Interest Rate Caps, Corporate Lending, and Bank Market Power: Evidence from Bangladesh*

Yusuke Kuroishi† Cameron LaPoint‡ Yuhei Miyauchi§

Hitotsubashi University Yale SOM Boston University

February 2025

Latest version here

Abstract

How does market power in the corporate banking sector influence the effects of interest rate cap policies on credit allocation? We study this question using credit registry data from Bangladesh, where the Central Bank capped rates on corporate loans in 2009. Using difference-in-differences designs with variation in pre-regulation, branch-level rates as exposure measures, we find that a one percentage point cap-induced drop in rates increased lending amounts by 30%. This increase in lending is not driven by costs of supplying credit. Our results point to substantial credit under-provision due to banks' market power, even in the presence of relationship lending.

Keywords: corporate banking, interest rate caps, relationship lending, market power, regulation, emerging markets finance

JEL classifications: D43, G21, G28, L51, O16

*We are extremely grateful to Bangladesh Bank, especially Mohammad Akhtaruzzaman and Habibur Rahman, for providing the data necessary to complete this research. We are grateful to comments from Abhijit Banerjee, Gustavo Cortes, Esther Duflo, Glenn Ellison, Gabriel Kreindler, Scott Nelson, Felipe Netto, Hoai-Luu Nguyen, Ben Olken, Farzad Saidi, Robert Townsend, Guosong Xu, and audiences at MIT, Kyoto University, the University of Tokyo, and the 2022 Virtual AEA Meeting. We thank CEPR Private Enterprise Development in Low-Income Countries (PEDL) and the Nakajima Foundation for their financial support of this project.

†Hitotsubashi University, Department of Economics. Website: https://sites.google.com/view/yusukekuroishi/home. Email: y.kuroishi@r.hit-u.ac.jp

‡Yale School of Management. Website: https://www.cameronlapoint.com/. Email: cameron.lapoint@yale.edu

§Boston University, Department of Economics. Website: https://sites.google.com/view/yuhei-miyauchi/home. Email: miyauchi@bu.edu.

1 Introduction

A well-functioning financial market spurs economic growth by reducing the costs of external finance offered to firms (Rajan and Zingales 1998, Levine 2005). At the same time, external financing costs for firms in countries with underdeveloped financial and legal systems are systemically high (Demirgüç-Kunt et al. 2004, Beck et al. 2005). To what extent is this driven by the pass through to borrowers of costs lenders' face in supplying credit or risks associated with lending? To what extent are high borrowing costs driven by market failures (e.g., imperfect competition and asymmetric information)? Can policy interventions limit the influence of such market imperfections, and if so, under what conditions?

This paper provides an empirical assessment of these questions using an interest rate cap policy as a natural experiment. Imposing a ceiling on corporate lending rates is one of the most widely used tools by regulators in emerging markets to alleviate firms' financing constraints and spur corporate investment (Ferrari et al. 2018). We use credit registry microdata and a 2009 policy reform in Bangladesh, where the Central Bank imposed a maximum limit for interest rates on business term loans at 13 percent, under the stated objective of boosting industry investment in the aftermath of the Global Financial Crisis. Bangladesh Bank lifted the cap in 2011 after the International Monetary Fund (IMF) made the extension of a $1 billion credit line conditional on the removal of the cap, citing deteriorating financial sector conditions (Reuters 2012). We study how this interest rate cap regime affects equilibrium credit supply and credit allocation across segments of the borrower pool during the regulation period and after the cap is lifted. We then discuss the implications of our empirical results for the prospect of using rate caps to mitigate lending market power in the corporate banking sector.

From a theoretical perspective, whether interest rate caps increase or decrease equilibrium credit supply crucially depends on the nature of banking competition. If the lending market is competitive and banks are barely defraying their costs of supplying capital (net of default risk), imposing an interest rate cap may lead to contractions in credit supply. Conversely, if banks are imperfectly competitive and earn strictly positive profit margins, such policies may actually increase credit supply. Furthermore, rate caps may have long-run implications for credit supply in the presence of relationship lending, or *ex post* market power. Over the course of their relationship with borrowers, lenders learn about borrowers' creditworthiness. This renders the dynamic screening problem easier to solve, enabling lenders to provide finance in the longrun by adjusting lending terms accordingly. The importance of such relationship lending – in both emerging markets and advanced economy settings – has received ample attention in the literature.[1]

We resolve this theoretical ambiguity by studying the causal effect of the introduction and removal of Bangladesh's 2009 interest rate cap policy. A key challenge to identifying the causal

[1] See, for example, Petersen and Rajan (1994) and Berger and Udell (1995) for early contributions to this literature. Boot and Thakor (2000) and Kysucky and Norden (2016) provide surveys of the literature. More recent evidence by Gertler et al. (2024) indicates that lack of trust in financial institutions is the most important behavioral friction preventing firms from undertaking profitable projects, and that the length of a lending relationship helps proxy for the strength of this friction.

effects of this type of regulation is that rate caps are often endogenously enacted when credit market conditions and the macroeconomic outlook are less favorable. Hence, simply relying on time series variation comparing outcomes across pre-reform and post-reform periods would be inconclusive. To address this issue, we use pre-regulation interest rates at the bank branch level as a source of plausibly exogenous cross-sectional variation. In particular, we adopt a difference-in-differences research design in which we compare branches within the same parent bank which were more vs. less "exposed" to the 13% rate cap depending on average rates charged on short-term corporate loans in the lead up to the reform.

We show that bank branches charging high interest rates relative to the cap threshold prior to the regulation suddenly lower their interest rates after the policy's introduction, and then gradually increase interest rates once the policy is lifted. On the other hand, such patterns do not exist for infra-marginal bank branches whose interest rates were already lower than the cap prior to its implementation. A branch with an average interest rate 100 basis points further above the cap in the pre-reform period lowers its interest rate by 30 basis points more than infra-marginal branches after the cap is imposed. We use our branch-level reform exposure measure and this strong first stage pass through of the cap to interest rates as an instrumental variable for post-reform interest rates to translate our estimates to a corporate lending semi-elasticity.

We highlight two main empirical findings. First, we find that the interest rate cap significantly *increased* equilibrium credit supply. Furthermore, we observe an expansion of credit supply via an increased number of loans (extensive margin), as well as an increase in average loan dollar amounts (intensive margin). We show through the lens of simple extensions to a conceptual model à la Petersen and Rajan (1995) featuring both *ex ante* and *ex post* market power (i.e., relationship lending) that the observed expansion in credit supply is consistent with *ex ante* forms of market power dominating relationship lending channels. A one percentage point cap-induced drop in rates increased total outstanding loan amounts by 30%, and generated a 15% increase in the number of loans issued.

Our second main finding is that this expansion in lending is not accompanied by any statistically significant changes in the risk profile of corporate borrowers, as proxied by the proportion of secured loans and *ex post* delinquency rates, or in rates paid out on individual deposit accounts, indicating that the rate cap did not alter banks' marginal cost of originating loans. We also find no evidence of banks reallocating credit away from rural firms which might be riskier in terms of their exposure to the business cycle (Ongena et al. 2015). Our conclusions stand in sharp contrast to other studies that find negative impacts of interest rate caps on lending in consumer credit markets in advanced economies, especially for riskier borrowers for whom rate caps are more likely to bind.

We inspect our proposed theoretical mechanism by examining how branch lending outcomes and loan pricing respond to the local entry of close competitor banks' branches. Relying on simple measures of market concentration, like the popularly used Herfindahl-Hirschman Index (HHI), as a proxy for *ex ante* market power is problematic when firms compete on both prices and quantities (De Loecker and Eeckhout 2018, De Loecker et al. 2020). Indeed, we uncover no heterogeneous responses to the interest rate cap according to a branch's local deposit or lending HHI, or with respect to the same HHIs defined at the parent bank level. To help isolate *ex ante* market power, we identify banks' closest competitors by nearest-neighbor matching on a host of characteristics, including balance sheet size and industrial sector specialization. We then conduct an event study analysis where we define the event as a branch's nearest-neighbor parent bank's competitor opening a new branch within small administrative areas averaging one-sixth the size of the average U.S. county. The idea underlying this research design is that if the corporate lending sector is sufficiently imperfectly competitive prior to the enactment of the rate cap, then for branches operating within the same parent bank and quarter, local entry of a close competitor bank's branch should have no effect on the pricing and provision of credit at incumbent branches.

Consistent with this imperfect competition hypothesis, we find that local entry of a close competitor bank has no discernible impact on interest rates or extensive and intensive margin lending. We find such null effects regardless of whether we use OLS or modern difference-in-differences estimators which account for treatment effect heterogeneity, given that cohorts of branches experience entry at various times over the sample period. This null result also holds regardless of whether we define the control group as branches which have not-yet experienced entry (de Chaisemartin and D'Haultfœuille 2020), predominantly rural branches never experiencing competitor entry (Sun and Abraham 2021), or a combination of the two sets of counterfactuals (Borusyak et al. 2024). One might be concerned that branch entry is endogenous to local economic conditions, and thereby endogenous to the performance of incumbents, because competing banks would not open a branch unless they expected the new branch to earn positive profits. Reassuringly, the null effect holds conditional on fine geography-by-time fixed effects, and there are no pre-trends in lending outcomes prior to competitors' local entry, suggesting that competitors' entry decisions are relatively divorced from incumbents' lending patterns.

We use our definition of close competitor branches to show that credit supply decisions in response to the cap are not driven by price or quantity competition, consistent with our conceptual framework. Our semi-elasticity estimates are almost quantitatively unchanged when we augment our baseline specification by conditioning on competing banks' interest rates, instrumented with the competing local branch's exposure to the reform. Competition on the margin of entry is also irrelevant for how branches respond to the cap; if we condition on the presence of competing banks in an area interacted with competing banks' interest rates, we estimate quantitatively similar lending semi-elasticities.

Our results point to two important market failures in the Bangladesh banking market prior to the regulation. The first is static market power distortions due to imperfect competition in the banking sector. The existence of this form of market power leads to interest rates set above break-even levels and depressed equilibrium credit supply below its optimal level. The second is under-experimentation with *ex post* profitable borrowers. The fact that credit provision on both the intensive and extensive margin did not decrease after the removal of the interest rate cap implies that banks found it optimal to supply credit to existing borrowers. These borrowers would not have been financed if the regulation had not induced lending relationships to form during the regulation period when demand for credit was high. Hence, the interest rate cap not only increased access to financing during the regulation period, but also reduced the influence of imperfect competition in a persistent fashion after the regulation was lifted.

Still, it is difficult to conclude that the interest rate cap in Bangladesh was an effective policy from an overall aggregate welfare perspective. Because our empirical design relies on cross-sectional variation across bank branches to identify causal effects on equilibrium credit outcomes, we are unable to estimate economy-wide policy effects. There are other objectives besides increasing credit supply that policy makers should have in mind. For example, a chief concern raised by the IMF about the 2009 cap was the possibility that imposing caps might dampen the transmission of monetary policy (International Monetary Fund 2011). In light of these important caveats about the macroeconomic effects of rate caps, our main contribution is to offer new causal evidence on the quantitative importance of *ex ante* imperfect competition for corporate credit provision and highlight how rate caps can mitigate such market imperfections.

We contribute to several strands of literature. First, this paper contributes to a literature examining the impacts of interest rate caps by focusing on caps targeting corporate industrial loans in an emerging markets environment. As documented by Maimbo and Henriques Gallegos (2014), interest rate caps are a common policy in both developing and developed countries. However, in advanced economies, interest rate ceilings are usually framed as anti-usury laws imposed on payday loans or other types of unsecured consumer credit featuring high origination fees (Asian Development Bank 2016).[2]

The extant empirical evidence on rate caps is mostly limited to consumer credit markets in developed countries (Alessie et al. 2005, Benmelech and Moskowitz 2010, Rigbi 2013, Melzer and Schroeder 2017). A common theme among recent studies is that banks ration credit to *ex ante* riskier borrowers to limit losses (Cuesta and Sepulveda 2021, Burga et al. 2022, Cherry 2024). In contrast, we uncover *positive* impacts on credit supply, with no evidence of banks shifting credit away from riskier borrowers. Our findings are consistent with evidence that banks in settings with weaker financial infrastructure may earn higher profit margins (Demirgüç-Kunt et al. 2004). Another important distinction of our work relative to the rate cap literature is that our setting features the unanticipated, top-down enactment of a rate cap, rather than continuous tweaking of the policy regime at high frequency, allowing us to both purge our estimates of seasonality and examine asymmetries in the sign of regulated changes in loan pricing.

Second, this paper offers empirical guidance to a long-standing literature on market imperfections in external financing by highlighting that the comparative statics of equilibrium lending with respect to a rate cap depends on whether *ex ante* (i.e., before any borrower-creditor relationship is formed) or *ex post* market power is a more dominant driver of credit provision. We therefore build on the literature's traditional focus on lenders' competition *after* a borrower-creditor relationship develops (Petersen and Rajan 1995, McMillan and Woodruff 1999,

[2]To our knowledge, the only other study examining a rate cap on commercial bank loans to firms in a developing country context is Safavian and Zia (2018), who examine a 2016 reform in Kenya that simultaneously imposed a floor on deposit rates. Although their analysis is not causal in nature, those authors provide suggestive evidence that the reform resulted in lower credit provision and bank substitution away from SMEs towards corporate borrowers.

Fisman and Raturi 2004). Recent papers in this literature highlight the role of policy and regulation in removing lending market imperfections (Corbae and D'Erasmo 2019, 2020, Joaquim et al. 2019) We study how the presence of market power affects the role of interest rate caps, a common form of regulation in emerging markets where central banks have mandates to promote well-functioning markets which provide loans to the tradables sector.

Third, we contribute to the literature documenting barriers to obtaining financing faced by firms in developing countries by offering evidence for the existence of large interest rate markups charged on industrial corporate loans. There is ample support for the notion that firms in developing countries face more severe credit constraints (De Mel et al. 2008, Hsieh and Klenow 2009, Kaboski and Townsend 2011, Banerjee and Duflo 2014). We present causal micro-evidence pointing to *ex ante* market power as a key driver of equilibrium credit outcomes in emerging markets where interest rate caps are predominantly used as a form of countercyclical macroprudential policy, with the hope of stimulating investment.

Finally, a large body of recent work examines the role of broader market interest rate pass through to loan rates, emphasizing that *ex ante* market power can generate loan rate stickiness. Market power in lending markets can manifest directly through loan rate markups or via a deposit franchise channel, whereby banks pay depositors low interest rates and profit off the relatively higher rates charged on loans or returns earned on investing in longer-term assets (Drechsler et al. 2017, 2021). Matching corporate loans to bond spreads from the same firm, Schwert (2020) finds that lending markups are large in the U.S., with an upper bound markup of around 140 to 170 basis points for secured term loans. While rate ceilings often generate criticism on the grounds that they limit the effectiveness of expansionary monetary policy, imperfect lending competition can also impede monetary transmission in low policy rate environments when banks face capital regulation (Wang et al. 2022).

We use detailed credit registry data to causally separate these two types of market power in a developing country context – to our knowledge, a first in the literature. In our setting, we find the deposit market power channel to be quantitatively weak. Individual deposit rates fall by, at most, 9 basis points in response to a 100 basis point fall in cap-induced corporate loan rates, while corporate loan rates rise substantially in response to the Central Bank signaling the possible future enactment of a floor on deposit rates.

The rest of the paper is organized as follows. In Section 2, we explain institutional details about the corporate banking market and interest rate cap introduced in Bangladesh. Section 3 presents a conceptual framework that admits predictions for the effects of the interest rate cap on equilibrium credit supply. Section 4 describes the credit registry data and introduces our empirical strategy. Section 5 presents our main empirical results of the effects of interest rate caps on loan provision and performance. We offer further evidence of *ex ante* market power in Section 6 using branch entry of direct competitor banks. Section Section 7 concludes.

2 Banking in Bangladesh and Interest Rate Cap Regulation

Commercial banks in Bangladesh operate under the supervision of Bangladesh Bank, the central bank of Bangladesh. There are broadly four types of banks in Bangladesh: State-Owned Commercial Banks (SCBs), State-Owned Development Financial Institutions (DFIs), Private Commercial Banks (PCBs), and Foreign Commercial Banks (FCBs). As of December 2013, there are 4 SCBs, 4 DFIs, 39 PCBs, and 9 FCBs, totaling 56 banks. In our main analysis, we focus on private banks, which include the 39 PCBs and 9 FCBs.[3]

On April 19, 2009, Bangladesh Bank imposed a maximum annualized interest rate of 13 percent on most types of business loans.[4] Prior to this change, there was no direct regulation of the interest rate on bank loans, except for trade credit loans, which were capped at 7 percent. There is no indication from the Bangladesh press that the interest rate cap announcement was anticipated by market actors or policy analysts. According to Unnayan Onneshan (2011), the cap was introduced "to boost investment." The 2009 cap incurred severe criticism from the International Monetary Fund (IMF) amidst concerns about inflation and devaluation of the currency (*taka*) against the U.S. dollar.[5] Under external pressure, on March 9, 2011, Bangladesh Bank withdrew the cap for all previously regulated categories except for industrial term loans, pre-shipment credits, and agricultural sector loans.[6]

Figure 1 shows that the 2009 cap effectively bound the interest rates of bank loans originated during the regulation period. Panel (a) plots the transition of the share of loan amounts and loans whose annualized interest rates are equal to or below 13 percent. When the cap was introduced in 2009Q2, this proportion suddenly jumped from 20 percent to 50 percent, and continued to increase to 90 percent by the end of 2010. Active loans charging over 13 percent continue to exist during the regulation period due to loans originated prior to the regulation. In other words, the interest cap did not apply retroactively to loans with a maturity period extending beyond 2009Q2. Right after the cap was lifted in 2011Q1, the proportion of loans previously subject to the cap suddenly dropped to about 60 percent, and declined to 30 percent by the fourth quarter of 2011, again driven by new loan contracts. Panel (b) shows that these patterns arise due to loans whose annualized interest rates bunch at exactly 13 percent.

Despite visual evidence that the regulation introduced a sharp bound on corporate loan

[3] In the Appendix, we replicate our main results when we either (i) include the 7 state-owned banks (SCBs and DFIs) active during the cap regime; or (ii) exclude the 8 PCBs which adhere to Islamic finance principles.

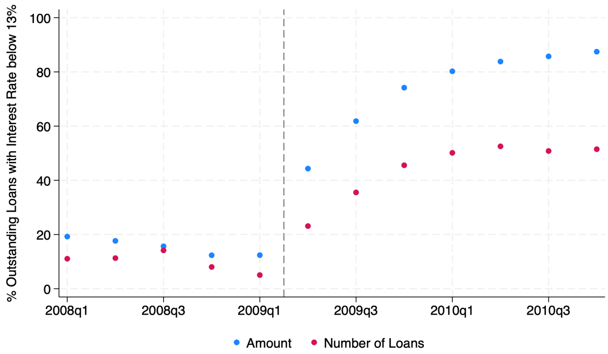
[4] More specifically, the circular issued by Bangladesh Bank states that the cap applied to working capital and term loans to large and medium scale industrial firms, agriculture, housing sector loans, and trade financing. In the data, this corresponds to loans originated to all sectors except government, other public sector entities, and individuals. We also exclude the agricultural sector from our analysis, since interest rates to firms in that sector are lower than the cap throughout the sample period. We compare prevailing loan interest rates across sectors in the Appendix.

[5] Reuters (2012) reported that the IMF made a new $1 billion credit disbursement conditional on Bangladesh Bank's withdrawal of the 13% interest rate cap.

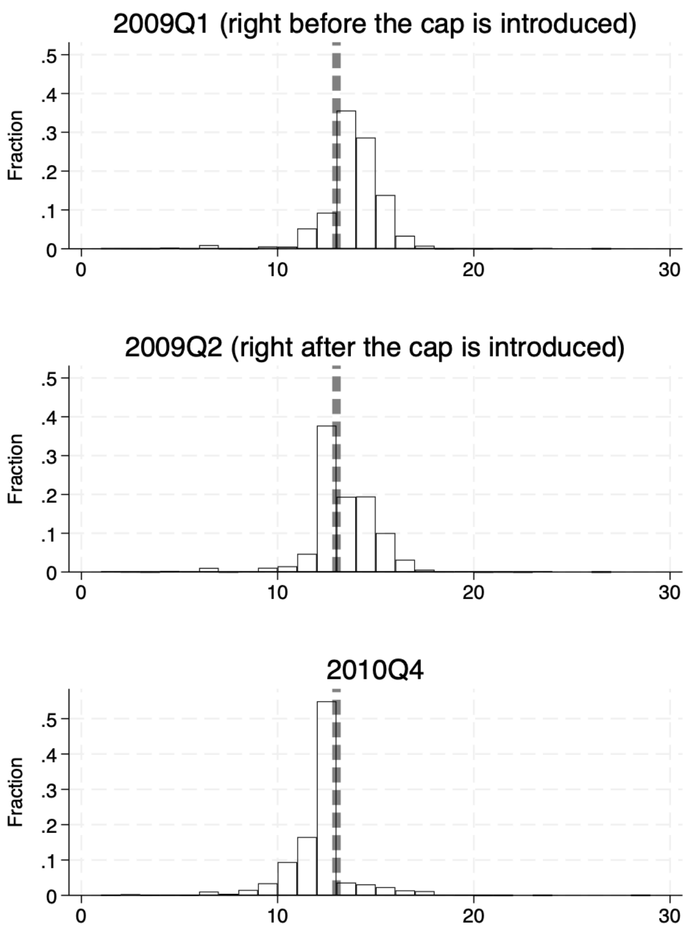
[6] The cap on interest charged on term loans for industries was also lifted on January 4, 2012. However, on January 22, 2012, Bangladesh Bank introduced another regulation to cap the spread between lending and deposit rates to 100 basis points. In our analysis, we focus on the two-year period of the direct 13% cap on loan interest to avoid contamination effects resulting from the 2012 cap. In the Appendix, we present results from the extended time period which includes the removal of the cap.

Figure 1: Interest Rates for Industrial Loans around the Cap Period

(a) Proportion of Outstanding Loans with Interest Rates below 13% Cap



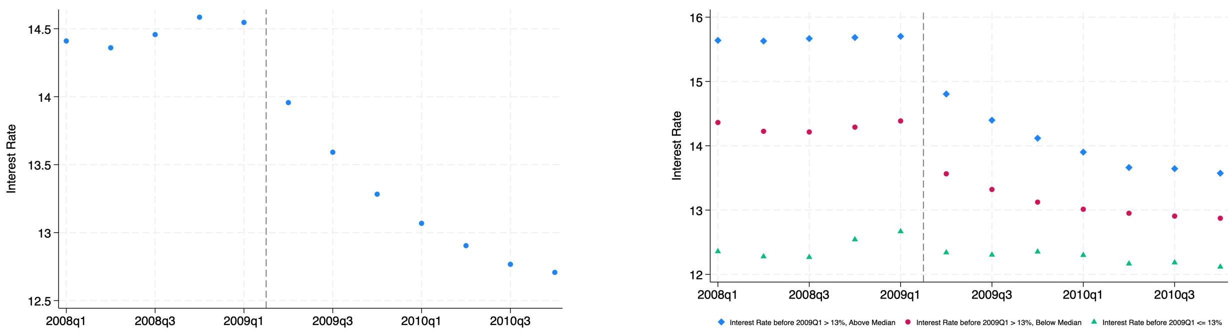
(b) Distribution of Outstanding Loans by Interest Rate (%)



Notes: The figures show the evolution of branch-level, outstanding loan amount share-weighted average interest rates, computed using the SBS-3 credit registry data obtained from Bangladesh Bank (see Section 4.1). Panel (a) shows the quarterly fraction of loans and outstanding loan amounts with average annualized interest rates equal to or below the 13 percent statutory cap. Panel (b) shows the distribution of loans relative to the 13 percent cap right before its passage (2009Q1), immediately after its passage (2009Q2), and right before its repeal by Bangladesh Bank (2010Q4). We restrict the same to bank branches with at least one outstanding industry loan in the first quarter of 2008.

