.38	.39
Control Mean	-.03	-.03	-.03	-.03	-.03	-.03
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Size-Year FE	N	N	Y	Y	Y	Y
Industry-Year FE	N	Y	Y	Y	Y	Y
Firm Controls	N	N	Y	Y	Y	Y
District Controls	N	N	N	Y	Y	Y
Age FE	N	N	N	N	Y	N

Notes: This table estimates the treatment effect of the BAP on manufacturing investment. The unit of observation is the manufacturing establishment. The outcome of interest is capital expenditures, defined as in (2). Capital expenditures is restricted to capital expenditures in plant and machinery. All specifications include establishment fixed effects, and a linear polynomial in the running variable. Column (1) includes establishment and year fixed effects. Columns (2)-(5) replace year fixed effects with 2-digit industry-year fixed effects, while column (6) considers 3-digit industry year fixed effects. Size-year fixed effects are also included in columns (2)-(6). Size refers to pre-treatment establishment size, measured using the average number of workers hired by the establishment in the pre-treatment period. Column (3) includes establishment specific covariates while column (4) adds in district covariates. Column (5) replaces the quadratic in establishment age with age fixed effects. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table 3: Manufacturing Investment in Underbanked Districts: Robustness and Placebo Checks

	Capital Expenditures				
	Unweighted	District-industry Cluster	Exclude Districts	Long Term Effects	Placebo
	(1)	(2)	(3)	(4)	(5)
Underbanked × Post	.039**	.063***	.046*	.062***	
	(.016)	(.021)	(.027)	(.021)	
Underbanked × Post 2001					-.003
					(.030)
Observations	71542	71484	68648	85633	38813
R^2	.26	.38	.38	.35	.47
Control Mean	-.02	-.03	-.04	-.02	-.02

Notes: This table shows robustness of the treatment effect of BAP on manufacturing investment to alternate specifications and placebo tests. The unit of observation is the manufacturing establishment. The outcome of interest is capital expenditures, defined as in (2). Capital expenditures is restricted to those in plant and machinery. All specifications include establishment, 2-digit industry-year fixed effects, a linear polynomial in the running variable, establishment and district covariates. Column (1) excludes establishment weights; column (2) clusters the standard errors by district-industry; column (3) excludes the 9 districts for which the underbanked rule was violated; column (4) extends the sample till the year 2014; column (5) restricts the sample to the years between 1998 and 2005 and considers the period after 2001 to comprise of the post-treatment period. All specifications except column (1) include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district, with the exception of column (2), where they are twoway custered by district and industry. Significant levels: *10%, **5%, and ***1%

Table 4: Manufacturing Investment and Credit Growth in Underbanked Districts: Heterogeneity by Establishment Size, Age and Listing Status

	Capital Expenditures				Credit Growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Underbanked × Post	.071**	.081**	.126***	.079***	.254***	.274***	.313***	.144***
	(.032)	(.041)	(.044)	(.023)	(.066)	(.082)	(.085)	(.047)
Underbanked × $Size$ > Median × Post	-.019				-.215***			
	(.039)				(.079)			
Underbanked × $10 > Size \leq 25$ × Post		-.003				-.164		
		(.056)				(.112)		
Underbanked × $25 > Size \leq 50$ × Post		-.005				-.266*		
		(.064)				(.153)		
Underbanked × $50 > Size \leq 100$ × Post		-.061				-.115		
		(.061)				(.135)		
Underbanked × $Size > 100$ × Post		-.061				-.202**		
		(.051)				(.079)		
Underbanked × Large, Young × Post			-.019				-.279**	
			(.055)				(.117)	
Underbanked × Large, Old × Post			-.107**				-.269***	
			(.051)				(.089)	
Underbanked × Small, Old × Post			-.101**				-.103	
			(.050)				(.121)	
Underbanked × Listed × Post				-.137***				-.124
				(.037)				(.098)
Observations	71542	71542	71542	71542	53666	53666	53666	53666
R^2	.38	.38	.38	.38	.34	.34	.34	.34
Control Mean	-.03	-.03	-.03	-.03	.04	.04	.04	.04

Notes: This table estimates the heterogeneity in the treatment impact of BAP on manufacturing investment across establishments which are most likely to be credit constrained. The unit of observation is the manufacturing establishment. The outcome of interest in columns (1)-(4) is manufacturing investment; in columns (5)-(8), credit growth. Growth variables are defined as in equation (2); manufacturing investment is restricted to investments in plant and machinery. All specifications include establishment and industry-year fixed effects, a linear polynomial in the running variable, and establishment and district covariates. *Median* refers to the median establishment size; $Size$ refers to establishment size in the pre-treatment period, defined as the number of workers hired. *Large* and *Small* refer to establishments with above and below median sizes. *Young* refers to establishments which started operations after 1992. *Listed* refers to establishments which are publicly listed. All specifications are weighted using establishment-specific weights. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table 5: Minimum Distance of Manufacturing Establishments to Bank Branches

	Private Banks				Government Banks			
	Workers ≥ 1	Workers ≥ 5	5< Workers ≤ 25	Workers > 25	Workers ≥ 1	Workers ≥ 5	5< Workers ≤ 25	Workers > 25
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Underbanked	-4.557***	-4.530**	-5.066***	-1.249	1.115***	1.008***	1.226***	-.697
	(1.386)	(1.766)	(1.753)	(1.636)	(.341)	(.350)	(.352)	(.532)
Observations	377694	71467	60691	10768	377694	71467	60691	10768
R^2	.36	.40	.41	.30	.07	.09	.09	.12
Control Mean	13.42	12.54	13.03	9.76	.93	.72	.73	.66

Notes: This table estimates the impact of the BAP on the minimum distance between a manufacturing establishment and a bank branch, using a cross-sectional regression discontinuity design. The unit of observation is the manufacturing establishment in the Economic Census of 2013. The outcome of interest is the minimum distance between the establishment and a private (government) bank branch in columns (1)-(4) [(5)-(8)]. Columns (1) and (5) restrict the sample to establishments that hire at least one worker; columns (2) and (6) exclude establishments hiring less than 5 workers; columns (3) and (7) restrict the sample to establishments hiring between 5 and 25 workers; columns (4) and (8) exclude establishments hiring less than 25 workers. All specifications include establishment ownership controls, state and industry fixed effects, in addition to district-specific pre-treatment covariates. The sample is restricted to ruralestablishments located in districts within a neighbourhood of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table 6: Manufacturing Investment and Credit Growth in Underbanked Districts: Heterogeneity by Distance to Private Bank Branch

	Capital Expenditures			Credit Growth		
	All	Small Est.	Large Est.	All	Small Est.	Large Est.
	(1)	(2)	(3)	(4)	(5)	(6)
Underbanked × Post	.076***	.112***	-.003	.138***	.154**	.072
	(.019)	(.026)	(.035)	(.053)	(.067)	(.058)
Underbanked × High Dist. Pvt. Bank × Post	-.126**	-.138*	-.086	-.079	-.093	.072
	(.064)	(.080)	(.084)	(.105)	(.132)	(.153)
Observations	62556	27904	34608	46271	20441	25805
R^2	.38	.42	.29	.34	.41	.25
Control Mean	-.03	-.04	.00	.04	.05	.02

Notes: This table estimates heterogeneity in the impact of BAP on manufacturing investment across distance to private banks. The unit of observation is the manufacturing establishment. The outcome of interest in columns (1)-(3) is manufacturing investment; in columns (4)-(6), credit growth. Growth variables are defined as in equation (2); manufacturing investment is restricted to investments in plant and machinery. All specifications include establishment and industry-year fixed effects, a linear polynomial in the running variable, and establishment and district covariates. *High Dist. Pvt. Bank* refers to districts with high (above median) distance of manufacturing establishments to the nearest private bank branch. Columns (1) and (4) include all establishments; columns (2) and (5) restrict the sample to small establishments; columns (3) and (6) restrict the sample to large establishments. *Small* establishments refer to those hiring under 25 workers; *Large* establishments are those hiring in excess of 50 workers. All specifications are weighted using establishment-specific weights. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table 7: Officers and Employees in Underbanked Districts

	Officers		Employees	
	Private Banks	State-Owned Banks	Private Banks	State-Owned Banks
	(1)	(2)	(3)	(4)
Underbanked	35.571***	9.184	52.357***	18.417
	(13.467)	(14.297)	(16.465)	(28.601)
Observations	2505	2505	2505	2505
R^2	.81	.98	.89	.99
Control Mean	97.887	470.792	217.290	1764.064

Notes: This table estimates the impact of the BAP on staffing levels of private and state-owned banks in underbanked districts. The unit of observation is the district. All specifications include district and year fixed effects, along with a linear polynomial in the running variable, and district covariates. The sample is restricted to districts within a neighbourhood of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table 8: Manufacturing Investment and Credit Growth in Underbanked Districts: Heterogeneity by Establishment Size, Age and Listing Status

