Out of Sight, Out of Mind: Nearby Branch Closures and Small Business Growth*

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Abstract

Since 2010, the total number of commercial bank branches in the United States has fallen by about 20%. Do branch closures meaningfully affect economic activity? We investigate the impact of branch closures on small businesses, whose credit access may be facilitated through local relationships with bankers. We use exogenous variation in closures related to mergers and acquisitions to show that closures of nearby branches decrease small business employment growth and entry. Our results are robust to variations in our measure of employment, proximity, and construction of the instrument. Altogether, our analysis highlights the importance of local branches to small businesses.

JEL classifications: E32, E44. D22, D53, G21, J23, L25.
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1 Introduction

According to the U.S. Census Bureau's Business Dynamic Statistics, firms with under 20 employees account for over 20 million jobs in the United States. These small firms rely heavily on relationship lending, which is facilitated by bank branch access (Petersen and Rajan (1995), Berger and Udell (2002)). However, about one third of U.S. commercial bank branches have closed since 2010, with the total number of branches declining by about 20%. The pace of closures was particularly high during and after the Covid-19 pandemic. Could these branch closures have significant consequences for small businesses and the U.S. economy in the coming years?

The answer isn't clear. As an anecdote, consider a new bakery that is looking to expand by hiring a few more workers and acquiring a delivery van. If the local bank branch is familiar with the bakery's nascent business operations, then this knowledge may give the local branch the confidence required to make the loan the bakery needs to expand. Or, if the local branch knows the community and residents—and sees the upside for a new bakery in the neighborhood—the branch may be more willing to extend a loan. Now, assume that local branch closes. It may take the bakery time to establish adequate rapport with bankers at whichever branch the bakery takes its banking business to next. Or, perhaps there are no nearby branches left, and distant lenders have less knowledge of local economic conditions. Consequently, the bakery may see reduced credit availability—consistent with evidence presented in Bonfim, Nogueira and Ongena (2021)—and its growth could be curtailed.

On the other hand, the bakery may have sufficiently transparent operations and risks to enable any nearby bank—or even a distant FinTech lender—to evaluate its creditworthiness. Moreover, even if the nearby branch closes, perhaps the loan officer working with the bakery can find employment at another bank and preserve the "soft information" required to continue the lending relationship. In short, it's not obvious that the closing of a nearby branch should have an impact on the bakery.

To be sure, bank branch closures increase local banking market concentration, but this also has an ambiguous impact on small business growth. While greater market power is often associated

with reduced supply, market power might be needed for banks to establish lending relationships with risky smaller firms (Petersen and Rajan (1995)).

We contribute to this literature by empirically assessing the impact of local branch closures using an instrumental variable identification strategy as well as official data from the U.S. Census Bureau and the Federal Reserve System's National Information Center (NIC) database.[1] In particular, we employ U.S. Census Bureau data from the Longitudinal Business Database (LBD) on small (i.e., 20 or fewer employees) standalone firms in the United States from 1990 to 2020—excluding the finance, insurance, real-estate, and government sectors. And the NIC database contains information on the location of all commercial bank branches in the United States.

Since branch closures are not randomly assigned, we use quasi-random branch closures induced by mergers and acquisitions (M&A) among large banks as an instrument. We model changes in employment at the firm level as a function of the share of branches closing within a certain distance of the firm and a full set of fixed effects. The share of branches closing is instrumented with the share of branches exposed to certain M&A activity.

We find that closures of bank branches within 5 kilometers (3.1 miles) have a statistically significant impact on small business employment growth. We observe that a one standard deviation increase in nearby branch closures reduces employment growth by approximately 1 percentage point over five years. However, the impact of branch closures could potentially be much larger in areas with low bank branch density, where a single branch may have met a significant share of local business' banking needs.[2] Even so, if we were to extrapolate to the sample average branch closure rate of around three percent, and multiply by aggregate small firm employment of 20 million, this amounts to an impact of approximately 100,000 jobs per year.[3]

[1] Some of the previous literature on the real effects of lending shocks employed National Establishment Time-Series (NETS) data. We prefer U.S. Census Bureau data as Crane and Decker (2019) show NETS to be inadequate to analyze business dynamics because of the high prevalence of data imputations.

[2] In our sample, around 18 percent of zip codes have between 1 and 5 branches.

[3] To be clear, this paper estimates the causal impact of exogenous bank branch closures on employment in nearby small businesses. Not all bank branch closures are independent of local economic conditions, making an identification strategy for our analysis necessary. For example, some closures may result from declining demand for financial services due to local economic downturns. These endogenous closures might have a different employment impact than what our analysis captures.

We also discover that most of the negative impact associated with nearby branch closures is concentrated among younger firms as well as firms in sectors that are more dependent on bank loans for funding. A potential explanation is that newer firms have less "hard data" on hand that they can use for the purposes of obtaining a new loan. Local lenders might play a crucial role in funding those firms because, compared with distant lenders, local lenders have a better understanding of the community and, hence, a better grasp of local economic conditions. Lenders that are located further away may not be as knowledgeable of local conditions and therefore have less of an ability to assess the potential merits of a new business. And, not surprisingly, this effect is pronounced in sectors that are more reliant on banks as a source of funding.

In addition, we explore the impact of local branch closures on the extensive margin of small business growth. We estimate the impact of branch closures on the entry and exit rates of small businesses, and we find a significant contractionary impact on each.

Even so, our estimates may fall below the true effects of branch closures. As discussed later, our identification strategy studies outcomes around closing branches that belong to large banks and are proximate to other branches. The literature has emphasized that small banks tend to be more important for small business lending and that distance matters more in relationships with small banks (Berger, Miller, Petersen, Rajan and Stein (2005)). In other words, branch closures may have greater impact where they create "banking deserts," but our estimates do not capture such outcomes.

