Local Economic Shocks and the Market for Credit

Samuel Crowell

February 18, 2025

Abstract

Local labor market shocks can impact the commercial banking system through various economic channels. Utilizing a set of continuous difference-in-differences regressions, I identify plausibly exogenous shifts in the value of bank assets and in local deposit supply generated by Permanent Normal Trade Relations (PNTR) with China. The local labor market shocks from PNTR disrupted both sides of banks' balance sheets, especially for banks with branches in multiple counties. The banks most exposed to these local disruptions adjusted their credit origination strategies along product and geographic lines, consistent with a "flight to liquidity," where banks originated mortgages which could sold into secondary credit markets regardless of their quality. As the most heavily exposed banks originated more mortgages, they reduced their small business lending. These adjustment responses highlight the deposits channel as an important mechanism linking local labor market shocks to the commercial banking sector.

JEL Codes: D22; G21; L25.

1 Introduction

Commercial banks are exposed to a host of risks. Some risks, such as regulatory changes and business cycle fluctuations, affect all banks. Others, such as local labor market disturbances, affect only a subset of banks. Whether because of natural disasters, changes in trade policy, or shifts in the broader macro-economy, these more localized shocks typically follow a similar pattern which begins outside of the banking system. Firms most exposed to the shocks cut wages, reduce workforces, or in some cases cease operations (Pierce and Schott (2016)). Changes in business conditions like this pose a risk to commercial banks, and given the importance of the commercial banking system, it is essential to understand the channels through which these spillovers may occur and how banks behave in response.

Two problems arise when analyzing banks' responses to local economic shocks. The first is that many economic shocks begin within the financial system.[1] Disentangling cause and effect becomes a futile task when disruptions originate with the banks in question. The second is that because such shocks often impact both sides of banks' balance sheets, it is difficult to determine the mechanisms driving banks' responses. Previous research often points to the importance assets channel of transmission, where increases in non-performing loans force banks to reduce credit supply (Izadi and Saadi (2023), Federico et al. (2023), Mayordomo and Rachedi (2022)). Few researchers, however, investigate how local shocks affect the liabilities side of balance sheets as local labor market shocks increase the draw down in deposit holding. Such a channel is unique from bank runs and can be thought of similar to increase in the cost of capital. Shifts in the supply of deposits, the primary source of commercial banks' funding, place unique constraints on the bank business model. Banks can compensate for lost deposits by tapping more expensive wholesale funding markets or adjust the asset side of their balance sheets by adjusting the duration of loans they originate or selling assets into secondary credit markets.

To investigate the connections between commercial banks and local labor market shocks, I leverage banks' differential exposure to the passage of Permanent Normal Trade Relations (PNTR) with China in 2000. PNTR produced plausibly exogenous local labor market shocks which can be used to study the transmission of these pressures to the banking system. The empirical design in this paper relies on measures of county and bank level exposure to PNTR. County exposure is based on each county's labor market composition, and bank exposure relies on banks' branch footprints. Following Pierce and Schott (2016), I use tariff schedules and county labor force compositions from before PNTR to create a measure of each county's exposure to increased import competition. This measure, which varies by

[1] Prominent examples include the Great Depression, the Savings and Loan Crisis, and the Great Financial Crisis.

county but constant across time, accounts for the change in each industry's tariffs and the proportion of each county's workforce employed in each industry prior to PNTR. 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.[2]

I first utilize a set of event studies and continuous difference-in-difference regressions to quantify the first stage impact of differential exposure to PNTR on banks' balance sheets and income statements. These analyses establish that PNTR impacted portions of bank operations which affect credit supply. The analyses find that PNTR led to an increase in non-performing loans and an inward shift in deposit supply, indicative of the presence of both asset and deposits channels. Further analysis of the deposit channel finds that it was driven primarily by local customers' supply of deposits, not by changes in banks' demand for deposits or through the shuttering of bank branches.

I then examine the impact of PNTR on credit supply decisions, finding that at the bank level, exposure to PNTR led to reductions in small business lending but temporary increases in mortgage originations. When adjusting for bank-level lending trends prior to PNTR, I find that a one standard deviation increase in bank-level exposure led to a 24 percent reduction in small business loan originations and a 3 percent increase in mortgage originations.

To examine the importance of credit supply in these reduction, I examine origination at the bank-by-county-by-year level. Similar to 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 control for local credit demand. This specification isolates changes in each bank's local credit supply decisions caused by increased import competition. I find that exposure to PNTR led banks to reallocate capital at the local level from small business loans to mortgage loans, especially in geographic markets not affected by increased import competition. When controlling for local credit demand, a one standard deviation increase in bank-level exposure led to a 15 percent reduction in small business loan origination and a 19 percent increase in mortgage originations. As banks adjusted credit supply between small business lending and mortgage lending, they also adjusted along geographic lines. The banks most exposed to PNTR increased mortgage origination outside of markets where they had branches.

This research contributes to a large literature studying the economic impact of China's reception of PNTR. Many papers investigate the harm increased import competition inflicted

[2]I use this method of local bad bank exposure because banks have the ability to open and close branches in response to local shocks and any measure of post-PNTR exposure based on concurrent branch networks may capture this endogenous response. Others, such as Autor et al. (2013), measure exposure to import competition based on measured increases in imports in each sector.

on 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 PNTR, and beyond the direct labor market consequences, other studies have found evidence that PNTR 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)).[3] The papers most closely related to this 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) show similar 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 substitutions between small business and mortgage lending and between geographic markets. 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.

This paper is also related to research studying the transmission of local shocks through bank branch networks. As with other firms, banks' internal capital markets allow for the movement of lending capital between different geographic segments of each bank. Investigations into the role of banks' internal capital markets have leveraged exogenous credit and liquidity shocks from hurricanes (Schuwer et al. (2018)), the shale oil boom (Gilje et al. (2016)), and floods (Rehbein and Ongena (2022)) to understand their ability to transmit both positive and negative shocks across geographic markets.[4] In times of economic turmoil, branch networks can have positive benefits, allowing banks to continue lending in impacted areas (Quincy (2023)). Alternatively, branch networks can have negative local effects, as firms sometimes siphon capital from peripheral operations (Biermann and Huber (2023)). This study complements previous work by isolating a plausibly exogenous and persistent local economic shock from the real economy and examining banks' adjustment along both product space and geographic market dimensions. While many of the previous papers show networks being used to transfer liquidity to increase credit supply in affected markets, my analysis shows that rather than a "flight to quality," the most exposed banks participated in a "flight to liquidity." Banks shifted credit supply into assets that could be sold into secondary credit markets. Such a strategy conserves liquidity when the cost of deposits increases.

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

[4]Natural disasters are useful for studying the transmission of economic shocks since many economic shocks originate in the financial system (Clark et al. (2021)). Lazzaroni and Bergeijk (2014) provide a more extensive summary of studies examining the macroeconomic impact of natural disasters.

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 which ties bank level outcomes to the real economy (Diamond and Dybvig (1983), 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 is impacted. I expand this literature by investigating relatively smaller losses of deposits commiserate with real economic conditions. Rather than bank runs, which lead to a sudden halt in all credit supply, I show that smaller declines in deposits can lead to credit reallocation. In the face of constricted funding, banks lend more in markets with active and liquid secondary markets.

The paper proceeds as follows. In Section 2, I provide background on PNTR, a significant change in trade policy with China. In Section 3, I provide an overview of the data and explain the county and bank level measures I use to quantify exposure to PNTR. In Section 4, I present my empirical strategy and provide first stage results, and in Section 5, I present the main results connecting exposure to increased import competition with adjustments in credit origination. In Section 6, I conclude.

2 Background

2.1 Permanent Normal Trade Relations To understand how changes in trade policy affect local labor markets, I provide a brief overview of US trade policy over the previous fifty years. For imports into the US, tariffs are documented in the US's Harmonized Trade Schedule, which has two categories of rates for each type of good based on its country of origin. Countries are divided into Column One and Column Two based on their political standing with the US.[5] Countries assed at Column One rates are referred to as having Normal Trade Relations (NTR) with the US. NTR is beneficial for bilateral trade, as Column One rates are less than or equal to Column Two rates.

