Import Competition and Local Deposits

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Abstract

I examine how local deposit outflows in markets affected by import competition constrict bank funding and how banks react to these funding shocks. Utilizing a set of continuous difference-in-differences regressions, I identify shifts in local deposit supply generated by the granting of Permanent Normal Trade Relations with China. I find that local deposit losses generate balance sheet wide funding constraints, especially for banks operating in multiple markets. The banks most constrained by this import competition reallocate their credit portfolios from small business loans to mortgage loans in markets not exposed to import competition. I find that the ability for banks to shift their lending between geographic and lending markets allows them to continue operating after such a shock.

1 Introduction

Increased import competition often compels struggling firms to make difficult decisions, including implementing wage cuts, reducing their workforce, and in some cases, ceasing operations (Pierce and Schott (2016)). Trade shocks that begin at the firm level, however, can spill over to the banks that operate in the markets near them. Banks exposed to import competition supply less credit across their networks, even to firms not affected by the trade shock. Given the scale of commercial banks and their importance in economic development, a question remains, what causes these spillover effects?

A problem when addressing this question is that increased import competition can affect many economic factors which impact both sides of banks' balance sheets. Previous research often points to the role of increases in non-performing loans in reducing banks' credit supply (Izadi and Saadi (2023), Federico et al. (2023), Mayordomo and Rachedi (2022)). Few researchers, however, have investigated how import competition affects the supply of deposits. It would be natural to assume that local labor market shocks generated from import competition could affect banks' deposit levels, as businesses and customers impacted by import competition deplete savings and reduce deposit holdings. Given the importance of deposits in bank funding, sufficiently large losses of local deposits may force banks to reduce lending across their entire networks. Understanding how such local funding shocks shape credit supply is important, especially when considering the numerous drivers of local economic shocks and the span of bank networks.

In this paper, I investigate the transmission of trade shocks to local deposits by investigating the the passage of Permanent Normal Trade Relations (NTR) with China in 2000, referred to as the China Shock, and its impact on credit supply. My approach builds on the framework that certain local markets were more exposed to increased import competition than others (Pierce and Schott (2016), Pierce and Schott (2020)) and that banks operated branches in multiple county markets, each with with differential exposure levels. Banks use interest rates on deposits to attract funds, but though banks could set deposit prices at the branch level, they often rely on regional and network wide pricing strategies (Radecki (1998), Edelstein and Morgan (2006), Granja and Paixao (2021), Begenau and Stafford (2022)). If banks demand deposits inelastically at the same price regardless of market characteristics, then any relative change in deposits quantities between the two branches could be attributed to shifts in deposit supply.

Applying this approach, I exploit differences in county exposure to increased import competition and compare deposits between branches of the same bank. I find that increased import competition affected banks' local funding, and these local deposit losses had an impact on total bank funding. In response, the banks most exposed to import competition reallocated lending capital away from small business loans and into mortgage lending in local markets not exposed to import competition.

My empirical design relies on measures of county and bank level exposure to import competition. Following Pierce and Schott (2016), I use tariff schedules and county labor force compositions from before the China Shock to create a measure of each county's exposure to increased import competition which accounts for the change in each industry's tariffs and the proportion of each county's workforce employed in each industry.[1] The measure varies by county but is constant across time. I then create a measure of each bank's exposure to import competition based on the location of its deposit accepting branches and those counties' exposures to import competition. Similar to county exposure, bank exposure varies across banks and is constant across time.

I use a continuous difference-in-difference regression with bank-by-county and bank-by-state-by-year fixed effects to uncover the impact of differential county exposure on local deposit supply. Given the deposit pricing strategies, differential movements in the quantity of deposits at branches of the same bank can be attributed to shifts in the local deposit supply curve. I then aggregate deposits to the bank level and examine whether these local deposit shocks affected funding across banks' full balance sheets. I divide total deposits into core and brokered deposits, where core deposits are deposits sourced from local retail customers and brokered deposits are purchased in external markets. While my primary analyses utilizes two-way fixed effect Ordinary Least Squares regression, I show that the results are robust to the use of a discrete treatment measure and to using Double Machine learning estimation.

Each level of analysis shows that increased import competition matters for bank funding and credit outcomes. The first result finds that deposit shocks began at the county level. A one standard deviation increase in a county's exposure to the China Shock led to a 1.7% to 4.2% decrease in deposits attributable to supply reductions. At the bank level, the combination of local shocks were significant, as a one standard deviation increase in exposure to the China Shock led to a 2.3% reduction in total deposits, a 2.2% reduction in core deposits, and a 3.5% reduction in brokered deposits.

Once I establish the existence of the deposits channel, I examine its impact on local

[1] Others such as Autor et al. (2013) measure exposure to import competition based on measured increases in imports in each sector.

mortgage and small business lending. Similar to the analyses in Khwaja and Mian (2008) and Izadi and Saadi (2023), I use a continuous difference-in-difference regression with bank-by-county and county-by-year fixed effects to isolate changes in each bank's local credit supply decisions caused by increased import competition. I find that bank level exposure led banks to reallocate lending at the local level from small business loans to mortgage loans, especially in markets not affected by the China Shock. A one standard deviation increase in bank-level exposure led to a 4% reduction in small business loan origination, and a 14% increase in mortgage originations. Examining the interaction between bank and county level exposure shows that the decreases in small business lending were uniform across county exposures, but mortgage lending only increased in counties not exposed to import competition.

Underlying each of these analyses is the identification assumption that in the absence of the China Shock, local trends in deposit and lending growth would have evolved similarly to their pre-period trajectories, and in parallel across counties with varying exposure levels. To provide support for this identification assumption, I provide several event study specifications and pre-trend plots.

My research contributes to a large literature studying the economic impact of China's reception of Permanent NTR. Many papers investigate the harm increased import competition inflicted upon industries and labor markets most exposed to these tariff changes (Autor et al. (2013), Pierce and Schott (2016), Autor et al. (2016)). Autor et al. (2021) find evidence of labor market scarring nearly twenty years after the Shock, and beyond the direct labor market consequences, other studies have found evidence that the Shock reduced the provision of local public goods (Feler and Senses (2017)), led to an increase in "deaths of despair" (Pierce and Schott (2020)), and was amplified by local housing market conditions (Xu et al. (2019)).[2] The most closely related papers investigate credit market changes following the China's ascension to the World Trade Organization. Izadi and Saadi (2023) show that small business lending decreased in counties most exposed to the Chinese import competition, and Federico et al. (2023) and Mayordomo and Rachedi (2022) similarly show that increased

[2]Sasahara (2022) provides a more complete overview of the existing literature and methods used in the analysis of the China Shock and other import competition induced shocks.

import competition induced credit constrictions in Italy and Spain. I expand on their work by investigating the role of the deposits channel in driving these credit supply responses and by analyzing the substitution between small business and mortgage lending. I show that the deposits channel played an important role in constricting balance sheets, and while banks reduced their small business lending, they increased their mortgage lending.

My paper is also related to research studying the movement of local shocks through bank networks. As with other firms, banks' internal capital markets allow for the movement of lending funds between lending segments in different geographic markets. Many investigations into the use of these internal capital markets leverage exogenous credit and liquidity shocks from hurricanes (Schüwer et al. (2018)), the shale oil boom (Gilje et al. (2016)), and floods (Rehbein and Ongena (2022)) to understand their ability to transmit both good and bad shocks across markets. Natural disasters are useful for studying the transmission of economic shocks, since many economic shocks originate in the financial system (Clark et al. (2021)).[3] In times of economic turmoil internal capital markets can allow banks to continue lending to sustain lending activities (Quincy (2023)) or they can force firms to siphon capital from peripheral operations (Biermann and Huber (2023)). I complement these papers by isolating a persistent local economic shock originating in the real economy. A persistent shock such as this differs from many of the transitory shocks studied before. While many of the previously mentioned papers show networks being used to transfer liquidity to increase credit supply in affected markets, my analysis shows the opposite, as banks shift credit supply away from impacted markets.

Finally, I contribute to the research studying the deposits channel of transmission. Many banking models recognize that although demand deposits are a cheap source of funding, their inherent volatility is a fundamental weakness (Diamond and Dybvig (1983)), and this weakness ties bank level outcomes to the real economy (Diamond and Rajan (2006)). Khwaja and Mian (2008) illustrate this principal, examining unexpected liquidity shocks to Pakistani banks, and Karam et al. (2014) similarly investigate the impact of credit rating downgrades on banks' access to deposits. Each shows that when access to deposits is lost, credit supply

[3]Lazzaroni and Bergeijk (2014) provide a more extensive summary of studies examining the macroeconomic impact of natural disasters.

is impacted. I expand on this literature by investigating small loss of deposits commiserate with real economic conditions. Rather than a bank run, which leads to a sudden halt in all credit supply, I show that the smaller decline in deposits leads to credit reallocation. In the face of constricted funding, banks lend more in markets with active secondary markets.

In Section 2, I provide background on the change in trade policy which created the China Shock. In Section 3, I provide an overview of the data and explain the county and bank level measures I use to quantify exposure to increased import competition. In Section 4, I introduce the empirical strategies and results connecting the China Shock to bank funding, and in Section 5, I explore how these funding shocks affect local lending patterns. In Section 6, I conclude.

2 Background

2.1 China Shock Background To understand how changes in trade policy affect local labor market conditions, its important to first give an overview of US trade policy. The US's Harmonized Trade Schedule maintains two tariff schedules for imports– normal trade relations (NTR) and Column Two status.[4] The two schedules outline the tariff rates assessed on different categories of imported goods from a given country, and all tariff rates in the NTR schedule are less than or equal to the Column Two rates. With the passage of the Trade Act of 1974, countries that were currently taxed at the favorable tariff schedule would permanently hold that tariff schedule.[5] Prior to 1974, communist countries, including China, had been excluded from NTR status, and accordingly, their imports had been taxed at Column Two rates.