Our analysis engages with two bodies of literature. First, prior literature has shown that the distance between a firm and its potential lenders matters for the quantity, quality, and price of the loans it receives. See, for example, Petersen and Rajan (2002), Degryse and Ongena (2005), Brevoort and Hannan (2006), Agarwal and Hauswald (2010), Bellucci, Borisov and Zazzaro (2013), Hollander and Verriest (2016), and Adams, Brevoort and Driscoll (2023). Nguyen (2019) shows that branch closures in the United States lead to a persistent decline in lending to local small businesses, and Amberg and Becker (2024) does the same using Swedish data: Such declines in small business lending are likely responsible for the decline in employment growth we estimate in this

paper. Second, there is a vast literature on the real effects of shocks to bank credit. Some recent papers include Chodorow-Reich (2014) and Huber (2018) on the consequences of a large bank cutting lending during the Great Recession, Amiti and Weinstein (2018) on the role of bank supply shocks in aggregate investment fluctuations, Berton, Mocetti, Presbitero and Richiardi (2018) on the elasticity of employment to credit supply shocks, Heblich and Trew (2019) on the role of banking access in the spread of the Industrial Revolution, Bottero, Lenzu and Mezzanotti (2020) on the real effects of a credit contraction, Alfaro, García-Santana and Moral-Benito (2021) on the propagation of bank-lending shocks through input-output relationships, and finally Benson, Blattner, Grundl, Kim and Onishi (2024) on the impact of bank mergers of close-proximity banks on consumer credit.

The three papers closest to ours are Greenstone, Mas and Nguyen (2020), who find that shocks to banks' credit supply are transmitted to their small business customers, but with close-to-zero impact on small business employment; Amberg and Becker (2024), who associate shrinkage of branch networks in Sweden with declines in employment and sales and an increase in business exit; and Mann (2022), who focuses on the impact of changes in county-level bank concentration on small business lending and county-level employment. We add to this literature by looking directly at the economic consequences of bank branch closures, which can be easily measured as opposed to banking supply shocks that need to be estimated (often as a residual), and using data on the whole population of small businesses in the United States instead of focusing on a single bank or region.

Finally, we briefly discuss how our study relates to Nguyen (2019), which primarily investigates the impact of branch closures on small business lending. We believe our work offers two key improvements. First, we use Census Bureau data rather than NETS data, which has been shown to be less reliable for studying business dynamics.[4] Second, while Nguyen aggregates employment and establishment counts at the Census tract level, we rely on firm-level data, which we believe

[4]Crane and Decker (2019) demonstrate that imputed data in NETS, especially for small firms, makes it less useful for analyzing business dynamics. They find that NETS data produces patterns of firm growth and life cycles that are inconsistent with more reliable sources like the Census data we use in this paper.

is more appropriate for studying firm behavior. In particular, this approach allows us to better control for firm-specific characteristics. As a result of better data and identification, we obtain more precise estimates of the effects of branch closures on real outcomes for small businesses.

2 Data Description

The Center for Economic Studies at the U.S. Census Bureau created and maintains the Longitudinal Business Database (LBD), a longitudinal establishment-level database that covers private establishments with at least one employee in the United States. The LBD provides the number of employees, zip code, firm ID, and sectoral affiliation (NAICS code) of each establishment.[5] [6]

An LBD establishment is defined as a single physical location where business is conducted. Note that this definition is not equivalent to the IRS Establishment Identification Number (EIN), which might be composed of more than one LBD establishment. The LBD establishment is also not equivalent to a firm, as a firm may own multiple establishments. This distinction matters because multi-establishment firms tend to be large and do not rely on relationship lending. Moreover, they usually pool funding across their establishments and therefore might not be hurt by the closing of a branch close to one of their establishments. In other words, they are less dependent on local economic conditions.

Since we focus on small firms operating from a single location, we include in our sample all stand-alone firms with only one establishment and 20 or fewer employees from 1990 to 2020. We exclude from the analysis the finance, insurance, real-estate, and government sectors.

We also use the U.S. Census Bureau's Quarterly Financial Report (QFR) to estimate a sectoral measure of bank dependence. The QFR is a quarterly survey of firms across manufacturing, mining, wholesale, and retail trade sectors. It provides detailed information on firms' income statements and balance sheets.

[5] For more information on the U.S. Census Bureau's Longitudinal Business Database see Jarmin and Miranda (2002) and Chow, Fort, Goetz, Goldschlag, Lawrence, Perlman, Stinson and White (2021).

[6] The zip code information in the LBD is not cleaned to be longitudinally consistent. As a consequence, there might be spurious switches in zip codes causing measurement error in our data.

The banking data employed in this project comes from the public Federal Reserve System's National Information Center (NIC) database. NIC contains information from many different regulatory reports, and includes panel data on bank branch locations, ownership, corporate activity, and banking activity and balance sheets. The data we use are merged with the LBD at the zip code level. To assess proximity between branches and establishments or other branches, we use Euclidean distances measured between zip code centroids from the NBER's ZIP Code Distance Database.

3 Empirical Model

We model changes in employment at the firm level as a linear function of the share of branches closing within 5 kilometers. We believe that branch closures mainly impact small business employment by disrupting lending relationships. Previous studies show that it is costly for small businesses to establish new lending relationships. When a small business loses its lender due to a branch closure, it may suffer even if new branches open nearby. Therefore, we focus on the total number of branch closures rather than the net change in branches. Our regression equation is as follows:

$$g_{i,t,t+h} = \xi_i + \kappa_{s,t} + \gamma_{l,t} + \beta ShareClose_{i,t} + \delta X_{i,t} + \varepsilon_{i,t} \tag{1}$$

where $g_{i,t,t+h}$ is the growth in employment for firm i in four-digit NAICS sector s in county l from year t to year $t+h$ winsorized at the 1st and 99th percentiles, $ShareClose_{i,t}$ is the share of bank branches closing between year $t-1$ and t within a distance of 5 kilometers from firm i, ξ_i represents firm fixed effects, $\kappa_{s,t}$ are four-digit NAICS sector by year fixed effects to control for sectoral trends, $\gamma_{l,t}$ are county by year fixed effects to control for regional trends, and $X_{i,t}$ is a vector of controls for recent neighborhood trends and firm life-cycle effects. These controls include the average employment growth rate in the zip code in the previous three years, the average entry rate in the zip code in the previous three years, the average exit rate in the zip code in the previous three

years, and a dummy equal to 1 if the firm is 10-year old or younger.[7]

For reasons discussed further below, our controls also include three lags of the share of branches within 5 kilometers that are involved in any M&A event. As is commonly done in studying firm dynamics, we estimate all of our regressions using employment at year t as a weight. Thus, results represent the perspective of the representative small firms' employee and are not as heavily driven by volatility associated with the very smallest firms. Finally, we estimate the model following Correia (2016).