With the passage of the Trade Act of 1974, countries that had been assessed at Column One schedule would permanently hold that tariff schedule.[6] Prior to 1974, China had been excluded from NTR status, and accordingly, its imports had been taxed at Column Two rates. Section 402 of the Trade Act of 1974 allowed the President of the US to issue annual waivers allowing imports from a Column Two country to be assessed at Column One rates.

[5]Prior to 1998, Column One 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.

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

In 1980, President Carter broke with tradition and granted China, a Column 2 country at the time, an annual waiver.[7] Opening trade was seen as a way to push China towards a market economy model and increase political stability in Asia (Alexandroff (1998)). President Carter and succeeding US presidents continued to grant China annual waivers, and between 1985 and 1995, bilateral trade between the US and China increased from $7.7 billion USD to over $57.3 billion USD.[8]

Despite the increase in bilateral trade, Congress frequently threatened to revoke China's NTR waivers. Uncertainty surrounding the extension of the waivers provided protection for many US producers that had relative disadvantages to their Chinese counterparts. Firms considering offshoring needed to carefully weigh the savings of moving production to China with the risks that its waiver might not be renewed (Pierce and Schott (2016)). Many World Trade Organization (WTO) member countries similarly raised concerns about the NTR waiver process, questioning its consistency with WTO trade rules. By withholding permanent normal trade relations (PNTR) status from China, the US prevented China from joining the WTO.

This issue prompted the introduction H.R. 4444 on May 15, 2000, a bill to grant China permanent NTR (PNTR) status if it joined the WTO. The bill's promoters believed that the offshoring of labor-intensive production processes and expansion of export markets for American farmers would stimulate economic growth in both the US and China. Despite resistance from organized labor groups, the bill passed through Congress and the Senate and was signed into law on October 10, 2000. Once China officially joined the WTO in December, 2001, tariff rates on Chinese imports were permanently set at Column One rates.

PNTR, or the China Shock as it is sometimes called, did not involve an abrupt reduction of tariffs; rather, it resolved the uncertainty that tariffs on some imports could have significantly increased if Congress blocked China's NTR waiver. The resolution of this uncertainty ushered in a period of rapid offshoring and decline in specific industries exposed to these tariff schedules.

2.2 Commercial Banks, Branch Networks, and Secondary Credit Markets This era was a time of transition in the financial world as changing regulations, new technologies, and shifting competitive landscapes affected markets for the assets and liabilities central to commercial banks' business models.

Customer deposits have traditionally played a central role in bank funding, as commercial banks rely on a combination of demand deposits, time deposits, borrowed funds, and bank

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

[8] Bilateral trade is defined as the sum of imports from and exports to China. Trade data from US Census Bureau, Trade in Goods with China.

capital to fund their assets. Due to their low cost and limited sensitivity to interest rate fluctuations, demand deposits have been an essential part of these liabilities.[9] Banks have traditionally used physical branches to attract deposits from custmers in their local markets. For most of the past century, interstate branch networks were not legally permitted. 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, and the majority of banks operated with small geographic footprints. Following the IBBEA's passage, however, there was rapid expansion of branch networks as banks created de-novo branches and acquired rival banks. Between 1992 and 2000, the number of out-of-state branches surged from 62 to nearly 20,000 (Rice and Johnson (2008)). With the ability to expand their branch networks, banks could theoretically safeguard their balance sheets against local shocks by diversifying operations across multiple interstate markets.

Advancements in internet technologies began to reduce frictions in the origination of credit.[10] Banking technologies reduced geographic frictions in the secondary mortgage markets and allowed for more seamless injections of liquidity into mortgage markets across the country. These liquidity injections were aided by government sponsored enterprises which backstopped the mortgage market.

Fannie Mae and Freddie Mac were the largest providers of liquidity to the mortgage market, as they purchased mortgages from banks. The two entities expanded rapidly around the turn of the century, as their combined mortgage loan portfolios from nearly $175 billion in 1995 to over $450 billion in 2005.[11] Liquidity injections of this scale fundamentally reshaped the business model of financial firms originating mortgages. Banks and other financial firms could originate loans and immediately sell them to Fannie Mae and Freddie Mac, freeing up liquidity to originate more loans. While these secondary credit markets were not new, their expanded scale fundamentally shifted the way in which commercial banks could operate.

The confluence of enhanced technological accessibility reducing geographic barriers and and evolving regulatory environments which allowed for the expansion of branch networks provides a compelling backdrop for examining how the banking system responds to local shocks.

[9] In 2000, for example, demand deposits comprised nearly 82 percent of all commercial bank liabilities.

[10] One prominent example, Fannie Mae's Desktop Underwriter software, allowed banks to verify their ability to sell mortgage loans to Fannie Mae prior to origination.

[11] Source: Federal Reserve Economic Data.

3 Data and Exposure Measures

3.1 Data To examine banks' responses to local labor market shocks, I link datasets covering the operations of commercial banks and their branch networks with local markets' exposures to PNTR. The FDIC's Quarterly Call Reports offer a comprehensive view of FDIC-insured commercial banks' operations from 1994 to the present. These reports contain balance sheet and income statement items including assets, deposits, non-performing loans, income, and losses.[12]

I use the FDIC's Summary of Deposits (SOD), an annual survey of FDIC-insured bank branches and their associated deposits, to measure banks' geographic footprints. To link the SOD with Quarterly Call Reports, I aggregate each bank's deposits to the county-by-year level. Data on banks' small business and mortgage loan originations come from the the Home Mortgage Disclosure Act (HMDA) and the Community Reinvestment Act (CRA).[13] The HMDA provides details on the size of each originated mortgage, the county of origination, the bank originating the loan. Additionally, the data includes whether each loan was held on the originating bank's balance sheet for more than a year or sold into the secondary mortgage market. I aggregate the amount of mortgages held on balance sheet and the amount sold to the bank-by-county-by-year level. The mortgages sold within a year are denoted as being scrutinized. The CRA reports the number and size of small business loans under $1 million that each bank originates in each county each year, and it is merged with the previous datasets.[14]

Finally, I collected annual county-level data obtained from the Bureau of Labor Statistics (BLS) to account for local demographic and labor market characteristics. These data include average income income, population, college attainment levels, and employment rates for each county. Averages of each variable from the three years before permanent NTR are used as time invariant controls in the county level analyses. For bank level analyses, I use the 1996 to 1999 averages of each bank's assets, non-performing loans divided by assets, and equity divided by assets as time invariant controls.

3.2 County Exposure to Import Competition Many of the industries most exposed to increased import competition following PNTR were located in clustered geographic regions. I adopt the approach outlined by Pierce and Schott (2020) to measure

[12] A full list of call report items and their reference codes are found in the Appendix Table 11.

[13] Reporting of small business loan and mortgage loan is required by all banks, thrifts, and credit unions that are above a certain asset threshold determined each year.

[14] Greenstone et al. (2020) note that CRA data is fairly representative of all small business lending, as in 2007 it covered 86 percent of all small business loans under $1 million.

each county's exposure to increased import competition. By analyzing each county's labor force composition in 1999, the year before the shock, and calculating the difference between Column One and Column Two tariff rates for each industry operating within that county I can observe how "exposed" each county was to increased import competition. Differences in tariffs are computed using the 1999 tariff rates provided by Feenstra et al. (2002) for each industry group, and *CountyExposure* is the weighted sum of these tariff gaps, where the weights are the labor market shares in that county. The resulting measure is the extent to which a given county's labor market was exposed to increased import competition at the time PNTR was adopted:

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

Figure 1 shows the geographic distribution of *CountyExposure*. It is important for my empirical strategy that there is significant inter- and intra-state variation in exposure, with the exception of several western states which uniformly low exposure.