	Capital Expenditures				Credit Growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Underbanked × Post	.071**	.081**	.126***	.079***	.254***	.274***	.313***	.144***
	(.032)	(.041)	(.044)	(.023)	(.066)	(.082)	(.085)	(.047)
Underbanked × $Size$ > Median × Post	-.019				-.215***			
	(.039)				(.079)			
Underbanked × 10 > $Size \leq 25$ × Post		-.003				-.164		
		(.056)				(.112)		
Underbanked × 25 > $Size \leq 50$ × Post		-.005				-.266*		
		(.064)				(.153)		
Underbanked × 50 > $Size \leq 100$ × Post		-.061				-.115		
		(.061)				(.135)		
Underbanked × $Size$ > 100 × Post		-.061				-.202**		
		(.051)				(.079)		
Underbanked × Large, Young × Post			-.019				-.279**	
			(.055)				(.117)	
Underbanked × Large, Old × Post			-.107**				-.269***	
			(.051)				(.089)	
Underbanked × Small, Old × Post			-.101**				-.103	
			(.050)				(.121)	
Underbanked × Listed × Post				-.137***				-.124
				(.037)				(.098)
Observations	71542	71542	71542	71542	53666	53666	53666	53666
R^2	.38	.38	.38	.38	.34	.34	.34	.34
Control Mean	-.03	-.03	-.03	-.03	.04	.04	.04	.04

Notes: This table estimates the heterogeneity in the treatment impact of BAP on manufacturing investment across establishments which are most likely to be credit constrained. The unit of observation is the manufacturing establishment. The outcome of interest in columns (1)-(4) is manufacturing investment; in columns (5)-(8), credit growth. Growth variables are defined as in equation (2); manufacturing investment is restricted to investments in plant and machinery. All specifications include establishment and industry-year fixed effects, a linear polynomial in the running variable, and establishment and district covariates. *Median* refers to the median establishment size; $Size$ refers to establishment size in the pre-treatment period, defined as the number of workers hired. *Large* and *Small* refer to establishments with above and below median sizes. *Young* refers to establishments which started operations after 1992. *Listed* refers to establishments which are publicly listed. All specifications are weighted using establishment-specific weights. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table 9: Aggregate Effects of Bank Branch Expansion

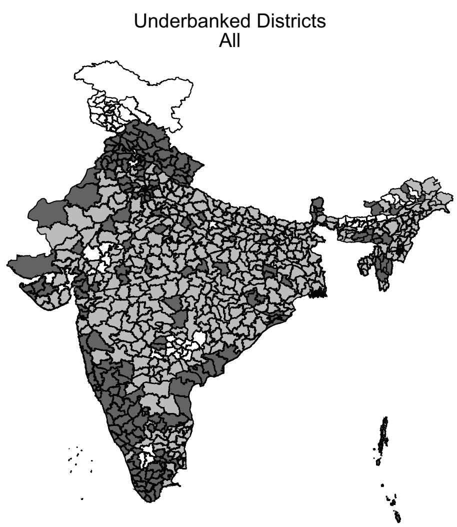
	Capital Expenditure (1)	Any Capital Expenditure (2)	Credit Growth (3)	Output (Log) (4)	Workers (Log) (5)	Revenue TFP (6)	Total Establishments (Log) (7)	Fraction Closed (8)
Underbanked×Post	.054**	.033	.103**	.018	.121	.032	.140**	-.032
	(.024)	(.023)	(.045)	(.087)	(.082)	(.040)	(.057)	(.026)
Observations	17962	18152	15908	18015	17898	16128	19388	19388
R^2	.07	.12	.06	.36	.35	.10	.33	.19
Control Mean	.03	.28	.07	1586.71	.97	-.03	14.59	.07

Notes: This table estimates the impact of BAP on aggregate district-level outcomes. The unit of observation is the district-industry (3-digit). The outcomes of interest in columns (1) and (3) are constructed using equation (2). The outcomes of interest in columns (2) and (8) are fractions. The remaining outcomes are log transformed. Capital expenditures refer to expenditures in plant and machinery. All specifications include district and 3-digit industry-year fixed effects, in addition to district-specific controls. Standard errors are in parentheses, clustered by district.
Significant levels: *10%, **5%, and ***1%

A Branch Authorisation Policy and Banking Outcomes

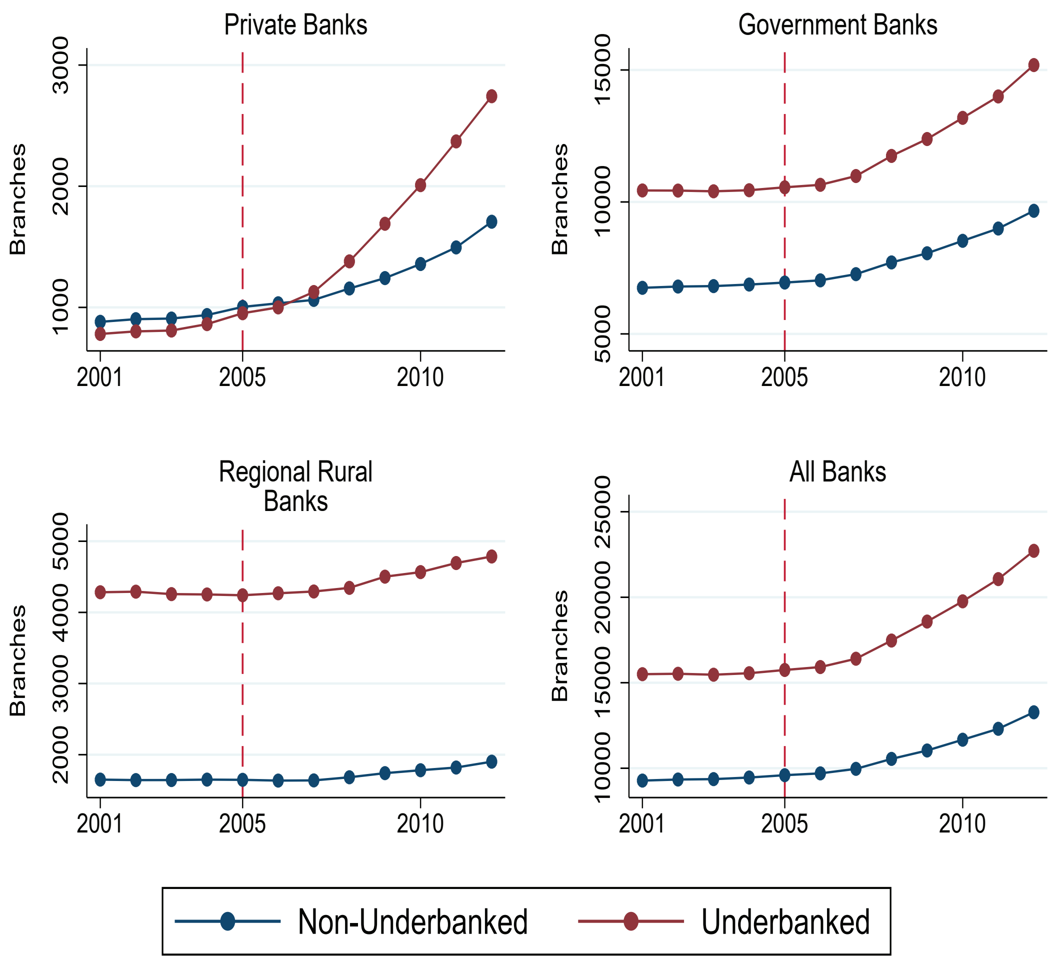
A.1 Figures

Figure A1: Geographical Distribution of Underbanked Districts



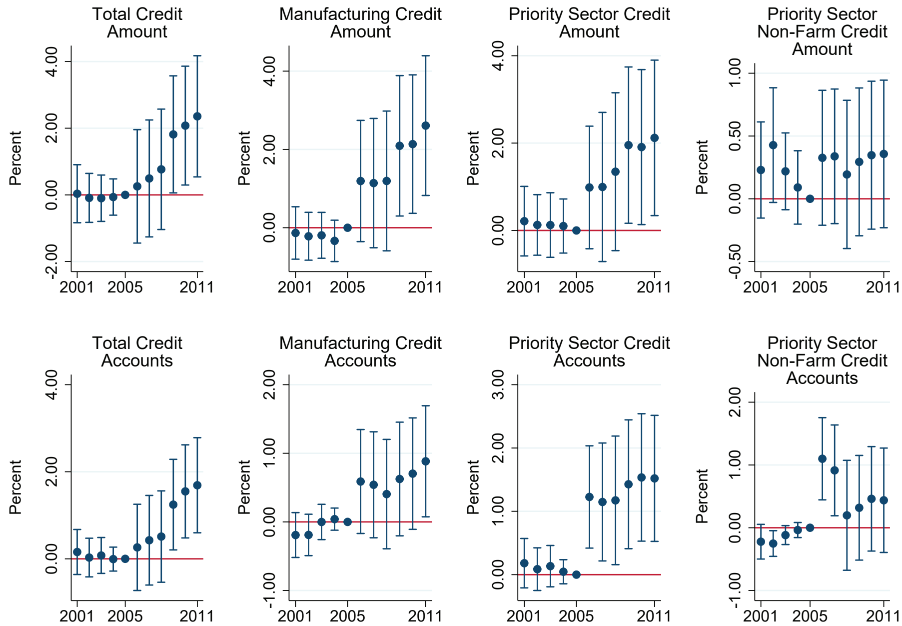
Notes: This figure shows the geographical distribution of underbanked districts. The left-panel shows all districts; the right panel shows districts which form our primary sample, which are located within a bandwidth of 15 bank branches per capita from the discontinuity threshold. The darker shades depict underbanked districts; lighter shades depict non-underbanked districts. Districts in white are excluded from the sample.