Figure 2: Time Path of Branch-Level Interest Rates

(a) Average Branch-Level Interest Rates **(b) Average Rates by Cap Exposure**



Notes: The figure plots the path of average interest rates charged by branches for industrial loans in Bangladesh. To compute average branch-level interest rates we take a share-weighted average using outstanding loan amount shares of total industrial lending. Panel (a) shows the path pooling all bank branches, while in Panel (b), we divide bank branches into three strata according to the average interest rate charged prior to the regulation relative to the 13 percent cap. We compute rates from the SBS-3 microdata obtained from Bangladesh Bank (see Section 4.1). We restrict the same to bank branches with at least one outstanding industry loan in the first quarter of 2008..

interest rates, making conclusions about the causal effect of the regulation by relying solely on time series variation would not be credible. One issue is that the regulation was introduced to stimulate the economy following the global macroeconomic downturn in 2009. In particular, if the objective of the policy was truly to encourage industry investment, the timing of the policy implementation is likely correlated with aggregate credit demand. The reduction of export to developed countries was especially of concern to policymakers.[7]

To address this issue, we use bank branch-level interest rates prior to the regulation as a source of quasi-exogenous variation in branch exposure to the regulation. Bank branches accustomed to charging higher average interest rates above the cap before the regulation incurred larger reductions in their average interest rates during the regulation period. More formally, our research design is a difference-in-differences strategy with pre-regulation branch-level interest rates as a source of additional cross-sectional variation. The identifying assumption underlying this research design is that, conditional on any time-varying bank-specific shocks, outcomes tied to branches charging *ex ante* higher or lower interest rates would have evolved similarly in the absence of the interest rate cap we study.

Figure 2 illustrates our identification strategy. The figure plots the loan share-weighted average annualized interest rate charged on corporate loans subject to the cap by different branches in Bangladesh. As shown in Panel (a), before the cap implementation, average interest rates charged across bank branches are stable and show no clear time trend. Within the same

[7]Bangladesh Bank implemented a similar interest rate cap policy during the COVID-19 crisis from April 2020 and removed the cap in June 2023, replacing it with a market-based rate formed by taking an average of six-month Treasury rates. The 2020 policy imposed a percent cap on loans originated to by 9 percent, and a 6 percent cap on deposit rates (Bangladesh Bank 2022). We study the earlier interest rate cap policy regime in 2009–2011 given that it represented a cap on only business loans without restrictions on deposits, and did not occur contemporaneously with a major public health crisis in the country.

quarter the interest rate cap was introduced, average interest rates suddenly decreased. Panel (b) of Figure 2 decomposes average annualized interest rates on loans according to three strata. Interest rates charged by branches with pre-regulation average interest rates above 13 percent ("treatment branches") suddenly declined. At the same time, rates on loans originated by bank branches that used to charge below 13 percent prior to the regulation ("control branches") show no significant trend break. Consequently, the gap in interest rates between the treatment and control branches suddenly narrowed.[8]

Figure 2 confirms that the interest rate cap affected branches differently based on prevailing pre-regulation interest rates charged on industrial loans. This compression in interest rate differentials across loans offered by different branches may affect both the demand and supply of credit. First, demand for credit should increase due to lower interest rates prevailing in the market. Second, lenders will not find it profitable to supply credit if the capped rate is below their break-even interest rate. Note that break-even rates may also increase if banks rely on relationship lending and supply credit under the presumption of extracting surpluses in future periods when the cap may no longer be in place. We present a two-period model which formalizes these theoretical predictions in Section 3. In Section 5, we present the results from applying our difference-in-differences approach to document effects of the interest rate cap on credit provision and loan performance. Our empirical findings are consistent with *ex ante* imperfect competition exhibiting a strong influence on corporate credit markets.

In Table 1 we investigate how branches determine interest rates on loans originated before the regulation. To eliminate the role of heterogeneity at the bank and sector levels, we control for bank and sector fixed effects in all columns. This is important to the extent that features of lending contracts may be specific to certain types of firms or the pricing strategy of multi-branch banks which form the basis of our sample.

We observe three interesting factors explaining dispersion in branch-level interest rates within industrial sectors. First, branches attached to a parent bank with a higher market share within the same bank category within a district set higher interest rates (column 1). This result is robust to using alternative measures of geographic loan market concentration such as the (log) number of other banks by bank category operating in a district, or district-bank category-level HHI based on outstanding loans (columns 2 and 3, respectively). Second, branches paying higher interest rates on deposits and issuing loans without physical collateral set higher interest rates. This makes intuitive sense given that deposits help banks obtain capital to lend out and that losses given default will be higher on unsecured, non-recourse loan contracts. Lastly, interest rates are higher in more population dense areas and in districts where a large fraction of the population is above the upper poverty line. Hence, selection into our measure of treatment exposure based on pre-reform interest rates is based on a combination of proxies for non-relationship, static notions of market power, marginal costs of supplying credit, and local demand-side factors – all of which we account

[8]Note that for the most exposed segment of branches, average rates charged remain above 13% over the cap regime because such branches originate longer-term loans, and the cap does not apply retroactively to already issued loans.

Table 1: Determinants of Pre-Cap Branch-Level Interest Rates

	Pre-Cap Interest Rate		
	(1)	(2)	(3)
District-Bank Category-Bank Market Share	0.177^{***}		
	(0.031)		
log Number of Banks by Bank Category in District		-0.112^{***}	
		(0.007)	
District-Bank Category-Bank Level HHI			0.615^{***}
			(0.032)
Deposit Interest Rate	0.040^{***}	0.039^{***}	0.036^{***}
	(0.003)	(0.003)	(0.003)
Without Collateral Dummy	2.312^{***}	2.313^{***}	2.312^{***}
	(0.048)	(0.048)	(0.048)
Population Density	0.312^{***}	0.128^{***}	0.109^{***}
	(0.024)	(0.027)	(0.025)
Upper Poverty Ratio	-0.205^{***}	-0.200^{***}	-0.224^{***}
	(0.031)	(0.031)	(0.031)
Specification	OLS	OLS	OLS
Bank FE	X	X	X
Sector FE	X	X	X
Number of Banks	39	39	39
Number of Branches	2121	2121	2121
Observations	331374	331374	331374
Adj. R-squared	0.305	0.306	0.306

Notes: Each column in the table reports results from estimating a predictive regression of pre-cap branch-level average corporate loan interest rates on branch characteristics. The largest administrative unit in Bangladesh is a district (*zila*). Each division (akin to a census region) is comprised of districts, and further subdivided into subdistricts (*upazilas*). In total, Bangladesh has 8 divisions, 64 districts, and 495 upazilas. District-Bank Category-Bank Market Share is the market share of the outstanding loan amount lent by a parent bank within the same bank category and district prior to the regulation. Number of Banks by Bank Category is the number of banks within the same bank category and district. District-Bank Category-Bank Level HHI is the Herfindahl-Hirschman Index calculated based on the market share of the outstanding loan amount lent by a parent bank within the same bank category in a district prior to the regulation. To calculate District-Bank Category-Bank Market Share and District-Bank Category-Bank Level HHI, we exclude loans with greater than 9 months of delinquent payments. We compute population density by dividing population by the total land area in a district. Upper poverty ratio is the proportion of the population living below the upper poverty line in a district. The upper poverty line is set at the cost of consuming 2,122 calories per person per day, along with an allowance for non-food expenditures (World Bank 2023).

for in our main specifications.

3 Conceptual Framework

In this section, we use a simple model of the credit market with imperfectly competitive banks to analytically discuss possible impacts of interest rate caps on corporate lending. The model is a simple extension of Petersen and Rajan (1995), a canonical model of credit supply under relationship lending and imperfect competition by lenders. We extend this model to incorporate *ex ante* market power by banks, in addition to *ex post* market power (i.e. relationship lending) already featured in this framework.

Banks face potential borrowers with investment opportunities over two periods. If the borrower invests and succeeds in the project, the bank can lock in a fraction of borrowers and extract rents in the next period. At the same time, the market is imperfectly competitive, and the bank charges an interest rate above the marginal cost net of default risk. Hence, depending on the degree of imperfect competition in the first and second periods, interest rate caps may increase or decrease the equilibrium credit supply.

3.1 Model Setup

There is a continuum of entrepreneurs with measure one seeking financing for projects. At date 1, each borrower has a project that requires one unit of consumption goods as an investment. Hereafter, we take the consumption good as a numéraire. If invested, the project succeeds and returns R_1 with probability p, and fails and returns zero with probability $1-p$ at the end of date 1. Furthermore, if the project is successful in date 1, the entrepreneur will access another project at the beginning of date 2. This project requires one unit of the consumption good as an investment at the beginning of date 2 and returns R_2 with probability one at the end of period 2. If the project is not financed on date 1, the borrower does not have an investment opportunity in date 2.

There is no storage technology in this economy, and hence, borrowers need to finance their projects through banks on both dates. We assume that there is a representative risk-neutral bank that operates under imperfect competition. The bank's cost of raising one unit of funding is a constant c in both periods.

In date 1, the bank posts the interest rate on new loans r_1. Based on this interest rate, each entrepreneur determines whether to borrow from the bank and invest in the project. To borrow from the bank, each entrepreneur i incurs a fixed cost u_i to go to the bank. u_i is distributed following the cumulative distribution function $F(\cdot)$, which has full support and is twice continuously differentiable.

At the beginning of date 2, the bank observes which entrepreneurs succeeded with their date 1 projects and thus have an investment opportunity in date 2. We assume that the bank can lock in such borrowers with probability γ. In this event, the bank can fully extract rents from these borrowers by charging an interest rate R_2. With remaining probability $(1-\gamma)$, borrowers leave the bank and seek funding through other means at an interest rate R_2. Therefore, the parameter γ proxies for banks' *ex post* market power after establishing a relationship with the borrower.[9]

On date 1, the bank sets interest rates r_1 to maximize their expected profit. Given that the bank extracts all rents on date 2, the entrepreneur's decision to borrow depends solely on the surplus on date 1. Hence, an entrepreneur i with cost u_i borrows from the bank if and only if

$$R_1 - r_1 - u_i > 0. \tag{1}$$

By integrating over u_i, the demand function is given by $D(r_1) = 1 - F(R_1 - r_1)$. We denote the elasticity of demand by $\epsilon(r_1) \equiv -\frac{r_1}{D(r_1)} \frac{\partial D(r_1)}{\partial r_1}$.

To define the equilibrium interest rate, we first consider the break-even interest rate for the bank in date 1. For each entrepreneur, the cost of funding on both dates is c. The bank breaks even if this cost equals the expected benefit in date 1, pr_1, plus the expected profit in date 2, $p\gamma(R_2 - c)$. Hence, the break-even interest rate for the bank is $c/p - \gamma(R_2 - c)$. Following the approach of Weyl and Fabinger (2013), we introduce imperfect competition to this setting using a conduct parameter. Namely, we assume that the bank charges interest rates as follows:

$$r_1 = \frac{c/p - \gamma(R_2 - c)}{1 - \theta/\epsilon(r_1)}, \tag{2}$$

where θ is the conduct parameter that governs the degree of imperfect competition. If $\theta = 1$, the bank operates as a monopoly, and when $\theta = 0$, the market is under perfect competition.

3.2 Predicted Effects of an Interest Rate Cap on Lending

We now analyze the impacts of an interest rate cap policy in this lending market with imperfect competition. Consider the interest rate cap in dates 1 and 2 at $\bar{r} = \delta r_1$, where $0 < \delta < 1$. To focus on a nontrivial case, assume that $R_2 > \bar{r}$, so that the interest rate cap also binds in date 2. Because the bank's surplus goes down in date 2, the bank's break-even interest rate on date 1 goes up to

$$c/p - \gamma(\bar{r} - c) \tag{3}$$

If this break-even rate is still below the interest rate cap $\bar{r}$, banks keep supplying credit at interest rate $\bar{r}$. In this case, lower interest rates attract credit demand and increase equilibrium credit supply. If the break-even rate is above the cap, the bank is unwilling to supply credit because expected profit is zero. We summarize this result in the following proposition:

Proposition 1 *Consider the policy to cap the interest rate at $\bar{r} = \delta r_1$ in dates 1 and 2, where* $0 <$

[9] Petersen and Rajan (1995) interpret γ as the degree of competition of banks *after* the relationship is built. This parameter is generically different from the degree of competition in date 1. Also note that, for our purpose, it does not matter whether the borrower seeks funding from other banks or non-bank entities in the economy if the bank cannot lock in the borrower.

$\delta < 1$ and $R_2 > \bar{r}$. Equilibrium credit supply in date 1 strictly increases if and only if

$$\delta > \frac{1 - \theta/\epsilon(r_1)}{c/p - \gamma(R_2 - c)} \left(c/p - \gamma(\bar{r} - c)\right).$$

Proposition 1 clarifies under what conditions the interest rate cap leads to increases or decreases in credit supply. In particular, it clarifies how *ex ante* market power (proxied by θ) and *ex post* market power (proxied by γ) shape the cap's impacts. First, this condition is more likely to be satisfied if *ex ante* market power, or θ, is greater. In particular, if $\theta = 0$ (i.e., perfect competition), the equilibrium interest rate coincides with the break-even interest rate (equation 2) even without regulation. In this case, any binding $\bar{r}$ results in a decrease in credit supply. Second, this condition is less likely to be satisfied if γ is larger. Intuitively, if banks supply credit in date 1 under the assumption that they can extract more surplus in date 2 (a higher γ), the binding interest rate in date 2 limits the scope for surplus extraction and decreases expected profit.

It immediately follows that the socially optimal interest rate cap in this model is the bank's break-even interest rate. Therefore, if the condition in Proposition 1 is satisfied, the interest cap is welfare-improving. This welfare improvement arises because of the expansion of credit supply in both date 1 and date 2. As mentioned above, this condition is more likely to be satisfied if *ex ante* market power (θ) is stronger and *ex post* market power (γ) is weaker. The following sections of the paper empirically assess this prediction.

4 Data and Empirical Specification

In this section we describe the credit registry and bank balance sheet data we use to explore how interest rate cap policies influence business lending outcomes.

4.1 Data

Central Bank credit registry data. The main dataset we use in this paper consists of confidential loan microdata from the Scheduled Bank Statistics (SBS-3) provided to us by Bangladesh Bank. We merge SBS-3 to bank balance sheets, which are contained in a related regulatory dataset called SBS-1. In Bangladesh, all banks must submit detailed information about advances from all of their branches to Bangladesh Bank at the end of each quarter. The information reported includes the number of outstanding loan accounts and total outstanding amount, the interest rate charged within each loan or deposit account type, the presence and types of collateral (e.g., real estate-secured vs. cash-flow secured), borrowers' industrial sector, and the economic purpose of the loans.[10]

[10]Since the SBS-3 data available to researchers are collapsed to the account type-by-sector level, interest rates are calculated as total annual interest charged divided by the outstanding dollar value of the account and rounded up to the nearest basis point. More detailed descriptions about the SBS-3 data set can be found in Bangladesh Bank (2013), accessed at https://www.bangladesh-bank.org/aboutus/draftguinotification/guideline/draftsbs.pdf. Note that there were some changes in the specification of the SBS-3 data entry in 2013, and this paper uses the data set before this revision.

While we lack data on individual loans from the interest rate cap period, the SBS-3 data are sufficiently disaggregated that we can distinguish segments of the lending market subject to the policy, document how lending flows to different sectors of the economy respond, and identify the location of bank branches up to the subdistrict (*upazila*) level. For the analysis in Section 6 in which we examine bank competition using a nearest-neighbor design, we define banks' closest direct competitors by matching on branch characteristics within the same subdistrict, including size and the industry composition of corporate lending. We tabulate sectoral shares of lending at the branch level in the Appendix (see Figure A.1); about two-thirds of branches in our sample conduct the largest share of their corporate lending to firms in the commerce and trade sector (export firms), with domestic manufacturing as the second-most common sector for corporate lending specialization. Bangladesh is administratively subdivided into 495 subdistricts, each with an average area of 300 square kilometers. For comparison, the average *upazila* is roughly one-sixth the size of the average U.S. county.

The SBS data also contain information about individual and corporate deposits and interest paid on those accounts. We use these line items to assess whether banks wield market power in the corporate lending market by keeping rates paid on deposits low despite movements in benchmark policy rates – sometimes referred to as the "deposit franchise" – as has been argued for the banking sector in the U.S. (e.g., Drechsler et al. 2017, 2021). Although Table 1 shows that branches paying greater deposit rates charge higher interest rates on corporate loans, we find only mixed evidence of heterogeneous branch lending responses with respect to proxies for the marginal cost of capital, including deposit rates.[11]

For our main analysis, we use data from the first quarter of 2008 to the fourth quarter of 2010 to study the interest rate cap regime. The full span of our data covers the period from 2008Q1 to 2014Q3, which is divided into the pre-cap period (2008Q1–2009Q1), the cap regime period (2009Q2–2010Q4), and the post-cap period (2011Q1–2014Q3). Note that since we have a full calendar year of data prior to the introduction of the cap, seasonal trends in lending do not play a role in our analysis. Further, we exclude loans to the agricultural sector which has highly cyclical output within a given year due to the monsoon season.

The 2009 interest rate cap applied to working capital and term loans to large and medium-scale industrial firms, agriculture, housing sector loans, and trade financing. To select the relevant category of loans subject to the regulation, we omit loans whose borrowers' sectors fall into the category of fuel, government, other public sectors, and individuals. We then aggregate the dataset to the bank-branch level. To obtain the interest rate at each branch in each quarter, we take averages share-weighted by the outstanding loan amount, excluding from the calculation loans that were ever past due over the preceding nine months. In the Appendix, we show virtually

[11] Part of the reason we do not find strong evidence of a deposit franchise form of market power in this setting is that Bangladesh Bank encouraged banks to raise deposit rates in their announcement of the interest rate cap. Bangladesh Bank subsequently capped the rate spread between corporate loans and deposits after the corporate loan cap regime we study. The more recent round of interest rate cap policy implemented in April 2020 also included a cap on the rate spread between corporate lending and deposit interest rates of 100 basis points, indicating that this potential form of static market power is of concern to regulators.

identical results when we instead use equal-weighted averages to measure branch-level interest rates (see Appendix Tables A.5, A.6, and A.7).

World Bank Enterprise Survey data. Since the SBS data lack information about individual loans, we use firm responses to the Bangladesh World Bank Enterprise Survey (WBES) to examine how the 2009 interest rate cap influenced individual firm outcomes.[12] Firms in the WBES provide information on their output, use of labor and capital inputs, and their capital structure (internal vs. external financing), including contract features such as the interest rate, collateral, and term length of any loans received in the last three years prior to the survey. Firm panel responses are available for the 2007 (pre-cap) and 2011 (post-cap) survey waves. Target respondents in the WBES waves include small and medium-sized enterprises (SMEs) as well as larger enterprises, meaning the WBES panel data includes firms which are both subject and not subject to rate caps.

The panel structure of WBES allows us to estimate static difference-in-differences (DiD) specifications comparing lending and real outcomes for regulated vs. unregulated firms before vs. after the implementation of the cap. We can also estimate versions of our main empirical specification, described below for the SBS data, but using the WBES data. Because this involves comparing firms within regulated sectors who were previously receiving loans above vs. below the rate cap, we run into statistical power issues given the relatively small number of firms who appear in both survey waves ($N = 488$) before imposing any sample restrictions. We construct pseudo-panels of observably similar enterprises and re-estimate our static DiD specifications to overcome concerns about sample attrition bias between survey waves.

4.2 Main Empirical Specifications

Our main identification strategy is a DiD design using branch-level variation in pre-regulation interest rates. As discussed in Section 2, the introduction and removal of the interest rate cap is associated with a sudden decrease and then increase of interest rates for bank branches, particularly for branches whose interest rates are above 13 percent prior to the regulation. On the other hand, those that charge below 13 percent *ex ante* do not exhibit any significant change in interest rates charged on loans. Motivated by this observation, we estimate the following regression specification:

$$Y_{i,t} = \sum_{s=-m,s\neq-1}^{s=n} \beta_s \cdot \text{TrtIntensity}_i \times \mathbb{1}\{t=s\} + \sum_{s=-m,s\neq-1}^{s=n} \gamma_s \cdot \text{PreRateGrowth}_i \times \mathbb{1}\{t=s\}$$

$$+ \gamma' \cdot \mathbf{X}_{Bank(i),t-1} + \eta_i + \nu_{Bank(i),t} + \epsilon_{i,t} \tag{4}$$

where i is the bank branch, t is the quarter, $Bank(i)$ is the bank that branch i belongs to, and $Y_{i,t}$ is the outcome variable (e.g., interest rates, amount and number of outstanding loans, delinquency

[12] The WBES is a standard resource to the development economics literature; see Hallward-Driemeier and Pritchett (2015) for an overview of the survey construction and its limitations. Publicly available, anonymized microdata for each country can be downloaded here: https://www.enterprisesurveys.org/en/data.

status). TrtIntensity_i captures how much branch i is exposed to the interest rate cap regulation, à la Panel (b) of Figure 2, and it is constructed as follows: we first take an average of annualized interest rates on outstanding loans originated by bank branch i during the pre-cap period of our data, spanning 2008Q1 to 2009Q1. If that average is above 13 percent, we then take the difference between the branch-level average interest rate and the 13 percent cap. If it is below 13 percent, we assign $\text{TrtIntensity}_i = 0$ to the branch. Hence, β_s captures the marginal increase in the outcome variable in quarter t if the pre-regulation interest rate increases by one percentage point.

PreRateGrowth_i controls for the time trend of any branch-specific pre-regulation changes in interest rates. This is the growth rate of the average interest rate in 2009Q1 relative to 2008Q1. Controlling for the pre-reform path of interest rates is potentially important for the validity of our research design for two reasons. First, some loans included in our average interest rate calculation may be floating rate debt contracts indexed to a market rate like the repo rate, which is directly controlled through central bank monetary policy. We verify using firm-level data from the World Bank Enterprise Survey (WBES) – which offers details on individual loan contracts – that most firms who borrow receive short-term fixed rate loans, with maturities under one year. The typically short, less than 2-year maturity offered on loans in Bangladesh is consistent with our Figure 1, which shows that almost 90% of outstanding loans abide by the 13% cap within seven quarters of the policy regime; in other words, new term loans to repeat borrowers "reset" below the cap once any previous loans mature. Second, even if the vast majority of corporate loans in our sample are fixed rate contracts, there may be branch-specific monetary policy pass-through to loan interest rates. This would be the case if, for instance, branches to a greater or lesser extent rely on deposits to fund loan originations. Reassuringly, we do not uncover any clear differences in deposit rates or deposit amounts across branches along the dimension of TrtIntensity_i.[13]

Depending on the specification, we define $\nu_{Bank(i),t}$ as either bank $\times$ quarter fixed effects or bank category $\times$ quarter fixed effects. Bank category dummies distinguish between private domestic vs. foreign commercial banks. These fixed affects allow us to account for time-varying shocks to banks, including any bank-specific fallout from the Global Financial Crisis or bank-specific changes to capital requirements accompanying the adoption of Basel II regulations in Bangladesh in 2010 (Bangladesh Bank 2008). To assess the validity of the parallel trends identifying assumption, we test whether β_s is insignificant and close to zero before the regulation starts. As is standard practice, we omit the quarter before the reform, β_s for $s = 2009Q1$, which serves as the reference period for the event study coefficients. Finally, in specifications with bank category $\times$ quarter fixed effects, the vector $\mathbf{X}_{Bank(i),t-1}$ includes lagged bank balance sheet controls: the log of cash holdings, deposit liabilities, total assets, and total liabilities. We lag the bank balance sheet measures to account for the "bad control" problem; that is, variables such as profitability may themselves be outcome variables influenced by the interest rate cap.[14]

[13]Over half of deposits come from individual accounts, while the next highest share (18%) comes from commerce and trade accounts. We plot the repo market policy rate against deposit rates offered by banks for individual deposit accounts in Figure X. Indeed, deposit rates closely track movements in the policy rate.