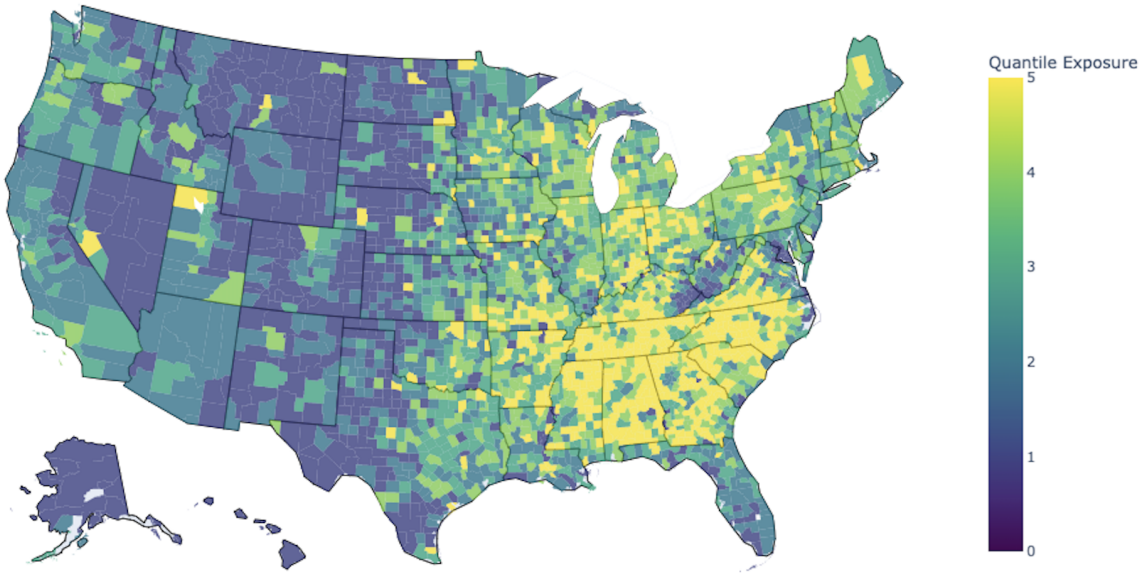
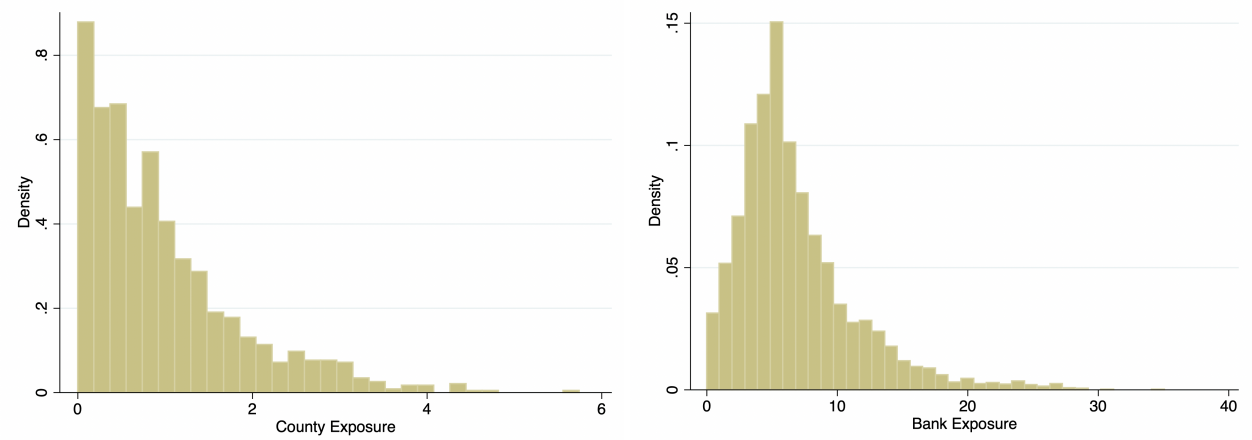


Figure 1: Map of County Exposure

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

3.3 Bank Exposure to Import Competition Banks can be exposed to local economic shocks through both sides of their balance sheets. For this study, however, I focus on exposure through their deposit collecting branches. Banks have historically collect

Figure 2: Distribution of County and Bank Exposure to Import Competition



(a) County Exposure

(b) Bank Exposure

Note: Distributions of bank and county level exposure to increased import competition.

deposits from local markets. Deposit creation was historically tied to the presence of physical bank branches, as customers desired access to their funds. Honka et al. (2017), for example, shows that a primary driver in depositors' bank choice is the distance to the nearest branch. Additionally, for banks there are regulatory, time, and cost related frictions which signify an investment in operating in a particular markets. Mortgage origination, however, is less geographically tied, as standards set by Fannie Mae and Freddy Mac have led to homogenized products and many of the processes necessary to originate and service mortgages can be completed from afar. The geographic frictions for lending are less restrictive thank those for deposit creation.

In light of these considerations, I adopt the methodology proposed by Kundu et al. (2021) to measure each bank's exposure to PNTR by taking the deposit weighted average of $CountyExp$, where the deposit weights reflect the relative share of each bank's deposits that are raised in a given county. Bank exposure measures the extent to which a given bank's deposit base is exposed to increased import competition, and it is calculated as follows:

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

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.

Cross-sectional distributions of $CountyExposure$ and $BankExp$ are shown in Figure 2. The mean and median of $CountyExposure$ are 7.23 and 5.68, respectively, and the measure ranges from a minimum of zero in the least exposed county to a maximum of 44.44 in the most exposed. The mean and median of $BankExp$ are 6.76 and 5.60, and as with

CountyExposure, the least exposed bank had zero exposure, while the most exposed bank measured 44.44. For the main analyses, I normalize both measures such that the means are equal to zero and standard deviations are equal to one.

4 Empirical Strategy

The following analyses link the economic shock accompanying increased import competition to banks' credit supply decisions. To achieve this, I begin with a simple model of banks, which guides the analysis. I then outline the empirical strategy and present a first stage analysis which links banks' exposure to increased import competition with balance sheet effects capable of affecting credit supply decisions.

4.1 Model of Bank Behavior To understand how a local economic shock may affect banks, consider the business model of a typical commercial banks. Initial bank capital at the time of founding is provided by investors and share holders. Bank management augments this capital by accepting time and demand deposits and borrowing from other banks and financial firms. There is some cost to borrow these funds, and there is some risk that depositors and lenders will request their funds returned. Additionally, banks must balance the funds they collect with regulatory requirements that limit leverage.

In their simplest form, banks use the funds they have collected to originate loans. Loans are productive assets in that they generate some return each period, however, there risks associated with loans. For one, borrowers may default, leaving their loans worthless. Interest rates in the broader market may also change, thus affected the market value of loans left on each bank's balance sheet.

Some classes of loans, such as mortgages, have active secondary markets whereby one bank may originate a loan and then sell it to either Fannie Mae, Freddie Mac, or other another financial institution. The ability to sell a loan means that its value to the bank comes from both the revenue the loan generates and the option value of the capital freed up from its liquidation. Small business loans, on the other hand, lack the extensive secondary market.

The choice of how many of which type of loan to originate, then, is a function of many factors. A decline in the expected returns of one class of loan will inevitably lead to a reduced incentive to originate that type of loan. The effects of such asset side mechanisms are quite direct. In deciding their optimal credit strategies, banks also need to examine the liabilities side of their balance sheets. If a bank expects future liquidity needs, it may find an increased incentive to originate loans with an active secondary market.