Figure A2: Bank Branches in Underbanked Districts: Unconditional Trends



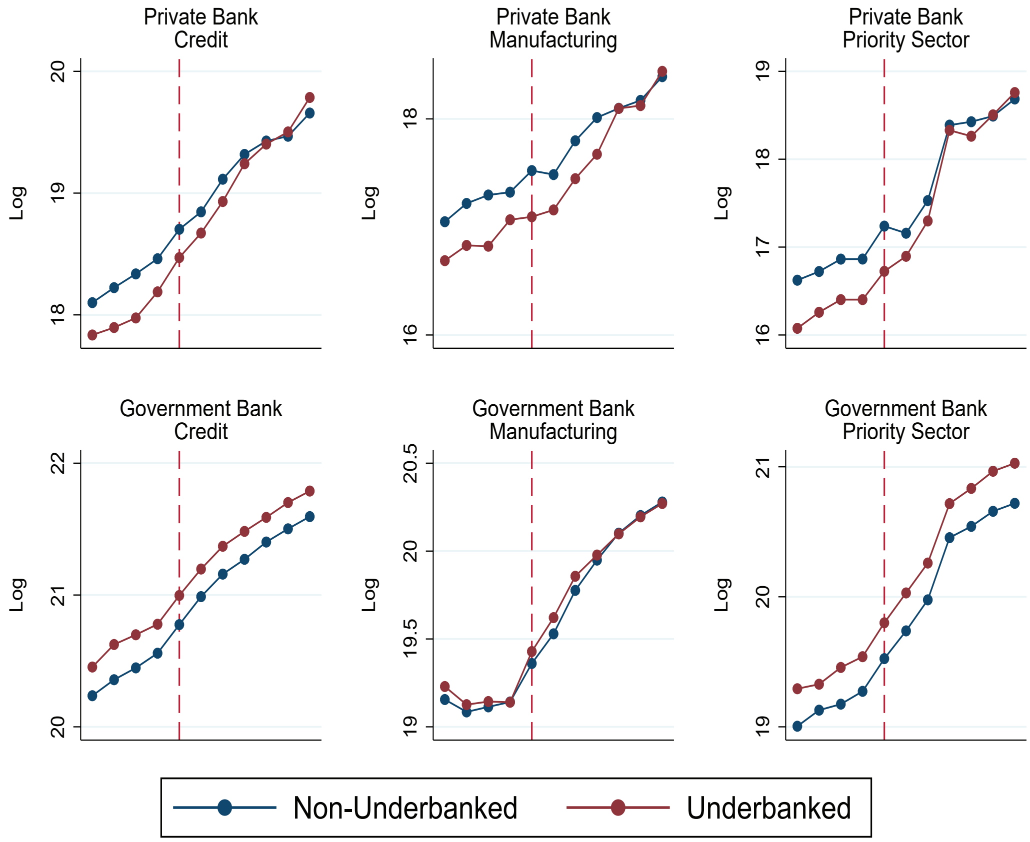
*Notes:*The above figure presents unconditional trends in the number of bank branches across underbanked and non-underbanked districts between 2001 and 2011. The sample is restricted to districts within a bandwidth of 15 around the discontinuity threshold. The red vertical line corresponds to the year 2005. The top-left panel has private bank branches; the top right panel, government bank branches; the bottom-left panel, regional rural banks; the bottom-right panel, total bank branches.

Figure A3: Private Bank Credit in Underbanked Districts: Event-Study Plots



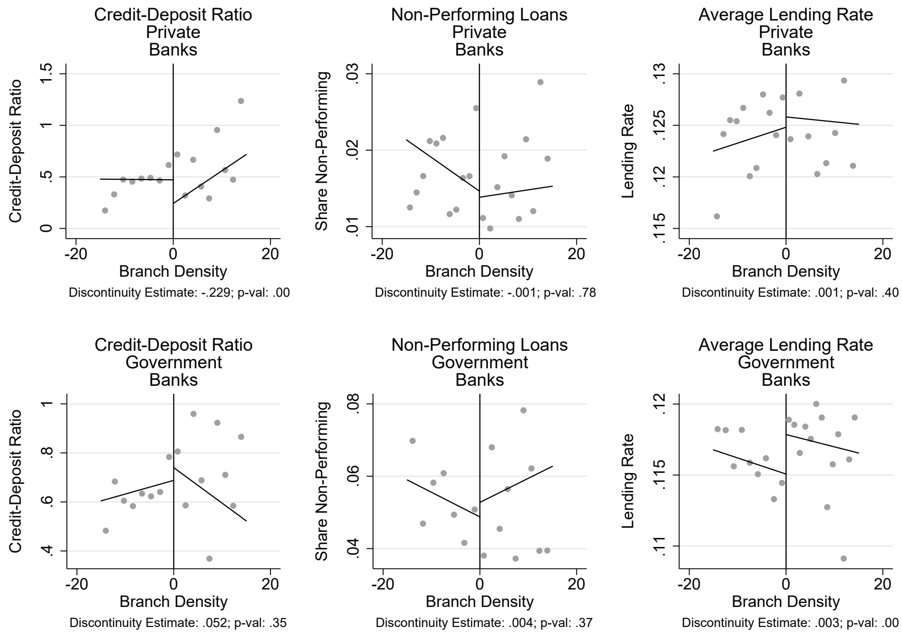
Notes: The above figures shows event-study plots comparing financial intermediation by private banks across underbanked and non-underbanked districts, before and after the BAP. The unit of observation is the district. The outcome of interest in the top-panel is outstanding private bank loan amounts for the categories mentioned; in the bottom panel, loan accounts. The outcome of interest is inverse hyperbolic sine transformed. The year 2005, in which the BAP was introduced, is omitted and forms the reference period. The vertical lines correspond to 95% confidence intervals. All specifications include district and year fixed effects, in addition to district covariates. The sample is restricted to a bandwidth of 15 around the discontinuity threshold. Standard errors are clustered by district.

Figure A4: Credit Disbursement in Underbanked Districts: Unconditional Trends



Notes: The above figures present unconditional trends in logged credit disbursement across underbanked and non-underbanked districts for select credit categories. The vertical line corresponds to the year 2005 in which the BAP was introduced. The sample is restricted to districts within a bandwidth of 15 around the discontinuity threshold. The top panel corresponds to private banks; the bottom panel considers government banks. The left-panel considers aggregate credit disbursement by banks, inclusive of loans to farm, manufacturing, trade and service sectors, along with personal loans to households.

Figure A5: Banking Outcomes in Underbanked Districts: RD Plots



Notes: This figure shows RD plots comparing credit-deposit ratios, lending rates and non-performing loans across underbanked and non-underbanked districts. The vertical line denotes the national average threshold. Districts to the left of the cutoff are classified as "underbanked". RD coefficients and standard errors are computed using the methodology of Calonico et al. (2020). RD coefficients are estimated using a linear polynomial and weighted using a triangular kernel. All specifications include state-region fixed effects and the sample is restricted to districts within a bandwidth of 15 around the threshold. Credit-deposit ratios is the amount of private bank credit in the district, scaled by total private bank deposits. Loan volume weighted average lending rates are for the year 2011; non-performing loans for 2016. Non-performing loans are expressed as a share of total outstanding loans. The top row corresponds to private banks; the bottom row, government banks. Standard errors are clustered by state-region.