[14]$\mathbf{X}_{Bank(i),t-1}$ is absorbed by bank $\times$ quarter fixed effects, and therefore we can only include lagged balance sheet controls in specifications where we include $\nu_{Bank(i),t}$ as bank category $\times$ time fixed effects.

Our estimation sample includes all privately-owned bank branches with a strictly positive amount of outstanding business loans in all quarters from the first quarter of 2008 to the fourth quarter of 2011. This corresponds to a balanced panel of 1,855 bank branches that belong to 39 parent banks. To incorporate the possibility that outcome variables are correlated within each branch and over time, we cluster standard errors at the branch level; however, we also report standard errors at the bank-time level in the Appendix (see Tables A.11–A.15), which generally results in less conservative standard errors. Using the full timespan of our data prior to the removal of the interest cap results in a time window of $m = -5$ quarters prior to the cap and $n = +7$ quarters during which the cap was in place.

While regression equation (4) is informative about differential impacts of the interest rate cap regulation across banks, it is also useful to provide elasticity estimates of how the outcome variables (e.g., credit supply measures) respond to a one percentage point change in charged interest rates. To empirically estimate this policy parameter, we execute the following IV regression:

$$Y_{i,d,t} = \alpha \cdot \text{InterestRate}_{i,t} + \gamma' \cdot \mathbf{X}_{Bank(i),t-1} + \eta_i + \nu_{Bank(i),t} + \psi_{d,t} + \epsilon_{i,d,t} \tag{5}$$

where we instrument $\text{InterestRate}_{i,t}$ with $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\}$. This instrument extrapolates the impacts of the decrease in interest rates on outcome variables using the change in interest rates induced by the introduction of the cap. For log outcomes $Y_{i,t}$, the resulting IV estimate of α thus results in an interest rate semi-elasticity.[15] We account for time-varying shocks to the parent bank via bank-by-quarter fixed effects $\nu_{Bank(i),t}$, and to the geographic market via branch district-by-quarter fixed effects, $\psi_{d,t}$. Importantly, estimating (5) via OLS would result in elasticities contaminated by reverse causality, since outward shifts in credit demand can push up interest rates, and the central bank may respond to an expanding economy by raising the policy rate to rein in inflation.[16]

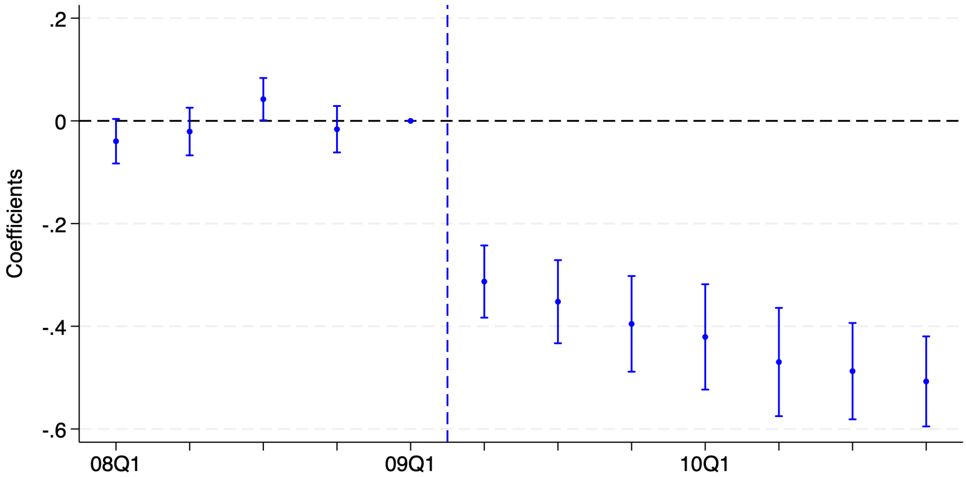
5 Main Results

This section presents our headline results showing that banks which previously charged rates above the interest rate cap responded to the policy by expanding equilibrium credit provision, consistent with *ex ante* market power dominating a relationship lending channel in determining credit supply.

[15] In the Appendix, we report estimates from (5) including a longer time sample which allows us to study the remove of the interest rate cap in 2012Q1. With the extended time sample, we augment 5 to accommodate asymmetric effects of the introduction of the cap (α_1) and the lifting of the cap (α_2). Interest rates partially revert to pre-cap levels after the removal of the cap. This is due, in part, to the fact that the Central Bank increased the policy repo rate as the Global Financial Crisis receded.

[16] Indeed, OLS regressions yield $\widehat{\alpha} > 0$, indicating a positive correlation between interest rates and loan demand, when the outcome variable is defined as extensive margin lending.

Figure 3: First Stage Effect of Rate Cap on Interest Rates Charged on Corporate Loans



Notes: The figure plots the estimated coefficients of treatment intensity interacted with quarter dummies from event study equation (4) with the share-weighted average branch-level interest rate charged on corporate loans as the outcome. We omit the quarter before the cap reform (2009Q1) as the reference category. Bangladesh Bank announced the interest rate cap on April 19, 2009 (2009Q2), with the cap effective immediately. 95% confidence interval bars obtained from clustering standard errors at the branch level.

5.1 Effects of Interest Rate Caps on Interest Rates and Credit Supply

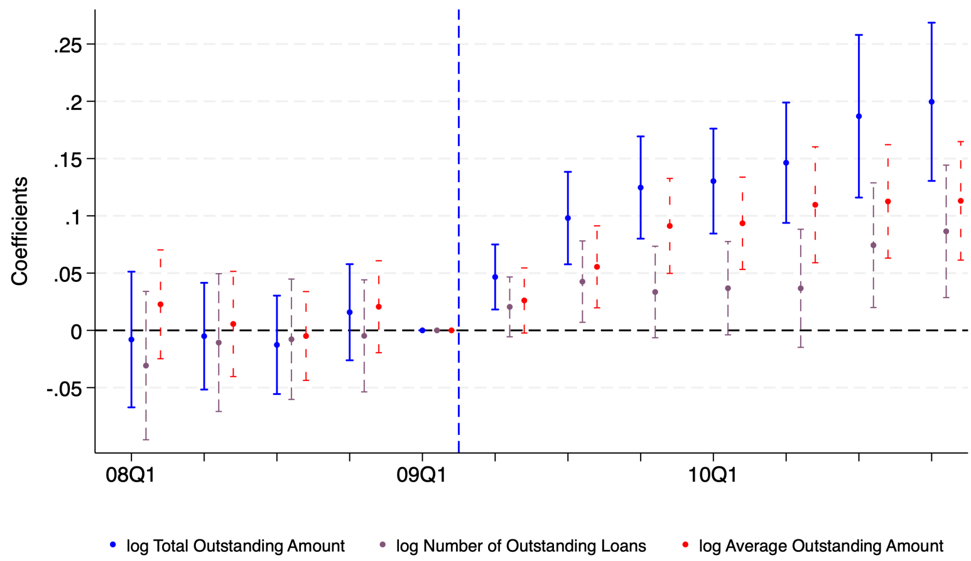
Figure 3 shows the first stage effect of the interest rate cap on average interest rates, plotting the estimated $\widehat{\beta}_s$ from regression (4). As predicted from the discussion in Section 2, there are strong and sudden negative effects on branch-level interest rates. Before the regulation, there is no discernible pre-trend. Right after the cap is introduced, interest rates immediately decline, indicating that bank branches with high treatment intensity (i.e., those that *ex ante* charged rates above 13%) decrease their interest rates by relatively more. Average interest rates respond gradually to the introduction of the cap, likely because some outstanding loans were disbursed before the cap was introduced, and the loans were not refinanced but instead held to maturity. In response to a 1 p.p. increase in treatment intensity – that is, a 100 basis point spread between pre-reform interest rates and the 13% cap – average interest rates decline by 30 basis points in 2009Q2, and the effect grows to a 50 basis point decline by 2010Q4. The immediate pass through of the cap to lower interest rates is slightly more pronounced for non-tradable firms; within a quarter of the reform, interest rates on loans charged to that sector decline by 45 basis points, compared to a 30 basis point decline for loans to tradable sector firms (Figure A.3).

How does credit supply respond to this decrease in interest rates? Figure 4 shows the effects on branch-level log total outstanding loan amounts, the number of total outstanding loans, and the average outstanding amount per loan account (excluding loans whose repayment is past due over nine months).[17] There are no statistically significant pre-trends prior to the regulation, bolstering the validity of our difference-in-differences design.

The figure reveals a striking finding. The introduction of the cap leads to *increases* in corporate

[17]Note that since we restrict our sample to a balanced panel of branches issuing loans in each quarter, using log outcomes does not result in dropped observations.

Figure 4: Event Study Analysis of the Interest Rate Cap on Corporate Lending



Notes: The figure plots the estimated coefficients of treatment intensity interacted with quarter dummies from event study equation (4) with corporate lending measures as the outcome. We consider three measures of equilibrium branch-level credit supply: the log of total outstanding loan dollars, the log number of outstanding loans (extensive margin), and the log average outstanding amount, computed as total lending dollars divided by the number of loans. We omit the quarter before the cap reform (2009Q1) as the reference category. Bangladesh Bank announced the interest rate cap on April 19, 2009 (2009Q2), with the cap effective immediately. 95% confidence interval bars obtained from clustering standard errors at the branch level.

credit provision, with the effect growing over the course of the cap regime. The effect on total outstanding loan amounts gradually increases from 5.1% (5 log points) in the second quarter of 2009 to 22.1% (20 log points) by the fourth quarter of 2010, while the number of the total outstanding loans gradually increases from 2.0% (2 log points) in the second quarter of 2009 to 9.4% (9 log points) by the fourth quarter of 2010. Since the effect of the cap on the total outstanding loan amount is larger than the effect on the number of total outstanding loans, there is also a statistically significant impact on the average outstanding amount per loan account.

Table 2 summarizes these results in a regression table format where we pool coefficients across quarters and additionally control for lagged bank balance sheet characteristics. Columns (1) and (2) show the coefficients for the first stage effect on interest rates, while the remaining columns of the table use loan measures as the outcome. Mirroring Figure 4, our results indicate that banks respond to the cap by expanding their lending on both the intensive and extensive margins. Our results hold regardless of whether we include the bank-by-quarter fixed effects (odd columns) or zoom out to bank category-by-quarter fixed effects (even columns), indicating that our source of variation is not simply driven by differences in loan pricing across parent banks. Indeed, the standard deviation of cap exposure measure TrtIntensity across branches is roughly 101 basis points in our sample; the within-bank standard deviation of TrtIntensity is 59 basis points. Hence, in contrast to other sectors such as retail in the U.S. where the same products are sold across many locations DellaVigna and Gentzkow (2019), banks in Bangladesh do not engage in uniform loan pricing across branches.

Table 2: Effects of the Rate Cap on Interest Rates and Credit Provision

	Interest Rate		log Total Outstanding Amount		log Number of Outstanding Loans		log Average Outstanding Amount	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trt Intensity x 08Q1-Q4	-0.009		-0.002		-0.013		0.011	
	(0.007)		(0.021)		(0.026)		(0.018)	
Trt Intensity x 08Q2-Q4		0.007		0.050**		0.061***		-0.011
		(0.009)		(0.020)		(0.020)		(0.017)
Trt Intensity x 09Q2-Q4	-0.353***	-0.156***	0.090***	0.099***	0.032**	0.030**	0.058***	0.069***
	(0.037)	(0.035)	(0.017)	(0.015)	(0.015)	(0.015)	(0.016)	(0.014)
Trt Intensity x 10Q1-Q4	-0.471***	-0.349***	0.166***	0.171***	0.059**	0.078***	0.107***	0.093***
	(0.044)	(0.042)	(0.028)	(0.024)	(0.024)	(0.022)	(0.022)	(0.019)
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X	X	X	X
Bank X Quarter FE	X		X		X		X	
Bank Category X Quarter FE		X		X		X		X
Lagged Balance Sheet Controls		X		X		X		X
Number of Banks	39	30	39	30	39	30	39	30
Number of Branches	1855	1137	1855	1137	1855	1137	1855	1137
Observations	22260	12507	22260	12507	22260	12507	22260	12507
Adj. R-squared	0.879	0.799	0.955	0.961	0.906	0.870	0.921	0.907

Notes: The table reports results from estimating event study regression (4) with effects pooled across several quarters. Trt Intensity$_i$ captures how much branch i is exposed to the interest rate cap regulation, and it is constructed as follows: we first take average annualized interest rates of outstanding loans by bank branch i from the first quarter of 2008 to the first quarter of 2009. If this number is above 13 percent, we take the difference between the average interest rate and the 13 percent cap threshold. If the difference is below 13 percent, we assign Trt Intensity$_i$ $= 0$, indicating that the branch is, on average, infra-marginal to the reform. All estimates are relative to the quarter before the reform, and we therefore omit $TrtIntensity \times 09Q1$. We define the interest rate outcome in columns (1) and (2) as the share-weighted average branch-level interest rate on corporate loans. Odd columns correspond to our baseline specification in which we include bank-by-quarter fixed effects; in even columns, we replace the bank-by-quarter fixed effects with bank category-by-quarter fixed effects and add lagged balance sheet controls, including log cash holdings, deposit liabilities, and total assets. Robust standard errors clustered at the branch level in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Table 3 presents results from estimating the instrumental variable (IV) regression in (5). Recasting our research design as a difference-in-differences instrument variables (DiD-IV) specification helps translate the estimates in Table 2 into a lending semi-elasticity. After the Central Bank introduces the interest rate cap, a one percentage point decrease in average interest rates increases branch-level total outstanding loan dollars by 31 percentage points, the number of outstanding loans by 14 percentage points, and the average outstanding amount per loan account by 17 percentage points, respectively. In all specifications, we exclude public-sector banks which are subject to separate regulations which keep average pre-reform interest rates below the eventual 13% cap; such publicly-owned banks are therefore infra-marginal to the reform. This indicates that the increase in branch-level credit supply is driven by both the extensive and intensive margin for private-sector banks.[18]

For each specification in Table 3, we report the (Montiel Olea and Pflueger 2013) F-stat for the

[18]Our results are directionally the same, albeit attenuated, when we include public-sector banks in the estimation sample. For instance, Table A.4 the estimated IV effect on log total outstanding loan dollars is -0.17 log points, compared to -0.31 log points in our baseline specification in Table 3 excluding public banks.

Table 3: IV Estimates of Cap-Induced Change in Interest Rates on Credit Provision

	log Total Outstanding Amount		log Number of Outstanding Loans		log Average Outstanding Amount	
	(1)	(2)	(3)	(4)	(5)	(6)
Interest Rate	-0.312***	-0.404***	-0.142**	-0.056	-0.171***	-0.349***
	(0.056)	(0.084)	(0.056)	(0.078)	(0.049)	(0.078)
Specification	IV	IV	IV	IV	IV	IV
Montiel Olea and Pflueger F-Statistics	492.80	61.74	492.80	61.74	492.80	61.74
Branch FE	X	X	X	X	X	X
Bank X Quarter FE	X		X		X	
Bank Category X Quarter FE		X		X		X
Lagged Variables		X		X		X
District X Quarter FE	X	X	X	X	X	X
Number of Banks	39	30	39	30	39	30
Number of Branches	1855	1137	1855	1137	1855	1137
Observations	22260	12507	22260	12507	22260	12507

Notes: The table reports results from estimating the IV specification in (5) via 2SLS. We instrument the endogenous variable, the branch-level average interest rate, with $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\}$, which captures how much branch i is exposed to the interest rate cap regulation. See text for how we define Trt Intensity_i. Odd columns correspond to our baseline specification in which we include bank-by-quarter fixed effects; in even columns, we replace the bank-by-quarter fixed effects with bank category-by-quarter fixed effects and add lagged balance sheet controls, including log cash holdings, deposit liabilities, and total assets. Robust standard errors clustered at the branch level in parentheses. For each specification, we report the first-stage F-statistic for the excluded instrument from Montiel Olea and Pflueger (2013), which is robust to clustering by bank branch and to heteroskedasticity. *p<0.1; **p<0.05; ***p<0.01.

excluded first stage instruments of TrtIntensity × Quarter, which is robust to clustering by bank branch and to heteroskedasticity (Andrews et al. 2019). Across all regressions, and even when we include district × quarter fixed effects and lagged bank balance sheet controls, the F-Stat exceeds the 2SLS estimator thresholds for 5% worst case bias relative to OLS at the 5% confidence level. Hence, our analysis is not subject to a weak IV problem, despite the use of several instruments when we estimate dynamic policy effects by quarter.[19]

Bangladesh Bank imposed a ceiling on corporate interest rates in the wake of the Global Financial Crisis in an effort to help prop up corporate investment. One concern is that firms may have responded to the crisis by seeking more credit to smooth out negative shocks to their product demand even in the absence of lower cap-induced rates. While Figure 3 and Figure 4 exhibit no clear visual evidence of violations of the parallel trends assumption, we test the robustness of our estimated treatment effects for interest rates and lending when we relax the parallel trends assumption and allow for the possibility that our treatment effects are only partially identified by branch-level variation in exposure to the cap. Specifically, we conduct Rambachan and Roth (2023) tests in which we vary the M parameter representing the multiple by which the post-treatment violations of parallel trends can deviate from the pre-treatment differences in

[19]In subsequent tables, we also report test statistics from the more commonly used Kleibergen-Paap rk Wald F-test, which is only robust to clustering. With the exception of some specifications in which we examine heterogeneous responses to the reform by branch location characteristics, our first stage still reaches the rule-of-thumb F-stat threshold of 10.

trends. The estimated first stage effect on interest rates remains statistically significant even if we impose a relatively extreme value of $M = 2$. The positive branch-level outstanding loan response remains significant at the 90% level for $M = 2$ and significant at the 95% level for $M < 2$. We provide the full results of our parallel trends tests in Figure A.4.

As a placebo check, we show in the Appendix that there is no discernible impact of the interest rate cap on segments of the lending market not directly regulated by the policy. Event study figure Figure A.5 and Table A.19 show results from re-estimating (4), where the outcome variables are now defined using loans to individuals, which includes both sole-proprietorships or entrepreneurs and consumer installment loans. The treatment intensity measure is defined in the same way as in Table 2 but now computed over the segment of loans to individuals instead of corporate industrial loans. We find no statistically significant first stage effects on interest rates or reduced-form effects on the supply of credit to individuals. This further indicates that the estimated increase in lending to the corporate sector is unlikely to simply be due to secular, expansionary trends in the overall banking sector during the recovery from the Global Financial Crisis.[20]

We also examine in the Appendix the effects of the cap on lending outcomes by *ex ante* interest rate bins. Figure A.6 reports the event study graphs and Table A.1 summarizes the results in a pooled regression format. After the regulation, shares of outstanding loan amounts and the number of loans with interest rates below 13% increase while the share of the lending market with interest rates above 13% symmetrically declines. Based on the findings in Tables 2 and A.1, we also estimate changes in the total outstanding amount and the number of loans within each 100 basis point interest rate bin. Figure A.6 shows that the estimated effects are driven by interest rate bins farther above 13%. Our analysis is therefore robust to using more non-parametric versions of our treatment intensity measure to identify effects of the rate cap.

Finally, we show in the Appendix that interest rates fall and lending expands even when we include publicly-owned banks or exclude the eight Islamic finance banks from the sample. Pass through of the rate cap into lower average branch-level interest rates is stronger for publicly-owned banks, and lending responses are more muted (see Tables A.2, A.3, and A.4). Through the lens of Proposition 1 of the model, this would suggest that relationship lending forces may be stronger than *ex ante* markups among bank-borrower pairs in the public banking segment of the market. However, the point estimates for both the pricing and quantity responses are virtually identical even when we drop the Islamic finance banks (see Tables A.8, A.9, and A.10).

Taking stock, our lending semi-elasticity estimates are at the upper end of estimates produced from other policy experiments in the literature on loan markets. Studies using bunching below thresholds in interest rate schedules for mortgages (DeFusco and Paciorek 2017) and unsecured fintech loans (Cespedes 2024) find semi-elasticities of around 2, meaning that for every 100 basis point increase in interest rates, loan demand falls by 2%. However, these estimates combine the extensive and intensive margins. Bhutta and Ringo (2021) exploit a drop in interest rates via insurance premia charged on FHA mortgages and uncover a similar 2 semi-elasticity, but also

[20] The null effect on individual loan interest rates and lending volumes also means there is no average cross-loan segment pricing response within bank branches.

show that the semi-elasticity is closer to 20 on the extensive margin of mortgage demand. We estimate an extensive margin corporate lending semi-elasticity of 15 (14 log points). The extensive margin response is lower than the overall response in our setting, in part, due to the presence of relationship lending in corporate loans, whereas this type of market power is less pronounced for consumer loans.

Our study is among the first to estimate a lending semi-elasticity with respect to interest rate regulation in a corporate loan market. An exception is Altavilla et al. (2022), who decompose credit supply and demand determinants of equilibrium lending in the euro area around the COVID-19 crisis. Those authors estimate a semi-elasticity of credit demand in the range of 7 to 23 – more in line with our estimates, especially when we include publicly-owned banks in our sample (Table A.4). Our analysis still deviates in two major ways: (i) we identify lending responses via variation across branches within the same domestic bank, as opposed to shocks across banks spanning multiple countries; and (ii) we focus on a developing country where *ex ante* bank market power is likely stronger due to weaker financial institutions.

5.2 Effects on Loan Performance and Lenders' Costs of Capital

One criticism of interest rate caps is that they may result in the rationing of credit to *ex ante* riskier borrowers, as other studies find when rate caps are imposed in consumer lending markets (Cuesta and Sepulveda 2021, Burga et al. 2022, Cherry 2024). Intuitively, if banks are unable to charge higher interest rates for riskier borrowers, they might prioritize loans to borrowers infra-marginal to the reform, who would have received rates below 13% even without the cap. Given that most corporate loans in Bangladesh have a term of one or two years, such changes in the borrower risk pool should be reflected in delinquency rates during the two-year cap period and the extent to which loans are secured by collateral. At the same time, our results in the preceding section document that equilibrium credit supply increased on both the extensive and intensive margins. Hence, banks likely responded to the reform by broadening the pool of borrowers beyond existing customers during the cap period when short-term credit demand was high.

We resolve this tension in Table 4 by examining the effects of interest rate caps on proxies for banks' marginal cost of supplying funds. Banks may find it easier to make up losses from the reduction in interest rates by reducing deposit rates on individual accounts, thus widening the spread on deposits relative to rates charged on corporate loans – otherwise known as the deposit franchise channel of market power (Drechsler et al. 2021). Column (1) with bank $\times$ time fixed effects shows no clear evidence of a reaction in deposit rates to the cap, although the sign of the immediate post-period coefficient is negative. However, in column (2) where we include lagged bank balance sheet controls and bank type $\times$ time fixed effects, we find banks decrease deposit rates within three quarters after the reform by an average of 9.1 basis points for every 100 basis points greater exposure to the cap, with no observed effect in the second year of the cap regime. Part of the reason we do not find strong evidence of a deposit franchise form of market power is that Bangladesh Bank relied on moral suasion to keep deposit rates elevated and tightened maximum credit-to-deposit ratios towards the end of the industrial loan rate cap regime (International Monetary Fund 2011, pg. 12).[21]

Banks in the SBS credit registry data report loans as "bad" or a "loss" if the payment is past due for over nine months. Similarly, we observe flags for the proportion of loans which are delinquent for at least 3 months or at least 6 months. We find null effects for more persistent 9-month and 6-month delinquency rates, but some evidence of an uptick in 3-month delinquency rates in column (8) in the specification with lagged bank balance sheet controls and bank type-by-time fixed effects. Towards the end of the cap regime, 3-month delinquency rates increase by 0.8 percentage points (a 14% increase relative to the pre-cap baseline), reflecting that a portion of the extensive margin response of lending involves the provision of new loans to *ex post* riskier borrowers.[22]

In the final two columns of Table 4, we investigate whether bank branches shift lending towards contracts secured by physical collateral to mitigate lost profits from the cap. Such contracts feature lower loss given default, since the asset backing the loan can be liquidated in the event of severe non-payment spells. We find no clear effect of the cap on the proportion of collateralized loans; in column (9), there is marginally statistically significant one percentage point increase in the probability of secured lending. In Figure A.2 we show null dynamic effects across all outcomes considered in Table 4. In sum, our findings belie the notion that the interest rate cap led to systematic rationing of credit to riskier borrowers.