4.2 Identification Strategy To identify the impact of this shock on bank behavior, I compare outcomes between banks with different levels of exposure to PNTR before and after the adoption of PNTR. The first stage of this analysis examines the direct impact of exposure to PNTR on outcomes which drive banks' credit supply decisions. I estimate the coefficients in the following event study specification:

$$y_{b,t} = \sum_{\tau=1996}^{\tau=2006} \beta_\tau \mathbb{1}\{\tau = t\} \times BankExp_b + \sum_{\tau=1996}^{\tau=2006} \gamma_\tau \times X_b + \delta_b + \delta_t + \epsilon_{bt} \tag{3}$$

where y_{bt} is the dependent variable of interest at bank b in year t, $BankExp_b$ is bank b's exposure to PNTR, and X_{bt} is a vector of time invariant bank level controls interacted with a post-dummy. The bank level controls are 1996 to 1999 averages of assets, non-performing loan ratio, and equity ratios.[15] Each regression includes time fixed effects to control for quarter specific shocks which affected all banks and bank fixed effects to control for time invariant bank-level factors driving individual credit and funding decisions. The coefficients of interest are the β_τs which represent the difference in outcomes in year τ for the average bank, relative to 1999, due to a one standard deviation increase in $BankExp$. Event studies present a visual representation of the dynamic response of outcomes over time, and they are useful in assessing the validity of identification assumptions. In addition, I estimate the coefficients in the following difference-in-difference specification to summarize the effect of exposure across the full period:

$$y_{bt} = \beta(\mathbb{1}\{t \geq 2000\} \times BankExp_b) + \gamma(\mathbb{1}\{t \geq 2000\} \times X_{bt}) + \delta_b + \delta_t + \epsilon_{bt} \tag{4}$$

Where y_{bt} is the coefficient of interest and $\mathbb{1}\{t \geq 2000\}$ is an indicator variable equal to 1 if year t is greater than 2000 and 0 otherwise. The same time-invariant bank controls are used as before, and regressions include bank and time fixed effects. The "Strong Parallel Trends," which states that regardless of exposure level, all banks would have experienced similar outcomes had they received a specific exposure. (Callaway et al. (2024))[16]

The identification assumption is supported first by the fact that bank exposure is found using the extent of bank networks in the year prior to the shock, and PNTR's passage was primarily political and driven by political considerations and lobbying from commercial firms,

[15] These variables are a measures of each bank's size, the quality of their asset portfolio, and their leverage.

[16] Whereas the traditional parallel trends assumption states that in the absence of treatment, the difference in outcomes between treated and control groups would have remained constant, the strong parallel trends assumption states that the outcome for groups with low exposure reflect the outcomes that high exposure groups would have experienced had they had a lower dose. In the appendix, I show that results are robust to using a discrete treatment measure, which reduces the strength of the necessary parallel trends assumptions.

outside the scope of bank influence.[17] The extent of banks' branch networks was established prior to the announcement of PNTR, and thus PNTR would not have shaped their branch networks. This is not to say that banks operating in regions with high manufacturing shares were not different from other banks, as there are advantages to specializing in lending to the customers in a given area. For identification, though, we need that the banks serving high exposed areas did not select into these markets because of differences in bank quality which might affect potential outcomes.

Though an imperfect test of this assumption, I examine whether pre-PNTR measures of bank quality were balanced across exposure levels by regressing a selection of time invariant bank characteristics on bank exposure.[18] Results of these regressions, shown in Table 1, find that exposure levels are generally balanced across measures of balance sheet and physical branch network size. Additionally, exposure is balanced across broad measures of performance including net income, borrowed funds, interest expenses, and provisions for loan and credit losses. Exposure is negatively correlated with non-performing loans and salaries, however, the size of the coefficients suggests that the relationship may not be economically significant. Together, these results suggest that pre-shock bank characteristics were generally balanced across exposure levels.

4.3 Local Labor Markets I begin by establishing that the passage of NTR resulted in local labor market disturbances capable of influencing local deposit-holding behaviors and asset values. Previous research has demonstrated that the industries most exposed to increased import competition witnessed substantial reductions in labor demand, and many of these industries were geographically clustered. Limited out migration magnified the local repercussions of the job losses in the most exposed industries.[19] In the counties most exposed to import competition, opting out of the labor force was the primary means of adjustment to the reductions in labor demand (Autor et al. (2013), Pierce and Schott (2016)). These exits coupled with increased mechanization of labor processes to increase unemployment rates and reduce wages in the industries and counties most exposed to increased import competition.

Comparing average wage and employment growth across different levels of exposure reveals the impact of import competition on local labor markets. I separate counties into high and low exposure based on whether their $CountyExposure$ measure was above or below

[17] A report from Public Citizen finds that pro-PNTR corporate lobbying was primarily from the agricultural, manufacturing, life insurance, and technology sectors. See "Purchasing Power: the Corporate-White House Alliance to Pass the China Trade Bill Over the Will of the American People".

[18] Specific measures include the log of assets, deposits, borrowed funds, non-performing loans, net income, interest expense, provisions for credit and loan losses, salaries, and the number of branches and number of counties in which the bank maintained branches.

[19] Autor et al. (2021) find only modest rates of out-migration from the affected counties.

Table 1: Balance of Pre-Shock Covariates

	Independent Variable = Pre-Shock Average of				
	Assets	Deposits	Borrowed Funds	Non-Perf Loans	Net Income
est	-0.013*	-0.010	-0.000***	-0.025***	-0.000***
se	(0.008)	(0.007)	(0.000)	(0.006)	(0.000)
n	3519	3519	3519	3381	3519
r2	0.001	0.001	0.002	0.005	0.002
	Independent Variable = Pre-Shock Average of				
	Interest Expense	Provisions	Salaries	Branches	Dep. Markets
est	0.002	0.004	-0.026***	-0.000***	-0.003*
se	(0.007)	(0.005)	(0.008)	(0.000)	(0.001)
n	3519	3514	3519	3366	3366
r2	0.000	0.000	0.003	0.001	0.001

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

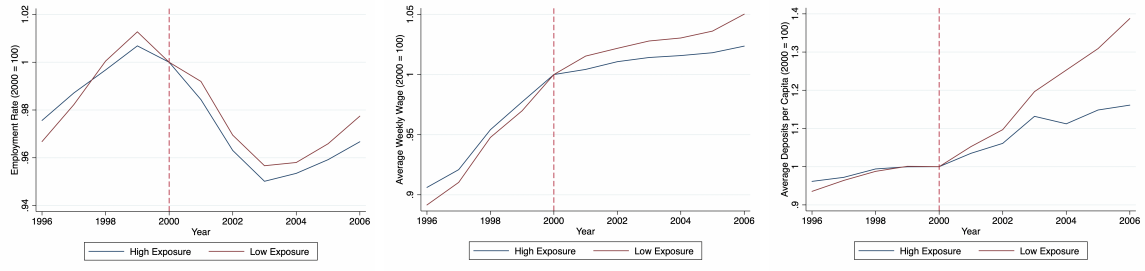
Note: Results from the regression of BankExp on pre-shock averages of each variable. Coefficients for balance sheet items are estimated using OLS with robust standard errors.

the median and find the population weighted average growth employment levels and wages across time. The time trends are depicted in Figures 3 (A) and (B), and following the year 2000, a clear divergence in each series emerges. Employment rates and average wages in high exposure counties fell below those in low exposure counties. This matches the 2 to 3.5% reduction in per capita unemployment and wages found by Autor et al. (2013).

Even with worker adjustment programs and other safety nets, such labor market change people and business' savings and deposit holding behavior. At the individual level, the loss of employment this may lead to a reduction of new savings and increased draw down of the existing stock of savings. A noticeable divergence between deposits in high and low exposure counties begins after the China Shock, shown Panel (C) of Figure 3, as the quantity of deposits in high-exposure counties declines relative to the less exposed counties. A full analysis of county markets shown in the Appendix supports this evidence.

4.4 First Stage Response I now connect exposure to import competition with outcomes that may affect individual banks' credit supply decisions using event study estimates (equation 8) and difference-in-difference regressions (equation 9). I analyze two parts of bank operations– balance sheet items (stocks) and income statement items (flows). Balance sheet items are reported quarterly and include the log of assets, deposits, and non-performing loans. Income statement items include the log of net income, provisions for credit

Figure 3: County Variables by Exposure to Import Competition



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

Note: Average employment rate, weekly wage, and deposits per capita at the county level, normalized so that the value in the year 2000 is equal to 1. Counties are divided into high and low based on the value of their exposure relative to the median.

losses, and provisions for loan losses. Figures 4 and 5 present the event studies, and results of the regression analysis are displayed in Table 2.