Section 402 of the Trade Act of 1974 allowed the President to issue annual waivers which would allow imports from a given Column Two to be taxed at NTR rates. In 1980, President Carter granted China one such annual waiver.[6] Opening trade with China was seen as a way

[4]Prior to 1998, permanent NTR was referred to as Most Favored Nation status. As of September 2023, Cuba, North Korea, Russia and Belarus are the only countries with Column Two status.

[5]https://www.govinfo.gov/content/pkg/COMPS-10384/pdf/COMPS-10384.pdf

[6]https://www.cartercenter.org/news/features/p/china/40-anniversary-china-relations.html

to achieve two goals: pushing the Chinese economic model towards a market economy and maintaining political and security stability in Asia (Alexandroff (1998)). President Carter and succeeding Presidents continued to grant China these annual waivers.

As China continued to expand its industrial capacity, reduced tariffs granted under the temporary NTR waivers facilitated the growth of trade between the United States and China. However, there was persistent uncertainty regarding the continued renewal of these waivers. Congress frequently posed threats to revoke the President's authority to issue these annual waivers, and as Pierce and Schott (2016) note, this uncertainty surrounding the extension of the waivers provided a protective shield for many domestic industries. This safeguard extended to industries that operated at a relative disadvantage compared to their Chinese counterparts. The element of uncertainty forced businesses to carefully weigh the advantages of shifting their production to China against the risks of rapidly escalating tariffs.

Over time, several international trading partners raised concerns about the United States' annual waiver process, questioning its consistency with the rules of the World Trade Organization (WTO). By withholding permanent Normal Trade Relations (NTR) status from China, the United States effectively prevented China from becoming a full member of the WTO. This issue prompted Representative William Archer to introduce H.R. 4444 on May 15, 2000, a bill that would grant China permanent NTR status upon its accession to the WTO. Providing China with this status was perceived as a means to stimulate economic growth in the United States and encourage human rights reforms in China. The expected economic growth would result from the outsourcing of labor-intensive production processes, the importation of more affordable goods, and the expansion of export markets for American farmers.

The bill faced opposition and controversy, with numerous unions and labor groups lobbying against its passage. Despite the resistance, the bill successfully made its way through Congress on May 24, 2000, and it was later approved by the Senate on September 19, 2000. President Clinton signed the bill into law on October 10, 2000. Following China's accession to the World Trade Organization on December 11, 2001, tariff rates on Chinese imports were officially and permanently set to the NTR schedule. An important nuance in this process is that, between 1980 and 2001, Chinese imports were never subject to taxes at Column Two

rates. The China Shock, as it has come to be known, did not involve an abrupt reduction of tariffs; rather, it resolved the uncertainty that tariffs might suddenly increase if Congress blocked China's temporary NTR waiver. The resolution of this uncertainty ushered in a period of rapid offshoring and industrial decline in the US.

2.2 Bank Background The late 1990s and early 2000s were a time of transition in the financial world. In addition to changing regulations, new technologies and shifting competitive landscapes affected banks' traditional business models.

Customer deposits have traditionally played a central role in bank funding. Banks often relied on a combination of demand deposits, time deposits, borrowed funds, and bank capital to fund their asset portfolios. Due to their low cost and limited sensitivity to interest rate fluctuations, demand deposits held a pivotal position among liabilities. In 2000, demand deposits comprised nearly 82 percent of bank liabilities. However, over the last 40 years, new financial instruments and changes in technology have begun to reshape the conventional model of funding. Money Market Funds, designed to offer liquid and secure accounts with modest returns, began to siphon retail deposits away from commercial banks. Despite originating in the 1970s, these funds experienced substantial growth in the 1990s. According to the Federal Reserve, retail money market funds held approximately $350 billion in deposits in 1990, soaring to over $900 billion by the end of 2000. These funds, while directly competing for bank deposits, applied pressure to banks' traditional funding models.

The enactment of the Riegle–Neal Interstate Banking and Branching Efficiency Act of 1994 (IBBEA) established a standardized national framework permitting banks to operate branches beyond their home state. While some states had previously allowed reciprocal interstate branching, such agreements were not widespread, leading to limited expansion of bank branch networks beyond local regions. IBBEA marked a pivotal shift in regulatory policy, and following its passage, there was rapid interstate expansion through both de-novo branching and mergers and acquisitions. According to Rice and Johnson (2008), between 1992 and 2000, the number of out-of-state branches surged from 62 to nearly 20,000. This proliferation of branch networks created an environment where banks could theoretically safeguard their liabilities against local shocks by diversifying branch operations across mul-

tiple states. Simultaneously, advancements in internet technologies, such as Fannie Mae's Desktop Underwriter software, reducing financial frictions. The software allowed banks to verify their ability to sell mortgage loans to Fannie Mae before originating them.

In summary, the confluence of enhanced technological accessibility, evolving regulatory environments, and heightened competition within the financial sector created a compelling backdrop for examining the banking system. Local funding disruptions occurred as demand deposits were already diminishing in significance, and the emergence of financial technologies reduced the costs of reshaping banks' asset and liability portfolios.

3 Data and Defining Exposure Measures

3.1 Data I utilize multiple data sources to examine local banking responses to increased import competition. The FDIC's Quarterly Call Reports offer a comprehensive view of FDIC-insured commercial banks' balance sheets, spanning from 1994 to the present. These reports provide valuable insights into various bank-level variables, including assets, deposits (core and brokered), equity, and non-performing loans.

To understand the local nature of bank operations, I utilize the FDIC's Summary of Deposits database. The Summary of Deposits is an annual survey collected in June of each year, from 1994 to the present. The Summary of Deposits documents all FDIC-insured bank branches and their associated level deposits. To align this data with lending data, I aggregate bank deposits to the county-by-year level. Additionally, I classify banks as either single- or multi-market entities based on the geographical spread of their branches across county markets. While my primary focus is on banks operating in multiple markets, I also retain data on single-market banks to conduct robustness checks found in the appendix.

I collect data on each bank's small business and mortgage loan originations from the Community Reinvestment Act (CRA) and the Home Mortgage Disclosure Act (HMDA) disclosure files. The HMDA data provides details on the size of each originated mortgage, the county of origination, the bank originating the loan, and whether or not the loan is held on the originating bank's balance sheet or sold within a year. I aggregate the amount of mortgages held on balance sheet and the amount sold to the bank-by-county-by-year

level. The CRA data reports number and size of small business loans under $1 million that each bank originates in each county each year. Greenstone et al. (2020) note that CRA data is fairly representative of all small business lending, as in 2007 it covered 86% of all small business loans under $1 million. I integrate this data with local lending and deposits information.

I employ annual county-level statistics obtained from the Bureau of Labor Statistics (BLS) to account for local demographic and labor market characteristics. These statistics encompass key economic indicators such as income, population, local college attainment levels, and employment rates, and I use averages of each variable from before the granting of permanent NTR as time invariant controls in the county level analyses.

3.2 Defining County Exposure to Import Competition In measuring each county's exposure to increased import competition, I adopt the approach outlined by Pierce and Schott (2020). This method involves analyzing the composition of the labor market in each county before the year 2000 and calculating the difference between Normal Trade Relations (NTR) and Column Two tariff rates for industries operating within that county.[7] These differences are computed using the 1999 tariff rates provided by Feenstra et al. (2002) for each industry group, and are weighted using industry-specific labor market shares from before the import shock. The resulting measure reflects each county's exposure to increased import competition and is computed as follows:

$$CountyExp_c = \sum_{i \in I} \frac{L_{i,c}}{L_i} (ColumnTwoRate_i - NTRrate_i) \tag{1}$$

I then normalize the measure so that across all counties, the mean and standard deviations of exposure are 0 and 1, respectively.

Despite increasingly flexible capital markets and more complete transportation networks, industries have persistently formed geographic clusters (Porter (1998)). These clusters have

[7] Of the nearly 10,000 HS8 code items in the 1999 data, nearly 8 percent had NTR gaps of zero. Summary Statistics: Mean NTR Gap = 0.32, sd = 0.23, max = 4.84, min = 0. Example difference between NTR and Column 2 rates: HS code 91069085 (a form of watches) 0.08 vs. 2.52. HS code 22082020 (Pisco and Singani alcohol) 0 vs. 2.13. HS code 28049000 (tellurum and boron) 0 vs. 0.

exposed local markets to fluctuations within specific industries. Figure 1 illustrates the geographic distribution of CountyExposure. The map reveals significant exposure to increased import competition in some, but not all, counties. Important for my empirical strategy, there appears to be significant intra-state variation, with the exception of several western states.