5.3 Heterogeneous Effects on Credit Supply

Through the lens of the model in Section 3, the magnitudes by which equilibrium credit supply responds to the interest rate cap may depend on the degree of local competition faced by banks. In Table 5 and Table 6, we empirically investigate what bank and local bank market characteristics induce heterogeneous credit provision responses using different combinations of *ex ante* measures. We repeat our IV analysis based on equation (5) by including interactions of the loan interest rate with such characteristics. As before, each coefficient in the two tables represents the effect of a one percentage point increase in interest rates. We therefore amend the excluded instruments to now be $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\} \times \mathbb{X}_{\mathbb{i}}$, where $\mathbb{X}_{\mathbb{i}}$ consists of a vector of *ex ante* bank branch or market characteristics in the district where branch *i* resides.

Two clear dimensions of heterogeneous responses emerge. Bank branches operating in more population dense areas and those offering larger loan amounts (i.e., above the median in the cross-section of branches) respond more strongly to the rate cap by increasing their credit supply. For instance, based on the point estimates in column (2) of Table 5, in response to a one percentage point decrease in the interest rate, and within the same parent bank, branches in an above-median

[21]Consistent with the Central Bank encouraging banks to raise their deposit rates, we find that corporate deposit rates increase by 20.3 basis points within the year of the reform for every 100 basis points greater exposure to the cap based on pre-reform branch lending patterns. Average pre-cap corporate deposit rates are almost 300 basis points lower than rates paid out on individual deposit accounts.

[22]The average pre-cap 9, 6, and 3-month delinquency rates are 4.4%, 4.9%, and 5.6%, respectively.

Table 4: Effects of the Rate Cap on Lenders' Costs of Supplying Credit

	Deposit Rate for Individual Accounts		Delinquency Rate: 9 Months or More Overdue		Delinquency Rate: 6 Months or More Overdue		Delinquency Rate: 3 Months or More Overdue		Proportion of Secured Loans	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Trt Intensity x 08Q1-Q4	0.011		-0.000		-0.002		-0.002		0.008	
	(0.040)		(0.002)		(0.002)		(0.002)		(0.007)	
Trt Intensity x 08Q2-Q4		0.076**		-0.001		-0.002		0.002		-0.016***
		(0.036)		(0.002)		(0.002)		(0.003)		(0.006)
Trt Intensity x 09Q2-Q4	-0.048	-0.091**	0.000	0.002	0.000	0.003	0.000	0.006**	0.006	0.002
	(0.035)	(0.036)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.003)	(0.004)	(0.004)
Trt Intensity x 10Q1-Q4	0.012	-0.031	-0.001	0.004	-0.001	0.004	0.001	0.008**	0.010*	0.007
	(0.047)	(0.049)	(0.003)	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)	(0.006)	(0.005)
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X	X	X	X	X	X
Bank X Quarter FE	X		X		X		X		X	
Bank Category X Quarter FE		X		X		X		X		X
Lagged Variables		X		X		X		X		X
Number of Banks	39	30	39	30	39	30	39	30	39	30
Number of Branches	1855	1137	1855	1137	1855	1137	1855	1137	1855	1137
Observations	22260	12507	22260	12507	22260	12507	22260	12507	22260	12507
Adj. R-squared	0.799	0.767	0.757	0.797	0.746	0.795	0.737	0.778	0.734	0.571

Notes: The table reports results from estimating event study regression (4) with effects pooled across several quarters. For outcome variables, we consider several proxies for lenders' costs of supplying corporate credit, including: annualized deposit rates on individual accounts, delinquency rates, and the proportion of loans secured by physical collateral. Trt Intensity$_i$ captures how much branch i is exposed to the interest rate cap regulation, and it is constructed as follows: we first take average annualized interest rates of outstanding loans by bank branch i from the first quarter of 2008 to the first quarter of 2009. If this number is above 13 percent, we take the difference between the average interest rate and the 13 percent cap threshold. If the difference is below 13 percent, we assign Trt Intensity$_i = 0$, indicating that the branch is, on average, infra-marginal to the reform. All estimates are relative to the quarter before the reform, and we therefore omit $TrtIntensity \times 09Q1$. Odd columns correspond to our baseline specification in which we include bank-by-quarter fixed effects; in even columns, we replace the bank-by-quarter fixed effects with bank category-by-quarter fixed effects and add lagged balance sheet controls, including log cash holdings, deposit liabilities, and total assets. Robust standard errors clustered at the branch level in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Table 5: IV Estimates of Heterogeneous Effects on Credit Provision by Branch Characteristics

	log Total Outstanding Amount			log Number of Outstanding Loans			log Average Outstanding Amount		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Interest Rate	-0.368***	-0.175*	-0.261*	-0.229**	-0.101	-0.202	-0.138	-0.074	-0.059
	(0.111)	(0.104)	(0.143)	(0.098)	(0.099)	(0.123)	(0.088)	(0.086)	(0.112)
Interest Rate X Above Median (Deposit Rate)	0.088		0.144	0.080		0.085	0.007		0.059
	(0.119)		(0.128)	(0.119)		(0.126)	(0.105)		(0.111)
Interest Rate X Above Median (Delinquency Rate: 9 Months or More Overdue)	0.119		0.119	0.142		0.143	-0.023		-0.025
	(0.118)		(0.117)	(0.115)		(0.110)	(0.104)		(0.103)
Interest Rate X Branch Lending Unsecured Loans Dummy	-0.013		-0.003	0.005		0.010	-0.019		-0.013
	(0.025)		(0.025)	(0.026)		(0.027)	(0.023)		(0.023)
Interest Rate X Above Median (Population Density)		-0.316**	-0.310**		-0.122	-0.111		-0.194*	-0.199*
		(0.124)	(0.130)		(0.115)	(0.119)		(0.106)	(0.105)
Interest Rate X Above Median (Upper Poverty Ratio)		0.143	0.148		0.050	0.088		0.092	0.060
		(0.111)	(0.113)		(0.107)	(0.105)		(0.097)	(0.102)
Specification	IV	IV	IV	IV	IV	IV	IV	IV	IV
Kleibergen-Paap rk Wald F-Statistics	8.42	15.64	4.99	8.42	15.64	4.99	8.42	15.64	4.99
Branch FE	X	X	X	X	X	X	X	X	X
Above Median Dummy X Bank X Quarter FE	X	X	X	X	X	X	X	X	X
Above Median Dummy X District X Quarter FE	X	X	X	X	X	X	X	X	X
Number of Banks	39	39	39	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260	22260	22260	22260

Notes: The table reports results from estimating the IV specification in (5) via 2SLS with additional terms interacting the endogenous variable, the branch-level average interest rate, with branch-level characteristics. We instrument the endogenous variable with $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\}$, which captures how much branch i is exposed to the interest rate cap regulation. Likewise, we instrument each interaction term with $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\}$ interacted with the branch characteristic variable. See text for how we define Trt Intensity_i. We define population density and the upper poverty ratio as in Table 1. Robust standard errors clustered at the branch level in parentheses. We include in each specification branch, above-median characteristics-by-bank-by-quarter fixed effects, and above-median characteristics-by-district-by-quarter fixed effects. For each specification, we report the Kleibergen-Paap cluster-robust first-stage F-statistic for the excluded instruments. *p<0.1; **p<0.05; ***p<0.01.

Table 6: IV Estimates of Heterogeneous Effects on Credit Provision: Additional Results

	log Total Outstanding Amount			log Number of Outstanding Loans			log Average Outstanding Amount		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Interest Rate	-0.040	-0.005	-0.177*	-0.099	-0.164	-0.166	0.059	0.159	-0.011
	(0.070)	(0.129)	(0.104)	(0.094)	(0.147)	(0.107)	(0.072)	(0.117)	(0.086)
Interest Rate X Above Median (Average Outstanding Amount)	-0.288***	-0.200*	-0.305**	-0.089	0.012	-0.114	-0.199**	-0.212*	-0.192
	(0.102)	(0.115)	(0.124)	(0.111)	(0.138)	(0.120)	(0.095)	(0.116)	(0.118)
Interest Rate X Above Median (Deposit Rate)			0.165			0.029			0.136
			(0.119)			(0.119)			(0.106)
Interest Rate X Above Median (Population Density)		-0.210*			-0.083			-0.127	
		(0.117)			(0.116)			(0.102)	
Interest Rate X Above Median (Upper Poverty Ratio)		0.063			0.112			-0.049	
		(0.115)			(0.125)			(0.107)	
Interest Rate X Above Median (Delinquency Rate: 9 Months or More Overdue)			0.138			0.105			0.033
			(0.129)			(0.122)			(0.118)
Interest Rate X Branch Lending Unsecured Loans Dummy			0.010			0.015			-0.005
			(0.025)			(0.027)			(0.023)
Specification	IV	IV	IV	IV	IV	IV	IV	IV	IV
Kleibergen-Paap rk Wald F-Statistics	27.50	11.76	8.74	27.50	11.76	8.74	27.50	11.76	8.74
Branch FE	X	X	X	X	X	X	X	X	X
Above Median Dummy X Bank X Quarter FE	X	X	X	X	X	X	X	X	X
Above Median Dummy X District X Quarter FE	X	X	X	X	X	X	X	X	X
Number of Banks	39	39	39	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260	22260	22260	22260

Notes: The table reports results from estimating the IV specification in (5) via 2SLS with additional terms interacting the endogenous variable, the branch-level average interest rate, with branch-level characteristics. We instrument the endogenous variable with $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\}$, which captures how much branch i is exposed to the interest rate cap regulation. Likewise, we instrument each interaction term with $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\}$ interacted with the branch characteristic variable. See text for how we define Trt Intensity_i. We define population density and the upper poverty ratio as in Table 1. Robust standard errors clustered at the branch level in parentheses. We include in each specification branch, above-median characteristics-by-bank-by-quarter fixed effects, and above-median characteristics-by-district-by-quarter fixed effects. For each specification, we report the Kleibergen-Paap cluster-robust first-stage F-statistic for the excluded instruments. *p<0.1; **p<0.05; ***p<0.01.

population density area increase total outstanding loan dollars by 42% (35 log points) more than a branch in a below-median population density area. Column (1) of Table 6 shows that branches within the same bank which offer above-median loan sizes, on average, drive the entire credit supply response in the sample.

We fail to uncover any statistically significant differential responses of branches according to whether they are located in high poverty areas, whether they pay higher interest rates on individual deposits, and the risk profile of their borrowers, as again proxied by delinquency rates and the fraction of unsecured loans. These patterns hold across different combinations of interaction terms with $\mathbb{X}_{\mathbb{i}}$ included as regressors, with the caveat that in some specifications the first stage F-stat is attenuated by the inclusion of several weak instruments. Our analysis of heterogeneous responses points to greater pass through of interest rate caps to more capitalized banks in urban areas. We further examine the extent to which these findings are due to *ex ante* market power in local markets in the next section.

6 Testing the Mechanisms

We discuss in this section policy implications and possible alternative explanations for the observed increase in equilibrium corporate credit supply in response to the 2009 Bangladesh interest rate cap. To highlight the role of *ex ante* market power, we examine how incumbent banks react to competitors' local branch entry, but find no effects on loan pricing or provision, indicating that banks wield significant market power in the corporate loan market on the eve of the rate ceiling.

6.1 Evidence of Market Power from Local Entry of Close Competitors

We rationalize our finding of an increase in corporate credit supply via a conceptual framework in which static market power is sufficiently strong to overcome the influence of relationship lending. However, we fail to uncover any evidence of heterogeneous branch responses to the interest rate cap by local branch deposit or lending HHI quantiles, or by analogous HHIs defined at the parent bank level. According to HHI-based measures, bank branches in more concentrated districts by lending (Figure A.6) or deposit amounts (Figure A.7) do not differentially respond to the cap in a statistically significant way.[23] De Loecker et al. (2020) show that HHI is divorced from markups and argue that HHI is a problematic measure of market power in contexts where the definition of the market is dynamic and firms engage in non-Cournot competition. Moreover, even if HHI were a good measure of *ex ante* market power in the corporate banking sector, we may still fail to isolate heterogeneous responses to the interest rate ceiling by HHI, because our branch-level DiD specifications identify slope rather than level shifts in the credit supply curve.

[23]If anything, the sign of the coefficient goes in the opposite direction one would expect if HHI were a reasonable proxy for *ex ante* market power, pointing to *lower* rather than greater markups for high-HHI branches on the eve of the cap (see the IV estimates of Table A.20).

To help overcome these issues, we examine how banks react when a close competitor opens a new branch nearby their pre-existing branch in a small geographic area. We hypothesize that if banks are subject to a substantial degree of imperfect competition prior to the imposition of a cap, then entry of a close competitor bank's branch into a geographic area should have no effect on the pricing and provision of credit at incumbent branches. To test this hypothesis, we estimate staggered event study regressions of the following form:

$$Y_{i,d,t} = \sum_{t=-m,t\neq-1}^{t=n} \xi_t \cdot Entry_{i,Bank(i,j),t} + \eta_i + \nu_{Bank(i),t} + \psi_{d,t} + \varepsilon_{i,d,t} \tag{6}$$

where the dummy $Entry_{i,Bank(i,j),t}$ is a dummy equal to unity if branch i in quarter t experiences entry into the same district of a new branch j belonging to its parent bank's closest competitor bank $Bank(i,j)$.[24] As before, we include branch fixed effects and parent bank × quarter fixed effects $\nu_{Bank(i),t}$ to soak up any time-varying shocks to particular banks. Using the full timespan of our data, we consider a time window of $m = -5$ quarters prior to entry and $n = +10$ quarters after branch entry to investigate pre-trends and trace out dynamic effects.[25]

To code $Entry_{i,Bank(i,j),t}$, we first collect a panel of bank branch entry events by scraping information on branch openings from bank websites and then matching each branch to an *upazila*. We then identify close competitors at the bank level using a nearest-neighbor approach. The idea underlying this design is that the banking pair $Bank(i,j)$ represents two parent banks of a similar balance sheet size and sectoral specialization, which are hence most likely to be in direct competition for new loan contracts.[26] Each bank i matches to a single nearest neighbor, in a Mahalanobis distance sense, but the pair (i,j) may not be bilateral. For instance, j may be bank i's closest competitor, but k may be j's closest competitor. We match on pre-cap regulation bank characteristics to avoid any possible influence of the cap on the market structure.

Based on our definition of close competitors, 17% of bank branches experience competing branch entry during our sample period, or, $\max_t\{Entry_{i,Bank(i,j),t}\} = 1$. We stack up treatment events within each branch, meaning that $Entry_{i,Bank(i,j),t}$ assigns treatment timing according to the first instance of the competitor bank's entry. We model treatment as an absorbing state because very few branches experience multiple local competitor entry events, and branch closures are uncommon.[27]

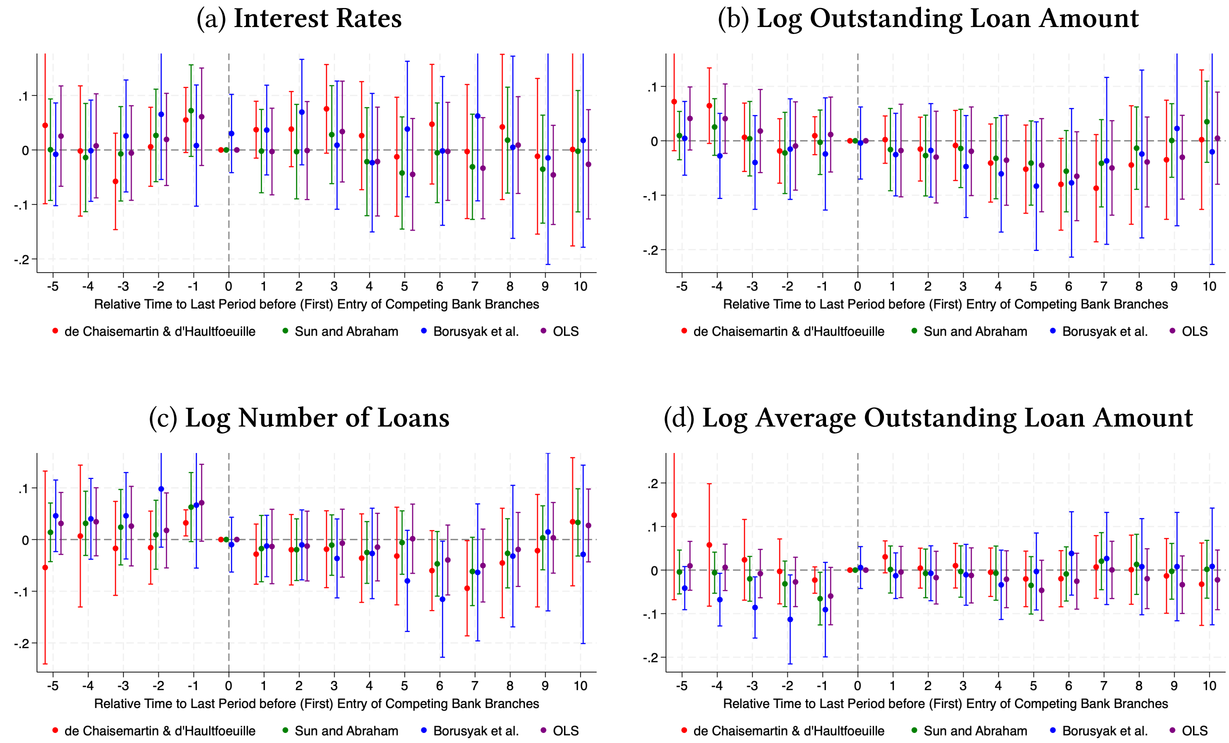
[24]We do not observe any instances in which a bank has multiple close competitor's branches opening up within the same district in the same quarter. Therefore, this parameterization of $Entry_{i,Bank(i,j),t}$ is not the result of an econometric choice we make.

[25]Our research design is similar in spirit to the one adopted by Kuehn (2020), who instruments for the number of competing branches in an area using historical characteristics of markets where the parent bank, $Bank(i)$ in our setup, has no pre-existing branches. Kuehn (2020) studies strategic complementarity in banks' branching decisions, whereas our objective is to use *de novo* entry of direct competitors to test the existence of lending market power.

[26]Figure A.1 shows that over 90% of banks lend to at least two sectors, and two-thirds of banks do the largest share of their lending to export firms (commerce and trade); hence, there is some degree of sectoral specialization in corporate lending in Bangladesh.

[27]Only 62 out of the 2,723 branches in our sample experience multiple competitor entry events during the sample period. We obtain similar null effects for all our outcomes of interest when we re-estimate (6) while simply dropping these branches from the sample.

Figure 5: Null Effect of Nearest-Neighbor Bank Competitor Local Entry on Credit Conditions



Notes: The figure plots the estimated quarterly event study coefficients on the sequence of dummies $Entry_{i,Bank(i,j),t}$ from equation (6) indicating the first entry of a branch j tied to the nearest-neighbor competitor bank of branch i within the same district. We consider the four main outcome variables adopted throughout the paper: share-weighted average interest rates in Panel (a); log outstanding loan amounts in (b); the log number of loans in (c); and the log average loan size in (d). In each panel, we plot the coefficients from estimating (4) via four estimators: de Chaisemartin and D'Haultfœuille (2020), Sun and Abraham (2021), Borusyak et al. (2024), and OLS. In each regression, we omit the quarter prior to the competing branch's entry as the reference category. 95% confidence interval bars obtained from clustering standard errors at the branch level. We implement the de Chaisemartin and D'Haultfœuille (2020) estimator with 1,000 bootstrap iterations to compute standard errors.

The never-treated group of branches– those which never experience the entry of a competitor branch within the same district during our sample period – are predominantly located in very rural parts of the country. This would lead to clear selection into treatment status if we used the never-treated branches as a control group. It is not obvious which direction this urban vs. rural selection goes as it pertains to the existence of imperfect competition. For instance, rural areas may possess fewer bank branches in general, meaning that any incumbent branch will have a natural monopoly. At the same time, Bangladesh is among the most traffic-congested countries in the world, with average kilometer per hour speeds over the course of a typical day being longer in Dhaka (the capital of Bangladesh) than in any other major city worldwide (Akbar et al. 2023). Commuting costs and the preponderance of in-person banking may therefore blunt the impact of branch entry on competition. Such urban congestion may contribute to the greater pass through of the reform we observe for the most population dense districts in Table 5 and Table 6, even conditional on other sources of potential factors contributing to banks' static market power, such as their ability to pay out lower deposit rates.

In light of this evidence, we view it more appropriate to use the not-yet treated group of branches as our baseline counterfactual via the estimator proposed by de Chaisemartin and D'Haultfœuille (2020), in contrast to other widely used estimators which include never-treated units in the control group (Callaway and Sant'Anna 2021, Sun and Abraham 2021, Borusyak et al. 2024).[28] Still, we find after plotting the estimate $\widehat{\xi}_t$ in Figure 5 that branch-level lending and loan pricing are unaffected by competing branch entry even when we adopt these alternative estimators. Figure 5 shows that competitor branch entry has no impact on interest rates, outstanding loan amounts, extensive margin loan origination, and average loan size. The OLS estimates are nearly identical to the other estimates, indicating that entry cohort heterogeneity plays a limited role in our results. The null effects on branch lending indicate that branches do not lose business – nor are they pressured to lower their interest rates to retain customers when a close competitor begins lending nearby – suggesting that banks exhibit *ex ante* local market power for corporate loans.

One might be concerned that branch entry is endogenous to local economic conditions, and thereby endogenous to the performance of incumbents. After all, competing banks would not open a branch in an area unless they expected the new branch to earn positive profits. We control for district-by-time fixed effects in equation (6), to account for shocks to the local economy. Further, even if entry decisions are driven by conditions at finer geographic levels, across all estimators, Figure 5 displays no pre-trends in lending outcomes prior to competitors' local entry, suggesting that competitors' entry decisions are relatively orthogonal to incumbents' lending patterns. This perhaps speaks to the perceived stickiness of lending relationships in the corporate sector.

6.2 Testing for Strategic Complementarities in Responses to the Cap

Do branches differentially respond to the interest rate cap depending on the prevailing interest rates offered by their close competitors within the same market segment? Although the preceding analysis shows that competitor entry into local banking markets has no discernible effect on loan pricing or lending, there could still be strategic complementarities in branch decisions to expand credit provision to firms after the rate cap. For instance, banks may be concerned that if they ration credit to relatively unprofitable borrowers at below-cap rates, they may lose market share to local competitors. Given the stickiness of lending relationships, failing to expand lending during the cap period may undermine a branch's efforts to recoup lost profits by raising rates on new loans issued after the cap is removed. Hence, some of the lending responses we observe in our main results could be driven by lenders' concerns about preserving local market share and intertemporal profit shifting rather than a reduction in *ex ante* markups due to imperfect competition.