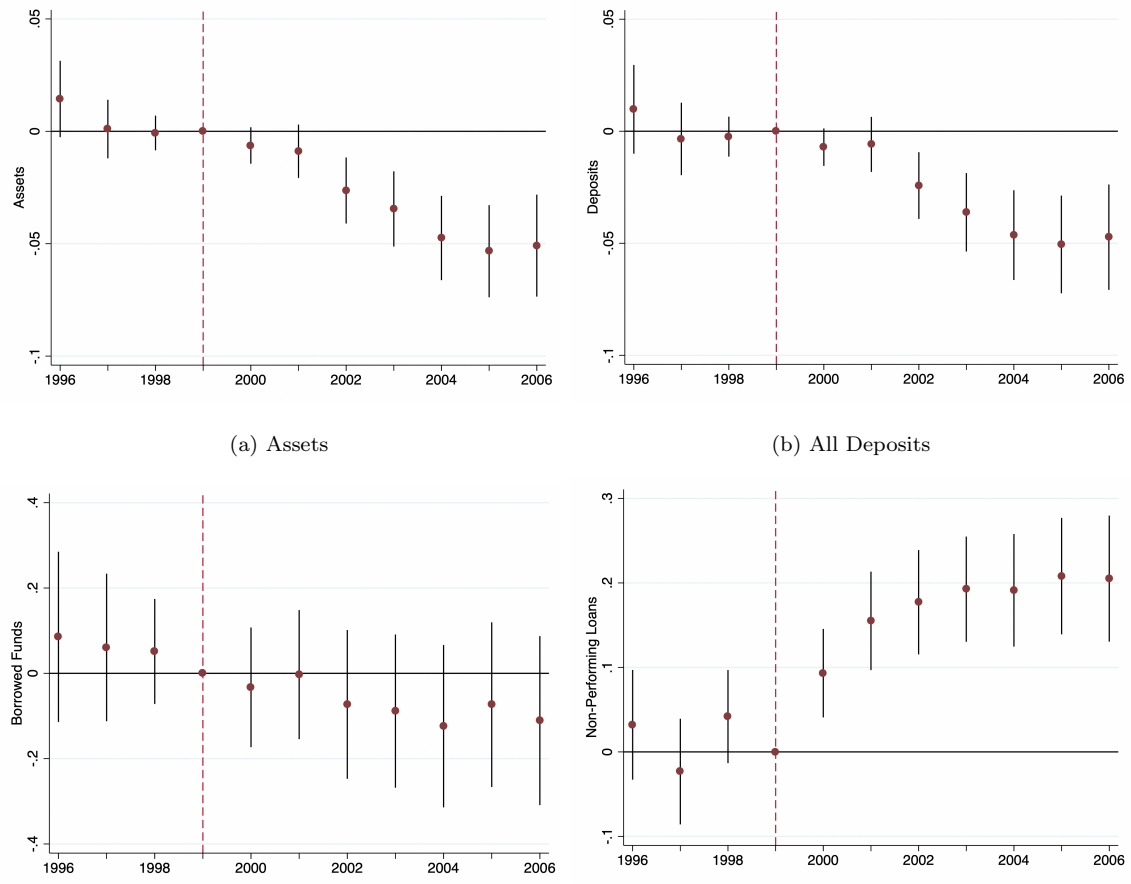
The event studies show that following the passage of PNTR, exposure to the shock led to a statistically significant decrease in assets and deposits and a large and statistically significant increase in non-performing loans. Net income similarly saw a large and statistically significant decrease. There was little impact on borrowed funds, measures of expenses, provisions for loan and credit losses, or network size.

The aggregated results in the regression analyses further support this, showing that a 1 standard deviation in increase in a bank's exposure to the shock led to a 3.6 percent decrease in assets, a 3.2 percent decrease in deposits, a 15 percent increase in non-performing assets, and a 7.5 percent decrease in net income. Borrowed funds, interest expense, loss provisions, and salaries, however, were not affected in a statistically significant manner.

This evidence suggests the first stage effects of exposure likely acted through banks' deposits and losses in their loan portfolios. These two channels affect both income and the size of balance sheets, as measured by balance sheets, yet when the magnitude of these shifts are weighed with the relative size of each, we see that the deposits channel is likely the more important of the two. The average bank had assets of $220.5 million, deposits of $176.8 million, and non-performing loans of $0.9 million. A one standard deviation increase in bank exposure led to, on average, a $5.65 million decrease in deposits and a $0.14 million increase in non-performing loans. The magnitude of the liabilities side shock outweighed the asset shock by a factor of over 40, and the lack of provisioning response suggests that the deposit loss channel was more significant than the asset quality channel.

With the knowledge that deposit losses may have played an important role in the transmission of these shocks, a question arises whether these deposit losses arose due to the exogenous impact of exposure to local labor market disruptions or through endogenous ad-

Figure 4: Bank Level Event Studies: Balance Sheets



(a) Assets

(b) All Deposits

(c) Borrowed Funds

(d) Non-Performing Loans

Note: Estimates show the impact of a one standard deviation increase in bank exposure on each balance sheet item. Data come from FDIC's Quarterly Call Report. Regressions include bank and year fixed effects and time-invariant bank characteristics interacted with year-indicator variables. Standard errors are clustered at the bank level.

justments in banks' branch networks. To disentangle these effects, I first analyze the number of branches that each bank operated and the number of county markets in which each bank had a branch. Given the discrete nature of these measures, I estimate the coefficients in a Poisson model similar to that in Equation 1.10. Event studies are shown in the bottom panels of Figure 5 and regression results are shown in the final columns of Table 2. The results show that exposure to PNTR did not have a significant impact on the size of bank's branch networks.

These deposits shifts were driven by local supply, rather than bank demand. I use 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 PNTR to isolate local supply

Table 2: First Stage Effects of Exposure to Import Competition

	Assets	Deposits	Borrowed Funds	Non.Perf Assets	Income
Post x BankExp	-0.036***	-0.032**	-0.106	0.150***	-0.075***
	(0.009)	(0.010)	(0.077)	(0.023)	(0.012)
... x npr	-0.023***	-0.026***	-0.078	-0.355***	0.007
	(0.008)	(0.008)	(0.049)	(0.066)	(0.011)
... x asset	0.028***	0.020***	-0.128***	-0.048***	0.016**
	(0.005)	(0.006)	(0.030)	(0.013)	(0.007)
... x eqr	1.390***	2.560***	2.675***	-0.903	-0.936***
	(0.232)	(0.598)	(0.995)	(0.652)	(0.363)
N	158389	158388	158389	153168	150886
R^2	0.970	0.956	0.775	0.769	0.891
Mean	12.304	12.083	6.583	6.889	6.354
	Interest Exp.	Loss Provisions	Salaries	Branches	Dep. Mkts
Post x BankExp	-0.017	-0.003	-0.016*	-0.022	0.000
	(0.012)	(0.038)	(0.009)	(0.036)	(0.020)
... x npr	-0.036***	-0.285***	-0.029***	-0.100***	-0.048***
	(0.011)	(0.056)	(0.009)	(0.036)	(0.015)
... x asset	0.020***	-0.046**	0.024***	0.039**	0.081***
	(0.007)	(0.022)	(0.006)	(0.019)	(0.017)
... x eqr	4.174***	0.806*	1.696***	-1.245	0.171
	(0.504)	(0.484)	(0.294)	(1.532)	(0.593)
N	158389	153724	158389	156681	156681
R^2	0.948	0.644	0.964	0.922	0.710
Mean	7.963	5.498	7.531	18.344	4.947

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Continuous difference-in-differences regression with time and bank fixed effects. Dependent variables include the log of assets, total deposits, core deposits, and brokered deposits. Covariates include $BankExp$, and the 1997 to 1999 averages of each bank's assets, non-performing loan ratio and, equity ratio. Covariates are interacted with an indicator $Post$ which is equal to 1 for observations after the year 2000. Regressions for Branches and Dep. Mkts use Poisson Pseudo-Maximum Likelihood estimation, while others are use OLS.