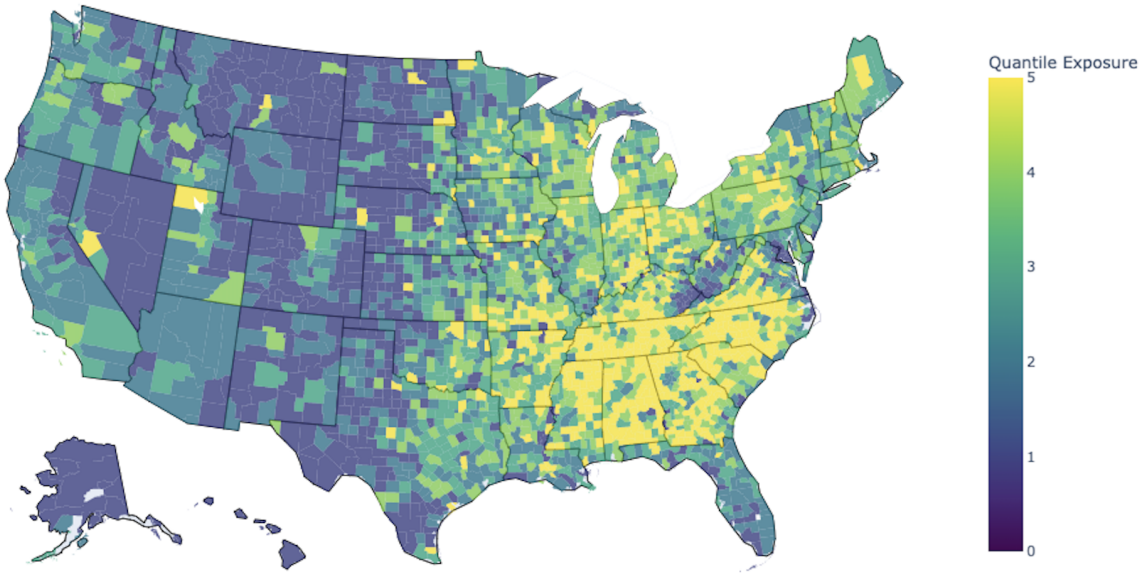
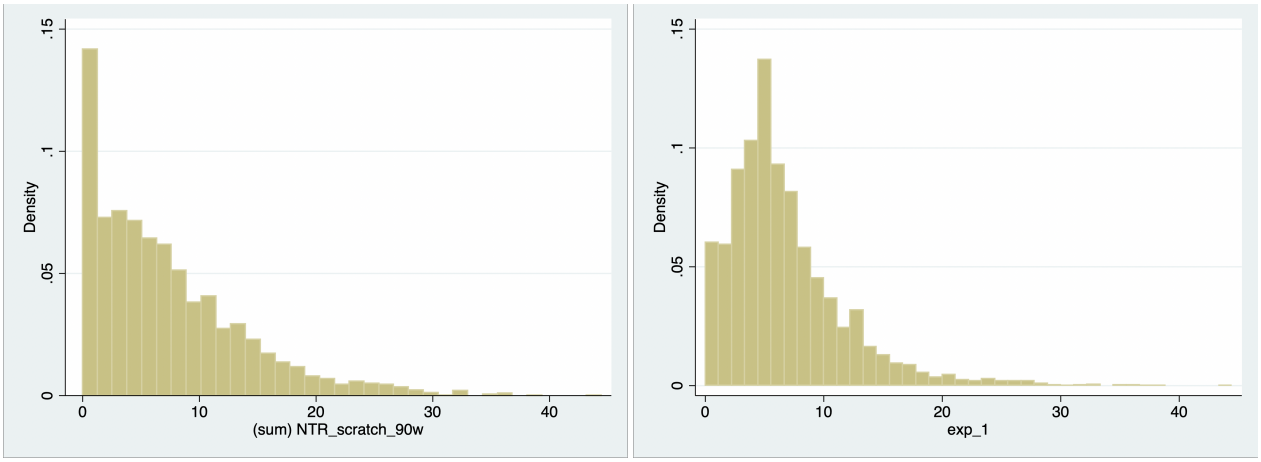


Figure 1: Map of County Exposure (Normalized)

Note: The map shows each county's the normalized County Exposure measure. The measure incorporates the difference between NTR and Column Two tariffs for each industry and the industrial composition of each county's labor market.

3.3 Defining Bank Exposure to Import Competition In theory, a bank's exposure to any economic phenomenon could be precisely quantified if comprehensive data on each depositor and borrower were available. For example, a bank in an agricultural community would be vulnerable to environmental factors, such as drought, if the majority of its customers were farmers. Conversely, a bank in a manufacturing community would be affected by import competition if the majority of its customers were employed in business impacted by tariffs. Since local credit and deposit markets are closely linked to the customers in those areas, banks are affected by local economic conditions.

Figure 2: County and Bank Exposure to Import Competition



(a) County Exposure

(b) Bank Exposure

Note: Figures show the distribution of bank and county level exposure to increased import competition.

In light of these considerations, I adopt the methodology proposed by Kundu et al. (2021) to create a measure of each bank's exposure to increased import competition. The measure is created using pre-China Shock deposit shares in each county and the respective exposures of each county:

$$BankExp_i = \sum_{c \in C} \frac{d_{i,c}}{d_i} CountyExp_c \tag{2}$$

where $d_{i,c}$ are bank i's deposits in county c, d_i is the sum of bank i's deposits across all counties it operates in, and $CountyExp_c$ is county c's exposure to the China Shock, as defined above.

Histograms presented in Figure 2 reveal significant variation in both county and bank exposure levels, and summary statistics in Table 1 provide a detailed view of these variations. On average, the county-level exposure is 7.23, with a median of 5.68. Exposure ranges from a minimum of zero in the least exposed county to a maximum of 44.44 in the most exposed one. When examining bank-level exposure, the average exposure is 6.76 and a median of 5.60. Similar to county exposure, the least exposed bank registers zero exposure, while the most exposed bank reaches 44.44. Since exposure is a unit-less measure, the normalization procedure enables meaningful comparisons of exposure levels between different units.

Table 1: Bank and County Exposure to PNTR

Measure	Mean	Sd.	Median	Min.	Max.
County Exposure	7.23	6.47	5.68	0	44.44
County Exposure Normalized	0	1	-0.24	-1.11	5.75
Bank Exposure	6.76	4.95	5.60	0	44.44
Normalized Bank Exposure	-0.07	0.76	-0.24	-1.11	5.75

Note: The County Exposure incorporates the difference between NTR and Column Two tariffs for each industry and the industrial composition of each county's labor market. Bank exposure incorporates the location of each bank's deposit collecting branches and those locations County Exposures.

3.4 Balance Tests One concern in studies like this is the potential correlation between exposure to a shock and the characteristics of banks. If banks in exposed counties were fundamentally different from those in unexposed counties, establishing causal relationships would be challenging. While difference-in-means tests are commonly used to examine covariate balance between treated and untreated groups, they are not suitable for continuous exposure measures. To assess the overlap of covariates, I follow Pei et al. (2019) by conducting a balance test. This test regresses each bank's exposure level on a range of pre-shock balance sheet measures:

$$BankExp_b = \beta_0 + \beta_1 \bar{X}_b + \epsilon_b \tag{3}$$

where $\bar{X}_b$ is the pre-treatment average of a given measure. The coefficient of interest, denoted as β_1, indicates whether the measure is balanced across bank exposure. A rejection of the null hypothesis $\beta_1 = 0$ suggests an imbalance.

Table 2 displays the outcomes of the balance test, which examines various balance sheet measures, including assets, deposits, branches, return-on-equity, non-performing loan ratios, and core deposit ratios. While the primary focus of this analysis pertains to banks with operations across multiple markets, I evaluate balance across all banks. Panel (A) shows the results for the entire sample of banks, Panel (B) for multi-market banks (which are the central focus of this study), and Panel (C) for single market banks. In the full sample, none of the coefficients are statistically significant at the 10% level, indicating a balance in pre-shock

Table 2: Correlation Between Bank Exposure and Pre-Shock Measures

$BankExp_b = \beta_0 + \beta_1 \bar{X}_b + \epsilon_b$							
		Explanatory Variable:					
		Assets	Deposits	Branches	ROE	NPL Ratio	Core Dep. Ratio
Pan. (A)							
	Est.	-0.007	0.0013	-0.0005	0.0011	-0.0005	0.074
	SE	(0.005)	(0.005)	(0.000)	(0.001)	(0.000)	(0.067)
	N	9,307	9,306	9,202	9,290	9,290	9,301
Pan. (B)							
	Est.	-0.019***	-0.012*	-0.0004***	0.001	-0.002**	-0.032
	SE	(0.007)	(0.007)	(0.000)	(0.001)	(0.001)	(0.128)
	N	2,793	2,792	2,688	2,793	2,793	2,787
Pan. (C)							
	Est.	0.013	0.027***	0.022***	0.001	0.0001	0.107
	SE	(0.009)	(0.008)	(0.005)	(0.001)	(0.001)	(0.077)
	N	6,514	6,514	6,514	6,497	6,497	6,514

Note: Data from FDIC Quarterly call reports. The balance tests regress each bank's exposure, Exp_b, on a pre-Shock average of a given balance sheet item. Each column presents the estimated coefficient, β_1 and its heteroskedasticity robust standard error. Panel (A) includes the full sample of banks and Panel (B) includes only banks operating in multiple markets, and Panel (C) includes only banks operating in a single market.

balance sheet measures across different treatment levels. However, for multi-market banks, statistically significant coefficients on assets, deposits, branches, and non-performing loan ratios suggest that larger banks were likely less exposed than smaller banks. This is because the exposure level reflects the extent of each bank's branch network. Single market banks, on the other hand, exhibit a different pattern, with positive and statistically significant coefficients on deposits and branches. While these variables are not balanced, difference-in-difference regressions can still yield valid inferences by accounting for these unbalanced covariates.

4 Empirical Strategy and Results

The following analyses aim to uncover the mechanisms that link increased import competition to banking outcomes. My specific focus lies in understanding how bank funding is impacted by shifts in local markets' exposure to import competition and how these funding constraints subsequently affect credit origination. To achieve this, I analyze the operations of banks which operate branches across more than one county-level market. For these multi-market banks, their branch networks can serve as conduits for transmitting, or as a form of insurance against, local fluctuations in deposits and credit demand.