Since branch closures are not random, we use mergers and acquisitions ("M&A") of the parent companies as a source of exogenous variation in branch closures.[8] M&A activity among banks disproportionately leads to the closure of bank branches that are located close to each other and were competing before the parent companies merged. Benson et al. (2024) find that banks involved in a close-proximity M&A event are 40 percentage points more likely to shut down branches and that total branches in the affected markets are 17 percentage points more likely to decrease. We consider only M&A activity between banks in the top percentile by number of branches to remove the possibility that the M&A activity is associated with hyper-local economic conditions. Even if M&A activity among large banks can be plausibly considered exogenous to the local economic conditions faced by the small firms in our data, the choice of which branches are shut down after an M&A event is not random. Therefore, our identification relies on the exposure of local branches to M&A activity among large banks. To be more precise, our instrument is the share of bank branches within 5 kilometers of a firm that are exposed to the possibility of M&A induced branch consolidation. We consider a branch of bank A to be exposed to possible consolidation if it is within 5 kilometers of a branch of bank B, and banks A and B are both large and involved in the same M&A event. Appendix A1 provides further information about how our merger exposure measure is distributed over time and across states. While our merger exposure instrument is well represented across most of the United States, relatively little merger exposure has taken place

[7]The average zip-code-level employment growth rate, entry rate and exit rate in the previous three years are computed using all establishments, not only single-unit small firms.

[8]We do not include internal reorganizations in our definition of M&A activity.

since the Global Financial Crisis–so most of the identification comes from the first 20 years of our sample.

Why must both be large banks? We want to avoid including an acquisition that is occurring because of local economic conditions. If we allowed one of the two banks to be small, the acquisition by the large bank might be happening because the area is depressed and the local banks are struggling. In that case, the M&A activity would not be exogenous to local conditions and would therefore not provide a valid instrument. In that situation, exposure to M&A activity wouldn't be causing branch closures, but rather the other way around.

We take two further steps in our approach to bolster the validity of the instrument. First, M&A activity may be associated with significant changes in management practices, including lending decisions. For example, if M&A activity is more common with economically stressed banks, we might expect that credit availability near any branch of the merging banks would be reduced. To address this concern, we include in all regressions as a control three lags of the share of branches within 5 kilometers whose parent bank is involved in any type of M&A activity. This step is important because M&A activity may be associated with changes in bank-level objectives or management practices. As a consequence, banks involved in M&A transactions might systematically change their small business lending supply or policies. If true, this would violate the exogeneity assumption for our instrument. However, such bank-wide changes in policy would presumably affect small business customers of all branches—not just those that happen to be proximate to branches of the banks' merger partner. Thus, we can rule out the possibility that our results are driven by M&A-related changes in the bank, and restore our instrument's exogeneity, by including controls for local branches' exposure to any M&A activity.

Second, by construction, exposure to possible M&A induced branch closure is only possible where branches of at least two large banks are near each other. Areas with fewer large banks are lower density, and could have different firm dynamics. Therefore, we restrict our sample to zip codes that satisfy two conditions: (a) the zip code had at least one branch of a large bank within 5 kilometers and (b) that branch was within 5 kilometers of another branch of a large bank between

$t-3$ and t. These excluded zip codes account for about 20% of bank branches in recent years.

With all of that in mind, our first-stage regression is:

$$ShareClose_{i,t} = \xi_i^{FS} + \kappa_{s,t}^{FS} + \gamma_{l,t}^{FS} + \delta^{FS} X_{i,t} + \theta Z_{i,t} + \nu_{i,t} \tag{2}$$

where the superscript ^{FS} denotes the first-stage estimates of the parameters and fixed effects included in the second-stage equation, and $Z_{i,t}$ is the vector of instruments. These include the share of branches that are exposed to the possibility of M&A induced branch closure in each of the three previous years. More precisely, we first determine for each firm which branches are within 5 kilometers and belong to a large bank undergoing M&A activity between $t-1$ and t. Among those branches, we count which are within 5 kilometers of a branch that belongs to a different large bank that is party to the same M&A activity. We then divide this count by the total number of branches in the zip code. We repeat for the periods between $t-2$ and $t-1$, and between $t-3$ and $t-2$, for a total of three instrumental variables.

The regression model in (1) estimates the effect of branch closures on the intensive margin of employment growth but is silent on the firm entrance and exit, that is, the extensive margin of growth. To investigate the latter, we estimate equation (1) replacing as outcome the intensive margin growth with a dummy equal to 1 if the firm exits in the next year. Such model will tell us the impact of branch closures on the probability that firms would exit the market. Since at the firm-level we can only measure the propensity to exit but not enter, we also aggregate the data to the zip code level and model the entry rate and exit rate as linear functions of the share of branches closing within 5 kilometers of the zip code:

$$y_{zip,t,t+1} = \gamma_{l,t}^{y} + \beta^{y} ShareClose_{zip,t} + \delta^{y} X_{zip,t} + \varepsilon_{zip,t}^{y} \tag{3}$$

where $y_{zip,t,t+1}$ is either the entry rate or the exit rate in zip code zip from year t to year $t+1$, $ShareClose_{zip,t}$ is the share of bank branches closing between year $t-1$ and t within a distance of 5 kilometers from zip code zip, $\gamma_{l,t}^{y}$ are county by year fixed effects, and $X_{zip,t}$ is a vector of

controls, which includes the same zip code level controls from (1) as well as the share of small firms in the zip code that are 10 years old or younger, and the share of small firm employment in the zip code in each 2-digit NAICS sector. Entry and exit rates are computed as in the Business Dynamic Statistics, that is the number of firms that enter or exit at time t divided by the average number of firms at t and $t-1$. Using the same instruments as before, the first-stage regression is:

$$ShareClose_{zip,t} = \gamma_{l,t}^{FS,y} + \delta^{FS,y} X_{zip,t} + \theta^{y} Z_{zip,t} + \nu_{zip,t}^{y} \tag{4}$$