A.2 Tables

Table A1: Credit Disbursement in Underbanked Districts: By Sectors and Bank Groups

Panel A: Private banks

	Total		Manufacturing		Priority Sector		Micro and Small Credit	
	Amt.	Act.	Amt.	Act.	Amt.	Act.	Amt.	Act.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Underbanked × Post	1.339	.896	1.904**	.693*	1.437*	1.249**	1.468	.697*
	(.948)	(.563)	(.870)	(.390)	(.851)	(.486)	(.897)	(.375)
Observations	2505	2505	2505	2505	2505	2505	2505	2505
R^2	.86	.89	.85	.89	.86	.90	.81	.85
Control Mean	6339.910	.035	2306.507	.001	539.630	.002	219.591	.000

Panel B: Government banks

	Total		Manufacturing		Priority Sector		Micro and Small Credit	
	Amt.	Act.	Amt.	Act.	Amt.	Act.	Amt.	Act.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Underbanked × Post	-.100	-.017	.020	-.187*	-.040	.041	.116	-.015
	(.066)	(.064)	(.153)	(.113)	(.093)	(.088)	(.290)	(.153)
Observations	2505	2505	2505	2505	2505	2505	2505	2505
R^2	.99	.99	.96	.92	.98	.98	.90	.95
Control Mean	23899.050	.094	9201.978	.006	4341.187	.032	1550.907	.001

Notes: This table shows credit disbursement across underbanked and non-underbanked districts in the post-treatment period. The unit of observation is the district. Panel A considers private bank credit; panel B credit from government banks. Outcome variables are transformed using an inverse hyperbolic sine transformation. Odd-numbered columns show bank credit along the intensive margin (outstanding loans); even-numbered columns, bank credit along the extensive margin (total loan accounts). The outcome of interest in columns (1) and (2) is total credit; in columns (3) and (4), manufacturing credit; in columns (5) and (6), loans to the priority sector; and columns (7) and (8), loans to micro and small enterprises. All specifications include district and year fixed effects, in addition to a linear polynomial in the running variable and district covariates. The sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Control variable means for outstanding loan amounts are in millions. Standard errors in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

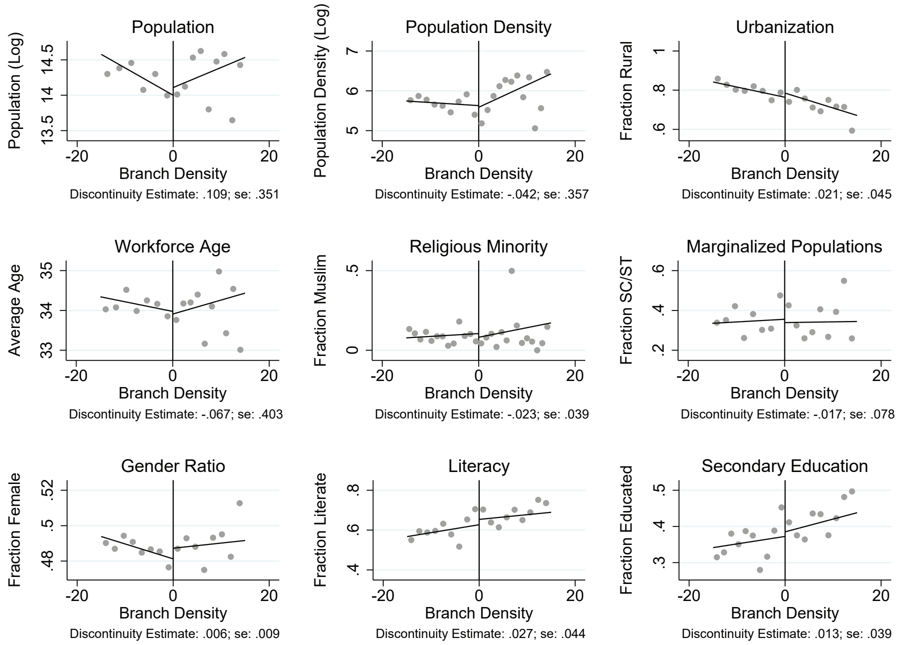
Table A2: Private Bank Credit in Underbanked Districts: Levels Specification, by Sectors and Bank Groups

	Total		Manufacturing		Priority Sector		Micro and Small Credit	
	Amt.	Act.	Amt.	Act.	Amt.	Act.	Amt.	Act.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Underbanked × Post	1257.284*	5515.649	278.350	263.905*	422.701	1110.599	194.753	144.439
	(737.419)	(4081.622)	(218.080)	(159.700)	222.665)	(2060.735)	(153.619)	(182.034)
Observations	2505	2505	2505	2505	2505	2505	2505	2505
R^2	.80	.75	.77	.52	.64	.78	.58	.48
Control Mean	6339.910	.035	2306.507	.001	539.630	.002	219.591	.000

Notes: This table credit disbursement across underbanked and non-underbanked districts in the post-treatment period. The unit of observation is the district. Outcome variables are in levels (millions of rupees). Odd-numbered columns show private bank credit along the intensive margin (outstanding loans); even-numbered columns, private bank credit along the extensive margin (total loan accounts). The outcome of interest in columns (1) and (2) is total credit; in columns (3) and (4), manufacturing credit; in columns (5) and (6), loans to the priority sector; and columns (7) and (8), loans to micro and small enterprises. All specifications include district and year fixed effects, in addition to a linear polynomial in the running variable and district covariates. The sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

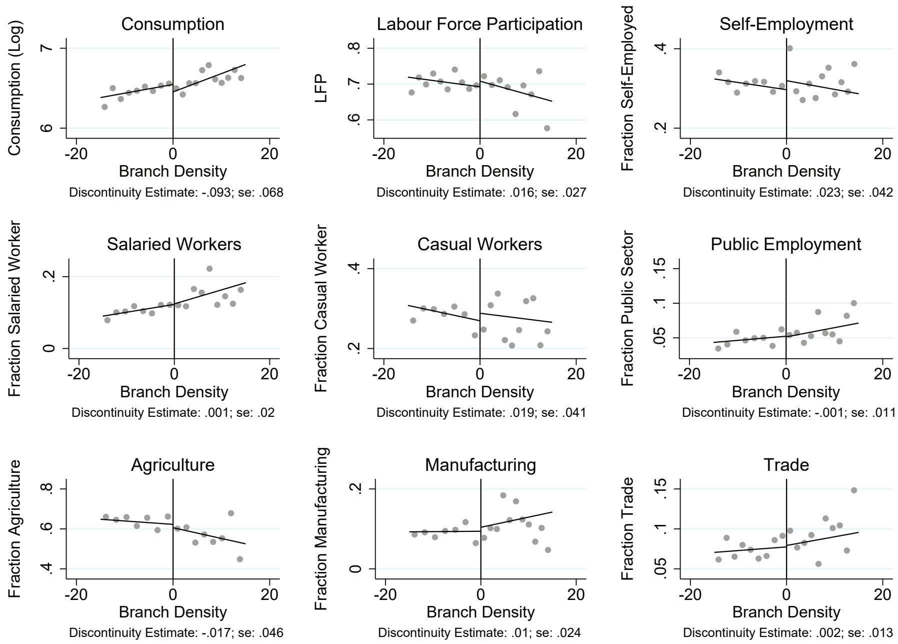
B Appendix: Additional Figures and Tables

Figure B1: Pre-Treatment Covariate Balance: District Demographics



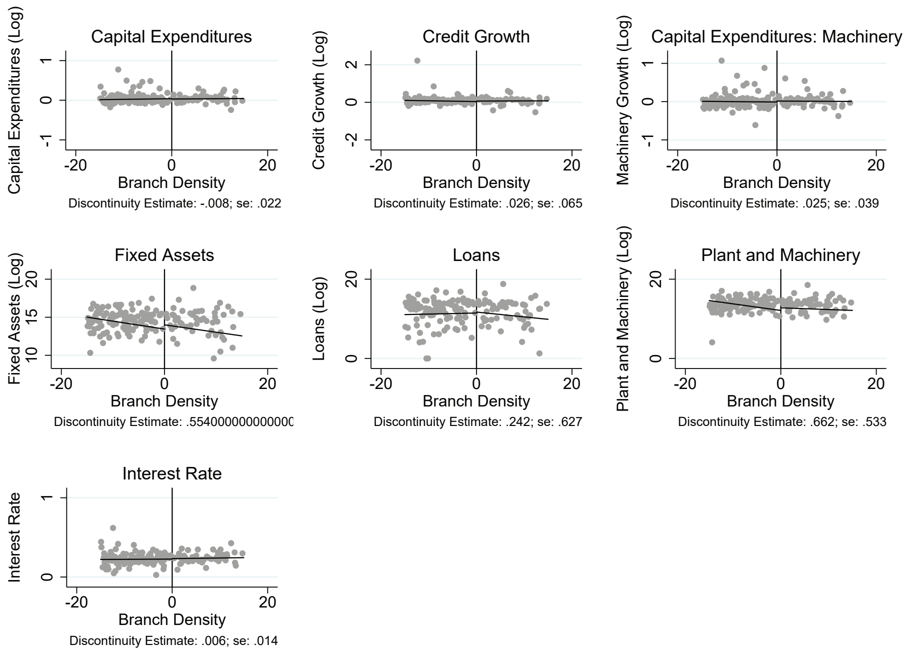
Notes: The above figure shows the pre-treatment covariate balance across district-specific demographic covariates. The vertical line denotes the national average threshold. Districts to the left of the cutoff are classified as "underbanked". The sample is restricted to a bandwidth of 15 around the threshold. The discontinuity estimates and standard errors corresponding to each figure are computed as outlined in Calonico et al. (2020).