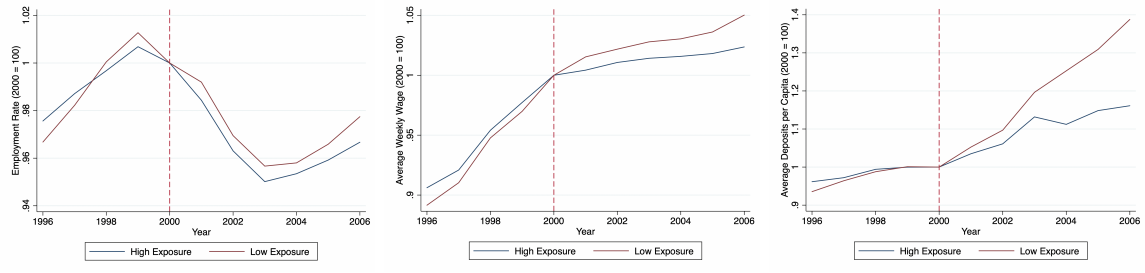
In the framework employed for this study, banks maintain branches across multiple markets. Deposits are gathered from customers segmented into these local markets, and despite the costs associated with operating deposit-accepting branches, deposits remain a relatively cost-effective form of bank funding (Hanson et al. (2015)). Deposits serve as the primary source of funding for the banks' lending operations, and banks efficiently allocate funds collected in one market to meet the lending demands of all others. While there are challenges associated with establishing and operating deposit collecting branches, the informational hurdles linked to lending in different markets are comparatively lower.

4.1 Import Competition and Local Labor Markets I begin by establishing that the China Shock resulted in local labor market disturbances that had the potential to influence local deposit-holding behaviors. Previous research has clearly demonstrated that the industries most exposed to increased import competition witnessed substantial reductions in labor demand. Limited migration played a significant role in magnifying the repercussions of job losses. Notably, Autor et al. (2021) find only modest rates of out-migration from the affected counties, with the majority of those leaving being foreign-born workers and individuals aged 25 to 39. The authors concluded that opting out of the labor force was the primary means of adjusting to the shocks in labor demand. Such exits from the labor force, coupled with increased mechanization of labor processes, led to elevated unemployment rates and reduced wages.

Comparing average wage and employment growth across different levels of exposure re-

veals the impact of import competition on local labor markets in these aspects. The determination of high and low exposure is based on county exposure level relative to the median. Time trends depicted in Figures 3 (A) and (B) illustrate the contrasts in average employment and wages between high and low exposure counties. Divergences emerge after the year 2000, with employment rates and average wages in high exposure counties falling below those in low exposure counties. These employment and wage effects reflect the labor market impact of increased import competition.

Figure 3: County Variables by Exposure to Import Competition



(a) Employment Rate (b) Average Wage (c) Deposits

Note: The figure presents the average employment rate, weekly wage, and deposits per capita at the county level based on exposure to the China Shock. Counties are divided into high and low based on the value of their exposure relative to the median. Values are then normalized such that 2000 is equal to 100.

Even with government subsidies and other programs designed to support unemployed workers, it would be reasonable to anticipate a decrease in savings and deposits within markets exposed to import competition. Panel (C) of Figure 3 depicts the trends in deposit growth between high and low-exposure counties. A noticeable divergence between these two series becomes apparent in the aftermath of the shock. Deposits in high-exposure counties decline relative to their low-exposure counterparts. The decline is not due to a redistribution of funds but rather to a decrease in incoming wealth for local businesses and customers. This trend aligns with the nature of the local labor market shocks which impact employment, wealth, and spending.

4.2 Local Deposit Supply While the decline in deposits shown in Panel (C) of Figure 3 likely reflect the impact of the labor market shock, it is crucial to discern whether

import competition operates through deposit supply or deposit demand. Equilibrium deposit quantities in local markets result from the interaction of banks' demand and customers' supply. Increased import competition could influence both of these curves, as banks in markets with reduced demand for credit might adjust their size by allowing deposits to flow out. However, local customers may supply fewer deposits due to their decreased employment rates and wages. The demand channel implies an endogenous readjustment of optimal deposit levels, while the supply channel suggests an exogenous, first-order spillover from import competition.

To identify supply-side drivers, I utilize bank-by-county-by-year records of deposits to compare deposits within the same bank and within the same state, but across counties with varying levels of exposure to increased import competition. Evidence indicates that banks typically do not set deposit prices at the individual branch level; instead, they implement uniform pricing strategies across regions or entire markets (Radecki (1998), Edelstein and Morgan (2006), Granja and Paixao (2021), Begenau and Stafford (2022)). This practice enables me to differentiate deposit supply shifts since deposit prices should be uniform at the bank-by-state-by-year level. The specification I employ is designed to isolate changes in deposits resulting from supply shifts, and it accomplishes this by controlling for deposit demand:

$$ln(D_{bct}) = \beta(Post_t \times NTRGap_c) + \gamma Post_t \times X_{bc} + \delta_{b,s,t} + \delta_{b,c} + \epsilon_{b,c,t} \tag{4}$$

where $D_{b,c,t}$ is the sum of bank b's deposits in county c in year t and X_{bc} is a vector of bank and county controls interacted with the *post* indicator. The bank-by-county fixed effects, $\delta_{b,c}$ control for potential non-random placement of bank branches and all time-invariant factors that may affect deposit activity for a bank in a given county, and bank-by-year fixed effects, $\delta_{b,s,t}$ control for any shock that hits bank deposits in bank b in year t across all markets in state s. This would include pricing changes set by the bank in order to increase or decrease deposit demand. Including this fixed effect then isolates changes in deposit quantity attributed to deposit supply, and this specification is similar to the within-bank estimator proposed by Khwaja and Mian (2008).

For this specification to accurately identify the causal relationship between local increases

Table 3: Effect of CountyExposure on Local Deposit Supply

	Full Sample		Established Markets	
	Dep.	Dep.	Dep.	Dep.
Post x CountyExp	-0.045***	-0.042***	-0.019**	-0.017*
	(0.01)	(0.01)	(0.01)	(0.01)
Post x Avg. Earnings	0.159***	0.182***	0.185***	0.240***
	(0.03)	(0.03)	(0.04)	(0.03)
Post x Manuf. Share	0.030	-0.008	-0.118*	-0.182***
	(0.06)	(0.05)	(0.06)	(0.06)
Post x Educ.	0.013***	0.012***	0.009***	0.008***
	(0.00)	(0.00)	(0.00)	(0.00)
Bank-by-County FE	yes	yes	yes	yes
Bank-by-Year FE	yes		yes	
Bank-by-Year-by-State FE		yes		yes
N	193,995	189,943	97,715	95,584
R^2	0.95	0.96	0.97	0.98

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

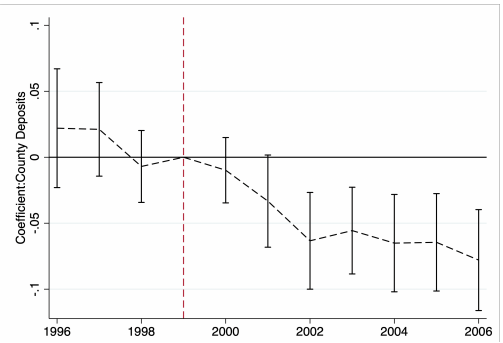
Note: Data are bank-by-county-by year observations. Each regression is a continuous difference-in-difference regression. The fixed effects included in each regression are denoted in the table. The parameter of interest is the coefficient $PostxNTR\_gap$, which signifies the percent change in local deposit supply due to a one standard deviation increase in county level exposure. The Established Markets sub-sample focuses on markets where banks have an established presence by excluding observations where the given bank has only one branch in the local market.

in import competition and bank deposits, it is essential that, in the absence of the permanent granting of Normal Trade Relations (NTR), deposit trends would have followed a similar trajectory across counties, regardless of their level of exposure to import competition. In many prior studies, the China Shock is assumed to be exogenous, which simplifies the identification process. However, if banks had strategically selected markets based on the manufacturing composition of those local markets, then the analysis would fail to capture the true causal relationship. The time plot in Figure 3 indicates that before the Shock, deposit trends exhibited similarities across counties. To address the possibility of banks selectively entering and exiting markets in response to the shock, I estimate the desired specification using both the full sample of bank-by-county-by-year observations and a sub-sample that excludes any observations where a bank has only a single branch in that local market. The sub-sample specifically includes markets in which banks have established a presence.

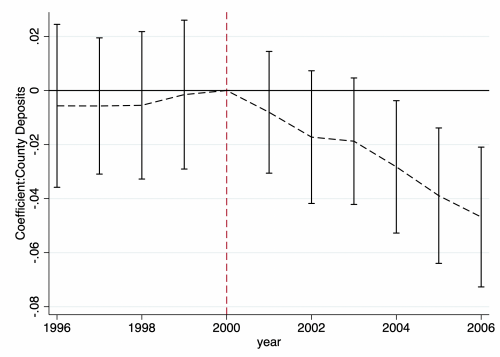
I bolster this analysis with event studies which estimate the coefficients in a specification similar to Equation (4) but where exposure and control variables are interacted with a dummy variable for each year. Plotting the coefficients gives a visual representation of the impact of exposure on the desired outcomes at each time period. While a lack of pretrends alone does not validate the causal estimates, it adds to the idea that in the absence of the China Shock, bank level outcomes would have continued in a parallel manner between treated and untreated banks.