Table 1: Summary Statistics of Benchmark and Excluded Samples

	Benchmark Sample		Excluded Sample	
	Mean	SD	Mean	SD
Bank Branch Characteristics				
Total branches	35.85	64.00	4.462	6.627
Share of closures	0.030	0.051	0.015	0.083
Share exposed to any merger	0.342	0.233	0.226	0.318
Instrument	0.018	0.069		
Firm Characteristics				
Employment growth	-0.015	0.343	-0.020	0.357
Employment	9.373	5.310	9.035	5.267
Young	0.425	0.494	0.414	0.493
Zip Code Entry rate	0.093	0.034	0.096	0.071
Zip Code Exit rate	0.083	0.016	0.081	0.025
Exit dummy	0.056	0.229		

Notes: The sample period is 1990-2020. The benchmark sample includes all firm-year observations in the main regression in Table 2. The excluded sample consists of firm-year observations not included in the main regression as they do not satisfy conditions (a) and (b) in the main text. "Young" refers to a dummy that equals 1 if the firm is 10 years old or younger. The entry and exit rates are the average entry and exit rates of all establishments in the zip code during the previous three years. The exit dummy is computed using a sample that includes exiting firms, which are excluded from the benchmark sample used for the intensive-margin regression at the firm level. These summary statistics are weighted by firm employment. See text for details.

Table 1 provides summary statistics for the benchmark sample (intensive-margin firm-level regression) and the excluded sample—that is, where there is at most only one large bank and thus no possibility of M&A induced branch closure. The unit of observation is at the firm-year level, and the summary statistics are weighted by firm employment like the regressions. Almost by definition, the bank branch network is far less extensive in the excluded sample–with an average of

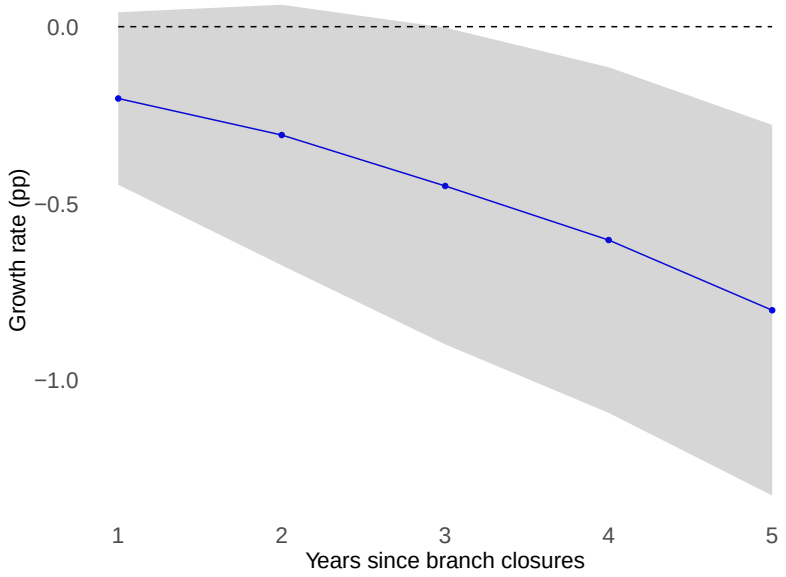
4.5 nearby branches (versus 36 in the benchmark sample). Perhaps reflecting the already sparser network, the average share of branches closing in the excluded sample is also lower at 1.5% (versus 3.0%). Despite these differences in the local bank branch network, the representative small firm employee in both samples has about eight coworkers, with almost 60% working at firms that are more than ten years old. Employment growth, on average, is negative. But this is balanced by an average entry rate that exceeds the average exit rate. In the excluded sample, the intensive margin employment growth is a bit lower, but the gap between entry and exit rate is also a bit larger.

4 Impact of Branch Closures on Small Business Employment Growth

Figure 1 depicts the estimated cumulative effect on small business employment growth due to a one standard deviation increase in closures of nearby branches.[9] The initial impact is small and statistically insignificant, but it slowly grows to a statistically significant 1 percentage point after five years. Since small businesses employ 20 million workers in America, the sample average branch closure rate of around three percent implies an impact of approximately 100,000 jobs per year in the aggregate. The persistence emerging from Figure 1 is consistent with the finding by Nguyen (2019) that branch closures lead to persistent declines in loan originations for up to six years. Moreover, it is likely that employment decisions by small businesses react to branch closures with a lag as credit needs gradually arise and remain unmet.

[9] We estimate equation (1) varying the horizon h from 1 to 5 years. In addition, we note that we use 5 kilometers in our baseline model because we hypothesize that a branch's small business customer base is located disproportionately within the local community. As the "correct" distance likely depends on population density, we use 5 kilometers as a compromise between smaller towns—where customers may travel much further—and dense urban areas where even 5 kilometers may cover many possible bank branches.

Figure 1: Employment Growth After Branch Closures



Notes: The figure shows the cumulative impact on employment growth after a 1 std. dev. of nearby branches shut down. The gray shaded area corresponds to 95% confidence intervals. See text for details.

Table 2: BRANCH CLOSURES AND SMALL BUSINESS GROWTH

Dependent variable:	5-year ahead Firm Employment growth				
	(1) All Sample	(2) Young	(3) Old	(4) High Bank Dep.	(5) Low Bank Dep.
Share branches closed	-0.157	-0.192	0.01	-0.215	-0.034
	(0.052)	(0.078)	(0.065)	(0.129)	(0.096)
First-stage effective F-stat	112.5	83.4	109.5	74.3	97.52
Num observations	41,260,000	19,900,000	21,100,000	4,914,000	12,120,000

NOTES: All regressions include the share of branches exposed to any merger during the past three years; the average employment growth rate in the zip code over the previous three years; the average entry rate in the zip code in the previous three years; the average exit rate in the zip code during the previous three years; a dummy equal to one if the firm is at most 10 years old; as well as fixed effects for each firm and year by four-digit sector and county by year. Robust standard errors are clustered at the zip code level and reported in parentheses. Figures are computed using employment weights. *Sample:* all stand-alone firms with 20 or fewer employees in years 1990-2020, excluding the finance, insurance, real-estate, and government sectors. Source: LBD, QFR, and NIC database. The effective F-stat is from Montiel Olea and Pflueger (2013).