To test this hypothesis, we augment our IV specification (5) to include a separate term, $\text{CompetingRate}_{i,t}$, measuring the average interest rate charged on regulated loans across any local

[28] Note that with the never-treated branches comprising the control group, the Callaway and Sant'Anna (2021) and Sun and Abraham (2021) estimates produce identical results for estimating versions of (6) without the bank-level covariates $\mathbf{X}_{Bank(i),t}$. Of the two, we use the Sun and Abraham (2021) estimator in our robustness checks due to its faster computational speed.

close competitor branches to branch i:

$$Y_{i,d,t} = \alpha_1 \cdot \text{InterestRate}_{i,t} + \alpha_2 \cdot \text{CompetingRate}_{i,t} + \eta_i + \nu_{Bank(i),t} + \psi_{d,t} + \epsilon_{i,d,t} \tag{7}$$

As in our entry specification in (6), we define competing branches as those belonging to the parent bank which is the nearest neighbor to branch i's parent bank according to sectoral loan shares and balance sheet size. As in our baseline IV strategy (5), we instrument $\text{InterestRate}_{i,t}$ with a branch's *ex ante* exposure to the interest rate cap, $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\}$. Analogously, we instrument $\text{CompetingRate}_{i,t}$ with $\text{TrtIntensity}_{Bank(-i)} \times \mathbb{1}\{t \geq 2009Q2\}$, the treatment intensity measure computed across local branches belonging to the competitor $Bank(-i)$. Intuitively, competing bank branches more exposed to the reform according to the extent to which they previously charged rates above the 13 percent cap respond by lowering rates which increases the credit demand they face. If this increase in credit provision has a spillover effect on branch i's decision to provide credit after the cap, then we would expect to find a negative and significant loading on α_2 in (7).

In Table 7, we find no support for the notion that branches expand lending due to competitive pressures to retain market share in the face of relationship lending and the possibility of charging higher rates in the future. Across all specifications, we find a null effect of competing branch interest rates on own-branch lending responses, on both the intensive and extensive margins. The implied semi-elasticity is hardly different from the one we estimate in the baseline IV results of Table 3. In Panel (b) of Table 7, we repeat the analysis but restrict to the 59% of branches where the nearest-neighbor competitor bank has branches operating in the same district over the full sample period; making this restriction shuts down the role of new branch entry in an effort by banks to capture market share after the cap. Again, we find no evidence of statistically significant strategic complementarities in response to the cap, although the sign of $\widehat{\alpha}_2$ switches from positive to negative in most columns. All of our results are robust to the inclusion of geography-by-time fixed effects $\psi_{d,t}$, defined at either the district or subdistrict (*upazila*) levels.

In Appendix Table A.18, we probe robustness of the nearest-neighbor approach to testing for strategic complementarities by defining the match at the bank-subdistrict level. This imposes a very strict definition of market competition, leading to many branches which are unmatched to a close competitor (i.e., many branches which are the only branch continuously lending in their subdistrict).[29] Consequently, we produce a low first-stage F-statistic if we adopt this matching approach and only use pre-cap data to compute vector distances. However, retaining this bank-subdistrict matching definition but pooling pre-cap and post-cap data to perform the match delivers similar results to Panel (b) of Table 7, both in terms of the strength of the first stage and the sign and statistical insignificance of the coefficient on $\text{CompetingRate}_{i,t}$.

[29] Recall that a subdistrict is a small geographic area averaging around one-sixth the size of the average U.S. county.

Table 7: Lack of Strategic Complementarities in Branch Responses to the Rate Cap

(a) Baseline Specification Including All Branches

	log Total Outstanding Amount		log Number of Outstanding Loans		log Average Outstanding Amount	
	(1)	(2)	(3)	(4)	(5)	(6)
Interest Rate	-0.299***	-0.235***	-0.134**	-0.083	-0.165***	-0.152***
	(0.057)	(0.058)	(0.056)	(0.056)	(0.050)	(0.049)
Competing Bank's Interest Rate X Competitor Exists	0.025	0.009	0.015	0.004	0.011	0.005
	(0.016)	(0.019)	(0.016)	(0.020)	(0.013)	(0.015)
Specification	IV	IV	IV	IV	IV	IV
Kleibergen-Paap rk Wald F-Statistics	63.68	44.54	63.68	44.54	63.68	44.54
Branch FE	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X
District X Quarter FE	X		X		X	
Upazila X Quarter FE		X		X		X
Number of Banks	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260

(b) Including Only Branches with Time-Invariant Local Competitors

	log Total Outstanding Amount		log Number of Outstanding Loans		log Average Outstanding Amount	
	(1)	(2)	(3)	(4)	(5)	(6)
Interest Rate	-0.343***	-0.265***	-0.127*	-0.068	-0.217***	-0.197***
	(0.080)	(0.078)	(0.073)	(0.069)	(0.063)	(0.062)
Competing Bank's Interest Rate	-0.118	-0.026	-0.105	-0.049	-0.013	0.023
	(0.075)	(0.089)	(0.067)	(0.078)	(0.059)	(0.071)
Specification	IV	IV	IV	IV	IV	IV
Kleibergen-Paap rk Wald F-Statistics	50.26	26.80	50.26	26.80	50.26	26.80
Branch FE	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X
District X Quarter FE	X		X		X	
Upazila X Quarter FE		X		X		X
Number of Banks	39	39	39	39	39	39
Number of Branches	1084	1084	1084	1084	1084	1084
Observations	13008	13008	13008	13008	13008	13008

Notes: The table reports results from estimating the IV specification in (7) via 2SLS. We instrument own-branch average interest rates $\text{InterestRate}_{i,t}$, with $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\}$, which captures how much branch i is exposed to the interest rate cap regulation. See text for how we define Trt Intensity_i. We instrument $\text{CompetingRate}_{i,t}$ with $\text{TrtIntensity}_{Bank(-i)} \times \mathbb{1}\{t \geq 2009Q2\}$, the treatment intensity measure computed across local branches belonging to the nearest-neighbor competitor $Bank(-i)$. See text for details on the nearest-neighbor matching procedures. In Panel (a), we interact $\text{CompetingRate}_{i,t}$ with a dummy for whether the branch has a competing branch in the district during that time period. In Panel (b), we restrict the sample to branches having a consistent local competitor branch over the full sample period to condition on the entry margin. In odd columns we include district-by-quarter fixed effects; in even columns, we instead include subdistrict-by-quarter fixed effects. All specifications include bank-by-quarter and branch fixed effects. Robust standard errors clustered at the branch level in parentheses. For each specification, we report the Kleibergen-Paap cluster-robust first-stage F-statistic for the excluded instruments. *p<0.1; **p<0.05; ***p<0.01.

6.3 Testing for Spatial Reallocation of Credit

Do banks reallocate credit within their branch network to smooth out the shock to credit demand induced by the interest rate cap by equating marginal loan profitability across branches? Or, do banks respond by reallocating credit provision to less risky segments of the borrower pool or locations where borrowers are easier to screen? The corporate finance literature argues that firms reallocate resources across plants within their internal network in response to shocks to production. Such shocks might include those to local investment opportunities via reduced informational costs (Giroud and Mueller 2015), local consumer demand via house prices (Giroud and Mueller 2019), and place-based corporate income tax incentives (LaPoint and Sakabe 2021).

Unlike firm inputs like capital or labor, since loans are both factors of production and a direct source of revenue for banks, it is not obvious which reallocation channel will dominate when there is an interest rate shock such as a cap and banks respond in a profit-maximizing way. Offering more loans increases revenues from charging interest but also requires banks to retain more capital to cover their position. To isolate redistribution of credit supply across locations within the bank, we estimate the following branch network regression:

$$\begin{aligned} Y_{i,d,t} &= \sum_s \beta_{1,s} \cdot \text{TrtIntensity}_i \times \mathbb{1}\{t=s\} + \sum_s \beta_{2,s} \cdot \sum_{k \neq i} \omega_k \cdot \text{TrtIntensity}_k \times \mathbb{1}\{t=s\} \\ &+ \sum_s \gamma_s \cdot \text{PreRateGrowth}_i \times \mathbb{1}\{t=s\} + \eta_i + \nu_{Bank(i),t} + \psi_{d,t} + \epsilon_{i,d,t} \end{aligned} \tag{8}$$

We augment our main reduced form specification (4) by adding a network effect term capturing the interest rate exposure of i's parent bank to the cap regulation through the internal network of branches other than branch i. To aggregate individual cross-branch exposures, we take a loan amount share-weighted average of TrtIntensity_k, where ω_k are the shares of branch k's lending as a fraction of total bank lending outside branch i. For lending as the outcome, if $\beta_{2,s} > 0$, then banks smooth out the interest rate cap shock across branches in their network. However, if $\beta_{2,s} < 0$, then banks instead reallocate loans to branches with relatively lower *ex ante* markups. To the extent that banks do respond to the cap by reallocating credit supply across locations within their branch network, toggling the inclusion of the subdistrict-by-time fixed effects $\psi_{d,t}$ is informative about whether this reallocation occurs across different geographic areas.

We present results from estimating (8) in Table A.21. We find no evidence of banks responding to the rate cap by reallocating loans across branches according to the distribution of *ex ante* markups across their internal network. This is true regardless of whether we include subdistrict-by-time fixed effects. If anything, banks smooth out the shock to their loan pricing across branches along the intensive margin of credit provision. The loadings on $\beta_{2,s}$ are positive and significant when we set log average outstanding amount as the outcome variable; however, the coefficients cease to be statistically significant if we instead cluster the standard errors at the bank-quarter level to account for the fact that most of the variation in the leave-one-out network TrtIntensity term comes from the parent bank rather than the branch level.

Although we fail to uncover conclusive evidence in our preceding tests that the increase in lending after the cap is driven by reallocation of credit to borrowers who appear to be *ex post* less risky (Table 4), banks might ration credit to rural borrowers who are less likely to be well-established firms and are more likely to experience severe reductions in performance and liquidity during global downturns in both emerging markets (Ongena et al. 2015) and among large listed U.S. firms (Loughran and Schultz 2005). For instance, Acharya et al. (2022) demonstrate that banks reallocate residential mortgage loans from the more exposed urban markets to rural areas in response to more stringent leverage limits in Ireland. However, it is an open question whether banks might similarly reallocate credit to reduce their exposure to top-down price regulation.

We directly test for this rural-to-urban reallocation channel in the following triple differences regression, which again augments our baseline reduced form equation, but now interacts branch-level treatment intensity with a bank-level exposure measure based on the concentration of local lending in rural areas.

$$Y_{i,d,t} = \sum_s \beta_{1,s} \cdot \text{TrtIntensity}_i \times \mathbb{1}\{t = s\} + \sum_s \beta_{2,s} \cdot \text{RuralExposure}_{Bank(i)} \times \text{TrtIntensity}_i \times \mathbb{1}\{t = s\}$$

$$+ \sum_s \gamma_s \cdot \text{PreRateGrowth}_i \times \mathbb{1}\{t = s\} + \eta_i + \nu_{Bank(i),t} + \psi_{d,t} + \epsilon_{i,d,t} \tag{9}$$

The coefficients of interest in (9) are the $\beta_{2,s}$, which indicate how branches charging *ex ante* interest rates above the cap threshold differentially respond to the cap policy depending on their parent bank's reliance on lending to rural firms. We define $\text{RuralExposure}_{Bank(i)}$ as the deviation of the parent bank's average market share in rural markets from its nationwide average subdistrict-level market share. When computing average subsdistrict-level market shares at the bank level, we exclude subdistricts where the bank has a 0% market share.

We define rural markets as subdistricts without a *paurashava*, which is an official municipal subdivision in population-dense areas in Bangladesh. The average population density in subdistricts with a *paurashava* is 73 people per acre; in rural subdistricts without a *paurashava* density is just 5 people per acre.[30] Seven banks are relatively more exposed to rural markets (i.e., $\text{RuralExposure}_{Bank(i)} > 0$) when we compute market shares by outstanding amounts; four banks have relatively more rural market exposure when we compute market shares by number of branches.

The results from estimating equation (9) in Table 8, with RuralExposure defined in terms of loan shares, contain no evidence of a rural-to-urban credit reallocation response. On top of their statistical insignificance, the coefficients on $\beta_{2,s}$ are positive in the post-reform period for total outstanding loan amounts (columns 4 to 6) or the average loan amount (columns 10 to 12), which would be inconsistent with allocation of credit away from rural areas. There is an increasing – but again statistically insignificant – positive trend on RuralExposure when we examine the extensive

[30]Under our definitions of urban and rural, median population density is 5.8 people per acre in urban subdistricts and 4.4 in rural subdistricts. Since much of the difference in population density when we use this measure of rurality originates from very population-dense areas in the capital city of Dhaka, we obtain similar results if we simply classify all subdistricts within Dhaka as urban and all others as rural.

Table 8: Testing for Rural-to-Urban Reallocation of Credit in Response to the Rate Cap

	Interest Rate			log Total Outstanding Amount			log Number of Outstanding Loans			log Average Outstanding Amount		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Trt Intensity x 08Q1-Q4	-0.017	-0.017	-0.018	-0.022	-0.015	0.005	-0.021	-0.018	-0.003	-0.001	0.003	0.008
	(0.085)	(0.085)	(0.087)	(0.031)	(0.033)	(0.040)	(0.024)	(0.023)	(0.028)	(0.024)	(0.024)	(0.027)
Trt Intensity x 09Q2-Q4	-0.349***	-0.358***	-0.404***	0.100***	0.114***	0.109***	0.030	0.044*	0.043	0.070***	0.070***	0.066**
	(0.083)	(0.081)	(0.082)	(0.032)	(0.034)	(0.041)	(0.022)	(0.023)	(0.028)	(0.023)	(0.023)	(0.027)
Trt Intensity x 10Q1-Q4	-0.473***	-0.510***	-0.609***	0.176***	0.199***	0.182***	0.058***	0.068***	0.054**	0.118***	0.131***	0.128***
	(0.078)	(0.078)	(0.080)	(0.031)	(0.032)	(0.039)	(0.022)	(0.021)	(0.026)	(0.022)	(0.022)	(0.026)
Rural Exposure x Trt Intensity x 08Q1-Q4	-0.501	-0.498	-0.530	-1.110	-1.144	-0.922	-0.417	-0.493	-0.550	-0.693	-0.651	-0.372
	(2.750)	(2.845)	(2.917)	(1.367)	(1.387)	(1.467)	(0.736)	(0.745)	(0.693)	(0.960)	(0.996)	(1.104)
Rural Exposure x Trt Intensity x 09Q2-Q4	0.233	-0.150	-1.382	0.591	0.764	0.686	-0.144	-0.100	-0.052	0.735	0.864	0.739
	(2.568)	(2.634)	(2.691)	(1.179)	(1.206)	(1.335)	(0.579)	(0.603)	(0.630)	(0.887)	(0.923)	(1.005)
Rural Exposure x Trt Intensity x 10Q1-Q4	-0.102	-0.704	-2.089	0.580	0.829	0.495	-0.050	-0.157	-0.307	0.630	0.986	0.802
	(2.623)	(2.727)	(2.802)	(1.299)	(1.333)	(1.434)	(0.603)	(0.618)	(0.634)	(0.948)	(0.996)	(1.116)
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X	X	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X	X	X	X	X	X	X
District X Quarter FE		X			X			X			X	
Upazila X Quarter FE			X			X			X			X
Number of Banks	39	39	39	39	39	39	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260	22260	22260	22260	22260	22260	22260
Adj. R-squared	0.879	0.879	0.880	0.955	0.955	0.954	0.906	0.906	0.909	0.921	0.922	0.920

Notes: The table reports results from estimating equation (9) where we set RuralExposure equal to the deviation of the parent bank's average market share in rural markets from its nationwide average subdistrict-level market share, where the shares are determined by the outstanding corporate loan amounts the bank has on its balance sheet in a subdistrict relative to the total amount of all corporate loans outstanding across all banks in that subdistrict; to compute average market shares within the bank, we exclude subdistricts where the bank has no market share. All other features of the specifications in the table are defined analogously to our baseline specification in Table 2. All other features of the specifications in the table are defined analogously to our baseline specification in Table 2. We cluster standard errors at the bank-time level to account for the fact that RuralExposure varies at the parent bank level. *p<0.1; **p<0.05; ***p<0.01.

margin response of lending in columns 7 to 9. We continue to find no evidence of rural-to-urban reallocation when we instead define RuralExposure in terms of rural market shares based on the bank's number of branches (Table A.22).

6.4 Interpretation and Policy Implications

Our empirical results are broadly consistent with the predictions of Proposition 1 in Section 3, which holds under the assumption of imperfect competition of banks during the regulation period, even in the presence of relationship lending. Section 6.1 offers causal evidence in favor of the model's assumption of pre-existing imperfect competition (captured by the case where $\theta > 0$) in the corporate lending market. Prior to the introduction of the interest rate cap, banks charged a markup on rates for business loans. Because of the existence of this markup, banks find it profitable to continue supplying credit under the rate cap but now at lower average interest rates Figure 3, leading to increases in credit demand Figure 4 without rationing credit to riskier borrowers (Table 4). Under this interpretation, our paper reveals static market power distortions due to imperfect competition of banks as a market failure that interest rate caps can help solve in an emerging markets context.

It is difficult to conclude that the interest rate cap in Bangladesh was welfare-improving in the aggregate. Because our empirical design relies on cross-sectional variation across bank branches to identify causal effects on equilibrium credit outcomes, we are unable to estimate economy-wide policy effects. There are other objectives besides increasing credit supply that policymakers may have in mind when weighing the option of capping rates. For example, a chief concern raised by the IMF about the 2009 interest rate cap in Bangladesh was the possibility that imposing caps might dampen the transmission of monetary policy and reduce demand for government paper, therefore necessitating central bank financing of the budget (International Monetary Fund 2011).[31]

A commonly cited merit of rate caps for corporate loans is that by lowering the cost of funds they provide access to finance for early-stage ventures and businesses, thereby stimulating economic growth and investment (Bangladesh Bank 2022). On the other hand, if price regulation applies to loans targeting small and medium-sized enterprises (SMEs) which are more difficult for lenders to screen, credit may be siphoned away from the most financially constrained firms with NPV positive projects, thus reducing output. Given that the 2009 rate cap we study only applied to medium and large-scale industrial enterprises, it is perhaps less surprising that we find no evidence of reallocation of credit away from *ex ante* riskier firms or from particular industrial sectors which comprise a large share of GDP.

Another possible drawback to rate caps is that banks may pass through their lower profit margins to lower deposit rates paid out on individual accounts, rendering it more difficult for banks to raise capital. Indeed, we find some evidence in Table 4 that branches more exposed to the reform respond to by lowering individual deposit rates. If banks face imperfect competition

[31] Financial markets have negatively priced the persistence of Bangladesh's latest rate cap into its sovereign debt rating. Fitch Ratings downgraded Bangladesh's Long-Term Foreign-Currency Issuer Default Rating to B+ from BB- in May 2024 (Fitch Ratings 2024).

for deposits, then this will have little to no impact on their ability to raise capital. However, to the extent this deposit franchise exists for privately-owned banks in Bangladesh, it results in quantitatively negligible reductions in branch-level deposit rates of only 9 basis points in response to a 100 basis point drop in corporate loan rates; this is relative to the 8.6% average pre-cap individual deposit rate.[32]

To the extent banks charge lower markups on loans following the cap regulation, reductions in their profitability may also dis-incentivize new branch creation, particularly in rural areas. The development finance literature has shown that reducing physical distance to bank branches promotes output growth by improving lending quality (Jayaratne and Strahan 1996), enhances productivity growth through capital accumulation (Rioja and Valev 2004), and reduces rural poverty (Burgess and Pande 2005).[33] Contrary to concerns about deterioration in bank access, we observe no trend break in the time series of new branch openings across the post-cap vs. pre-cap periods and across rural vs. urban districts, and no reallocation of lending from rural to urban branches within the same parent bank – neither on the extensive margin of fewer rural branch openings nor on the intensive margin of reductions in loan amounts granted by branches in rural districts (Table 8).

Overall, while we lack the data to identify all possible general equilibrium spillovers in our setting, the sign and magnitude of our point estimates suggest rate caps improve the functioning of corporate credit markets when two conditions are met: (i) banks are imperfectly competitive; and (ii) the caps target relatively larger firms who are less difficult for banks to screen and monitor either due to relationship lending or the availability of other government guarantees to critical businesses (i.e., export goods firms in the case of Bangladesh).

7 Conclusion

We study the effects of interest rate cap regulation on the corporate banking market using credit registry data and a policy experiment in Bangladesh. The Bangladesh Central Bank introduced an interest rate cap for business term loans of 13 percent in 2009, which was subsequently lifted in 2011. This regulation resulted in a sharp decrease and then partial recovery in interest rates for bank branches with high interest rates prior to the regulation, with no effects on loans originated by branches infra-marginal to the reform because their prevailing interest rates were already lower than the cap.

[32]Haas Ornelas et al. (2024) study a government-subsidized loan program in Brazil featuring an interest cap on loans to firms. Those authors find that lenders with relationship-based market power increase the price of other products charged to the same client firm to circumvent the cap. In contrast, we find negligible effects on individual deposit rates and positive effects on corporate deposit rates, indicating that this cross-product pricing strategy is limited.

[33]A more recent sequence of studies finds that technological developments can have mediating effects on the size of banking networks. Submarine fiber-optic cable rollout induces a credit supply expansion and strengthens firms in developing countries with weak interbank networks (D'Andrea and Limodio 2024). But in advanced economies, satellite cell phone service leads to a rise in mobile banking, resulting in banks closing brick-and-mortar branches (Jiang et al. 2023).

Using difference-in-differences designs comparing bank branches more vs. less exposed to the reform according to the proportion of loans which *ex ante* featured rates above the cap threshold, we document that the introduction of the cap significantly increased equilibrium credit supply along both the intensive and extensive margins. We do not find any clear evidence of credit reallocation to more or less risky segments of borrowers, as proxied by delinquency rates or whether loans are secured via physical collateral. This runs contrary to policymakers' concerns that rate cap policies like the one we consider ration credit to the riskiest segments of the firm population that are also more likely to face short-run financial constraints.

Our empirical findings are consistent with a simple conceptual model featuring an imperfectly competitive banking sector in which firms rely on relationship lending to access credit markets. We show through the lens of this conceptual framework that the causal increase in equilibrium credit supply we observe can be rationalized by cases in which *ex ante* market power dominates dynamic market power due to sticky borrower-creditor relationships. Our results point out two types of market failures that existed prior to the interest cap regulation: sub-optimally high levels of interest rates due to banks' static market power, and under-experimentation with socially profitable borrowers. We add nuance to ongoing debates about common features surrounding the implementation of interest rate caps in emerging markets by showing that such policies can improve the functioning of corporate credit markets if banks' lending market power – wielded through other means besides rent extraction from relationships – is sufficiently strong.

References

Acharya, Viral V., Katharina Bergant, Matteo Crosignani, Tim Eisert, and Fergal McCann, "The Anatomy of the Transmission of Macroprudential Policies," *Journal of Finance*, 2022, *77* (5), 2533–2575.

Akbar, Prottoy A., Victor Couture, Gilles Duranton, and Adam Storeygard, "The Fast, the Slow, and the Congested: Urban Transportation in Rich and Poor Countries," *NBER Working Paper, No. 31642*, 2023.

Alessie, Rob, Stefan Hochguertel, and Guglielmo Weber, "Consumer Credit: Evidence From Italian Micro Data," *Journal of the European Economic Association*, 2005, *3* (1), 144–178.

Altavilla, Carlo, Miguel Boucinha, and Paul Bouscasse, "Supply or Demand: What Drives Fluctuations in the Bank Loan Market?," *European Central Bank Working Paper Series, No. 2646*, 2022.

Andrews, Isaiah, James H. Stock, and Liyang Sun, "Weak Instruments in Instrumental Variables Regression: Theory and Practice," *Annual Review of Economics*, 2019, *11*, 727–753.

Asian Development Bank, "Impact of Restrictions on Interest Rates in Microfinance," *ADB Sustainable Development Working Paper Series No. 45*, 2016.

Banerjee, Abhijit V and Esther Duflo, "Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program," *Review of Economic Studies*, 2014, *81* (2), 572–607.

Bangladesh Bank, "Guidelines on Risk Based Capital Adequacy for Banks (Revised Regulatory Capital Framework in line with Basel II)," Technical Report 2008.

_ , "Guidelines to Fill in the Banking Statistics Returns SBS-1, SBS-2 & SBS-3," Technical Report 2013.