Results from the first analysis are shown in Table 3. The coefficient of interest is $Post \times CountyExp$, which signifies the percent change in deposits caused by a 1 standard deviation increase in county exposure to the increased import competition. I estimate the specifications in Columns (1) and (2) using the full sample of observations. Column (1) includes $bank \times county$ and $bank \times year$ fixed effects and time-invariant county level controls, and Column (2) includes $bank \times county$ and $bank \times state \times year$ fixed effects and time-invariant county level controls. The first specification varies slightly from the second, as $bank \times year$ fixed effects are not interacted with the state variable. Results from the first specification show that a 1 standard deviation increase in a county's exposure to import competition led to a 4.46% decrease in deposits, and when controlling for state-level deposit pricing, a 1 standard deviation increase in exposure led to a 4.2% decrease in deposits. The similarity of the two

Figure 4: Effect of Exposure to Import Competition on Deposits at Bank-County Level



(a) Full Sample



(b) Established Markets

Note: The figure present the estimates from the difference-in-difference regression from the panel of county level deposits for each FDIC insured bank. The dependent variable is the log of deposits at the bank-county level. Time invariant controls are interacted with a post-dummy. Regression includes bank-by-state-by-year and bank-by-county fixed effects. Panel A is estimated using the full sample of bank-by-county-by year observations and Panel B is estimated using the observations from banks' established markets.

estimates suggests that few bank-level attributes, such as deposit prices, vary across state lines.

I estimate the specifications in Columns (3) and (4) using the sub-sample of bank-by-market observations that are classified as established markets. Using these observations limits the influence of local deposit shifts that may arise from rapid entry and exit into markets. In addition to county level controls, Column (3) includes bank-by-county and bank-by-year fixed effects and Column (4) includes bank-by-county and bank-by-state-year fixed effects. These results indicate that a 1 standard deviation increase in a county's exposure to the China Shock led to a 1.6 to 1.8 percent decrease in deposits that could be attributed to supply.

The coefficients of interest in the established markets sample are only half the magnitude of those in the full sample, indicating that bank branches outside established markets experienced more pronounced dynamics. Event studies of the desired specification for both the full sample and the established market sample are displayed in Figure 4. In the full sample, a slight downward pre-trend exists, which continues after the treatment period. Conversely, the event study for the established markets sample lacks this downward pre-trend, suggest-

ing that the negative pre-trends in the full sample were primarily driven by single-branch observations. These findings imply that the causal effect of increased import competition on local deposit supply is more accurately estimated in the specifications derived from the sub-sample, which excludes single-branch observations.

4.3 Core and Brokered Deposits The question arises as to whether deposit outflows in local markets had an impact when aggregated on each bank's balance sheet. If deposits were merely shifting between counties but remaining within the same bank, local deposit changes wouldn't affect the total bank funding. To investigate this, I examine quarterly balance sheets provided by the FDIC. These balance sheets provide insights into total, brokered, and core deposits for each bank at a quarterly frequency.

Deposits can be categorized into core deposits and non-core deposits. For simplicity, I refer to non-core deposits as brokered deposits, even though some non-core deposits may not be brokered. Core deposits are generally a safer, more stable source of funding for banks, encompassing small-denomination time deposits, checking deposits, and other payment accounts of less than $250,000 for customers in the same geographic region as the branches[8]. On the other hand, banks typically acquire brokered deposits through brokers, who connect large savers with banks. These deposits are typically more expensive and often more volatile as they often exceed the FDIC's insurance limits. Therefore, it is essential to analyze both subsets of deposits, as movements in each may reflect different economic mechanisms.

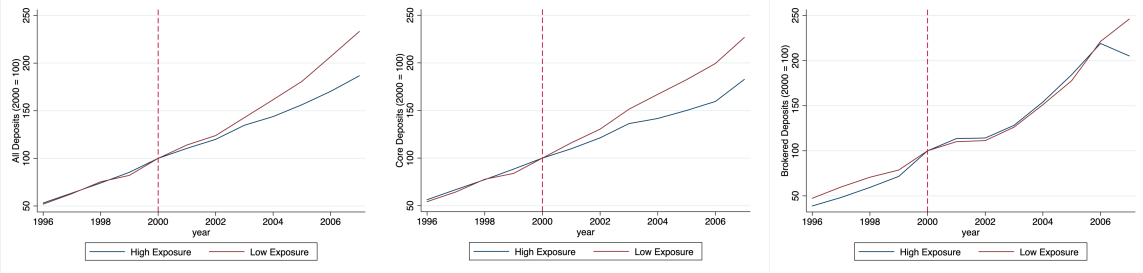
Figure 5 illustrates the time trend following the granting of permanent NTR with China. Banks more exposed to import competition than the median experienced a decrease in total and core deposits. This indicates that local outflows likely had a significant impact on bank funding.

I formally analyze this connection by leveraging differential bank exposure to increased import competition before and after permanent NTR in a difference-in-differences regression with continuous treatment. I estimate the parameters in the following equation:

$$ln(D_{bt}) = \beta(Post_t \times BankExp_b) + \gamma \times Post_t \times X_{bt} + \epsilon_{bt} \tag{5}$$

[8]For reference, see https://www.fdic.gov/regulations/safety/manual/section6-1.pdf.

Figure 5: Deposit Trends by Exposure to Import Competition



(a) All Deposits (b) Core Deposits (c) Brokered Deposits

Note: The figure presents the average of all deposits, core deposits, and brokered deposits at the bank level based on exposure to the China Shock. Banks are divided into high and low based on the value of their exposure relative to the median. Values are then normalized such that 2000 is equal to 100.

where D_{bt} is the sum of deposits at bank b in year t, $BankExp_b$ is bank b's exposure to increased import competition, and X_{bt} is a vector of time invariant bank level controls interacted with a post-dummy. The controls measure fundamental characteristics of each bank and are 1997 to 1999 averages of the assets, non-performing loan ratio, and equity ratios of each of the banks. Each regression includes time fixed effects which control for quarter specific shocks which affected every bank and bank fixed effects which control for time invariant bank-level factors which drive banks' individual credit and funding decisions. The coefficient of interest is β and it represents the effect of an increase in bank exposure to the China Shock on a given bank's deposits. Identification of a causal relationship hinges on the assumption that in the absence of the China Shock, bank funding would have been similar across banks.

The results of the regression analysis are displayed in Table 4. The dependent variables considered include the natural logarithm of total deposits, core deposits, and brokered deposits. A one-unit increase in bank exposure corresponded to a 2.3% decrease in total deposits, a 2.2% decrease in core deposits, and a 3.5% decrease in brokered deposits, with all coefficients attaining statistical significance at the 1% level. These outcomes demonstrate that exposure to import competition had a substantial impact on banks' funding. To examine whether these changes predominantly occurred at the intensive margin of deposit collection, I conducted an analysis of the number of branches operated by each bank and the

number of counties in which each bank had branches using the same difference-in-differences regression. The results of these regressions are presented in the final columns of Table 4.

Table 4: Effect of Exposure to Import Competition on Deposits (Balance Sheet Level)

Dep Var:	All Dep.	Core Dep.	Brokered Dep.	Branches	Markets
Post x BankExp	-0.023***	-0.022**	-0.035***	-0.004	0.011*
	(0.001)	(0.009)	(0.013)	(0.007)	(0.006)
Post x Asset	-0.003***	-0.003***	-0.004***	-0.002***	-0.001***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Post x Non-Perf. Loan	0.010	0.005	0.010	0.041***	0.052***
	(0.012)	(0.011)	(0.013)	(0.009)	(0.008)
Post x Equity Ratio	-65.18	-65.37	-32.88	-43.19*	-36.60*
	(52.98)	(51.63)	(54.14)	(23.35)	(19.18)
N	154,465	154,465	154,465	153,226	153,226
R^2	0.97	0.97	0.95	0.96	0.93

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Note: Data come from FDIC Quarterly Call Reports. The regression is a continuous difference-in-difference, and dependent variables include the log of total deposits, core deposits, and brokered deposits. Variables include an indicator *Post* which is equal to 1 for observations after the year 2000; *BankExp*, which is each bank's exposure to the China Shock based on its deposit collecting locations; the average non-performing loan ratio, log of assets, and equity-to-assets ratio for each bank in the years prior to 2000. Each regression includes time period and bank fixed effects.

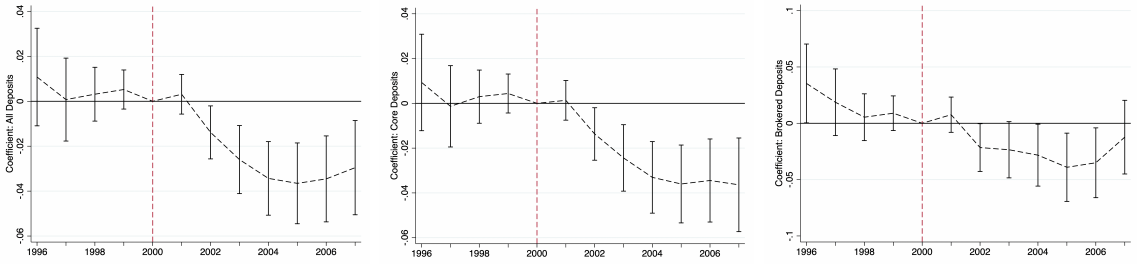
For the number of branches each bank operated, the coefficient of interest is negative but lacks statistical significance. For the number of markets a bank operated branches in, the coefficient is positive but quite small. A one-unit increase in bank exposure resulted in a 1.1% increase in the number of markets where a given bank operated branches. Given that, on average, banks operated in 2.6 markets, this increase is economically insignificant, even though it is statistically significant.