Table 2 details the effect on the cumulative 5-year intensive-margin growth rate. The coefficient of -0.157 implies that, if *all* of the branches shut down within 5 kilometers, firms' employment

growth would decrease by almost 16 percentage points over the next five years. In addition, the first-stage F statistic is well above 100, which speaks to the strength of the instruments.[10] We interpret the results in Figure 1 and Table 2 as evidence that lending relationships with local bank branches significantly impact real outcomes.

While we lack data on the financial situation of the firms in our sample, we do know their *ages* and *sectors*. Younger firms, defined as those no older than 10 years, are likely to depend more on relationship lending due to the limited information available about their business prospects. In Table 2, columns (2) and (3) speak to whether branch closures affect younger firms more. For younger firms, the coefficient associated with branch closures is negative, large, and statistically significant. In comparison, the coefficient associated with older firms is close to zero and not statistically significant. In other words, we find that the impact of branch closures is concentrated among young firms. One possibility is that younger firms have a less established track record, so they might have a harder time obtaining loans based on "hard data" alone, especially when there is a decrease in the number of branches (lenders) in the local area. Local lenders, on the other hand, may have access to more information on the local economy that proves favorable to extending loans to younger firms.

Relatedly, we use the QFR to calculate a measure of bank dependency at the three-digit sector level, because firms in sectors where bank loans serve as a more important funding source should be more affected by branch closures. High dependency sectors are those where the ratio of bank loans to total assets is statistically significantly above average in the QFR, and on average is almost 70% higher than that of the other ("low dependency") sectors.[11] Columns (5) and (6) of Table 2 confirm this channel, showing that branch closures have a significant, negative impact on firms in sectors with high bank dependency. In contrast, the effect is minimal and statistically insignificant in sectors with low bank dependency.

Our estimates are, however, identified from closures of branches of large banks that are near

[10] Table A1 in the Online Appendix shows the OLS coefficient and the first-stage estimates.

[11] Since the QFR does not cover all industries, our bank dependency measure applies only to a portion of the sample. Details on the construction of the bank dependency measure can be found in the Online Appendix.

other bank branches. Closures of branches that create "banking deserts" may be more detrimental. Indeed, the previous literature has emphasized that small banks tend to be more important for small business lending (Berger, Bouwman and Kim (2017)) and that distance matters more in relationships with small banks (Brevoort and Hannan (2006)). In our data, approximately 67% of closing branches are branches of large banks; and of these closures, about 85% are proximate to branches of other large banks. While the set of closures potentially used for our identification represents over half of all closures, the remaining closures of primarily small bank branches could potentially be more impactful to local small businesses. Therefore, our estimates may be a lower bound on the "true" effect of branch closures on real activity.

Table 3 describes the impact of branch closures on the extensive margin of firm growth. Panel A shows the results of the firm-level regression with an exit dummy as the outcome variable. As shown in (1), branch closures lead to an increase in the probability of exit one year ahead; after a one standard deviation increase in closures of nearby branches, the exit rate is about 0.6% higher the following year, which is approximately 10% of the average exit rate in Table 1. The propensity to exit after branch closures is much higher with young firms, column (2), than old firms, column (3), confirming the results in Table 2.[12] Panel B shows the estimates from equation (3), with the entry and exit rates of small business at the zip code level as outcomes. The effect is both economically and statistically significant for the entry rate and null on the exit rate.[13] More precisely, after a one standard deviation increase in closures of nearby branches, the entry rate is about 0.3% lower the following year, which is approximately 3% of the average entry rate, using the relevant statistic from Table 1.[14]

Combining the coefficients on the entry and exit rates, we can speak to the impact of branch closures on the growth of the number of firms.[15] Greenstone et al. (2020), for instance, find little

[12]Table A3 in the Online Appendix shows that the impact of branch closures on the propensity to exit is similar in sectors with high and low bank dependency.

[13]The LBD does not include the self employed. Thus, entry and exit could reflect transitions from and to firms owned and operated by their sole employee.

[14]We explored the effect on entry and exit rates after the first year since branch closure and do not find statistically significant effects in years two through five, as shown in Figure A3 in the Online Appendix.

[15]Following a simple accounting identity, the number of firms in period $t+1$ must be equal to the number of firms in period t plus entry between t and $t-1$ minus exit between t and $t-1$. If we define the growth in the number

Table 3: BRANCH CLOSURES AND SMALL BUSINESS GROWTH: EXTENSIVE MARGIN

Panel A: Firm-level			
Dependent variable:	Exit dummy		
	(1) All Sample	(2) Young	(3) Old
Share branches closed	0.107	0.089	0.034
	(0.016)	(0.023)	(0.015)
Num observations	88,600,000	51,800,000	36,400,000
Panel B: Zip Code level			
	(1)		(2)
Dependent variable:	Entry rate		Exit rate
Share branches closed	-0.051		-0.005
	(0.021)		(0.015)
Num observations	197,000		197,000

NOTES: All regressions include the share of branches exposed to any merger in the past three years, the average employment growth rate in the zip code in the previous three years, the average entry rate in the zip code in the previous three years, the average exit rate in the zip code in the previous three years. The firm-level regressions also include fixed effects for each firm and year by four-digit sector and county by year. The Zip Code-level regressions also include the share of employment in the zip code in each two-digit NAICS sector, the share of employment in the zip code in firms that are at most 10 years old, fixed effects county by year. Young refers to firms that are at most 10 years old. Robust standard error are clustered at the zip-code level and reported in parentheses. Figures are computed using employment weights. *Sample:* 1990-2020. Source: LBD and NIC database.

evidence of an impact of lending shocks on establishment growth rates. In contrast, we find that branch closures depress net business formation: since we did not find any effect of branch closures on the exit rate, the impact on the entry rate can be also seen as the impact on the growth of the number of small businesses.