Figure B2: Pre-Treatment Covariate Balance: District Demographics



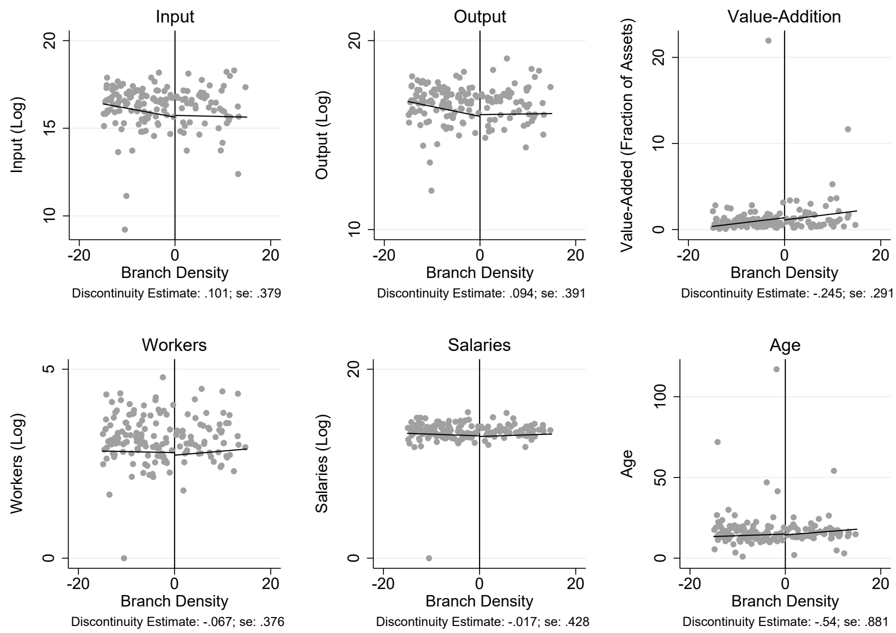
Notes: The above figure shows the pre-treatment covariate balance across district-specific demographic covariates. The vertical line denotes the national average threshold. Districts to the left of the cutoff are classified as "underbanked". Consumption refers to households monthly per capita consumption. The sample is restricted to a bandwidth of 15 around the threshold. The discontinuity estimates and standard errors corresponding to each figure are computed as outlined in Calonico et al. (2020).

Figure B3: Pre-Treatment Covariate Balance: Manufacturing Enterprise Financial Characteristics



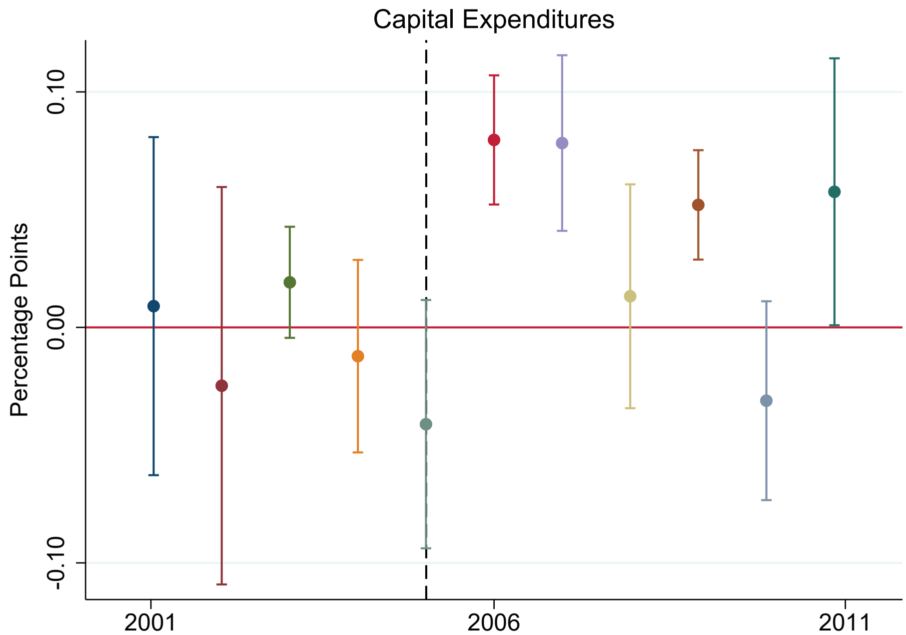
Notes: The above figure shows the pre-treatment balance across manufacturing enterprise characteristics. The vertical line denotes the national average threshold. Districts to the left of the cutoff are classified as "underbanked". The sample is restricted to a bandwidth of 15 around the threshold. The discontinuity estimates and standard errors corresponding to each figure are computed as outlined in Calonico et al. (2020).

Figure B4: Pre-Treatment Covariate Balance: Manufacturing Enterprise Labor and Production Characteristics



Notes: The above figure shows the pre-treatment balance across manufacturing enterprise characteristics. The vertical line denotes the national average threshold. Districts to the left of the cutoff are classified as "underbanked". Consumption refers to households monthly per capita consumption. The sample is restricted to a bandwidth of 15 around the threshold. The discontinuity estimates and standard errors corresponding to each figure are computed as outlined in Calonico et al. (2020).

Figure B5: Capital Investment in Underbanked Districts: Annual Cross-Sectional RD Estimates



Notes: The above figure shows the treatment effect on capital investment using a cross-sectional RD specification for each year. The first coefficient estimate corresponds to the year 2001; the last coefficient estimate, 2011. The unit of observation is the manufacturing establishment. The outcome of interest is capital expenditures, defined as in specification (2). Capital expenditures is restricted to plant and machinery (net of depreciation). All specifications include state and 3-digit industry fixed effects, in addition to establishment and district covariates. A linear polynomial in the running variable is also included. The estimates are weighted using a triangular kernel and establishment-specific multiplier weights. MSERD bandwidths, computed using the procedure outlined in Calonico et al. (2020), are used to compute the optimal bandwidth for each year. The broken vertical line denotes the year 2005, the year of introduction of the BAP. Standard errors are clustered by district. Vertical lines denote 95% confidence intervals.

Table B1: Summary Statistics: Manufacturing Establishments

	N	Mean	SD	P25	P50	P75
Capital Expenditures – Machinery	69071	-0.002	0.398	-0.162	-0.105	0.030
Any Capital Expenditure – Machinery	70285	0.269	0.443	0.000	0.000	1.000
Capital Expenditures	70285	0.023	0.328	-0.129	-0.066	0.060
Any Capital Expenditure	70285	0.318	0.466	0.000	0.000	1.000
Loan Growth	54066	0.042	0.753	-0.207	0.000	0.266
Any Loan Growth	69891	0.383	0.486	0.000	0.000	1.000
New Loan	70285	0.025	0.157	0.000	0.000	0.000
No Loan	69891	0.226	0.418	0.000	0.000	0.000
Interest Rate	54046	0.244	0.280	0.071	0.144	0.282
Plant and Machinery (INR)	70285	28.679	102.425	0.195	1.204	8.082
Fixed Assets (INR)	70285	40.335	124.906	0.799	3.241	15.985
Raw Materials (INR)	57602	15.970	45.519	0.618	2.459	8.999
Land and Buildings (INR)	70285	11.709	34.696	0.203	1.120	5.353
Assets (INR)	69890	127.688	383.564	4.284	14.663	60.823
Loans (INR)	69891	27.442	92.475	0.096	2.076	10.479
Hired Workers	70285	89.372	481.087	8.000	20.000	63.000
Contract Workers	70240	26.975	354.670	0.000	0.000	5.000
Supervisors	70240	10.029	81.256	1.000	2.000	6.000
Salaries – Hired Workers (INR)	70285	4.693	11.952	0.298	0.829	2.921
Salaries – Contract Workers (INR)	70240	0.940	3.069	0.000	0.000	0.174
Salaries – Supervisor (INR)	70240	2.442	7.487	0.057	0.235	1.119
Output (INR)	70285	182.752	480.885	5.877	23.301	109.496
Value-Addition (INR)	70285	35.866	106.813	1.216	3.850	16.743
Value-Addition (Share of Assets)	70285	0.820	2.612	0.186	0.322	0.570
Rural	70285	0.438	0.496	0.000	0.000	1.000
Computer Use	70285	0.592	0.492	0.000	1.000	1.000
Age	70285	17.841	14.709	8.000	14.000	23.000
Young Establishment	70285	0.449	0.497	0.000	0.000	1.000
Micro-Enterprise	70050	0.649	0.477	0.000	1.000	1.000
Small Enterprise	70050	0.272	0.445	0.000	0.000	1.000
Medium Enterprise	70050	0.029	0.168	0.000	0.000	0.000
Large Enterprise	70050	0.050	0.218	0.000	0.000	0.000
Small-Scale Industries	70050	0.808	0.394	1.000	1.000	1.000

Notes: This table shows the summary statistics for registered manufacturing establishments. The sample is restricted to establishments situated in districts located within a bandwidth of 15 around the discontinuity threshold. Rupee values are in constant 2005 millions of rupees. Growth variables are defined as in equation (2). Micro, small, small-scale, medium and large enterprises are defined according to administrative definitions.