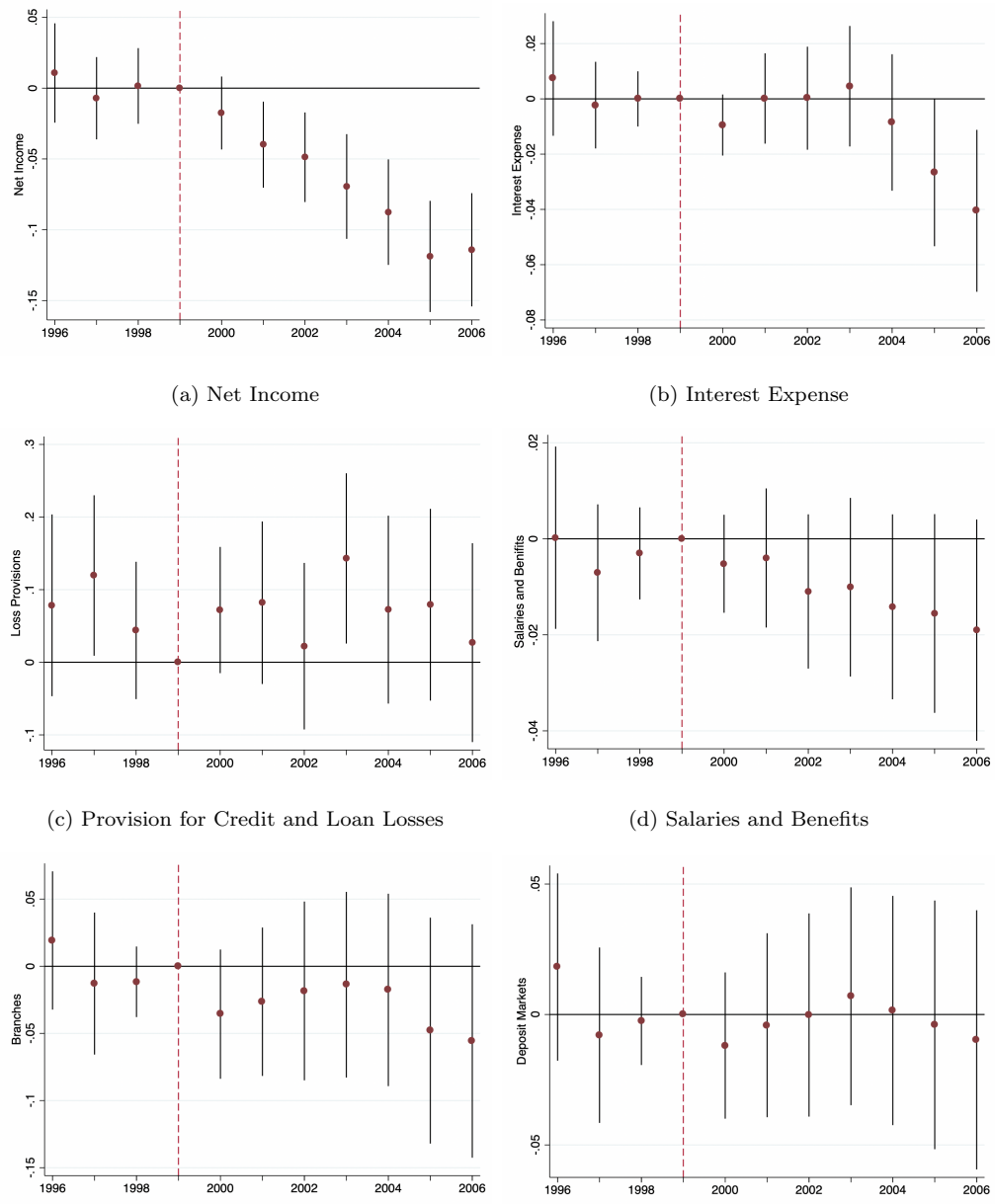
shifts.[20] I estimate the following equation:

$$y_{bct} = \beta(Post_t \times CountyExp_c) + \gamma(Post_t \times X_{bc}) + \delta_{b,s,t} + \delta_{b,c} + \epsilon_{b,c,t} \tag{5}$$

where $y_{b,c,t}$ is the log 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, $\delta_{b,c}$

[20]Evidence suggests that banks do not set deposit prices at the individual branch level, rather, they implement uniform pricing strategies across states or regions that incorporate multiple states (Radecki (1998), Edelstein and Morgan (2006), Granja and Paixao (2021), Begenau and Stafford (2022)).

Figure 5: First Stage Bank Level Event Studies: Income Statements



(a) Net Income

(b) Interest Expense

(c) Provision for Credit and Loan Losses

(d) Salaries and Benefits

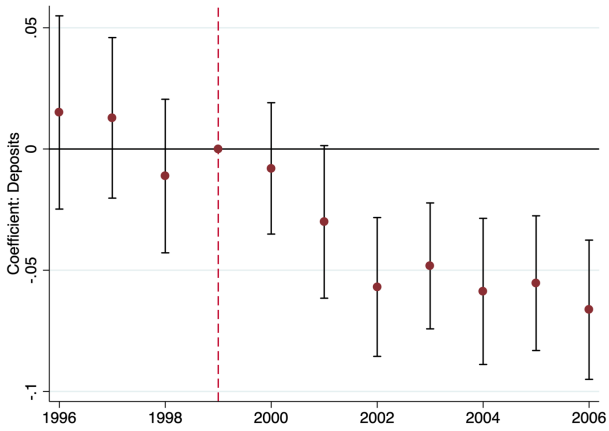
(e) Branches

(f) Deposit Markets

Note: Estimates show the impact of a one standard deviation increase in bank exposure. Regressions include bank and year fixed effects and time-invariant bank characteristics interacted with year-indicator variables. Branch and Deposit Market regressions use Poisson Pseudo-Maximum Likelihood estimation. Standard errors are clustered at the bank level. Interest expense is the sum of deposit interest expense and other interest expense.

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-state-by-year fixed

Figure 6: Effect of Import Competition on Deposit Supply



Note: Show the impact of a one standard deviation increase in bank exposure on deposit supply. Regressions include bank-state-year and bank-county fixed effects. Standard errors are clustered at the bank-year level.

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, including deposit prices. This fixed effect structure isolates inter-county changes in deposits that can be attributed to local deposit supply. The event study in Figure 6 clearly shows this negative and statistically significant decline in deposit supply, culminating in a nearly 5 percent reduction in deposit supply for a standard deviation increase in a local labor market's exposure to import competition.

Collectively, the evidence suggests that exposure to increased import competition led to a significant first stage response, as the most exposed banks saw increases in non-performing loans and decreases in deposit supply. While either transmission channel alone could affect a bank's decision making processes, the magnitude of deposit losses greatly overshadowed the increases in non-performing loans.

5 Main Results

Thus far, results have indicated that exposure to PNTR had a negative impact on the most exposed banks, and exposure acted primarily through reducing local deposit supply, which impacts bank funding. It is crucial to now understand how banks responded to these shocks. Funding constraints can have a multifaceted effect on bank lending, including the amounts they lend, the markets in which they choose to lend, and the borrowers to whom they extend credit.

Key to this analysis is the differentiation between small business lending and mortgage lending. These two lending types differ significantly, with small business loans being

information-intensive and reliant on relational capital, while mortgage loans tend to be more standardized, as they involve collateral that is easier to value and borrower risk that can be readily assessed. Furthermore, a liquid secondary market exists for mortgages, whereas no such market exists for small business loans.[21]

5.1 Bank Level Lending Responses Banks can adjust their loan portfolios along several margins. A bank's stock of mortgages and small business loans can be replenished through the purchase or origination of new loans. If the bank does not replenish the stock, it will naturally decrease as loans mature and borrowers default. Additionally, the stock may decrease as banks sell mortgages into the secondary market. The decision to originate loans is a function of the expected returns on these loans, expected default risks, and funding conditions. Banks make adjustments to their origination strategies in response to changes in any of these parameters.