Our evidence on intensive and extensive margin small firm employment growth combined imply that branch closures are related to a decline in small business employment. While we use merger activity as an instrument, our results do not, however, directly imply that bank mergers hamper small business growth. Indeed, mergers may lead to a reallocation of branches. The NIC data show that about half of the time, the merging banks grow their combined number of branches

of firms as $2\frac{\text{num firm}_{t+1}-\text{num firm}_{t+1}}{\text{num firm}_{t+1}+\text{num firm}_t}$, since $\text{num firm}_{t+1} - \text{num firm}_{t+1} = \text{entry} - \text{exit}$, then $2\frac{\text{num firm}_{t+1}-\text{num firm}_{t+1}}{\text{num firm}_{t+1}+\text{num firm}_t} = \text{entry rate} - \text{exit rate}$.

faster than that of other banks over the following three years. Thus, it might be possible that new branches created by a merger might positively affect small firm formation and growth.

Our findings contrast with Greenstone et al. (2020), who show that a negative lending shock translates to reduced lending to small businesses but close-to-zero changes in employment. We believe that our identification is cleaner as branch closures are easier to measure than lending shocks, and relying on the quasi-exogeneous nature of branch closures induced by M&A activity is preferable to a shift-share identification strategy that requires independence of banks' small business lending strategy and their regional presence. Moreover, our analysis covers a longer time-period and our unit of analysis is at the firm level.

5 Robustness

In this section, we explore different regression specifications to test the robustness of the results in Tables 2 and 3. These specifications examine how effects relate to, *inter alia*, the size of the firms, the size of the merging banks, and our measure of proximity between firms and branches.

Starting with the firm-level intensive margin regressions, we first ask whether our conclusions about small firm growth depend on the size of the small business in question. So, we run the regression using the sample of firms with 10 or fewer employees and again with 30 or fewer employees, respectively. The new estimates in rows (1) and (2) of Table 4 suggest that the exact firm size threshold does not matter.

Next, we experiment with our definition of a large bank. To be maximally assured of our instrument's validity, we want to focus on mergers of banks with a geographically dispersed small business customer base. The clearest simple measure of this is the number of branches the bank has. The share of branches in banks at the 99th "size" percentile (and thus the reliance of our instrument on particular time periods) is more stable over time when size is determined by number of branches. For these reasons, we prefer branch count as our measure of size, but we still check for robustness. Thus, in row (3), we present regression results when defining large banks as those

Table 4: ROBUSTNESS

Dependent variable:	Firm level		Zip Code level	
	Intensive Marg.	Extensive Marg.	Entry rate	Exit rate
Baseline	*-0.157*	*0.107*	*-0.051*	*-0.005*
	(0.052)	*(0.016)*	*(0.021)*	*(0.015)*
(1) <10 employee firms	-0.123	0.109	-0.061	-0.009
	(0.050)	(0.017)	(0.023)	(0.017)
(2) <30 employee firms	-0.134	0.110	-0.062	-0.012
	(0.053)	(0.016)	(0.022)	(0.015)
(3) Asset-based bank size	-0.131	0.095	-0.045	-0.011
	(0.052)	(0.016)	(0.021)	(0.015)
(4) Branches within 10 kilometers	-0.267	0.155	0.008	0.031
	(0.076)	(0.023)	(0.032)	(0.021)
(5) One lag of instrument	-0.139	0.081	-0.081	0.013
	(0.087)	(0.027)	(0.034)	(0.027)
(6) No controls and no firm FE	-0.161	-0.014		
	(0.052)	(0.011)		

NOTES: The figures refer to the estimated coefficient on the share of branches closed. The regression specifications are described in the main text. Robust standard errors are clustered at the zip code level and reported in parentheses. Figures are computed using employment weights. *Sample:* 1990-2020. Source: LBD and NIC databases.

above the 99th percentile in assets, as opposed to by number of branches. This definition affects the set of mergers our instrument is based on, and only slightly weakens our results.

In row (4), we define branches as nearby small firms if their zip codes are within 10 kilometers instead of 5 kilometers. We find a stronger impact of branch closures if we consider a wider radius. In row (5), we only use one instrument, the share of bank branches exposed to a merger between $t-1$ and t. Finally, in row (6), we present results of the regression when dropping controls and firm fixed effects. Our results are essentially unchanged.

We next apply the same methodological variations to our propensity-to-exit regressions at the firm level and zip code level extensive margin regressions in the last three columns of Table 4. The firm and bank size thresholds have little impact on our estimated extensive-margin effects. However, propensity-to-exit effects are statistically insignificant when we drop controls and firm fixed effects, and entrance and exit rate effects are statistically insignificant when considering nearby branches as those up to 10 kilometers from the small firms.

6 Conclusion

Our analysis suggests that bank branch closures have a significant effect on local economic activity through small business credit access. Using data from the U.S. Census Bureau and the Federal Reserve System's National Information Center database, we show that small business employment grows more slowly in the five years following nearby branch closures, firms are more likely to exit, and the entry rate of small businesses declines. This suggests that there are limits to the extent that small businesses can pursue lending opportunities from a more distant bank or non-bank lender.

To be sure, our analysis does not speak directly to the recent rise of FinTech lenders. Indeed, in recent years, billions of dollars have been invested in online financial services, while in-branch visits now account for only a fraction of banking transactions. This development could have reduced the role of branches. Variation in our instruments occurs mostly in the early to middle part of our panel, which limits our ability to draw inferences about recent years. Nevertheless, we still believe our results are informative. Adams et al. (2023) show that, while average distance has increased, banks themselves have not materially increased their lending distances. Outside of a very small subset of specialized loans, small businesses remain dependent on local banks. Thus, there is reason to believe that nearby branch closures still matter in an age of FinTech lenders.