Event studies for the deposit regressions are shown in Figure 6. The plots show that prior to permanent NTR, the coefficients of interest were identical to zero, and only after the year

2000 do the coefficients become negative. This pattern supports the assertion of parallel pretrends and the causal interpretation of the results. Together, the evidence supports the fact that the local deposit caused by increased import competition impacted bank's balance sheets, especially for banks operating in multiple markets.

Collectively, this evidence suggests that exposure to increased import competition led to a reduction in banks' deposits on the intensive margin, as banks did not alter the number of branches or markets they operated in. Instead, exogenous decreases in employment and wages in the markets exposed to the China Shock led to reduced deposits in the branches banks already operated. For the most exposed banks, these local deposit shocks led to statistically significant declines in total funding. As shown in the tables in the appendix, these results are robust to the use of a discrete treatment measure and the use of Double Machine learning. These results underscore the importance of local deposit shocks, as they can influence the overall funding of banks. Thus, the deposits channel serves as a vital link between bank funding and local economic shocks.

Figure 6: Effect of Exposure to Import Competition on Deposits at Bank Level



(a) Total Deposits (b) Core Deposits (c) Brokered Deposits

Note: The figure present the estimates from the difference-in-difference regression from the panel of bank level deposits for FDIC insured banks. The dependent variable is the log of deposits, core deposits, and brokered deposits at the bank-by-year level. Controls are interacted with year- dummy variables, and bank and time fixed effects are included.

5 Changes in Credit Origination

Thus far, results have indicated that exposure to increased import competition negatively impacted bank funding. It is crucial to understand how this phenomenon impacted individual banks' lending behavior. Funding constraints can have a multifaceted effect on bank lending, including the amount they lend, the markets in which they choose to lend, and the borrower they extend credit to. In building on the insights of Izadi and Saadi (2023), this examination encompasses not only small business lending but also home mortgage originations. These two lending markets differ significantly, with small business loans being information-intensive and often reliant on relational capital, while mortgage loans tend to be more standardized, as they involve collateral that is easier to value and borrower creditworthiness that can be readily assessed. Furthermore, a liquid secondary market exists for mortgages, whereas no such market exists for small business loans. The analysis begins with an assessment of changes in lending at the bank level and subsequently explores decisions related to local credit supply.

5.1 Bank Level Aggregating the credit origination data at the bank level allows for a comprehensive examination of each bank's credit origination decisions. This approach essentially assesses the pass-through rate, which indicates how lending changes in response to shifts in funding. It is expected that reduced funding would result in fewer loan originations. To empirically test this, I estimate parameters from Equation (5) using the log of each bank's small business and mortgage loan originations as dependent variables. Within each lending category, I analyze not only the dollar amount of loans but also the number of loans. This dual analysis helps mitigate potential impacts of endogenous pricing responses in affected counties. The key parameter of interest is the coefficient on the variable Post x BankExp, which represents the percentage change in lending due to a one-unit increase in bank exposure.

The results are presented in Table 5. Surprisingly, the coefficient of interest does not attain statistical significance in any of the specifications. This suggests that exposure to import competition had limited influence on the total amount of small business and mort-

Table 5: Impact of Exposure to Import Competition on Lending (Bank Level)

	Small Business Loans		Mortgage Loans	
	Number	Amount	Number	Amount
Post x BankExp	-0.003	-0.059	0.037	0.020
	(0.045)	(0.072)	(0.028)	(0.038)
Post x Asset	0.687***	1.029***	-0.028	-0.084**
	(0.032)	(0.050)	(0.023)	(0.034)
Post x Non-Perf. Loan	-12.50***	-15.13***	-1.86	-2.16
	(2.90)	(5.25)	(2.34)	(3.61)
Post x Equity Ratio	-2.58***	-3.34**	-0.06	-0.43
	(0.775)	(1.315)	(0.500)	(0.681)
N	30,173	30,173	30,173	30,173
R^2	0.76	0.75	0.83	0.83

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Note: The table presents the results of the continuous difference-in-difference regression using bank-by-year observations. Each regression includes bank and county fixed effects. Dependent variables include the log of small business lending, home mortgage originations.

gage loans originated by banks. This finding may appear somewhat perplexing, considering the established connection between exposure to import competition and reductions in bank funding, as well as the relationship between import competition and local demand for credit. One might naturally assume that these funding changes would be reflected in lending, but such an association does not appear.

Additionally, I investigate the number of markets in which banks operate branches and originate small business and mortgage loans using a similar difference-in-differences regression. The results are presented in Table 6, and once again, the coefficient of interest fails to attain statistical significance for either of the dependent variables. Import competition did not appear to affect the number of markets in which banks originated either type loans. Clearly, some underlying mechanisms enabled banks to sustain their lending levels even when their funding was constrained.

5.2 Reallocation and Securitization Findings in the previous section suggest that there is little connection between increased import competition and credit originations, but analysis at the bank level can mask underlying changes in credit supply. To investigate if aggregate measures of credit supply masked underlying changes, I turn to more granular bank-by-county-by-year data to estimate the coefficients in a model which examines local credit decisions. Analyzing credit decisions at the local level can uncover patterns of redistribution of credit supply between markets.

I estimate a model similar to Equation (4), however, I now include bank-by-county and county-by-year fixed effects. The bank-by-county fixed effects control for potential non-random placement of bank branches and all time-invariant factors that may affect lending activity for a bank in a given county, and the county-by-year fixed effects control for any shock that hits counties in year t, including county specific credit demand shocks. This within county estimator leverages banks' differential exposures to import competition to uncover local credit supply shifts. The primary explanatory variable in each of the specifications is BankExposure, and the coefficient of interest for that variable represents the percent change in local credit supply from a given bank due to a one standard deviation increase in BankExposure.

Table 6: Impact of Exposure to Import Competition on Bank Network Size

	Deposit Markets	Small Business Markets	Mortgage Markets
Post x BankExp	0.003	-0.030	0.015
	(0.020)	(0.026)	(0.022)
Post x Asset	0.043***	-0.011	0.072***
	(0.016)	(0.020)	(0.014)
Post x Non-Perf. Loan	1.938*	-4.278**	-1.827
	(1.137)	(1.757)	(1.551)
Post x Equity Ratio	-1.242	1.529*	-0.835**
	(0.913)	(0.863)	(0.388)
N	4,377	6,810	28,961
R^2	0.94	0.87	0.80

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Note: Data come from FDIC's Summary of Deposits, HMDA, and CRA. The regression is a continuous difference-in-difference, and dependent variables including the log of the number of counties a bank has branches in and the number of counties it originates small business and mortgage loans in. Variables include an indicator *Post* which is equal to 1 for observations after the year 2000; *BankExp*, which is each bank's exposure to the China Shock based on its deposit collecting locations; the average non-performing loan ratio, log of assets, and equity-to-assets ratio for each bank in the years prior to 2000. Each regression includes time period and bank fixed effects.

The results are presented in Table 7, and robustness checks are presented in the Appendix. The top panel of the Table presents the results for all observations, while the middle panel explores heterogeneity across county treatment by estimating the model using only observations from counties with County Exp greater than the median. The final panel uses only observations from counties with County Exp less than the median. Beginning with the full sample, for small business lending, the coefficient on bank exposure is negative for both the number and amount of loans, but it is statistically significant only for the number of small business loans. Specifically, a one-unit increase in bank exposure to increased import competition resulted in a 3.5% decrease in the number of small business loans. Across high and low exposure counties, the coefficient remains very similar, suggesting that any decreases in the supply of these loans were consistent across markets, regardless of their levels of exposure.

For mortgage originations, the coefficient on bank exposure is positive for both the number and amount of mortgage originations, and both coefficients are statistically significant at the 1% level. Specifically, across all observations, a one-unit increase in bank exposure resulted in a 4.7% increase in the number of mortgages and a 12.5% increase in the total amount of mortgages originated. The coefficients vary across high and low exposures, though, as the number and amount of mortgage loans increase 2.9% and 7.9% respectively in high exposure counties but increase 6.1% and 16.5%, respectively, in low exposure counties. The difference in magnitude indicates that increased exposure to import competition prompted banks to reallocate their lending toward mortgage originations but only in markets that were not subject to increased import competition.

Finally, I explore an additional mechanism that may have hampered the transmission of funding shocks to credit originations—namely, the securitization of mortgage loans. As previously mentioned, when a bank originates a mortgage loan, it has the option to either retain the loan on its balance sheet or sell it to another financial institution, a process commonly referred to as securitization. While keeping a mortgage on the balance sheet can yield higher profits, it exposes the bank to default risk and ties up its lending capital. In contrast, selling the mortgage can still generate profits and replenish the bank's lending capital. For banks exposed to funding shocks, this mechanism could play a vital role in their

Table 7: Impact of Import Competition on Local Credit Supply (Bank-by-County Level)

		Small Business Loans		Mortgage Loans		
		Number	Amount	Number	Amount	Securitized
All Counties						
	Post x BankExp	-0.035**	-0.041	0.047***	0.125***	0.316***
		(0.014)	(0.030)	(0.005)	(0.009)	(0.015)
	N	125,920	125,920	350,546	350,546	350,545
	R^2	0.90	0.79	0.87	0.83	0.73
High Exp.						
	Post x BankExp	-0.042*	-0.064	0.029***	0.079***	0.252***
		(0.021)	(0.046)	(0.008)	(0.012)	(0.022)
	N	45,870	45,870	140,004	140,004	140,004
	R^2	0.91	0.82	0.88	0.83	0.73
Low Exp.						
	Post x BankExp	-0.039**	-0.040	0.061***	0.165***	0.361***
		(0.018)	(0.041)	(0.008)	(0.012)	(0.021)
	N	80,050	80,050	210,542	210,542	210,541
	R^2	0.90	0.78	0.86	0.82	0.73

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Note: The table presents the results of the continuous difference-in-difference regression using bank-by-county-by-year observations. Each regression includes bank-by-county and county-by-year fixed effects and pre-treatment assets, non-performing loans, and equity ratios interacted with a post dummy as controls. Dependent variables include the log of small business lending, home mortgage originations, and home mortgage originated then sold within a year. The Second Panel includes only observations from counties with County Exp greater than the median, while the final panel includes observations from counties with County Exp less than the median.

ability to continue originating loans.