To examine these adjustments, I estimate event studies similar to Equation 1.10 and difference-in-differences specifications using the flow of new small business loans and mortgage loans. Given the presence of pre-trends, I also present detrended difference-in-difference coefficients which adjust for these pretrends.[22] The detrended difference-in-difference coefficients can be interpreted as the change in a given outcome relative to its existing linear trend due to a one standard deviation increase in exposure to PNTR.

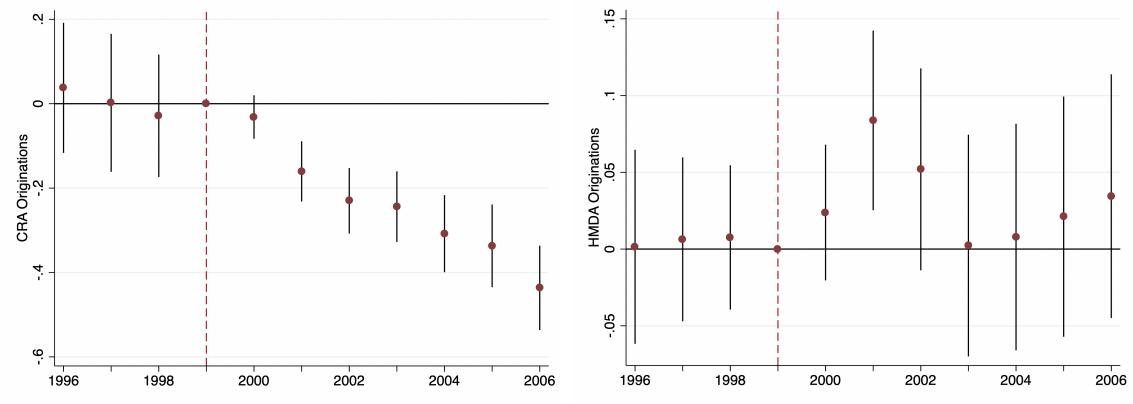
Detrended event studies are shown in Figure 7, raw event studies are shown in Table 13, and results of the regression are shown in Table 3. The detrended event studies show an immediate and significant decline in small business loan originations but a temporary increase in mortgage lending. The stark difference between the two event studies and the magnitude of the regression coefficients suggest the importance of cross product adjustment in response to PNTR. Declines in small business origination were offset by temporary increases in mortgage origination.

5.2 Local Credit Supply Response To verify that relative shifts in the origination of credit reflect bank supply rather than just local demand for each type of credit, I analyze credit originations at the bank-by-county-by-year level. Similar to Xu (2022), I

[21] In 1990, there were nearly $1 billion in outstanding Agency, GSE, and PLS issued Mortgage Backed Securities. By 2000, this had increased to nearly $3 billion. Source: Office of Federal Housing Enterprise Oversight's *Mortgage Market Note 08-3*.

[22] The process of estimating detrended coefficients begins by estimating the model using data from prior to the shock. In this pre-shock calibration, a bank exposure is interacted with a linear time trend. This linear time trend is then projected forward and differenced from the full data set. The regression coefficients are then estimated using differenced dataset. The process is outlined in Callaway et al. (2024) and examples of its implementation can be found in Smith (2024).

Figure 7: Bank Level Event Studies, Credit Origination



(a) Small Business Originations Detrended

(b) Mortgage Originations Detrended

Note: Estimates show the impact of a one standard deviation increase in bank exposure on each balance sheet item. Data come from FDIC's Quarterly Call Report. Regressions include bank and year fixed effects and time-invariant bank characteristics interacted with year-indicator variables. Standard errors are clustered at the bank level

use each bank's originations in a given county each year to estimate the coefficients in the following difference-in-difference regression:

$$y_{bct} = \beta(\mathbb{1}\{t \geq 2000\} \times BankExp_b) + \gamma(\mathbb{1}\{t \geq 2000\} \times X_{bt}) + \delta_{b,c} + \delta_{t,c} + \epsilon_{b,c,t} \qquad (6)$$

where y_{bct} is the log of originations by bank b in county c in year t. The specification is similar to equation 4, but now includes bank-by-county fixed effects, $\delta_{b,c}$, to control for unobserved factors related to each bank's county level operations and county-by-year fixed effects, $\delta_{t,c}$, to control for shocks to local credit demand.

The specification isolates changes in credit origination between banks within a county and thus separates credit supply from credit demand. Table 4 presents the results from these regressions. The first panel considers observations from all counties, while the second panel is limited to observations from counties with county exposure less than the median exposure level, and the third panel is limited to observations from counties with exposure greater than the median level. Across the three panels, the effect of exposure on small business lending is uniform. A one standard deviation increase in bank exposure led to reductions of 11.9 percent, 10.9 percent, and 12.9 percent in the number of small business loan originations in all counties, high exposure counties, and low exposure counties, respectively. Similar results hold for the amount of small business loan originations.

For the number of mortgage originations, however, a one standard deviation increase in bank exposure led to an increase of 3.6 percent, 2 percent, and 4.7 percent in the all counties, high exposure counties, and low exposure counties, respectively. These findings show that

Table 3: Impact of Exposure on Credit Origination

	Regular DiD		Detrended DiD	
	amt cra	amt hmda	amt cra	amt hmda
Post x BankExp	-0.003	-0.003	-0.240***	0.030
	(0.005)	(0.003)	(0.049)	(0.028)
... x asset	-0.006	-0.006***	-0.004	-0.008
	(0.004)	(0.002)	(0.037)	(0.017)
... x npr	0.281	0.375	2.806	2.423
	(0.741)	(0.243)	(5.287)	(2.098)
... x eqr	-0.163	-0.043	-1.722	-0.492
	(0.159)	(0.058)	(1.333)	(0.510)
N	9128	27742	9128	27742
R^2	0.824	0.832	1.000	0.996

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Continuous difference-in-differences regression with time and bank fixed effects and standard errors clustered at the bank level. Dependent variables include the log of the amount and number of mortgage and small business loans originated at the bank by year level. Covariates include *BankExp*, and the pre-shock averages of each bank's assets, non-performing loan ratio and, equity ratio. Covariates are interacted with an indicator *Post* which is equal to 1 for observations after the year 2000.

exposure to PNTR led banks to increase the supply of mortgages, especially in counties that were not exposed to import competition.

5.3 Relocation, Securitization, and Quality Adjustments As the previous analysis finds, banks adjusted their lending between product groups and between markets. While banks may have informational advantages for lending to borrowers in the markets they serve, fluctuations in credit demand may force them to look beyond beyond the markets in which they have branches. Additionally, banks can sell loans that they originate, in this way insulating their income from future changes in loan quality. Panels A and B in Figure 8 show the trends in in-market lending and securitization across high and low exposure banks.

After 2001, there is a rapid decrease in the volume of mortgages originations by both high and low exposure banks in their home markets. Prior to 2000, though, high exposure banks originated a larger percentage of mortgages in markets where they had branches. Given the informational frictions associated with originating credit outside of home markets, these

Table 4: Effect of Bank Exposure on Local Credit Supply

Panel A: All Counties	Small Business Loans		Mortgage Loans	
	Number	Amount	Number	Amount
Post x BankExp	-0.119***	-0.153***	0.036***	0.190***
	(0.003)	(0.011)	(0.002)	(0.008)
N	197109	196750	240460	240460
R^2	0.243	0.858	0.238	0.828
Panel B: High Exposure Counties	Small Business Loans		Mortgage Loans	
	Number	Amount	Number	Amount
Post x BankExp	-0.109***	-0.106***	0.020***	0.130***
	(0.004)	(0.016)	(0.003)	(0.011)
N	78559	78451	96386	96386
R^2	0.214	0.851	0.232	0.834
Panel C: Low Exposure Counties	Small Business Loans		Mortgage Loans	
	Number	Amount	Number	Amount
Post x BankExp	-0.129***	-0.196***	0.047***	0.237***
	(0.004)	(0.016)	(0.003)	(0.011)
N	118550	118299	144074	144074
R^2	0.262	0.861	0.242	0.824