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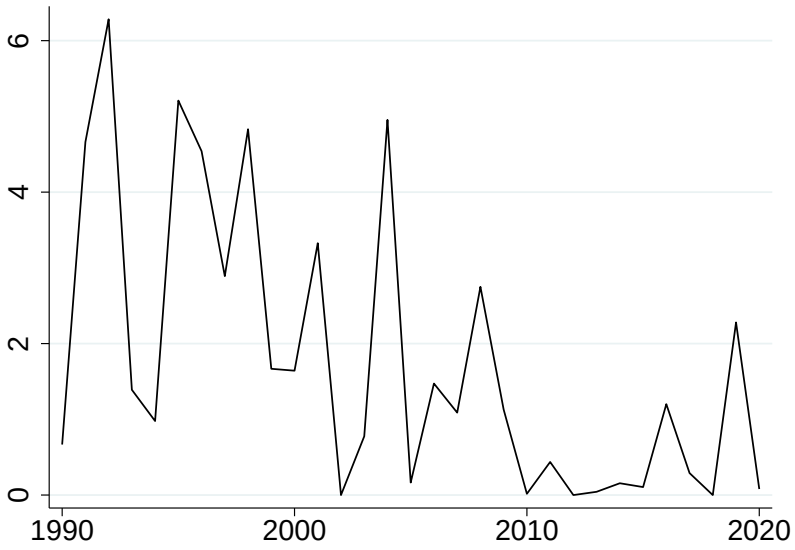
Online Appendix

"Out of Sight, Out of Mind: Nearby Branch Closures and Small Business Growth"

A1 Merger exposure instrument

In our empirical analysis, we use "merger exposure" as an instrument for branch closure. As described in Section 3, a branch of bank A is considered merger exposed when its zip code is within 5 kilometers of the zip code of a branch of bank B, and A and B are merging.[16] We count only mergers between "large" banks–those in the top percentile by the number of branches, or with at least 119 branches. Across our sample, we find 298 unique large banks, with around 80 or so existing and classified as "large" in any given year in our sample period.[17]

Figure A1: Merger exposed share of branches, by year (pp)



Within our set of large banks, 149 were involved in at least one merger of large banks. The share

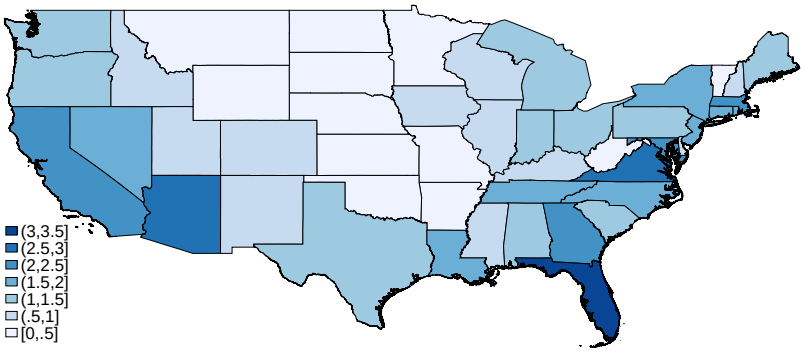
[16] Our definition of bank includes all branches of banks under a unique topholding entity–restructuring within a topholder does not count as a merger. We measure distances between zip codes as the haversine distance between zip code centroids.

[17] This figure ranges between 74 and 85 across years.

of bank branches exposed to these mergers by year is plotted in Figure A1.[18] Aside from 2019, a below-average share of branches have been merger exposed since the Global Financial Crisis. Thus, most of the identification of the effect of branch closures is from the pre-crisis period.

Next, we look at the geographical distribution of merger exposure. Specifically, we compute the average merger exposed share of bank branches in each state, and present this in Figure A2 below. Merger exposure is not concentrated in any particular region of the United States. However, merger exposure levels are low in the lower density northern plains states.

Figure A2: Merger exposed share of branches, by state (pp)



Notes: The merger exposed share for Alaska and Hawaii is not shown, but is low (below 0.5 percent) for each.

A2 Additional results

Table A1 shows more details regarding the effect on the cumulative 5-year intensive-margin growth rate. The first-stage estimates speak to the strength of the instruments, as the coefficients are highly statistically significant and the F statistic is above 100. The coefficients imply that the closure rate of branches exposed to possible M&A induced closure is several times (or about 5 percentage points) higher than for other branches. In comparing columns (1) and (2), we see that the impact of branch closures is basically null in the OLS specification and negative in the IV specification. However, downward bias in our OLS estimates associated with error in our measure of branch closure rates should be mitigated by the instrumental variable approach. Focusing on (2), the

[18] As with our primary analysis, we exclude zip codes without any branches that could be merger exposed, i.e. without any large bank branches within 5 kilometers of a branch of a different large bank.

coefficient of -0.157 implies that, if *all* of the branches shut down within 5 kilometers, firms' employment growth would decrease by almost 16 percentage points over the next five years.

Table A1: BRANCH CLOSURES AND SMALL BUSINESS GROWTH: INTENSIVE MARGIN

Dependent variable:	5-year ahead Firm Employment growth	
	(1)	(2)
	OLS	IV
Share branches closed	0.001	-0.157
	(0.003)	(0.052)
Num observations	41,260,000	41,260,000
IV First stage		
	Dependent variable: Share branches closed	
Share branches exposed$_{t,t-1}$		0.042
		(0.004)
Share branches exposed$_{t-1,t-2}$		0.056
		(0.004)
Share branches exposed$_{t-2,t-3}$		0.032
		(0.004)
Effective F-stat		112.5

NOTES: All regressions include the share of branches exposed to any merger during the past three years; the average employment growth rate in the zip code over the previous three years; the average entry rate in the zip code in the previous three years; the average exit rate in the zip code during the previous three years; a dummy equal to one if the firm is at most 10 years old; as well as fixed effects for each firm and year by four-digit sector and county by year. Robust standard errors are clustered at the zip code level and reported in parentheses. Figures are computed using employment weights. Sample sizes are rounded. *Sample:* all stand-alone firms with 20 or fewer employees in years 1990-2020, excluding the finance, insurance, real-estate, and government sectors. Source: LBD and NIC database. The effective F-stat is from Montiel Olea and Pflueger (2013).