Table B2: Covariate Balance Across Pre-Treatment District Demographic Covariates

	Population (Log)	Population Denisty (Log)	Fraction Rural	Workforce Age	Fraction Muslim	Fraction Marginalized	Fraction Female	Fraction Literate	Fraction Educated
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Underbanked	.339	.089	-.024	.389	-.046*	-.007	.002	-.041	-.006
	(.242)	(.171)	(.035)	(.428)	(.025)	(.045)	(.008)	(.027)	(.031)
Observations	228	228	228	228	228	228	228	228	228
R^2	.83	.86	.66	.58	.91	.82	.52	.84	.78
Control Mean	2.106	543.41	.74	34.11	.11	.35	.49	.67	.41

Notes: This table shows the pre-treatment covariate balance across district-level demographic covariates. The unit of observation is the district. *Underbanked* is a dummy equaling 1 if the district's per capita bank branch density in 2005 was less than the national average bank branch density. The sample is restricted to districts within a bandwidth of 15 on either side of the national average threshold. Workforce age is the average age of workers in the district; marginalized castes refer to the fraction of *Dalits* (Scheduled Castes) and *Adivasis* (Scheduled Tribes) in the district; educated refers to the fraction of adults with secondary or higher education. All specifications include a linear polynomial in the running variable and its interaction with a district's underbanked status. All specifications include state fixed effects and standard errors are clustered by state-region. Significant levels: *10%, **5%, and ***1%.

Table B3: Covariate Balance Across Pre-Treatment District Economic Covariates

	LFP	Fraction Self-Employed	Fraction Salaried Workers	Fraction Casual Workers	Fraction Farm Activities	Fraction Manufacturing Activities	Fraction Trade Activities	Fraction Public Employment	Per Capita Consumption (Log)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Underbanked	.018	.007	-.026	.004	.006	.012	.004	-.007	.013
	(.027)	(.021)	(.020)	(.033)	(.042)	(.022)	(.013)	(.009)	(.063)
Observations	228	228	228	228	228	228	228	228	228
R^2	.62	.82	.60	.74	.66	.55	.55	.67	.77
Control Mean	.69	.31	.15	.28	.57	.11	.09	.06	752.72

Notes: This table shows the pre-treatment covariate balance across district-level economic covariates. The unit of observation is the district. *Underbanked* is a dummy equaling 1 if the district's per capita bank branch density in 2005 was less than the national average bank branch density. The sample is restricted to districts within a bandwidth of 15 on either side of the national average threshold. All specifications include a linear polynomial in the running variable and its interaction with a district's underbanked status. Per capita consumption is the district's average household monthly per capita consumption. All specifications include state fixed effects and standard errors are clustered by state-region. Significant levels: *10%, **5%, and ***1%.

Table B4: Pre-Treatment Balance of Manufacturing Characteristics Across Underbanked Districts

	Capital Expenditures (Log) (1)	Any Capital Expenditures (2)	Plant Machinery Investment (Log) (3)	Credit Growth (Log) (4)	Interest Rate (5)
Underbanked	.004	-.039	-.025	-.014	-.001
	(.022)	(.027)	(.026)	(.029)	(.021)
Observations	21110	22079	20620	16044	17077
R^2	.01	.05	.01	.00	.02

Notes: This table shows balance across pre-treatment manufacturing characteristics using the ASI data. The unit of observation is the manufacturing establishment. All specifications include state and 2-digit industry year fixed effects, along with a linear polynomial in the running variable. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table B5: Pre-Treatment Balance of Manufacturing Characteristics Across Underbanked Districts

	Fixed Assets (Log) (1)	Plant Machinery (Log) (2)	Loans (Log) (3)	Input (Log) (4)	Workers (Log) (5)	Salaries (Log) (6)	Output (Log) (7)	Value-Addition (8)	Age (9)
Underbanked	-.595	-.398	-.818	-.242	.051	-.019	-.149	.444	.022
	(.447)	(.510)	(.712)	(.253)	(.131)	(.174)	(.208)	(.444)	(1.004)
Observations	22079	21462	21962	22079	22079	22079	22079	22079	21321
R^2	.15	.15	.16	.16	.08	.09	.14	.06	.08

Notes: This table shows balance across pre-treatment manufacturing characteristics using the ASI data. The unit of observation is the manufacturing establishment. All specifications include state and 2-digit industry year fixed effects, along with a linear polynomial in the running variable. Value-addition is defined as establishment value-addition, scaled by establishment assets. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and × ***1%

Table B6: Manufacturing Investment in Underbanked Districts: Alternate Outcome Variables

	Capital Expenditures: Plant and Machinery		Capital Expenditures			Raw Materials	
	Log Difference	Pr(Any Capex = 1)	Capital Expenditure	Log Difference	Pr(Any Capex = 1)	Expenditure	Log Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Underbanked × Post	.075***	.051**	.032*	.036**	.043*	.113***	.149***
	(.026)	(.024)	(.017)	(.017)	(.025)	(.040)	(.055)
Observations	71542	71542	71542	71542	71542	57673	57673
R^2	.37	.44	.38	.38	.45	.35	.35
Control Mean	-.003	.233	.003	.013	.268	.070	3.438

Notes: This table shows the robustness of the baseline specification to alternate functional forms and outcome variables. The unit of observation is the manufacturing establishment. All specifications include establishment, industry year fixed effects, and establishment size-year fixed effects, in addition to a linear polynomial in the running variable, establishment and district covariates. Columns (1) and (2) restricts capital expenditures to capital expenditures in plant and machinery; capital expenditures in columns (3)-(5) is net fixed assets; expenditures in columns (6)-(7) refers to raw materials. Columns (1), (4) and (7) measure capital expenditures as the logged difference in closing and opening values; the outcome in columns (2) and (5) is a dummy equaling 1 if the establishment undertook any positive capital spending during the year. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table B7: Credit Growth for Manufacturing Establishments in Underbanked Districts

	Credit Growth	Credit Growth (Log)	Any Credit Growth	New Loan	No Loan	Interest Rate
	(1)	(2)	(3)	(4)	(5)	(6)
Underbanked × Post	.128***	.600***	-.013	.011	.009	.013
	(.043)	(.139)	(.027)	(.008)	(.018)	(.018)
Observations	53666	71138	71138	71542	71138	53645
R^2	.34	.33	.44	.35	.71	.58
Control Mean	.043	.188	.381	.025	.224	.241

Notes: This table estimates the treatment effect on manufacturing credit growth. The unit of observation is the manufacturing establishment. All specifications include establishment, industry-year fixed effects, a linear polynomial in the running variable, district and establishment covariates. The outcome of interest in column (1) is credit growth, defined as in equation (2); in column (2), logged difference in closing and opening values of outstanding loans; column (3), a dummy equaling 1 if the closing value of loans exceeded the opening value; column (4), a dummy equaling 1 if the establishment had no outstanding loans through the year; in column (5), a dummy equaling 1 if the establishment had no outstanding credit at the beginning of the accounting period, but positive outstanding loans at the year-end; in column (6), the imputed interest rate. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table B8: Manufacturing Investment in Underbanked Districts: Heterogeneity by Establishment and Industry Characteristics