To examine this mechanism, I regress the amount of loans that each bank securitized in each county market on measures of bank and county exposure within the same difference-in-differences framework. The results are presented in the final column of Table 7. Notably, the coefficient on bank exposure is positive and statistically significant. Across all observations, a one-unit increase in bank exposure leads to a 32% increase in the amount of securitization. Analysing the effect across county exposures, a similar pattern as before appears, as a one-unit increase in bank exposure leads to a 25.2% increase in high exposure counties and a 36% increase in low exposure counties. This pattern is consistent with the earlier finding that lending activity was moving into county markets that were less exposed to import competition, and the magnitude and significance of the coefficients here points to the importance of the securitization channel.

These findings suggest that highly exposed banks managed funding shocks by shifting their lending to safer, less exposed markets and selling loans in secondary markets. Drechsler et al. (2017) write that small business loans are risky, illiquid, and rarely securitized. Mortgages, on the other hand, are frequently sold off balance sheet and have large secondary markets backed by other banks, financial institutions, and government sponsored enterprises. This geographic and market reallocation is similar to what some coined a flight to quality (Bernanke et al. (1996)) whereby external factors nudge banks to lend to only the safest customers when there is increased uncertainty, however, in this case, it is a flight to liquidity.

6 Summary and Concluding Remarks

In this paper, I show that the local labor market shock generated by the granting of Permanent Normal Trade Relations with China in 2000 had implications beyond the labor market consequences of decreased employment and wages. Banks rely on cheap funding from customer deposits in local markets, and when those local markets experience increased unemployment and decreased wages, deposit supply is constrained. I show that banks saw statistically significant declines in deposit supply in markets exposed to the China Shock,

and these local deposit declines aggregated up to the balance sheet level.

These funding constraints had far-reaching implications for how and where banks extended credit. While the impact of exposure to import competition was relatively modest when viewed at the level of banks' balance sheets, the banks achieved this limited pass-through of funding shocks by strategically shifting their lending focus. Specifically, they reallocated their lending from small business loans to mortgage loans in markets that were less exposed to increased import competition. The ability to offload mortgage loans to secondary markets played a crucial role in this reallocation process, as it allowed banks to fill funding gaps by moving mortgages off their balance sheets, thus freeing up lending capital. With any analysis like this, caution must be taken when assigning causality. Violations of the identification assumption can limit the ability for a causal interpretation of reduced form parameters. I support identification in many of my analyses by showing parallel pretrends and event study plots

The results of this study provide valuable insights into our understanding of how local shocks impact the financial system. While previous research has often emphasized the role of non-performing loans in influencing credit supply, it's crucial to recognize that funding constraints play an equally significant role. The deposits channel reveals that local exogenous shocks can result in tightened bank funding.

When banks face funding limitations, they adapt by altering both the nature and geographic distribution of the credit they provide. Instead of reallocating to safer assets, they tend to pivot towards more liquid assets that can be easily sold off their balance sheets. However, as demonstrated by the events of the Great Financial Crisis just eight years after the China Shock, a flight to the most liquid assets may not be the most prudent approach for stability in the financial system.

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8 Appendix: Robustness Checks

To check the robustness of my analyses, I begin by discretizing the exposure measures and re-running the regressions. For county exposure, I create the a discrete treatment variable which is equal to 1 for counties whose exposure is greater than the median, which is -0.02, and zero otherwise. Similarly, I create a new bank level treatment variable that is equal to 1 if the bank exposure is greater than the median, which is -0.22, and 0 otherwise. By using a discrete treatment measure, a weaker form of the identification assumption is necessary for a causal interpretation of the results. The identification assumption for discrete treatment is that differences in outcomes of high and low exposure banks would continue along the existing differential trend if both were exposed to small shocks.

In addition to this robustness check, I utilize a Double Machine Learning (DML). Specifically, I use Microsoft ALICE's PartialDML python package. Estimation works as follows. Consider the partially linear model :

$$y = \beta_0 \times T + g(X) + \epsilon$$
$$T = m(X) + v$$

I begin by removing any fixed effects using the demeaning method (See "Analysis of Panel Data," 3rd edition, page 62). The algorithm then splits the data into a test and a training set. Using machine learning methods in the training data-set, T is regressed on X to find $\hat{m}()$ and y is regressed on X to find $\hat{g}()$. Specifically, the algorithm uses a RandomForest regression to estimate these first stage models. The coefficient of interest, β_0 is then the OLS coefficient of the regression of $(y - \hat{g}(X))$ on $T - \hat{m}(X)$ using the test data. The logic is similar to the Frisch-Waugh-Lovell theorem, but in this case, the partial effects of covariates are removed using non-parametric methods, and the data is split into test and training sets in order to reduce bias. For a more complete overview, see Athey et al. (2019).

The main analyses are repeated using each of the above robustness checks. Results are presented below.

Table 8: Local Deposits Discrete Treatment

	Full Sample		Established Markets	
	dep	dep	dep	dep
Continuous Treatment				
Post x CountyExp	-0.045***	-0.042***	-0.019**	-0.017*
	(0.01)	(0.01)	(0.01)	(0.01)
N	193,995	189,943	97,715	95,584
R^2	0.95	0.96	0.97	0.98
Discrete Treatment				
1.tt 1.post	-0.041***	-0.031***	-0.038***	-0.037***
	(0.010)	(0.010)	(0.010)	(0.010)
N	193,995	189,943	97,715	95,584
R^2	0.95	0.96	0.97	0.98
DML Continuous Treatment				
Post x CountyExp	-0.042***	-0.022	-0.041***	-0.041***
	(0.011)	(0.015)	(0.011)	(0.014)
DML Discrete Treatment				
Post x Treated	-0.32**	-0.04***	-0.037***	-0.011
	(0.013)	(0.012)	(0.012)	(0.016)
Bank-by-County FE	yes	yes	yes	yes
Bank-by-Year FE	yes		yes	
Bank-by-Year-by-State FE		yes		yes

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Table 9: Bank Deposits, Discrete Treatment

	Dependent Var.				
	ldep	Core Dep	Broke Dep.	Branches	Markets
Continuous Treatment					
Post x BankExp	-0.023***	-0.022**	-0.035***	-0.004	0.011*
	(0.009)	(0.009)	(0.013)	(0.007)	(0.006)
N	154,465	154,465	154,465	153,226	153,226
R^2	0.97	0.97	0.95	0.96	0.93
Discrete Treatment					
Post x Treated	-0.033**	-0.030**	-0.041**	-0.001	0.004
	(0.014)	(0.014)	(0.020)	(0.011)	(0.010)
N	154,465	154,465	154,465	153,226	153,226
R^2	0.97	0.97	0.95	0.96	0.93
DML Continuous Treatment					
Post x BankExp	-0.028***	-0.031***	-0.041***	-0.005**	0.01***
	(0.003)	(0.003)	(0.004)	(0.002)	(0.002)
DML Discrete Treatment					
Post x Treated	-0.04***	-0.039***	-0.049***	-0.001	0.003
	(0.004)	(0.004)	(0.006)	(0.003)	(0.002)

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Table 10: Impact of Import Competition on Local Credit Supply (Bank-by-County Level)

	Small Business Loans		Mortgage Loans		
	Number	Amount	Number	Amount	Securitized
Continuous Treatment					
Post x BankExp	-0.036***	-0.042	0.050***	0.135***	0.330***
	(0.014)	(0.031)	(0.006)	(0.009)	(0.016)
Post x BankExp x CountyExp	0.009	0.009	-0.013***	-0.044***	-0.061***
	(0.012)	(0.026)	(0.005)	(0.008)	(0.014)
R^2	0.90	0.79	0.87	0.83	0.73
Discrete Treatment					
Post x BankTreated	-0.105***	-0.083*	0.117***	0.192***	0.547***
	(0.021)	(0.048)	(0.010)	(0.015)	(0.028)
Post x BankTreated x CountyTreated	0.004	-0.023	-0.038**	-0.058**	-0.019
	(0.043)	(0.090)	(0.016)	(0.024)	(0.044)
R^2	0.90	0.79	0.87	0.83	0.73
DML Continuous Treatment					
Post x BankExp	-0.002	0.045***	-0.016	-0.028	-0.14***
	(0.008)	(0.017)	(0.015)	(0.021)	(0.035)
Post x BankExp x CountyExp	0.109***	0.17***	0.072***	0.062***	-0.097***
	(0.008)	(0.015)	(0.013)	(0.016)	(0.027)
DML Discrete Treatment					
Post x BankTreated	-0.093***	-0.046*			
	(0.013)	(0.027)			
Post x BankTreated x CountyTreated	0.347***	0.522***			
	(0.021)	(0.042)			