Using the QFR, we constructed a sectoral measure of bank dependency by calculating the loans-to-assets ratio for all firms in the 2012 QFR. We then identified which three-digit NAICS sectors had an average loans-to-assets ratio that was statistically significantly above the national average. Tables A2 and A3 present the results of our intensive-margin and extensive-margin regressions on the subsample of firms in sectors where we could assess bank dependency. Since the QFR does not cover the entire U.S. economy, this sample is smaller than those used in our baseline regressions. The estimates suggest that bank branch closures have a greater impact on intensive-

Table A2: BRANCH CLOSURES AND SMALL BUSINESS GROWTH: BANK DEPENDENCY

Dependent variable:	5-year ahead Firm Employment growth		
	(1) All Sample with Bank. Dep.	(2) High Bank Dep.	(3) Low Bank Dep.
Share branches closed	-0.073	-0.215	-0.034
	(0.080)	(0.129)	(0.096)
First-stage effective F-stat	95.6	74.3	97.52
Num observations	17,070,000	4,914,000	12,120,000

NOTES: All regressions include the share of branches exposed to any merger during the past three years; the average employment growth rate in the zip code over the previous three years; the average entry rate in the zip code in the previous three years; the average exit rate in the zip code during the previous three years; a dummy equal to one if the firm is at most 10 years old; as well as fixed effects for each firm and year by four-digit sector and county by year. Robust standard errors are clustered at the zip code level and reported in parentheses. Figures are computed using employment weights. Sample sizes are rounded. *Sample:* all stand-alone firms with 20 or fewer employees in years 1990-2020, excluding the finance, insurance, real-estate, and government sectors. Source: LBD, QFR, and NIC database. The effective F-stat is from Montiel Olea and Pflueger (2013).

margin growth in sectors with high bank dependency, while their effect on the extensive margin remains consistent across sectors with both high and low bank dependency.

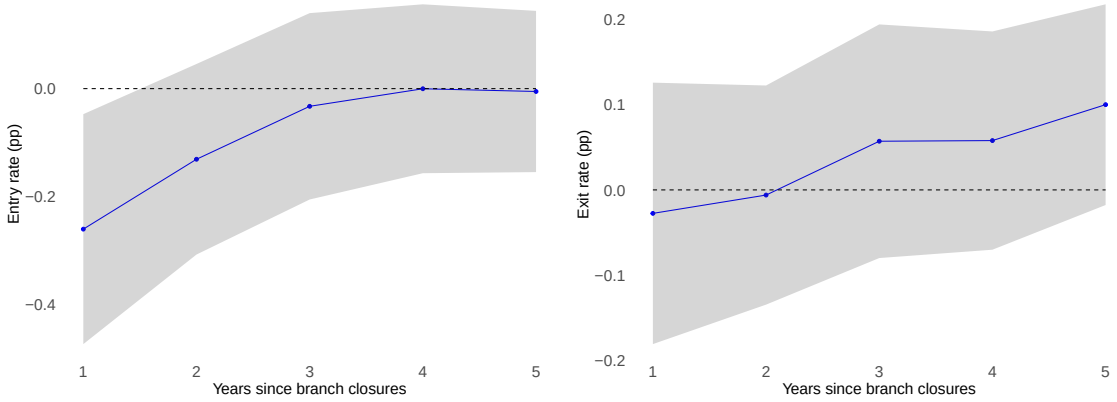
Table A4 shows the impact of branch closures on the entry and exit rates of small business at the zip code level. The effect is both economically and statistically significant for the entry rate and null on the exit rate. As shown in Figure A3, we explored the effect on entry and exit rates after the first year since branch closure and do not find statistically significant effects in years two through five.

Table A3: BRANCH CLOSURES AND SMALL BUSINESS GROWTH: BANK DEPENDENCY

Dependent variable:	Exit dummy		
	(1) All Sample with Bank. Dep.	(2) High Bank Dep.	(3) Low Bank Dep.
Share branches closed	0.095	0.091	0.099
	(0.021)	(0.034)	(0.024)
First-stage effective F-stat	100.0	78.3	102.7
Num observations	36,880,000	10,320,000	26,510,000

NOTES: All regressions include the share of branches exposed to any merger in the past three years, the average employment growth rate in the zip code in the previous three years, the average entry rate in the zip code in the previous three years, the average exit rate in the zip code in the previous three years, fixed effects for each firm and year by four-digit sector and county by year. Robust standard error are clustered at the zip-code level and reported in parentheses. Figures are computed using employment weights. Sample sizes are rounded. *Sample:* 1990-2020. Source: LBD, QFR, and NIC database.

Figure A3: Entry and Exit After Branch Closures



(a) Entry rate (b) Exit rate

Table A4: BRANCH CLOSURES AND SMALL BUSINESS GROWTH: EXTENSIVE MARGIN

Dependent variable:	Entry rate		Exit rate	
	(1) OLS	(2) IV	(3) OLS	(4) IV
Share branches closed	-0.001	-0.051	0.003	-0.005
	(0.001)	(0.021)	(0.001)	(0.015)
Num observations	197,000	197,000	197,000	197,000
IV First stage				
	Dependent variable: Share branches closed			
Share branches exposed$_{t,t-1}$		0.044		
		(0.004)		
Share branches exposed$_{t-1,t-2}$		0.057		
		(0.004)		
Share branches exposed$_{t-2,t-3}$		0.034		
		(0.004)		
Effective F-stat		125.0		

NOTES: All regressions include the share of branches exposed to any merger in the past three years, the average employment growth rate in the zip code in the previous three years, the average entry rate in the zip code in the previous three years, the average exit rate in the zip code in the previous three years, the share of employment in the zip code in each two-digit NAICS sector, the share of employment in the zip code in firms that are at most 10 years old, fixed effects county by year. Robust standard error are clustered at the zip-code level and reported in parentheses. Figures are computed using employment weights. Sample sizes are rounded. *Sample:* 1990-2020. Source: LBD and NIC database.