_ , "Impact Assessment of Interest Rate Caps and Potential Policy Options: Bangladesh Perspective," Technical Report 2022.

Beck, Thorsten, Asli Demirgüç-Kunt, and Vojislav Maksimovic, "Financial and Legal Constraints to Growth: Does Firm Size Matter?," *Journal of Finance*, 2005, *60* (1), 137–177.

Benmelech, Efraim and Tobias J Moskowitz, "The Political Economy of Financial Regulation: Evidence from U.S. State Usury Laws in the 19th Century," *Journal of Finance*, 2010, *65* (3), 1029–1073.

Berger, Allen N and Gregory F Udell, "Relationship Lending and Lines of Credit in Small Firm Finance," *The Journal of Business*, 1995, *68* (3), 351–381.

Bhutta, Neil and Daniel Ringo, "The Effect of Interest Rates on Home Buying: Evidence from a Shock to Mortgage Insurance Premiums," *Journal of Monetary Economics*, 2021, *118*, 195–211.

Boot, Arnoud W A and Anjan V Thakor, "Can Relationship Banking Survive Competition?," *Journal of Finance*, 2000, *55* (2), 679–713.

Borusyak, Kirill, Xavier Jaravel, and Jann Spiess, "Revisiting Event-Study Designs: Robust and Efficient Estimation," *Review of Economic Studies*, 2024, *91* (6), 3253–3285.

Burga, Carlos, Rafael Nivin, and Diego Yamunaqué, "Lending Rate Caps and Credit Reallocation," *Central Bank of Peru Working Paper Series*, 2022, *2022-012.*

Burgess, Robin and Rohini Pande, "Do Rural Banks Matter? Evidence from the Indian Social Banking Experiment," *American Economic Review*, 2005, *95* (3), 780–795.

Callaway, Brantly and Pedro H.C. Sant'Anna, "Difference-in-Differences with Multiple Time Periods," *Journal of Econometrics*, 2021, *225* (2), 200–230.

Cespedes, Jacelly, "Heterogeneous Sensitivities to Interest Rate Changes: Evidence from FinTech Loans," *Available at SSRN No. 3022332*, 2024.

Cherry, Susan, "Regulating Credit: The Impact of Price Regulations and Lender Technologies on Financial Inclusion," Technical Report, Stanford 2024.

Corbae, Dean and Pablo D'Erasmo, "Capital Requirements in a Quantitative Model of Banking Industry Dynamics," *NBER Working Paper, No. 25424*, 2019.

_ and _ , "Rising Bank Concentration," *Journal of Economic Dynamics and Control*, 2020, *115* (103877).

Cuesta, Jose Ignacio and Alberto Sepulveda, "Price Regulation in Credit Markets: A Trade-Off between Consumer Protection and Credit Access," *Available at SSRN No. 3282910*, 2021.

D'Andrea, Angelo and Nicola Limodio, "High-Speed Internet, Financial Technology, and Banking," *Management Science*, 2024, *70* (2), 773–798.

de Chaisemartin, Clément and Xavier D'Haultfœuille, "Two-Way Fixed Effects Estimators with Heterogeneous Treatment Effects," *American Economic Review*, 2020, *110* (9), 2964–2996.

De Mel, Suresh, David McKenzie, and Christopher Woodruff, "Returns to Capital in Microenterprises: Evidence form a Field Experiment," *Quarterly Journal of Economics*, 2008, *123* (4), 1329–1372.

DeFusco, Anthony A. and Andrew Paciorek, "The Interest Rate Elasticity of Mortgage Demand: Evidence from Bunching at the Conforming Loan Limit," *American Economic Journal: Economic Policy*, 2017, *9* (1), 210–240.

DellaVigna, Stefano and Matthew Gentzkow, "Uniform Pricing in U.S. Retail Chains," *Quarterly Journal of Economics*, 2019, *134* (4), 2011–2084.

Demirgüç-Kunt, Asli, Luc Laeven, and Ross Levine, "Regulations, Market Structure, Institutions, and the Cost of Financial Intermediation," *Journal of Money, Credit and Banking*, 2004, *36* (3), 593–622.

Drechsler, Itamar, Alexi Savov, and Philipp Schnabl, "The Deposits Channel of Monetary Policy," *Quarterly Journal of Economics*, 2017, *132* (4), 1819––1876.

**_ , _ , and _ **, "Banking on Deposits: Maturity Transformation without Interest Rate Risk," *Journal of Finance*, 2021, *76* (3), 1091–1143.

Ferrari, Aurora, Oliver Masetti, and Jiemin Ren, "Interest Rate Caps: The Theory and the Practice," *World Bank Policy Research Working Paper, No. 8398*, 2018.

Fisman, Raymond and Mayank Raturi, "Does Competition Encourage Credit Provision? Evidence from African Trade Credit Relationships," *Review of Economics and Statistics*, 2004, *86* (1), 345–352.

Fitch Ratings, "Fitch Downgrades Bangladesh to 'B+'; Outlook Stable," [link] 2024.

Gertler, Paul, Sean Higgins, Ulrike Malmendier, and Waldo Ojeda, "Why Small Firms Fail to Adopt Profitable Opportunities," Technical Report, Northwestern 2024.

Giroud, Xavier and Holger M. Mueller, "Capital and Labor Reallocation within Firms," *Journal of Finance*, 2015, *70* (4), 1767–1804.

**_ and _ **, "Firms' Internal Networks and Local Economic Shocks," *American Economic Review*, 2019, *109* (10), 3617–3649.

Hallward-Driemeier, Mary and Lant Pritchett, "How Business Is Done in the Developing World: Deals versus Rules," *Journal of Economic Perspectives*, 2015, *29* (3), 121–140.

Hsieh, Chang-Tai and Peter Klenow, "Misallocation and Manufacturing TFP in China and India," *Quarterly Journal of Economics*, 2009, *124* (4), 1403–1448.

International Monetary Fund, "Bangladesh 2011 Article IV Consultation," Technical Report 2011.

Jayaratne, Jith and Philip E. Strahan, "The Finance-Growth Nexus: Evidence from Bank Branch Deregulation," *Quarterly Journal of Economics*, 1996, *111* (3), 639–670.

Jiang, Erica Xuewei, Gloria Yang Yu, and Jinyuan Zhang, "Bank Competition Amid Digital Disruption: Implications for Financial Inclusion," *Available at SSRN 4178420*, 2023.

Joaquim, Gustavo, Robert Townsend, and Victor Zhorin, "Optimal Contracting and Spatial Competition among Financial Service Providers," *Working Paper*, 2019.

Kaboski, Joe and Robert Townsend, "A Structural Evaluation of a Large-Scale Quasi-Experimental Microfinance Initiative," *Econometrica*, 2011, *79* (5), 1357–1406.

Kuehn, Joseph, "Strategic Complementarities in Bank Branching Decisions," *The Journal of Industrial Economics*, 2020, *68* (4).

Kysucky, Vlado and Lars Norden, "The Benefits of Relationship Lending in a Cross-Country Context: A Meta-Analysis," *Management Science*, 2016, *62* (1), 90–110.

LaPoint, Cameron and Shogo Sakabe, "Place-Based Policies and the Geography of Corporate Investment," *Available at SSRN 3950548*, 2021.

Levine, Ross, "Finance and Growth: Theory and Evidence," *Handbook of Economic Growth*, 2005, *1* (A), 865–934.

Loecker, Jan De and Jan Eeckhout, "Global Market Power," *NBER Working Paper, No. 24768*, 2018.

_ , _ , and Gabriel Unger, "The Rise of Market Power and the Macroeconomic Implications," *Quarterly Journal of Economics*, 2020, *135* (2), 3253–3285.

Loughran, Tim and Paul Schultz, "Liquidity: Urban Versus Rural Firms," *Journal of Financial Economics*, 2005, *78* (2), 341–374.

Maimbo, Samuel Munzele and Claudia Alejandra Henriques Gallegos, "Interest Rate Caps around the World Still Popular, but a Blunt Instrument," *World Bank Policy Research Working Paper, No. 7070*, 2014.

McMillan, J. and C. Woodruff, "Interfirm Relationships and Informal Credit in Vietnam," *Quarterly Journal of Economics*, nov 1999, *114* (4), 1285–1320.

Melzer, Brian T and Aaron Schroeder, "Loan Contracting in the Presence of Usury Limits: Evidence from Automobile Lending," *Consumer Financial Protection Bureau Office of Research Working Paper No. 2017-02*, 2017.

Olea, Jose Luis Montiel and Carolin Pflueger, "A Robust Test for Weak Instruments," *Journal of Business & Economic Statistics*, 2013, *31* (3), 358–369.

Ongena, Steven, José-Luis Peydró, and Neeltje van Horen, "Shocks Abroad, Pain at Home? Bank-Firm-Level Evidence on the International Transmission of Financial Shocks," *IMF Economic Review*, 2015, *63* (4), 698–750.

Ornelas, Jose Renato Haas, Alvaro Pedraza, Ruiz-Ortega, and Thiago Christiano Silva, "Market Power and the Transmission of Loan Subsidies," *Review of Corporate Finance Studies*, 2024, *13* (4), 931-–965.

Petersen, Mitchell A. and Raghuram G. Rajan, "The Benefits of Lending Relationships: Evidence from Small Business Data," *Journal of Finance*, 1994, *49* (1), 3–37.

— **and** — , “The Effect of Credit Market Competition on Lending Relationships,” *Quarterly Journal of Economics*, 1995, *110* (2), 407–443.

Rajan, Raghuram G and Luigi Zingales, “Financial Dependence and Growth,” *American Economic Review*, feb 1998, *88* (3), 559–586.

Rambachan, Ashesh and Jonathan Roth, “A More Credible Approach to Parallel Trends,” *Review of Economic Studies*, 2023, *90* (5), 2555–2591.

Reuters, “Bangladesh Lifts Ceiling on Bank Loan Interest,” [link] 2012.

Rigbi, Oren, “The Effects of Usury Laws: Evidence from the Online Loan Market,” *Review of Economics and Statistics*, 2013, *95* (4), 1238–1248.

Rioja, Felix and Neven Valev, “Finance and the Sources of Growth at Various Stages of Economic Development,” *Economic Inquiry*, 2004, *42* (1), 127–140.

Safavian, Mehnaz and Bilal Zia, “The Impact of Interest Rate Caps on the Financial Sector,” *World Bank Policy Research Working Paper, No. 8393*, 2018.

Schwert, Michael, “Does Borrowing from Banks Cost More than Borrowing from the Market?,” *Journal of Finance*, 2020, *75* (2), 905–947.

Sun, Liyang and Sarah Abraham, “Estimating Dynamic Treatment Effects in Event Studies with Heterogeneous Treatment Effects,” *Journal of Econometrics*, 2021, *225* (2), 175–199.

Unnayan Onneshan, “Bangladesh Economic Update,” [link] 2011.

Wang, Yifei, Toni M. Whited, Yufeng Wu, and Kairong Xiao, “Bank Market Power and Monetary Policy Transmission: Evidence from a Structural Estimation,” *Journal of Finance*, 2022, *77* (4), 2093–2141.

Weyl, E Glen and Michal Fabinger, “Pass-Through as an Economic Tool: Principles of Incidence under Imperfect Competition,” *Journal of Political Economy*, 2013, *121* (3), 528–583.

World Bank, “Poverty and Equity Brief South Asia: Bangladesh,” Technical Report 2023.

Online Appendix to

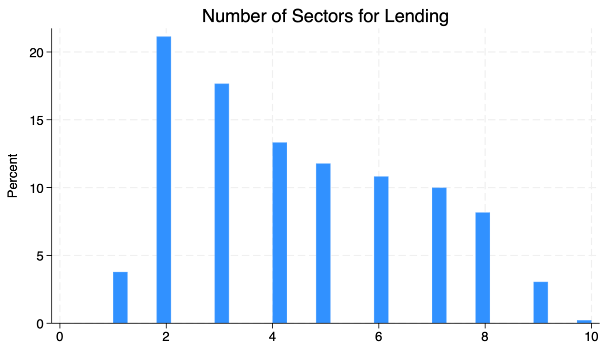
Interest Rate Caps, Corporate Lending, and Bank Market Power: Evidence from Bangladesh

by Yusuke Kuroishi (Hitotsubashi University), Cameron LaPoint (Yale SOM), and Yuhei Miyauchi (Boston University)

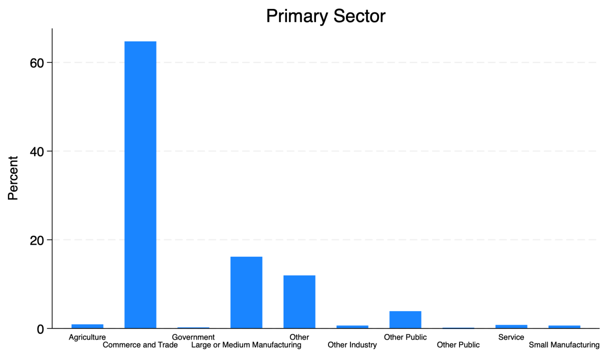
A Appendix Figures and Tables

Figure A.1: Bank-Branch Lending Patterns by Sector

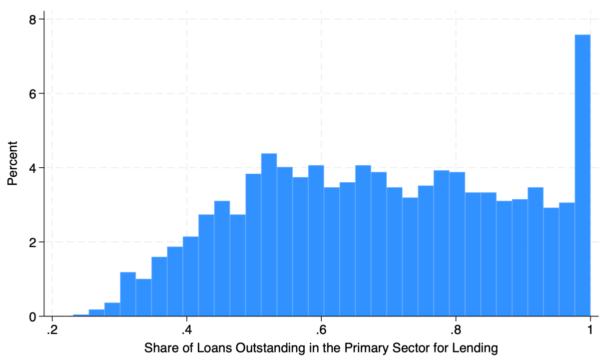
(a) **Number of Sectors**



(b) **Primary Sector**



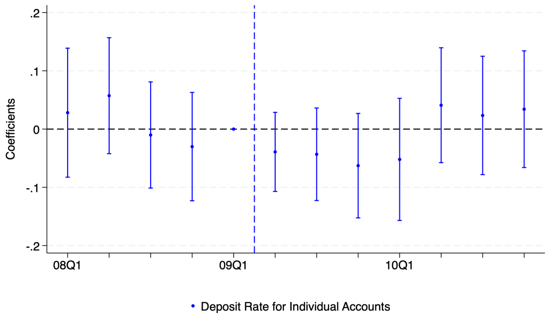
(c) **Share of Primary Sector Outstanding Loans**



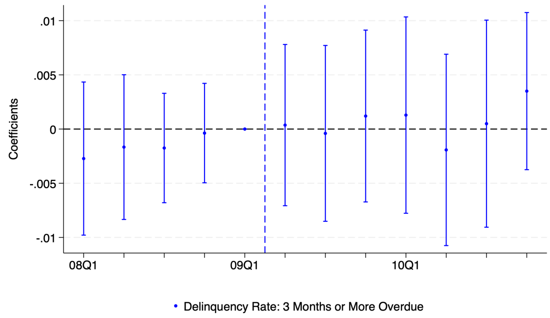
Notes: The figures plot the branch-level distributions of the number of lending sectors, the industrial sector with the largest loan share (i.e., the primary sector), and the share of outstanding loans in the primary sector during the pre-cap period from 2008Q1 to 2009Q1.

Figure A.2: Impact of Interest Rate Cap on Deposit Rates, Loan Performance, and Collateralization

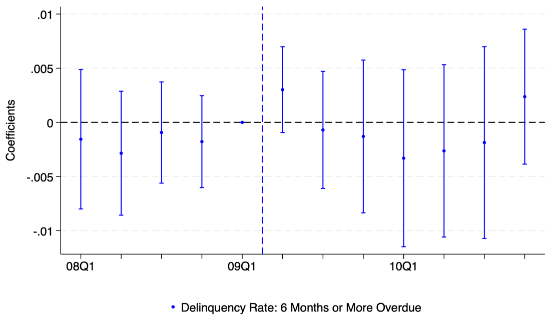
(a) **Deposit Rate for Individual Accounts**



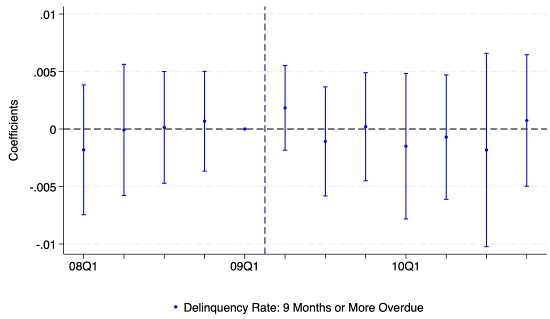
(b) **Delinquency Rate: $\geq$ 3 Months Overdue**



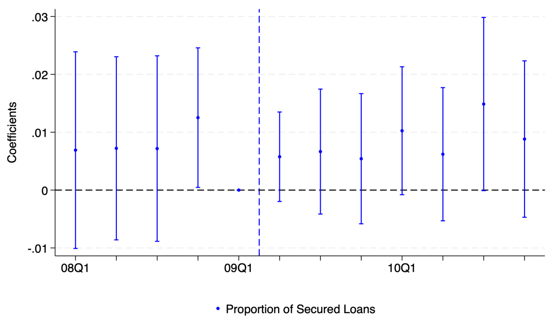
(c) **Delinquency Rate: $\geq$ 6 Months Overdue**



(d) **Delinquency Rate: $\geq$ 9 Months Overdue**



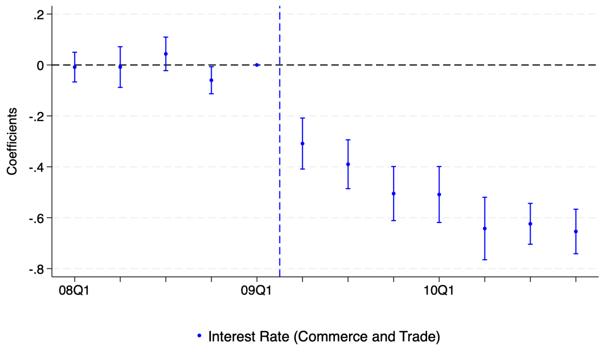
(e) **Proportion of Secured Loans**



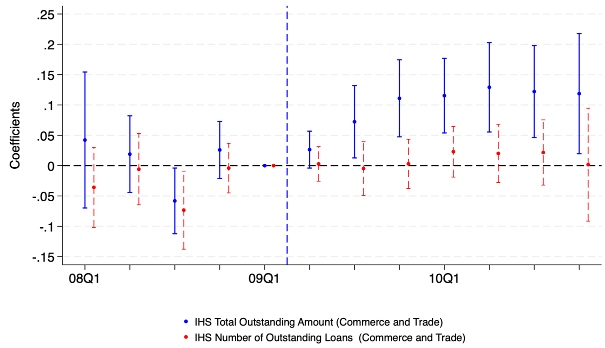
Notes: The figure plots the estimated coefficients of treatment intensity interacted with quarter dummies from event study equation (4) with proxies for lenders' costs of supplying credit as the outcomes, including: annualized deposit rates on individual accounts, delinquency rates, and the proportion of loans secured by physical collateral. We omit the quarter before the cap reform (2009Q1) as the reference category. Bangladesh Bank announced the interest rate cap on April 19, 2009 (2009Q2), with the cap effective immediately. 95% confidence interval bars obtained from clustering standard errors at the branch level.

Figure A.3: Event Study Impact of the Interest Rate Cap by Sector

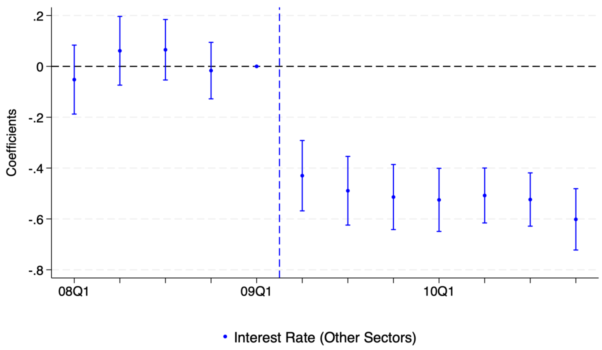
(a) **Interest Rates (Commerce and Trade)**



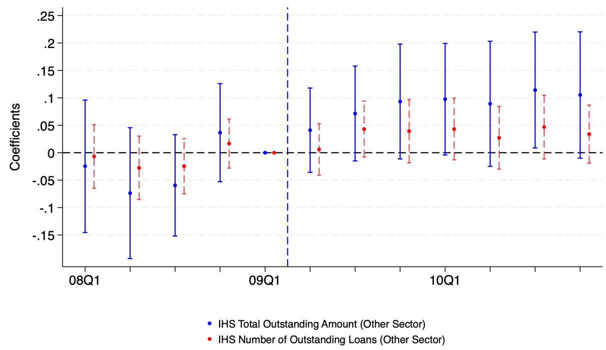
(b) **Lending (Commerce and Trade)**



(c) **Interest Rates (Other Sectors)**



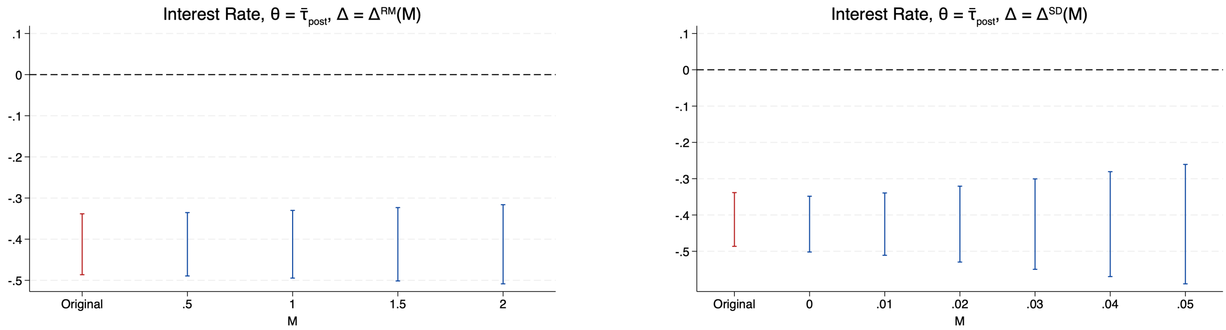
(d) **Lending (Other Sectors)**



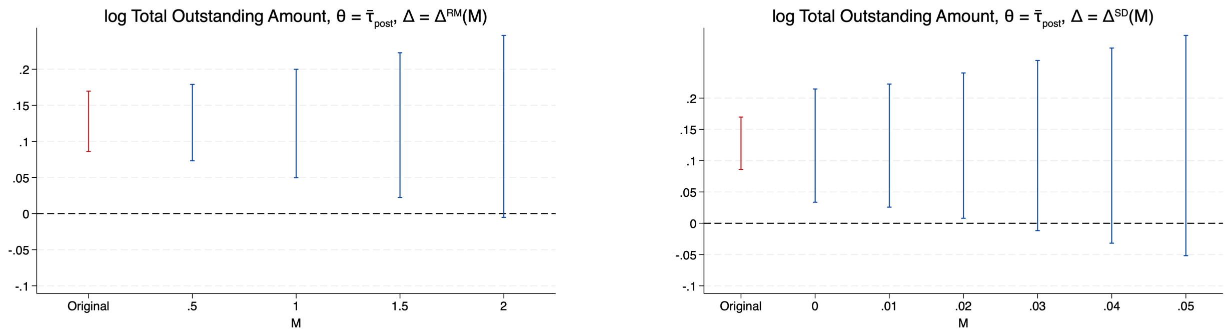
Notes: The figure plots the estimated coefficients of treatment intensity interacted with quarter dummies from event study equation (4) with interest rates (left-hand panels) corporate lending measures (right-hand panels) as the outcome variables. We repeat the analysis separately for loans to firms in the commerce and trade (i.e., tradables) sector vs. all other sectors (i.e., non-tradables). We consider three measures of equilibrium branch-level credit supply: the log of total outstanding loan dollars, the log number of outstanding loans (extensive margin), and the log average outstanding amount, computed as total lending dollars divided by the number of loans. We omit the quarter before the cap reform (2009Q1) as the reference category. Bangladesh Bank announced the interest rate cap on April 19, 2009 (2009Q2), with the cap effective immediately. 95% confidence interval bars obtained from clustering standard errors at the branch level.