	Capital Expenditures				
	(1)	(2)	(3)	(4)	(5)
Underbanked × Post	.084**	.068**	.076***	.087**	.065*
	(.035)	(.030)	(.026)	(.038)	(.039)
Underbanked × High Capital × Post	-.035				
	(.040)				
Underbanked × *Small* × Post		-.014			
		(.041)			
Underbanked × *Medium* × Post		-.149**			
		(.058)			
Underbanked × *Large* × Post		-.088			
		(.054)			
Underbanked × Non-SSI × Post			-.101**		
			(.047)		
Underbanked × High Collateral × Post				-.042	
				(.050)	
Underbanked × Partnership × Post					-.005
					(.047)
Underbanked × Private Ent. × Post					.036
					(.047)
Underbanked × Govt. × Post					.020
					(.103)
Underbanked × Listed × Post					-.094**
					(.047)
Observations	71542	71280	71280	71417	71542
R^2	.38	.38	.38	.38	.38
Control Mean	-.03	-.03	-.03	-.03	-.03

Notes: This table estimates the treatment heterogeneity on manufacturing investment across establishment fixed assets, tangibility, ownership and listing status. The unit of observation is the manufacturing establishment. The outcome of interest is capital expenditures. Capital expenditures refers to capital spending on plant and machinery, defined as in equation (2). All specifications include establishment and industry year fixed effects, along with a linear polynomial in the running variable, as well as establishment and district covariates. *High Capital* refers to establishments whose fixed assets exceed the median pre-treatment fixed assets. Administrative definitions are used to classify establishments as *Small*, *Medium*, *Large* and *SSI* (Small Scale Industries), based on their pre-treatment establishment fixed capital. *High Collateral* refers to establishments whose value of land and buildings exceed the pre-treatment median. *Listed* is a dummy for establishments owned by publicly listed corporations. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and × ***1%

Table B9: Credit Growth in Underbanked Districts: Heterogeneity by Establishment and Industry Characteristics

	Credit Growth				
	(1)	(2)	(3)	(4)	(5)
Underbanked × Post	.193**	.164***	.171***	.170**	.208**
	(.084)	(.058)	(.046)	(.067)	(.083)
Underbanked × High Capital × Post	-.089				
	(.101)				
Underbanked × *Small* × Post		-.045			
		(.077)			
Underbanked × *Medium* × Post		-.223			
		(.164)			
Underbanked × *Large* × Post		-.131*			
		(.076)			
Underbanked × Non-SSI × Post			-.178***		
			(.067)		
Underbanked × High Collateral × Post				-.061	
				(.079)	
Underbanked × Partnership × Post					-.064
					(.112)
Underbanked × Private Ent. × Post					-.087
					(.116)
Underbanked × Govt. × Post					-.196
					(.160)
Underbanked × Listed × Post					-.224**
					(.107)
Observations	53666	53507	53507	53597	53666
R^2	.34	.34	.34	.34	.34
Control Mean	.04	.04	.04	.04	.04

Notes: This table estimatestreatment heterogeneity in credit growth across establishment fixed assets, tangibility, ownership, and listing status. The unit of observation is the manufacturing establishment. The outcome of interest is credit growth. All specifications include establishment and industry year fixed effects, along with a linear polynomial in the running variable, as well as establishment and district covariates. *High Capital* refers to establishments whose fixed assets exceed the median pre-treatment fixed assets. Administrative definitions are used to classify establishments as *Small*, *Medium*, *Large* and *SSI* (Small Scale Industries), based on their pre-treatment establishment fixed capital. *High Collateral* refers to establishments whose value of land and buildings exceed the pre-treatment median. *Listed* is a dummy for establishments owned by publicly listed corporations. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table B10: Manufacturing Investment in Underbanked Districts: Heterogeneity by Pre-Treatment Establishment Characteristics

	Capital Expenditures				
	(1)	(2)	(3)	(4)	(5)
Underbanked × Post	.027	.085**	.116***	.064***	.050*
	(.031)	(.035)	(.031)	(.021)	(.028)
Underbanked × High MRPK × Post	.062*				
	(.035)				
Underbanked × High Output × Post		-.050			
		(.047)			
Underbanked × High Interest × Post			-.058		
			(.043)		
Underbanked × ICR < 1 × Post				-.057	
				(.092)	
Underbanked × Tradable × Post					.034
					(.037)
Observations	69918	71445	61198	71542	68826
R^2	.38	.38	.38	.38	.38
Control Mean	-.03	-.03	-.03	-.03	-.03

Notes: This table estimates the treatment heterogeneity on manufacturing investment across borrower and industry characteristics. The unit of observation is the manufacturing establishment. The outcome of interest is capital expenditures, defined as in equation (2). All specifications include establishment and industry year fixed effects, along with a linear polynomial in the running variable, as well as establishment and district covariates. *High MRPK* refers to establishments with relatively high (above median) marginal product of capital; *High Output* refers to establishments with relatively high (above median) output per worker; *High Interest* refers to establishments with relatively high (above median) interest rates; $ICR < 1$ refers to establishments whose annual interest payments exceeded annual sales at least once in the pre-treatment period; *Tradable* refers to establishments operating in industries with relatively low geographic dispersion. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table B11: Bank Branch Expansion, Manufacturing Output and Establishment Profits

	Medium-Term			Long-Term					
	Output (Log)	Profits (IHS)	Profit > 0	Output (Log)	Profits (IHS)	Profit > 0	Output (Log)	Profits (IHS)	Profit > 0
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Underbanked × Post	-.092	-.421	-.002	-.073	.127	.020			
	(.117)	(.655)	(.021)	(.106)	(.584)	(.019)			
Underbanked × $1(2006 \leq Year \leq 2010)$							-.131	-.168	.008
							(.113)	(.618)	(.020)
Underbanked × $1(Year > 2010)$							.076	.893	.048**
							(.117)	(.727)	(.024)
Observations	71542	69436	71542	90097	87347	90097	90097	87347	90097
R^2	.84	.51	.50	.83	.48	.47	.83	.48	.47
Control Mean	146.70	11.45	.84	146.70	11.45	.84	146.70	11.45	.84

Notes: This table estimates the impact of BAP on manufacturing wages. The unit of observation is the manufacturing establishment. All specifications include establishment, industry-year fixed effects, a linear polynomial in the running variable, district and establishment covariates. All outcome variables are logged. Outcomes in columns (1)-(4) are total wage payments; in columns (5)-(8), average daily wages. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table B12: Cost of Credit for Manufacturing Establishments in Underbanked Districts: Heterogeneity by Establishment Size and Age

	Interest Rate			
	(1)	(2)	(3)	(4)
Underbanked × Post	.039	.063**	.032	.007
	(.025)	(.031)	(.030)	(.021)
Underbanked × $Size >$ Median × Post	-.046			
	(.029)			
Underbanked × $10 > Size \leq 25$ × Post		-.062*		
		(.036)		
Underbanked × $25 > Size \leq 50$ × Post		-.088*		
		(.046)		
Underbanked × $50 > Size \leq 100$ × Post		-.107**		
		(.047)		
Underbanked × $Size > 100$ × Post		-.042		
		(.044)		
Underbanked × Large, Young × Post			.014	
			(.040)	
Underbanked × Large, Old × Post			-.071*	
			(.036)	
Underbanked × Small, Old × Post			.013	
			(.029)	
Underbanked × Listed × Post				.055
				(.044)
Observations	53645	53645	53645	53645
R^2	.58	.58	.58	.58
Control Mean	.24	.24	.24	.24

Notes: This table estimates the treatment heterogeneity on imputed interest rates for manufacturing enterprises. The unit of observation is the manufacturing establishment. The outcome of interest is the imputed interest rate. All specifications include establishment and industry year fixed effects, along with a linear polynomial in the running variable, as well as establishment and district covariates. $Size$ refers to the pre-treatment average number of employees employed by the establishment. *Large* and *Small* refer to establishments with above and below median sizes. *Young* refers to establishments which started operation after 1992. Listed establishments are those which are publicly listed. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

C Appendix: Bank Branch Expansion, Manufacturing Employment, and Output – Role of Managerial Capital

This section examines the impact of the branch expansion policy on manufacturing employment and output. Section 4.5 showed muted effects of financial deepening on establishment profits over the medium-run, but positive effects over the long-run. In light of the large literature documenting the positive role of managerial capital on firm performance, we examine whether financial deepening affected manufacturing output over the medium-run, conditional on the availability of managerial capital.

C.1 Workers and Wages

Columns (1)-(4) of Appendix Table C1 show no impact of financial deepening on firms' labor demand. The point estimates are negative and not precisely estimated. Appendix Table C2 shows that the lack of an impact on employment cannot be attributed to higher labor costs in underbanked districts. If anything, the evidence points to a decline in labor costs, with a significant reduction in contract worker wages. A possible explanation would be that manufacturing establishments were substituting labor with additional capital. As contractual employees are not protected by labor regulations, they are likely to form the first margin of labor adjustment.