Standard errors in parentheses

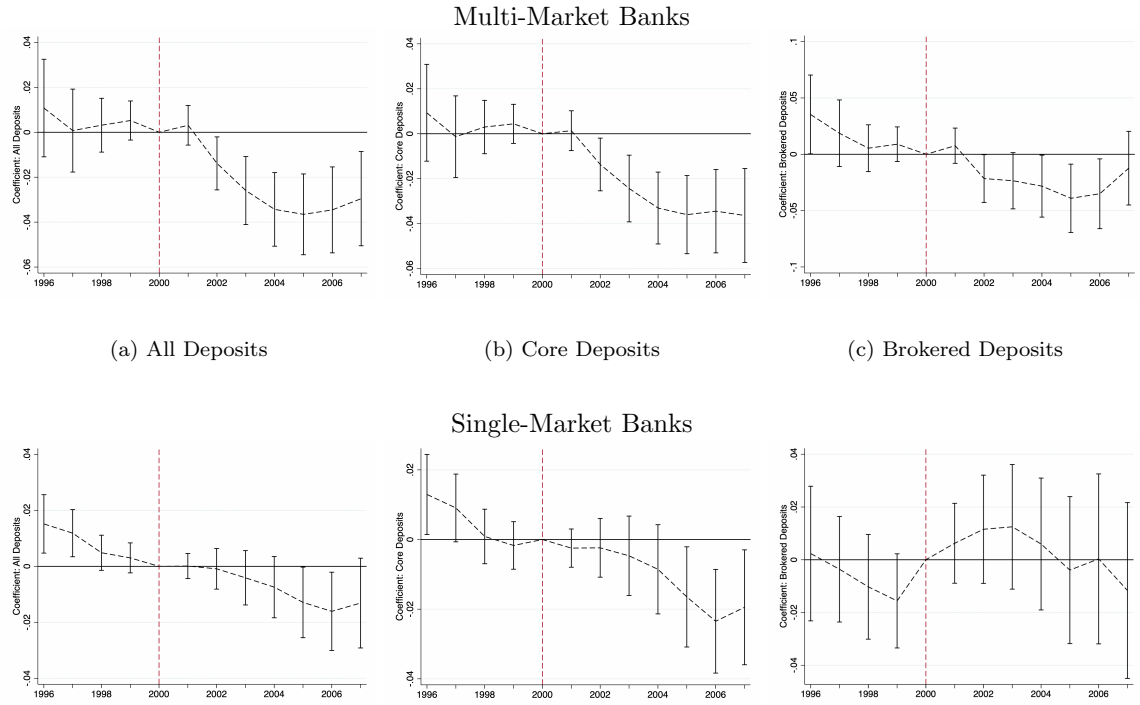
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Note: The table presents the results of the continuous difference-in-difference regression using bank-by-county-by-year observations. Each regression includes bank-by-county and county-by-year fixed effects. Dependent variables include the log of small business lending, home mortgage originations, and home mortgage originated then sold within a year.

9 Appendix Figures and Tables

In this appendix, I include analyses from the main paper but include single-market banks.

Figure 7: Deposit Reaction to China Shock



(a) All Deposits (b) Core Deposits (c) Brokered Deposits

(d) All Deposits (e) Core Deposits (f) Brokered Deposits

Note: The figure presents the event studies of the reaction of all deposits, core deposits, and brokered deposits to exposure to the China Shock. Regressions are continuous difference-in-difference regressions with bank and period fixed effects. Standard errors are clustered at the bank level, and the coefficient for year 2000 is standardized to zero.

Table 11: Bank Deposit Levels (Appendix)

	Full Sample			Multi-Market			Single-Market		
	ldep	coredep	brokdep	ldep	coredep	brokdep	ldep	coredep	brokdep
Post x BankExp	-0.0217***	-0.0198***	-0.00962	-0.0234***	-0.0223**	-0.0351***	-0.0135***	-0.0120**	0.0105
	(0.00487)	(0.00530)	(0.00864)	(0.00908)	(0.00895)	(0.0131)	(0.00477)	(0.00588)	(0.0108)
Post x NPR	-0.00295***	-0.00269***	-0.00328***	-0.00301***	-0.00284***	-0.00377***	-0.00272***	-0.00250***	-0.00299***
	(0.000404)	(0.000472)	(0.000819)	(0.000811)	(0.000782)	(0.000953)	(0.000458)	(0.000566)	(0.00114)
Post x Asset	0.000778	0.0184**	-0.0320**	0.00984	0.00465	0.0100	-0.0151	0.00479	-0.0766***
	(0.00804)	(0.00829)	(0.0144)	(0.0108)	(0.0110)	(0.0128)	(0.0126)	(0.0132)	(0.0293)
Post x EQR	25.31	-62.38*	41.91	-65.18	-65.37	-32.88	65.12**	-27.99	60.80
	(28.65)	(33.52)	(44.12)	(52.98)	(51.63)	(54.14)	(27.03)	(38.86)	(52.87)
N	376831	376830	376831	154465	154465	154465	222131	222130	222131
R^2	0.947	0.942	0.907	0.967	0.966	0.946	0.934	0.923	0.874

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Note: Data come from FDIC Quarterly Call Reports. The regression is a continuous difference-in-difference, and dependent variables include the log of total deposits, core deposits, and brokered deposits. Variables include an indicator *Post* which is equal to 1 for observations after the year 2000; *Exp*, which is each bank's exposure to the China Shock based on its deposit collecting locations; the average non-performing loan ratio, log of assets, and equity-to-assets ratio for each bank in the years prior to 2000. Each regression includes time period and bank fixed effects. The first panel includes all banks, the second includes only banks operating branches in more than one local market, and the final includes only banks operating branches in a single market.

Table 12: Bank Level Lending Changes (Appendix)

	Full Sample			Multi-Market			Single Market		
	amt cra	amt hmda	hmda sold	amt cra	amt hmda	hmda sold	amt cra	amt hmda	hmda sold
Post x BankExp	-0.0430	0.0403	0.117	-0.0325	0.0147	0.0893	0.0633	0. 195*	0.385**
	(0.0716)	(0.0380)	(0.0760)	(0.0708)	(0.0369)	(0.0799)	(0.0770)	(0.114)	(0.182)
Post x Asset	0.924***	-0.106***	0.0505	1.033***	-0.0875***	0.0708	-0.435***	- 0.111	0.134
	(0.0484)	(0.0330)	(0.0464)	(0.0498)	(0.0337)	(0.0487)	(0.108)	(0.149)	(0.139)
Post x NPR	-14.11***	-2.242	-6.649	-14.54***	-1.926	-8.297*	-9.351	5.116	30.17
	(5.251)	(3.560)	(4.817)	(5.219)	(3.627)	(4.807)	(14.86)	(15.82)	(19.89)
Post x EQR	-2.825**	-0.730	1.457	-2.959**	-0.437	1.196	-4.278*	-1.663	4.521
	(1.388)	(0.707)	(1.309)	(1.326)	(0.672)	(1.354)	(2.428)	(3.015)	(3.914)
N	32877	32877	32877	30123	30123	30123	2558	2558	2558
R^2	0.755	0.839	0.726	0.756	0.828	0.730	0.809	0.907	0.808

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Note: The table presents the results of the continuous difference-in-difference regression using bank-by-year observations. Each regression includes bank and county. Dependent variables include the log of small business lending, home mortgage originations, and home mortgages that were originated and sold within a year. The first panel includes all banks, the second includes only banks operating branches in more than one local market, and the final includes only banks operating branches in a single market.

Table 13: Credit Supply at Bank-by-County Level (Appendix)

	Full Sample			Multi-Market			Single Market		
	amt_cra	amt_hmda	sold_hmda	amt_cra	amt_hmda	sold_hmda	amt_cra	amt_hmda	sold_hmda
Post x BankExp	-0.242*	0.259*	0.607***	-0.0300	0.101	0.349***	-0.463**	0.531***	0.903**
	(0.144)	(0.137)	(0.193)	(0.0422)	(0.0956)	(0.113)	(0.221)	(0.200)	(0.399)
Post x BankExp x Exp	0.0416	-0.120***	-0.161***	0.00717	-0.0636**	-0.0524	-0.000451	-0.113	-0.173
	(0.0404)	(0.0376)	(0.0492)	(0.0317)	(0.0301)	(0.0352)	(0.0550)	(0.0920)	(0.132)
Post x Asset	-0.206***	-0.0449	0.0290	0.0156	-0.00756	0.129***	-0.304***	-0.203**	-0.385*
	(0.0545)	(0.0285)	(0.0508)	(0.0239)	(0.0254)	(0.0429)	(0.0771)	(0.0893)	(0.197)
Post x NPR	-6.802	1.306	20.10**	-9.855	2.591	20.34**	9.392	8.350	40.77
	(10.42)	(5.546)	(9.741)	(7.213)	(5.417)	(9.613)	(18.00)	(14.04)	(27.12)
Post x EQR	0.708	0.581	2.509	0.140	0.00632	0.973	0.662	3.669	13.88**
	(1.973)	(1.506)	(3.073)	(1.315)	(1.760)	(3.834)	(3.479)	(2.284)	(5.695)
N	341291	381808	381807	125920	350546	350545	204135	16351	16351
R^2	0.786	0.818	0.716	0.794	0.826	0.728	0.827	0.884	0.819

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Note: The table presents the results of the continuous difference-in-difference regression using bank-by-county-by-year observations. Each regression includes bank-by-county and county-by-year fixed effects. Dependent variables include the log of small business lending, home mortgage originations, and home mortgage originated then sold within a year. The first panel includes all banks, the second includes only banks operating branches in more than one local market, and the final includes only banks operating branches in a single market.