Figure A.4: Rambachan-Roth Robust Pre-Trend Tests for Main Lending Outcomes

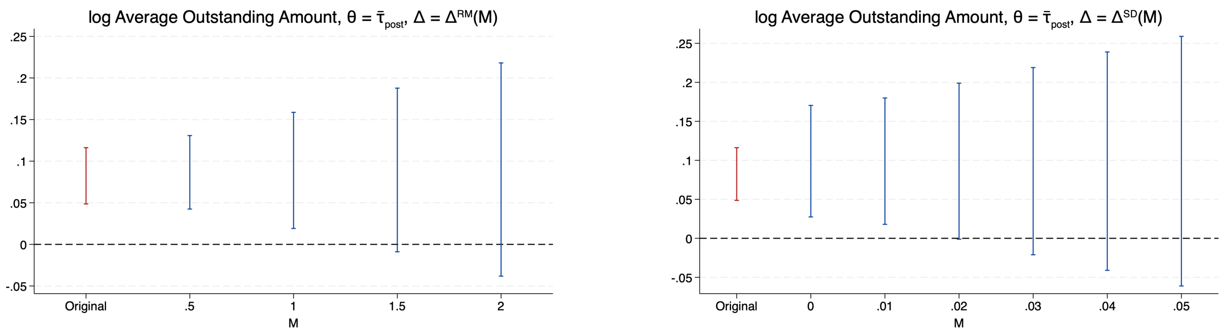
(a) **Interest Rates**



(b) **log Total Outstanding Loans**

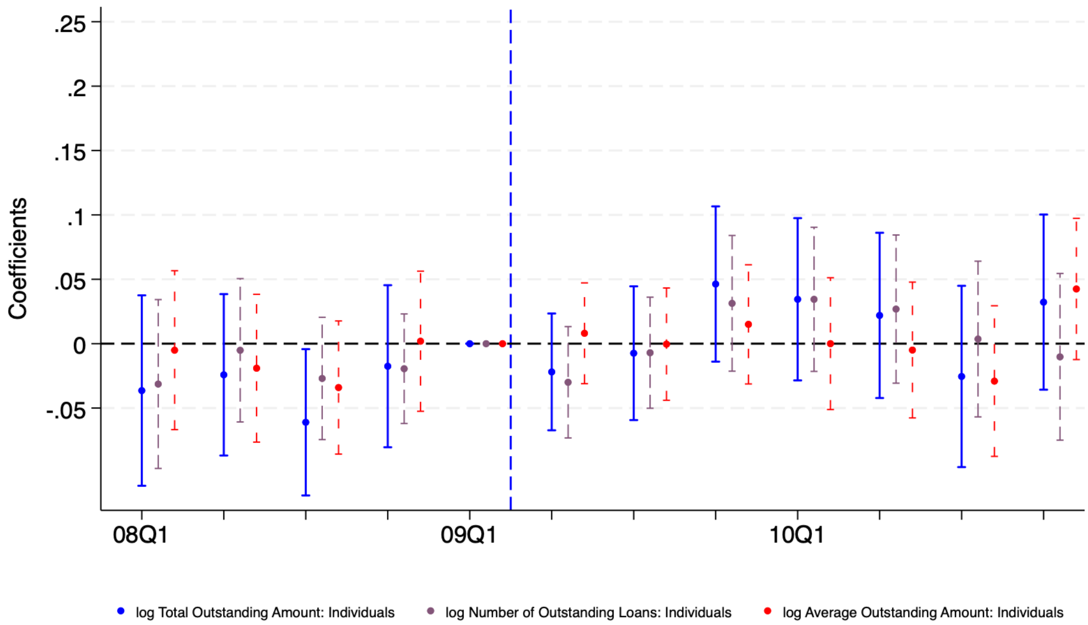


(c) **log Average Outstanding Amount**



Notes: The figure plots the 95% confidence intervals obtained from the robust pre-trends tests proposed by Rambachan and Roth (2023). We re-estimate the confidence intervals for different values of the parameter M (the x-axis variable), which represents the maximum amount that post-treatment violations of parallel trends can differ from pre-treatment differences in trends such that the treatment effect is partially identified. We report results for the first stage effect of the interest rate cap on branch-level interest rates, and the reduced form effects on log total outstanding loans and log average outstanding loan amounts (intensive margin). We perform pre-trend tests on the estimated dynamic effects pooled over time according to regression equation (4). See corresponding "original" estimates in the odd columns of Table 2 which include bank-by-quarter fixed effects. Left-hand side panels show how standard errors on the point estimates vary with respect to M, while right-hand side panels do the same for the corresponding point estimate.

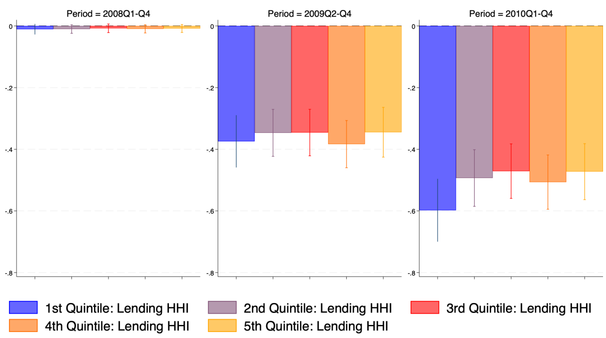
Figure A.5: Placebo Test: Event Study Analysis of the Interest Rate Cap on Loans to Individuals



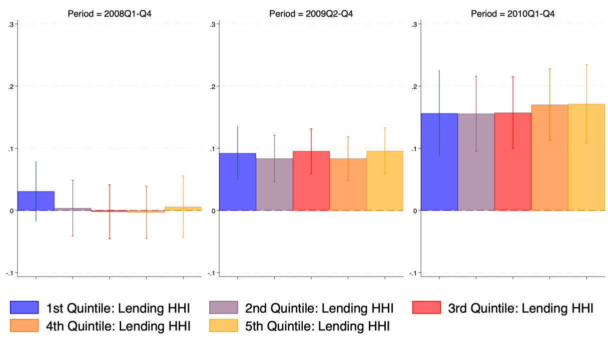
Notes: The figure plots the estimated coefficients of treatment intensity interacted with quarter dummies from event study equation (4) with measures of lending to individual borrowers as the outcome. The event study analysis forms a placebo test, since there was no interest rate cap placed on non-corporate loans. We consider three measures of equilibrium branch-level credit supply: the log of total outstanding loan dollars, the log number of outstanding loans (extensive margin), and the log average outstanding amount, computed as total . We omit the quarter before the cap reform (2009Q1) as the reference category. Bangladesh Bank announced the interest rate cap on April 19, 2009 (2009Q2), with the cap effective immediately. We restrict the sample to a balanced panel of bank branches originating loans to individual borrowers in each quarter, so that the results are not driven by lenders' entry and exit into the non-corporate loan segment of the market. 95% confidence interval bars obtained from clustering standard errors at the branch level.

Figure A.6: Heterogeneous Reduced Form Responses to the Cap by Lending HHI

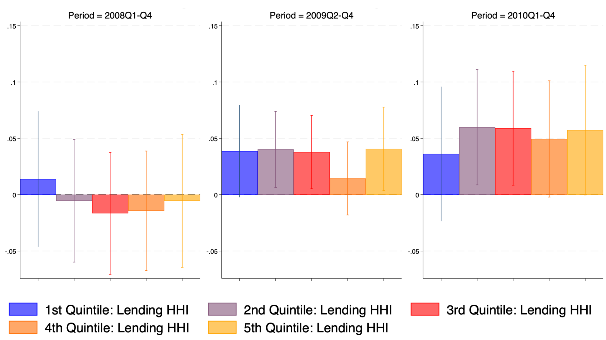
(a) **Interest Rates**



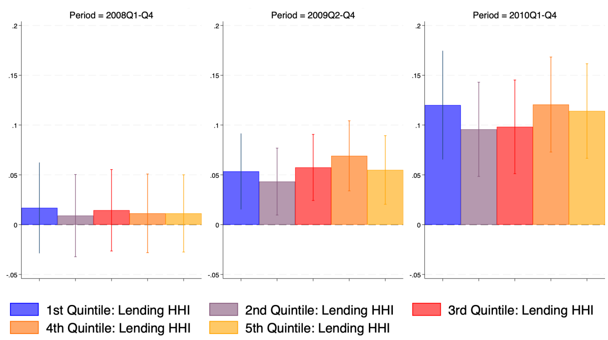
(b) **Log Outstanding Loan Amount**



(c) **Log Number of Loans**



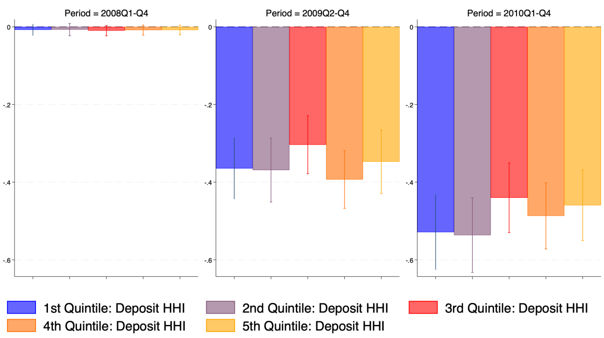
(d) **Log Average Outstanding Loan Amount**



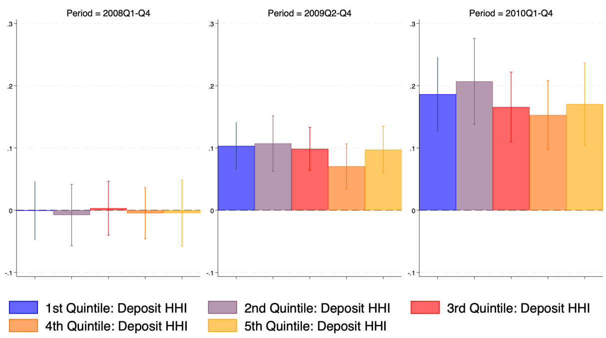
Notes: The figure plots the estimated coefficients of treatment intensity interacted with year dummies from the reduced form specification in (4), for branches within each quintile of lending Herfindahl-Hirschman Index (HHI). We continue to omit the quarter directly prior to the reform (2009Q1) as a reference category, as in our main results in Table 2. We define the lending HHI at the bank category-by-subdistrict (*upazila*) level based on loan dollars outstanding. We consider the four main outcome variables adopted throughout the paper: share-weighted average interest rates in Panel (a); log outstanding loan amounts in (b); the log number of loans in (c); and the log average loan size in (d). 95% confidence interval bars obtained from clustering standard errors at the branch level.

Figure A.7: Heterogeneous Reduced Form Responses to the Cap by Deposit HHI

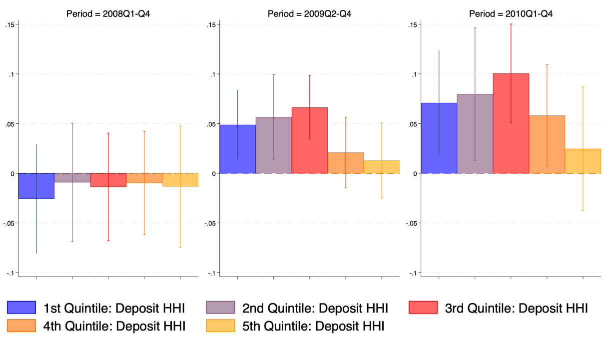
(a) **Interest Rates**



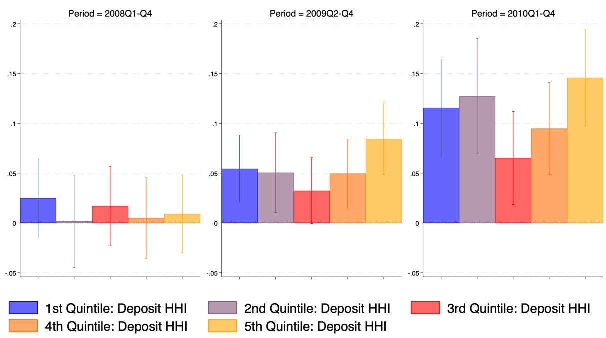
(b) **Log Outstanding Loan Amount**



(c) **Log Number of Loans**



(d) **Log Average Outstanding Loan Amount**



Notes: The figure plots the estimated coefficients of treatment intensity interacted with year dummies from the reduced form specification in (4), for branches within each quintile of deposit Herfindahl-Hirschman Index (HHI). We continue to omit the quarter directly prior to the reform (2009Q1) as a reference category, as in our main results in Table 2. We define the deposit HHI at the bank category-by-subdistrict (*upazila*) level, lumping amounts in individual and corporate deposit accounts together. We consider the four main outcome variables adopted throughout the paper: share-weighted average interest rates in Panel (a); log outstanding loan amounts in (b); the log number of loans in (c); and the log average loan size in (d). 95% confidence interval bars obtained from clustering standard errors at the branch level.

Table A.1: Effects of the Rate Cap on Interest Rates and Credit Provision by Loan Size

	log Total Outstanding Amount	log Number of Outstanding Loans	log Average Outstanding Amount
	(1)	(2)	(3)
Interest Rate	-0.041	-0.096	0.056
	(0.075)	(0.101)	(0.079)
Interest Rate X Above Median (Average Outstanding Amount)	-0.280**	-0.055	-0.225**
	(0.110)	(0.128)	(0.113)
Specification	IV	IV	IV
Kleibergen-Paap rk Wald F-Statistics	24.79	24.79	24.79
Branch FE	X	X	X
Above Median Dummy X Bank X Quarter FE	X	X	X
Upazila X Quarter FE	X	X	X
Number of Banks	39	39	39
Number of Branches	1855	1855	1855
Observations	22260	22260	22260

Notes: We conduct an additional test of heterogeneous pass through of the interest rate cap to corporate credit provision by augmenting the IV specification in (5) to include an interaction term of the endogenous variable (interest rates) with a dummy indicating whether the branch has an average outstanding loan above the median in size, with average loan size defined as total outstanding loan dollars divided by the number of outstanding loans. We instrument the interaction term with $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\}$ interacted with the above-median loan size dummy. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.2: Effects of the Rate Cap on Interest Rates and Credit Provision (Including Private and Public Banks)

	Interest Rate	log Total Outstanding Amount	log Number of Outstanding Loans	log Average Outstanding Amount
	(1)	(2)	(3)	(4)
Trt Intensity x 08Q1-Q4	-0.005	0.005	0.007	-0.001
	(0.005)	(0.016)	(0.021)	(0.016)
Trt Intensity x 09Q2-Q4	-0.536***	0.082***	0.058***	0.024
	(0.029)	(0.015)	(0.018)	(0.017)
Trt Intensity x 10Q1-Q4	-0.709***	0.137***	0.120***	0.017
	(0.033)	(0.022)	(0.024)	(0.021)
Specification	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X
Bank X Quarter FE	X	X	X	X
Number of Banks	46	46	46	46
Number of Branches	4852	4852	4852	4852
Observations	58224	58224	58224	58224
Adj. R-squared	0.828	0.943	0.777	0.895

Notes: We replicate the analysis conducted in Table 2 but now include the 8 publicly-owned banks (i.e., the State-Owned Commercial Banks and State-Owned Development Financial Institutions) in the estimation sample. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.3: Effects of the Rate Cap on Lenders' Costs of Supplying Credit (Including Private and Public Banks)

	Deposit Rate for Individual Accounts	Delinquency Rate: 3 Months or More Overdue	Delinquency Rate: 6 Months or More Overdue	Delinquency Rate: 9 Months or More Overdue	Proportion of Secured Loans
	(1)	(2)	(3)	(4)	(5)
Trt Intensity x 08Q1-Q4	-0.001	-0.001	-0.001	0.063	0.007
	(0.003)	(0.003)	(0.003)	(0.039)	(0.006)
Trt Intensity x 09Q2-Q4	-0.004	-0.002	-0.001	-0.020	0.005
	(0.003)	(0.003)	(0.003)	(0.036)	(0.004)
Trt Intensity x 10Q1-Q4	-0.001	-0.000	0.001	-0.013	0.006
	(0.003)	(0.004)	(0.004)	(0.045)	(0.005)
Specification	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X
Number of Banks	46	46	46	46	46
Number of Branches	4852	4852	4852	4852	4852
Observations	58224	58224	58224	58224	58224
Adj. R-squared	0.728	0.724	0.713	0.701	0.635

Notes: We replicate the analysis conducted in Table 4 but now include the 8 publicly-owned banks (i.e., the State-Owned Commercial Banks and State-Owned Development Financial Institutions) in the estimation sample. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.4: IV Estimates of Cap-Induced Change in Interest Rates on Credit Provision (Including Private and Public Banks)

	log Total Outstanding Amount	log Number of Outstanding Loans	log Average Outstanding Amount
	(1)	(2)	(3)
Interest Rate	-0.171***	-0.134***	-0.037
	(0.029)	(0.035)	(0.028)
Specification	IV	IV	IV
Montiel Olea and Pflueger F-Statistics	726.98	726.98	726.98
Branch FE	X	X	X
Bank X Quarter FE	X	X	X
District X Quarter FE	X	X	X
Number of Banks	46	46	46
Number of Branches	4852	4852	4852
Observations	58224	58224	58224

Notes: We replicate the IV analysis conducted in Table 3 but now include the 8 publicly-owned banks (i.e., the State-Owned Commercial Banks and State-Owned Development Financial Institutions) in the estimation sample. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.5: Effects of the Rate Cap on Interest Rates and Credit Provision (Arithmetic Average Interest Rates)

	Interest Rate	log Total Outstanding Amount	log Number of Outstanding Loans	log Average Outstanding Amount
	(1)	(2)	(3)	(4)
Trt Intensity x 08Q1-Q4	0.001	-0.002	-0.018	0.016
	(0.015)	(0.015)	(0.020)	(0.015)
Trt Intensity x 09Q2-Q4	-0.212***	0.040***	0.027*	0.013
	(0.060)	(0.014)	(0.015)	(0.021)
Trt Intensity x 10Q1-Q4	-0.306***	0.085***	0.048*	0.037
	(0.072)	(0.026)	(0.026)	(0.040)
Specification	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X
Bank X Quarter FE	X	X	X	X
Number of Banks	39	39	39	39
Number of Branches	1855	1855	1855	1855
Observations	22260	22260	22260	22260
Adj. R-squared	0.891	0.955	0.906	0.921

Notes: We replicate the analysis conducted in Table 2, except now we define branch-level average interest rates as a simple arithmetic average across loan accounts in defining the treatment intensity instrument based on branch exposure to the cap. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.6: Effects of the Rate Cap on Lenders' Costs of Supplying Credit (Arithmetic Average Interest Rates)

	Deposit Rate for Individual Accounts	Delinquency Rate: 9 Months or More Overdue	Delinquency Rate: 6 Months or More Overdue	Delinquency Rate: 3 Months or More Overdue	Proportion of Secured Loans
	(1)	(2)	(3)	(4)	(5)
Trt Intensity x 08Q1-Q4	0.001	0.000	-0.001	0.101	0.005
	(0.002)	(0.002)	(0.002)	(0.064)	(0.005)
Trt Intensity x 09Q2-Q4	0.002	0.002	0.002	0.021	0.003
	(0.002)	(0.002)	(0.003)	(0.053)	(0.004)
Trt Intensity x 10Q1-Q4	0.003	0.002	0.002	0.141	0.003
	(0.002)	(0.003)	(0.003)	(0.113)	(0.005)
Specification	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X
Number of Banks	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260
Adj. R-squared	0.757	0.746	0.737	0.799	0.733

Notes: We replicate the analysis conducted in Table 4, except now we define branch-level average interest rates as a simple arithmetic average across loan accounts in defining the treatment intensity instrument based on branch exposure to the cap. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.7: IV Estimates of Cap-Induced Change in Interest Rates on Credit Provision (Arithmetic Average Interest Rates)

	log Total Outstanding Amount	log Number of Outstanding Loans	log Average Outstanding Amount
	(1)	(2)	(3)
Interest Rate	-0.215^{***}	-0.177^{*}	-0.038
	(0.066)	(0.102)	(0.094)
Specification	IV	IV	IV
Montiel Olea and Pflueger F-Statistics	183.15	183.15	183.15
Branch FE	X	X	X
Bank X Quarter FE	X	X	X
District X Quarter FE	X	X	X
Number of Banks	39	39	39
Number of Branches	1855	1855	1855
Observations	22260	22260	22260

Notes: We replicate the IV analysis conducted in Table 3, except now we define branch-level average interest rates as a simple arithmetic average across loan accounts in defining the treatment intensity instrument based on branch exposure to the cap. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.8: Effects of the Rate Cap on Interest Rates and Credit Provision (Non-Islamic Banks)

	Interest Rate	log Total Outstanding Amount	log Number of Outstanding Loans	log Average Outstanding Amount
	(1)	(2)	(3)	(4)
Trt Intensity x 08Q1-Q4	-0.013**	0.008	-0.005	0.013
	(0.005)	(0.023)	(0.029)	(0.020)
Trt Intensity x 09Q2-Q4	-0.352***	0.091***	0.034**	0.057***
	(0.042)	(0.019)	(0.017)	(0.017)
Trt Intensity x 10Q1-Q4	-0.431***	0.160***	0.055**	0.106***
	(0.044)	(0.031)	(0.027)	(0.024)
Specification	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X
Bank X Quarter FE	X	X	X	X
Number of Banks	31	31	31	31
Number of Branches	1468	1468	1468	1468
Observations	17616	17616	17616	17616
Adj. R-squared	0.881	0.954	0.888	0.907

Notes: We replicate the analysis conducted in Table 2 but now exclude Islamic finance banks from the estimation sample. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.9: Effects of the Rate Cap on Lenders' Costs of Supplying Credit (Non-Islamic Banks)

	Deposit Rate for Individual Accounts	Delinquency Rate: 9 Months or More Overdue	Delinquency Rate: 6 Months or More Overdue	Delinquency Rate: 3 Months or More Overdue	Proportion of Secured Loans
	(1)	(2)	(3)	(4)	(5)
Trt Intensity x 08Q1-Q4	-0.002	-0.004	-0.004	0.016	0.008
	(0.002)	(0.002)	(0.002)	(0.043)	(0.007)
Trt Intensity x 09Q2-Q4	0.000	0.000	-0.001	-0.033	0.007
	(0.002)	(0.002)	(0.004)	(0.037)	(0.005)
Trt Intensity x 10Q1-Q4	-0.001	-0.001	0.000	-0.004	0.011*
	(0.003)	(0.004)	(0.004)	(0.051)	(0.006)
Specification	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X
Number of Banks	31	31	31	31	31
Number of Branches	1468	1468	1468	1468	1468
Observations	17616	17616	17616	17616	17616
Adj. R-squared	0.669	0.657	0.649	0.788	0.736

Notes: We replicate the analysis conducted in Table 4 but now exclude Islamic finance banks from the estimation sample. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.10: IV Estimates of Cap-Induced Change in Interest Rates on Credit Provision (Non-Islamic Banks)

	log Total Outstanding Amount	log Number of Outstanding Loans	log Average Outstanding Amount
	(1)	(2)	(3)
Interest Rate	-0.295***	-0.124*	-0.171***
	(0.063)	(0.064)	(0.055)
Specification	IV	IV	IV
Montiel Olea and Pflueger F-Statistics	330.37	330.37	330.37
Branch FE	X	X	X
Bank X Quarter FE	X	X	X
District X Quarter FE	X	X	X
Number of Banks	31	31	31
Number of Branches	1468	1468	1468
Observations	17616	17616	17616

Notes: We replicate the IV analysis conducted in Table 3 but now exclude Islamic finance banks from the estimation sample. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.11: Effects of the Rate Cap on Interest Rates and Credit Provision (Bank-Quarter Cluster)

	Interest Rate	log Total Outstanding Amount	log Number of Outstanding Loans	log Average Outstanding Amount
	(1)	(2)	(3)	(4)
Trt Intensity x 08Q1-Q4	-0.009	-0.002	-0.013	0.011
	(0.067)	(0.031)	(0.021)	(0.020)
Trt Intensity x 09Q2-Q4	-0.353***	0.090***	0.032	0.058***
	(0.066)	(0.032)	(0.021)	(0.020)
Trt Intensity x 10Q1-Q4	-0.471***	0.166***	0.059***	0.107***
	(0.062)	(0.031)	(0.020)	(0.019)
Specification	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X
Bank X Quarter FE	X	X	X	X
Number of Banks	39	39	39	39
Number of Branches	1855	1855	1855	1855
Observations	22260	22260	22260	22260
Adj. R-squared	0.879	0.955	0.906	0.921

Notes: We replicate the analysis conducted in Table 2, but now standard errors are clustered at the bank-quarter level. *p<0.1; **p<0.05; ***p<0.01.