C.2 Manufacturing Output

Appendix Table B11 identified a null effect of BAP on manufacturing output in the medium-run. Bloom (2010) points that lack of managerial talent (along with financing constraints) is a key factor depressing firm productivity in developing economies, while Bloom et al. (2019) use firm surveys to show that managerial capital can explain up to 20% of the variation in cross-country firm productivity. Fenizia (2022) combines administrative data and quasi-exogenous rotation of managers in Italy to show that improvements in the allocation of managerial capital can raise output by over 6 percent. Experimental evidence from Bloom et al. (2013), Bruhn et al. (2018) and Gosnell et al. (2020) also document a positive impact of managerial capital on firm performance and entrepreneurship. This leads us to examine whether the absence of managerial capital precluded establishments from fully realizing the gains from higher capital spending in response to improved access to credit.

The role of managerial capital becomes salient in our context as the branch expansion policy was targeted towards under-developed regions. While measuring managerial capital is challenging (Bruhn et al., 2010), a loose proxy using educational attainment shows that only a third of the working-age population in underbanked districts had completed secondary education in 2005. Consequently, if the supply of skilled labor remained fixed over the medium-run and there is limited mobility of labor across regions (Mahajan and Tomar, 2023; Munshi and Rosenzweig, 2009), the absence of skilled labor can preclude enterprises from fully realizing the gains from increased capital investment.

We test this hypothesis using ASI's disaggregation of employees into workers and supervisors, with the latter engaged in non-manufacturing tasks such as overall management and supervision of plant operations. We define an establishment's managerial capital as the ratio of supervisors to total employees ($ShSuper$). Establishments are classified as having "high" managerial capital if their pre-treatment ratio of supervisors ($ShSuper$) exceeds the pre-treatment median value of $ShSuper$ across all establishments.[1] Appendix Table C3 shows a positive coefficient on the triple interaction term in column (2), albeit it is imprecisely estimated (p-value: .145). A further disaggregation of establishments' managerial capital to the top two quartiles in column (3) yields positive coefficients for both triple interaction terms, with the one corresponding to establishments with the high-

[1] Between 2001 and 2005, $ShSuper$ for the median establishment in non-underbanked districts was 0.079. The median establishment hired 2 supervisors, (relative to 22 employees).

est managerial capital being statistically distinguishable from 0 at the 10% level (p-value .058). The sum of the coefficients suggest that manufacturing output increased by 14 percent in the post-treatment period in underbanked districts for establishments with the highest managerial capital.[2]

Since Table 8 shows that the increase in capital investment and credit is driven by relatively small establishments, column (4) of Appendix Table C3 shows the estimates for establishments below the median pre-treatment establishment size (20 workers). Column (4) shows that the results in column (3) are driven by relatively smaller establishments; within this sub-sample, output increases by almost 30 percent for establishments with the highest level of managerial capital. There is no corresponding increase in output for larger establishments in columns (5), irrespective of managerial capital. These findings line up with the results in Table 8, where capital investment and credit growth for the largest establishments were unaffected by the BAP.

Collectively, Appendix Table C3 underlines the critical role of managerial capital: while financial deepening can indeed alleviate credit constraints and lead to higher manufacturing investment, complementary inputs in managerial capital are necessary for capital investment to boost manufacturing output.

[2]We confirm in Appendix Table C4 that the increase in manufacturing investment and credit growth was also higher for establishments with relatively high managerial capital; while the triple interaction coefficients are imprecisely estimated, the sum of the coefficients for both capital investment and credit growth are significantly different from 0 for establishments with the highest level of managerial capital (p-values of .038 and .013 respectively).

Table C1: Manufacturing Employment in Underbanked Districts

	Total Employees (Log)) (1)	Total Workers (Log) (2)	Contract Workers (Log) (3)	Supervisors (Log)) (4)	Supervisors Share (5)
Underbanked × Post	-.035	-.033	-.143	-.064*	-.002
	(.056)	(.064)	(.109)	(.037)	(.005)
Observations	71542	71542	71496	71496	71229
R^2	.92	.90	.77	.88	.66
Control Mean	105.92	87.55	29.47	8.38	.11

Notes: This table estimates the impact of BAP on manufacturing employment. The unit of observation is the manufacturing establishment. All specifications include establishment, industry-year fixed effects, a linear polynomial in the running variable, district and establishment covariates. The outcome variables in columns (1)-(4) is logged. The outcome of interest in column (1) is total employees; in column (2), total number of workers; column (3), total contract workers; column (4), the number of supervisors; in column (5), supervisors as a share of total employees. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table C2: Labor Compensation in Underbanked Districts

	Total Wages (Log)				Daily Wages (Log)			
	All Employees	Total Workers	Contract Workers	Supervisors	All Employees	Total Workers	Contract Workers	Supervisors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Underbanked × Post	-.091	-.107	-.548	-.187	-.048*	-.036	-.127**	-.052
	(.096)	(.120)	(.446)	(.286)	(.026)	(.029)	(.050)	(.043)
Observations	71542	71542	71496	71496	71313	70999	24278	63427
R^2	.87	.78	.73	.78	.86	.82	.66	.77
Control Mean	6.95	3.92	.72	1.79	194.22	152.13	136.13	496.30

Notes: This table estimates the impact of BAP on manufacturing wages. The unit of observation is the manufacturing establishment. All specifications include establishment, industry-year fixed effects, a linear polynomial in the running variable, district and establishment covariates. All outcome variables are logged. Outcomes in columns (1)-(4) are total wage payments; in columns (5)-(8), average daily wages. All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table C3: Manufacturing Output in Underbanked Districts

	Output (Log)				
	(1)	(2)	(3)	(4)	(5)
Underbanked × Post	-.024	-.152	-.153	-.424	-.091
	(.105)	(.137)	(.138)	(.333)	(.140)
Underbanked × $High\ Super$ × Post		.211			
		(.145)			
Underbanked × $Sh.\ Super^{Q3}$ × Post			.130	.354	.097
			(.168)	(.375)	(.178)
Underbanked × $Sh.\ Super^{Q4}$ × Post			.302*	.696*	.105
			(.158)	(.372)	(.179)
Observations	63624	63556	63556	13822	49687
R^2	.85	.85	.85	.77	.85
Control Mean	181.29	181.29	181.29	181.29	181.29

Notes: This table estimates the impact of BAP on manufacturing output. The unit of observation is the manufacturing establishment. All specifications include establishment, 2-digit industry-year fixed effects, a linear polynomial in the running variable, district and establishment covariates. The outcome of interest is logged output. $High\ Super$ is a dummy equaling 1 if the establishment has a relatively high pre-treatment share of supervisors. $Sh.\ Super^{Q3}$ is a dummy equaling if the establishment's pre-treatment share of supervisors falls in the third quartile; $Sh.\ Super^{Q4}$ is a dummy equaling if the establishment's pre-treatment share of supervisors falls in the top quartile; All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and ***1%

Table C4: Capital Investment and Credit Growth in Underbanked Districts: Heterogeneity by Managerial Capital

	Capital Expenditures			Credit Growth		
	(1)	(2)	(3)	(4)	(5)	(6)
Underbanked × Post	.060**	.027	.026	.051	.055	.053
	(.023)	(.029)	(.029)	(.044)	(.076)	(.076)
Underbanked × $High\ Super$ × Post		.052			.004	
		(.045)			(.090)	
Underbanked × $Sh.\ Super^{Q3}$ × Post			.033			-.051
			(.049)			(.103)
Underbanked × $Sh.\ Super^{Q4}$ × Post			.076			.094
			(.054)			(.093)
Observations	63624	63556	63556	48752	48705	48705
R^2	.38	.38	.38	.34	.34	.34
Control Mean	-.02	-.02	-.00	.04	.04	.00

Notes: This table estimates the treatment heterogeneity in manufacturing investment and credit growth by establishments' managerial capital. The unit of observation is the manufacturing establishment. All specifications include establishment, industry-year fixed effects, a linear polynomial in the running variable, district and establishment covariates. The outcome of interest in columns (1)-(3) is capital expenditures, defined as in (2); in columns (4)-(6), credit growth. Capital expenditures is restricted to capital expenditures in plant and machinery. $High\ Super$ is a dummy equaling 1 if the establishment has above median pre-treatment share of supervisors. $Sh.\ Super^{Q3}$ is a dummy equaling if the establishment's pre-treatment share of supervisors falls in the third quartile; $Sh.\ Super^{Q4}$ is a dummy equaling if the establishment's pre-treatment share of supervisors falls in the top quartile; All specifications include establishment-specific weights and the sample is restricted to districts located within a bandwidth of 15 around the discontinuity threshold. Standard errors are in parentheses, clustered by district. Significant levels: *10%, **5%, and × ***1%