Table A.12: Effects of the Rate Cap on Lenders' Costs of Supplying Credit (Bank-Quarter Cluster)

	Deposit Rate for Individual Accounts	Delinquency Rate: 9 Months or More Overdue	Delinquency Rate: 6 Months or More Overdue	Delinquency Rate: 3 Months or More Overdue	Proportion of Secured Loans
	(1)	(2)	(3)	(4)	(5)
Trt Intensity x 08Q1-Q4	-0.000	-0.002	-0.002	0.011	0.008
	(0.002)	(0.002)	(0.003)	(0.037)	(0.006)
Trt Intensity x 09Q2-Q4	0.000	0.000	0.000	-0.048	0.006
	(0.002)	(0.002)	(0.003)	(0.036)	(0.005)
Trt Intensity x 10Q1-Q4	-0.001	-0.001	0.001	0.012	0.010^{*}
	(0.002)	(0.002)	(0.003)	(0.037)	(0.006)
Specification	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X
Number of Banks	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260
Adj. R-squared	0.757	0.746	0.737	0.799	0.734

Notes: We replicate the analysis conducted in Table 4, but standard errors are clustered at the bank-quarter level. *p<0.1; **p<0.05; ***p<0.01.

Table A.13: IV Estimates of Cap-Induced Change in Interest Rates on Credit Provision (Bank-Quarter Cluster)

	log Total Outstanding Amount	log Number of Outstanding Loans	log Average Outstanding Amount
	(1)	(2)	(3)
Interest Rate	-0.312^{***}	-0.142^{***}	-0.171^{***}
	(0.044)	(0.033)	(0.027)
Specification	IV	IV	IV
Montiel Olea and Pflueger F-Statistics	19.23	19.23	19.23
Branch FE	X	X	X
Bank X Quarter FE	X	X	X
District X Quarter FE	X	X	X
Number of Banks	39	39	39
Number of Branches	1855	1855	1855
Observations	22260	22260	22260

Notes: We replicate the IV analysis conducted in Table 3, but now standard errors are clustered at the bank-quarter level. *p<0.1; **p<0.05; ***p<0.01.

Table A.14: IV Estimates of Heterogeneous Effects on Credit Provision by Branch Characteristics (Bank-Quarter Cluster)

	log Total Outstanding Amount			log Number of Outstanding Loans			log Average Outstanding Amount		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Interest Rate	-0.368^{***}	-0.175^{***}	-0.261^{***}	-0.229^{***}	-0.101^{**}	-0.202^{***}	-0.138^{**}	-0.074	-0.059
	(0.069)	(0.065)	(0.084)	(0.068)	(0.048)	(0.071)	(0.054)	(0.048)	(0.071)
Interest Rate X Above Median (Deposit Rate)	0.088		0.144^{*}	0.080		0.085	0.007		0.059
	(0.085)		(0.081)	(0.070)		(0.061)	(0.056)		(0.061)
Interest Rate X Above Median (Delinquency Rate: 9 Months or More Overdue)	0.119^{***}		0.119^{**}	0.142^{**}		0.143^{**}	-0.023		-0.025
	(0.044)		(0.047)	(0.070)		(0.062)	(0.068)		(0.064)
Interest Rate X Branch Lending Unsecured Loans Dummy	-0.013		-0.003	0.005		0.010	-0.019		-0.013
	(0.013)		(0.013)	(0.014)		(0.014)	(0.014)		(0.014)
Interest Rate X Above Median (Population Density)		-0.316^{***}	-0.310^{***}		-0.122^{***}	-0.111^{**}		-0.194^{***}	-0.199^{***}
		(0.060)	(0.063)		(0.044)	(0.048)		(0.052)	(0.055)
Interest Rate X Above Median (Upper Poverty Ratio)		0.143^{**}	0.148^{**}		0.050	0.088		0.092^{*}	0.060
		(0.062)	(0.063)		(0.052)	(0.058)		(0.052)	(0.059)
Specification	IV	IV	IV	IV	IV	IV	IV	IV	IV
Kleibergen-Paap rk Wald F-Statistics	8.79	25.96	6.09	8.79	25.96	6.09	8.79	25.96	6.09
Branch FE	X	X	X	X	X	X	X	X	X
Above Median Dummy X Bank X Quarter FE	X	X	X	X	X	X	X	X	X
Above Median Dummy X District X Quarter FE	X	X	X	X	X	X	X	X	X
Number of Banks	39	39	39	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260	22260	22260	22260

Notes: We replicate the IV analysis conducted in Table 5, but now standard errors are clustered at the bank-quarter level. *p<0.1; **p<0.05; ***p<0.01.

Table A.15: IV Estimates of Heterogeneous Effects on Credit Provision by Branch Characteristics (Bank-Quarter Cluster)

	log Total Outstanding Amount			log Number of Outstanding Loans			log Average Outstanding Amount		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Interest Rate	-0.040	-0.005	-0.177***	-0.099*	-0.164**	-0.166**	0.059*	0.159**	-0.011
	(0.049)	(0.068)	(0.061)	(0.054)	(0.071)	(0.069)	(0.036)	(0.066)	(0.045)
Interest Rate X Above Median (Average Outstanding Amount)	-0.288***	-0.200***	-0.305***	-0.089	0.012	-0.114*	-0.199***	-0.212***	-0.192***
	(0.073)	(0.070)	(0.080)	(0.070)	(0.074)	(0.068)	(0.056)	(0.066)	(0.070)
Interest Rate X Above Median (Deposit Rate)			0.165**			0.029			0.136**
			(0.077)			(0.068)			(0.064)
Interest Rate X Above Median (Population Density)		-0.210***			-0.083*			-0.127**	
		(0.062)			(0.048)			(0.050)	
Interest Rate X Above Median (Upper Poverty Ratio)		0.063			0.112*			-0.049	
		(0.057)			(0.059)			(0.060)	
Interest Rate X Above Median (Delinquency Rate: 9 Months or More Overdue)			0.138***			0.105*			0.033
			(0.051)			(0.058)			(0.064)
Interest Rate X Branch Lending Unsecured Loans Dummy			0.010			0.015			-0.005
			(0.014)			(0.015)			(0.015)
Specification	IV	IV	IV	IV	IV	IV	IV	IV	IV
Kleibergen-Paap rk Wald F-Statistics	35.46	20.49	9.54	35.46	20.49	9.54	35.46	20.49	9.54
Branch FE	X	X	X	X	X	X	X	X	X
Above Median Dummy X Bank X Quarter FE	X	X	X	X	X	X	X	X	X
Above Median Dummy X District X Quarter FE	X	X	X	X	X	X	X	X	X
Number of Banks	39	39	39	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260	22260	22260	22260

Notes: We replicate the IV analysis conducted in Table 6, but now standard errors are clustered at the bank-quarter level. *p<0.1; **p<0.05; ***p<0.01.

Table A.16: Effects of the Rate Cap on Interest Rates and Credit Provision by Sector

	Commerce and Trade			Other Sectors		
	Interest Rate	IHS Total Outstanding Amount	IHS Number of Outstanding Loans	Interest Rate	IHS Total Outstanding Amount	IHS Number of Outstanding Loans
	(1)	(2)	(3)	(4)	(5)	(6)
Trt Intensity x 08Q1-Q4	-0.008	0.007	-0.030	0.017	-0.030	-0.011
	(0.015)	(0.028)	(0.025)	(0.050)	(0.045)	(0.022)
Trt Intensity x 09Q2-Q4	-0.401***	0.070***	0.000	-0.477***	0.069*	0.029
	(0.039)	(0.023)	(0.017)	(0.063)	(0.040)	(0.023)
Trt Intensity x 10Q1-Q4	-0.607***	0.121***	0.017	-0.539***	0.102**	0.038
	(0.039)	(0.035)	(0.027)	(0.050)	(0.050)	(0.025)
Specification	OLS	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X
Number of Banks	39	39	39	39	39	39
Number of Branches	1853	1853	1853	1310	1310	1310
Observations	22153	22153	22153	13874	15720	15720
Adj. R-squared	0.875	0.886	0.878	0.733	0.819	0.848

Notes: We replicate the analysis conducted in Table 2 but now split the estimation sample according to loans extended to the tradable goods sector (columns 1 to 3) or loans made to firms in the non-tradable sectors (columns 4 to 6). To account for the fact that some branch-quarters do not have any loan accounts to particular sectors, we apply the inverse hyperbolic sine transform to the lending outcome variables. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.17: IV Estimates of Cap-Induced Change in Interest Rates on Credit Provision by Sector

	Commerce and Trade		Other Sectors	
	IHS Total Outstanding Amount	IHS Number of Outstanding Loans	IHS Total Outstanding Amount	IHS Number of Outstanding Loans
	(1)	(2)	(3)	(4)
Interest Rate (Commerce and Trade)	-0.156***	-0.054		
	(0.048)	(0.047)		
Interest Rate (Other Sectors)			-0.227***	-0.093**
			(0.049)	(0.037)
Specification	IV	IV	IV	IV
Montiel Olea and Pflueger F-Statistics	24608.85	24608.85	5038.97	5038.97
Branch FE	X	X	X	X
Bank X Quarter FE	X	X	X	X
District X Quarter FE	X	X	X	X
Number of Banks	39	39	39	39
Number of Branches	1853	1853	1310	1310
Observations	22153	22153	15720	15720

Notes: We replicate the IV analysis conducted in Table 3 but now split the estimation sample according to loans extended to the tradable goods sector (columns 1 and 2) or loans made to firms in the non-tradable sectors (columns 3 and 4). To account for the fact that some branch-quarters do not have any loan accounts to particular sectors, we apply the inverse hyperbolic sine transform to the outcome variable. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.18: Lack of Strategic Complementarities in Branch Responses to the Cap: Extended Nearest-Neighbor Matching Based on Subdistrict

	log Total Outstanding Amount		log Number of Outstanding Loans		log Average Outstanding Amount	
	(1)	(2)	(3)	(4)	(5)	(6)
Interest Rate	-0.331***	-0.242***	-0.139**	-0.082	-0.193***	-0.160***
	(0.061)	(0.059)	(0.060)	(0.057)	(0.053)	(0.049)
Competing Bank's Interest Rate X Competitor Exists	-0.012	-0.014	0.002	0.002	-0.014	-0.016
	(0.011)	(0.014)	(0.012)	(0.015)	(0.010)	(0.013)
Specification	IV	IV	IV	IV	IV	IV
Kleibergen-Paap rk Wald F-Statistics	43.60	26.97	43.60	26.97	43.60	26.97
Branch FE	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X
District X Quarter FE	X		X		X	
Upazila X Quarter FE		X		X		X
Number of Banks	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260

Notes: The table reports results from estimating the IV specification in (7) via 2SLS. We instrument own-branch average interest rates $\text{InterestRate}_{i,t}$, with $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\}$, which captures how much branch i is exposed to the interest rate cap regulation. See text for how we define Trt Intensity_i. We instrument $\text{CompetingRate}_{i,t}$ with $\text{TrtIntensity}_{Bank(-i)} \times \mathbb{1}\{t \geq 2009Q2\}$, the treatment intensity measure computed across local branches belonging to the nearest-neighbor competitor $Bank(-i)$. Relative to the nearest-neighbor matching procedure in the main text and in Table 7, in this table we impose a more stringent matching to define competitor banks by additionally matching on the nearest-neighbor bank located within the same subdistrict (*upazila*), while still matching on the majority sector's loan share and balance sheet size. In odd columns we include district-by-quarter fixed effects; in even columns, we instead include subdistrict-by-quarter fixed effects. All specifications include bank-by-quarter and branch fixed effects. Robust standard errors clustered at the branch level in parentheses. For each specification, we report the Kleibergen-Paap cluster-robust first-stage F-statistic for the excluded instruments. *p<0.1; **p<0.05; ***p<0.01.

Table A.19: Placebo Test: Effects of the Rate Cap on Interest Rates and Credit Provision to Individual Borrowers

	Interest Rate: Individuals	log Total Outstanding Amount: Individuals	log Number of Outstanding Loans: Individuals	log Average Outstanding Amount: Individuals
	(1)	(2)	(3)	(4)
Corporate Loan Trt Intensity x 08Q1-Q4	-0.007	-0.035	-0.021	-0.014
	(0.018)	(0.026)	(0.022)	(0.024)
Corporate Loan Trt Intensity x 09Q2-Q4	0.007	0.006	-0.002	0.008
	(0.044)	(0.023)	(0.021)	(0.019)
Corporate Loan Trt Intensity x 10Q1-Q4	0.036	0.016	0.014	0.002
	(0.055)	(0.031)	(0.029)	(0.024)
Specification	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X
Bank X Quarter FE	X	X	X	X
Number of Banks	37	37	37	37
Number of Branches	1675	1675	1675	1675
Observations	20100	20100	20100	20100
Adj. R-squared	0.802	0.857	0.846	0.728

Notes: The table reports results from estimating event study regression (4) with effects pooled across several quarters, but with each outcome variable pertaining to loans to individual borrowers who were not subject to the interest rate ceiling. Trt Intensity$_i$ captures how much branch i is exposed to the corporate interest rate cap regulation, and it is constructed as follows: we first take average annualized interest rates of outstanding loans by bank branch i from the first quarter of 2008 to the first quarter of 2009. If this number is above 13 percent, we take the difference between the average interest rate and the 13 percent cap threshold. If the difference is below 13 percent, we assign Trt Intensity$_i = 0$, indicating that the branch is, on average, inframarginal to the reform. All estimates are relative to the quarter before the reform, and we therefore omit $TrtIntensity \times 09Q1$. We define the interest rate outcome in columns (1) and (2) as the share-weighted average branch-level interest rate on corporate loans. All columns include branch and bank category-by-quarter fixed effects. We restrict the sample to a balanced panel of bank branches originating loans to individual borrowers in each quarter, so that the results are not driven by lenders' entry and exit into the non-corporate loan segment of the market. Robust standard errors clustered at the branch level in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Table A.20: IV Estimates of Cap-Induced Change in Interest Rates on Credit Provision by Lending and Deposit HHI

	log Total Outstanding Amount			log Number of Outstanding Loans			log Average Outstanding Amount		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Interest Rate	-0.35***	-0.34***	-0.33***	-0.16**	-0.21***	-0.17**	-0.18***	-0.13**	-0.15**
	(0.07)	(0.08)	(0.08)	(0.07)	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)
Interest Rate X Above Median Lendnig HHI	0.16		0.16	0.10		0.06	0.06		0.09
	(0.12)		(0.13)	(0.11)		(0.12)	(0.10)		(0.10)
Interest Rate X Above Median Deposit HHI		0.12	0.03		0.19*	0.12		-0.07	-0.09
		(0.11)	(0.12)		(0.10)	(0.12)		(0.09)	(0.10)
Specification	IV	IV	IV	IV	IV	IV	IV	IV	IV
Kleibergen-Paap rk Wald F-Statistics	16.77	35.38	20.65	16.77	35.38	20.65	16.77	35.38	20.65
Branch FE	X	X	X	X	X	X	X	X	X
Above Median Dummy X Bank X Quarter FE	X	X	X	X	X	X	X	X	X
Above Median Dummy X District X Quarter FE	X	X	X	X	X	X	X	X	X
Number of Banks	39	39	39	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260	22260	22260	22260

Notes: We conduct an additional test of heterogeneous pass through of the interest rate cap to corporate credit provision by augmenting the IV specification in (5) to include interaction terms of the endogenous variable (interest rates) with a dummy indicating whether the branch is located in a segment of the market with an above-median lending and/or deposit Herfindahl-Hirschman Index (HHI). We instrument each interaction term with $\text{TrtIntensity}_i \times \mathbb{1}\{t \geq 2009Q2\}$ interacted with the above-median HHI dummy. We define the lending and deposit HHIs at the bank category-by-subdistrict (*upazila*) level, lumping amounts in individual and corporate deposit accounts together. In this table, we use the above/below-median split, rather than finer quantiles, to avoid the many weak instruments problem. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.21: Null Effects of the Interest Rate Cap through Bank Branch Network Exposure

	Interest Rate			log Total Outstanding Amount			log Number of Outstanding Loans			log Average Outstanding Amount		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Trt Intensity x 08Q1-Q4	-0.016	-0.016	-0.017	-0.017	-0.009	0.006	-0.028	-0.023	-0.009	0.011	0.014	0.015
	(0.067)	(0.066)	(0.066)	(0.027)	(0.030)	(0.036)	(0.017)	(0.016)	(0.021)	(0.021)	(0.022)	(0.025)
Trt Intensity x 09Q2-Q4	-0.380***	-0.384***	-0.408***	0.096***	0.108***	0.106***	0.029*	0.044***	0.042**	0.067***	0.064***	0.064**
	(0.066)	(0.064)	(0.064)	(0.027)	(0.030)	(0.036)	(0.015)	(0.016)	(0.020)	(0.022)	(0.023)	(0.026)
Trt Intensity x 10Q1-Q4	-0.485***	-0.514***	-0.590***	0.175***	0.196***	0.187***	0.055***	0.068***	0.057***	0.120***	0.127***	0.131***
	(0.061)	(0.059)	(0.059)	(0.026)	(0.028)	(0.035)	(0.014)	(0.013)	(0.018)	(0.020)	(0.021)	(0.025)
Network Trt Intensity x 08Q1-Q4	-0.287	-0.292	-0.297	-0.558*	-0.527*	-0.543*	-0.547	-0.513	-0.560	-0.010	-0.014	0.017
	(0.704)	(0.705)	(0.713)	(0.297)	(0.292)	(0.290)	(0.367)	(0.368)	(0.377)	(0.201)	(0.208)	(0.220)
Network Trt Intensity x 09Q2-Q4	-1.017	-1.015	-1.002	0.251	0.283	0.311	-0.105	-0.049	-0.059	0.357**	0.332*	0.370*
	(0.666)	(0.666)	(0.674)	(0.293)	(0.287)	(0.283)	(0.362)	(0.363)	(0.372)	(0.163)	(0.170)	(0.193)
Network Trt Intensity x 10Q1-Q4	-0.532	-0.580	-0.651	0.362	0.431	0.505*	-0.138	-0.069	-0.097	0.500***	0.499***	0.602***
	(0.716)	(0.718)	(0.725)	(0.296)	(0.289)	(0.285)	(0.355)	(0.354)	(0.365)	(0.175)	(0.181)	(0.196)
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X	X	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X	X	X	X	X	X	X
District X Quarter FE		X			X			X			X	
Upazila X Quarter FE			X			X			X			X
Number of Banks	39	39	39	39	39	39	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260	22260	22260	22260	22260	22260	22260
Adj. R-squared	0.879	0.879	0.880	0.955	0.955	0.954	0.906	0.906	0.909	0.921	0.922	0.921

Notes: The table presents results from estimating equation (8), which relative to our baseline reduced-form specification includes additional interaction terms of TrtIntensity with a branch network exposure term. We define branch i's network exposure as the leave-one-out loan share-weighted average of TrtIntensity across all other branches $k \neq i$. Standard errors are clustered at the branch level. *p<0.1; **p<0.05; ***p<0.01.

Table A.22: Testing for Rural-to-Urban Reallocation of Credit in Response to the Rate Cap (Alternative Exposure Measure)

	Interest Rate			log Total Outstanding Amount			log Number of Outstanding Loans			log Average Outstanding Amount		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Trt Intensity x 08Q1-Q4	-0.007	-0.006	-0.007	-0.086***	-0.083***	-0.067**	-0.071***	-0.070***	-0.053**	-0.014	-0.013	-0.013
	(0.096)	(0.097)	(0.098)	(0.026)	(0.027)	(0.032)	(0.022)	(0.020)	(0.024)	(0.028)	(0.029)	(0.032)
Trt Intensity x 09Q2-Q4	-0.289***	-0.306***	-0.355***	0.063**	0.079***	0.065**	0.026	0.038**	0.035*	0.037	0.041	0.030
	(0.091)	(0.090)	(0.088)	(0.025)	(0.026)	(0.031)	(0.018)	(0.017)	(0.021)	(0.025)	(0.026)	(0.030)
Trt Intensity x 10Q1-Q4	-0.416***	-0.460***	-0.573***	0.101***	0.129***	0.094***	0.028	0.035**	0.007	0.072***	0.095***	0.087***
	(0.085)	(0.086)	(0.085)	(0.023)	(0.024)	(0.029)	(0.019)	(0.017)	(0.020)	(0.024)	(0.025)	(0.029)
Rural Exposure (Number of Branches) x Trt Intensity x 08Q1-Q4	0.184	0.199	0.195	-8.199**	-8.550**	-8.281**	-5.691**	-5.896***	-5.642**	-2.509	-2.654	-2.639
	(7.448)	(7.513)	(7.823)	(3.360)	(3.335)	(3.461)	(2.447)	(2.266)	(2.432)	(2.018)	(2.171)	(2.263)
Rural Exposure (Number of Branches) x Trt Intensity x 09Q2-Q4	6.337	4.835	2.357	-2.634	-2.044	-3.069	-0.622	-0.686	-0.877	-2.012	-1.357	-2.192
	(7.223)	(7.203)	(7.379)	(3.565)	(3.560)	(3.739)	(2.470)	(2.289)	(2.484)	(2.128)	(2.265)	(2.351)
Rural Exposure (Number of Branches) x Trt Intensity x 10Q1-Q4	5.424	3.651	-0.153	-6.406*	-5.277	-7.460**	-2.966	-3.444	-4.926**	-3.440*	-1.832	-2.534
	(7.034)	(7.120)	(7.492)	(3.429)	(3.429)	(3.578)	(2.361)	(2.170)	(2.377)	(1.894)	(2.070)	(2.173)
Specification	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Branch FE	X	X	X	X	X	X	X	X	X	X	X	X
Bank X Quarter FE	X	X	X	X	X	X	X	X	X	X	X	X
District X Quarter FE		X			X			X			X	
Upazila X Quarter FE			X			X			X			X
Number of Banks	39	39	39	39	39	39	39	39	39	39	39	39
Number of Branches	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855	1855
Observations	22260	22260	22260	22260	22260	22260	22260	22260	22260	22260	22260	22260
Adj. R-squared	0.879	0.879	0.880	0.955	0.955	0.954	0.906	0.906	0.909	0.921	0.922	0.920

Notes: The table reports results from repeating the analysis of Table 8, re-estimating equation (9) where we instead define RuralExposure in terms of the number of branches a parent bank has in rural subdistricts. That is, we set RuralExposure equal to the deviation of the parent bank's average market share in rural markets from its nationwide average subdistrict-level market share, where the shares are determined by the number of branches the bank has in a subdistrict relative to the total number of branches across all banks in that subdistrict; to compute average market shares within the bank, we exclude subdistricts where the bank has no branches. We cluster standard errors at the bank-time level to account for the fact that RuralExposure varies at the parent bank level. *p<0.1; **p<0.05; ***p<0.01.