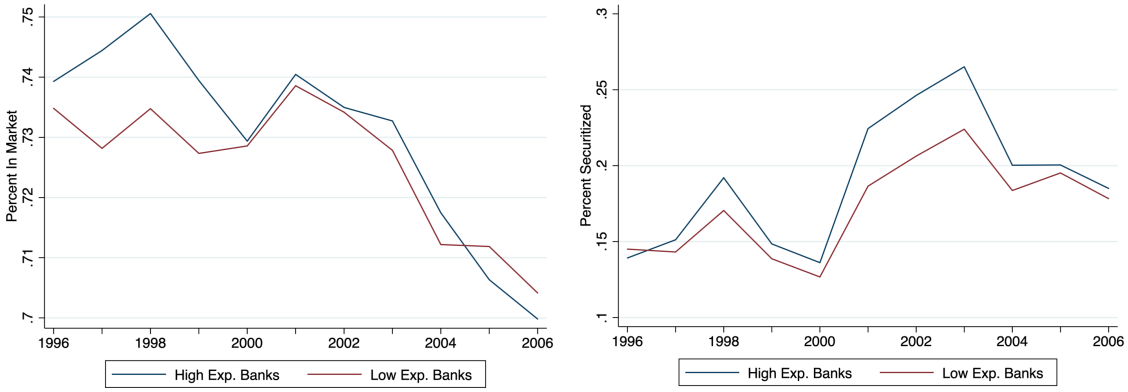
Standard errors in parentheses

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

Note: Continuous difference-in-differences regression with county by year and bank by county fixed effects and robust standard errors. The first panel includes all observations, the second includes observations from counties with *CountyExp* above the median, and the final includes observations from counties with *CountyExp* below the median. Dependent variables include the log of the number and amount of mortgage and small business loans originated at the bank by county by year level. Covariates include *BankExp*, and the pre-shock averages of each bank's assets, non-performing loan ratio and, equity ratio. Covariates are interacted with an indicator *Post* which is equal to 1 for observations after the year 1999. Regressions for amounts are estimated with OLS while those for numbers are estimated using PPML.

trends would suggest that some combination of market factors reduced these frictions.

Figure 8: Relocation and Securitization of Mortgage Loans



(a) Percent HMDA In-Market

(b) Percent HMDA Sold

Note: The figure presents the percent of mortgage loans originated in markets in which banks had branches and the percent of mortgage loans that were sold by banks above and below the median exposure level.

Additionally, after 2000, the percent of mortgages sold into secondary markets also increased for all banks, but especially for high exposure banks. When banks sell mortgages, they sacrifice the potential for higher profits from owning and servicing loans with the guaranteed returns from the sale of the loan. Such a trade-off could suggest expectations of future losses or liquidity needs.

To investigate this further, I estimate the coefficients from Equation 11 using the average income of borrowers, average size of loans, and the average loan-to-income ratio of these loans at the bank-by-county level as dependent variables. As before, this specification isolates the impact of bank's exposure to PNTR by controlling for local credit demand. Results of the regressions are shown in Table 5. Exposure to PNTR led banks to originate mortgages with higher debt to income ratios and lower borrower incomes. The size of the mortgages, however, was not impacted. A one standard deviation increase in bank exposure led to a 1.2 percentage point increase in the average debt-to-income ratio of originated loans and a 4.7 percent decrease in borrower income. Both of these metrics suggests that as the most exposed banks increased the amount of mortgage lending, the quality of the loans declined, even when controlling for local market characteristics.

5.4 Robustness The primary results are robust to the use of a discrete treatment measure. For these analyses, banks with $BankExp_b$ greater than the median are considered treated, and those with exposure below the median are considered untreated. Within the

Table 5: Effect of Bank Exposure on Mortgage Quality

	Debt to Income	Mortgage Size	Borrower Income
Post x BankExp	0.012***	0.002	-0.047***
	(0.004)	(0.002)	(0.006)
... x Assets	-0.021***	-0.011***	-0.013***
	(0.002)	(0.001)	(0.003)
... x npr	-1.306**	0.308	0.259
	(0.601)	(0.260)	(0.666)
... x eqr	-0.096	-0.094***	-0.352***
	(0.061)	(0.036)	(0.084)
County x Year FE	yes	yes	yes
County x Bank FE	yes	yes	yes
N	354174	365812	354252
R^2	0.572	0.800	0.806

Standard errors in parentheses

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

Note: Continuous difference-in-differences regression with county by year and bank by county fixed effects. Dependent variables include the log of the number and amount of mortgage and small business loans originated at the bank by county by year level. Covariates include *BankExp*, and the 1997 to 1999 averages of each bank's assets, non-performing loan ratio and, equity ratio. Covariates are interacted with an indicator *Post* which is equal to 1 for observations after the year 2000.

same difference-in-differences specifications, identification needs a weaker form of the parallel trends assumption. Results, found in the Appendix, show that the main findings are quantitatively similar and have nearly the same statistical significance when the discrete treatment measure is used.

6 Summary and Concluding Remarks

Shocks to local labor markets affect bank operations. Commercial banks rely on funding from customer deposits, and they need quality assets to invest in. When local labor markets experience economic disruptions, banks adjust their credit origination strategies. In analyzing the granting of Permanent Normal Trade Relations with China in 2000, I find that the banks exposed to the trade shock saw statistically significant declines in deposit supply and asset quality.

These funding constraints had far-reaching implications for how and where banks extended credit. While the impact of PNTR was relatively modest when viewed at the level of banks' balance sheets, the banks achieved a limited pass-through of funding shocks by strategically shifting their lending focus. Specifically, they reallocated lending from small business loans to mortgage loans, especially in markets that were less exposed to increased import competition. In the process of increasing their mortgage originations, however, these banks reduced the quality of these loans. The ability to sell mortgage loans into secondary markets played a crucial role in this reallocation process, as it allowed banks to compensate for a reduced demand for deposits by moving mortgages off their balance sheets, thus freeing up lending capital.

Such a shift in credit origination strategies is a "flight to liquidity", as the banks balanced the prospect of reduced income from selling these mortgage loans with an increased ability to liquidate these assets to meet short term capital needs generated by deposit outflows.

The results of this study provide valuable insights into how local labor market shocks impact the financial system. While previous research has often emphasized the role of non-performing assets in influencing credit supply, it's crucial to recognize that funding constraints play an equally significant role. The deposits channel shows that local exogenous shocks can result in tightened bank funding. When banks face funding limitations, they adapt by altering both the nature and geographic aspects of the credit they provide. Instead of reallocating to safer assets, banks may pivot towards more liquid assets that can be easily sold off their balance sheets. However, as the Great Financial Crisis demonstrated just eight years after PNTR, an aggregate flight to liquidity can generate instability in the greater financial system.

References

Alan S. Alexandroff. Concluding china's accession to the wto: The u.s. congress and permanent most favored nation status for china. *UCLA Journal of International Law and Foreign Affairs*, 3(1):23–42, 1998. ISSN 10892605, 21697833. URL http://www.jstor.org/stable/45302082.

David Autor, David Dorn, and Gordon Hanson. On the persistence of the china shock. *Brookings Papers on Economic Activity*, pages 381–447, 2021.

David H. Autor, David Dorn, and Gordon H. Hanson. The china syndrome: Local labor market effects of import competition in the united states. *American Economic Review*, 103(6):2121–68, October 2013.

David H. Autor, David Dorn, and Gordon H. Hanson. The china shock: Learning from labor-market adjustment to large changes in trade. *Annual Review of Economics*, 8:205–240, 2016.

Juliane Begenau and Erik Stafford. Uniform rate setting and the deposit channel. Technical report, May 2022.

Marcus Biermann and Kilian Huber. Tracing the International Transmission of a Crisis Through Multinational Firms. NBER Working Papers 31061, National Bureau of Economic Research, Inc, March 2023. URL https://ideas.repec.org/p/nbr/nberwo/31061.html.

Brantly Callaway, Andrew Goodman-Bacon, and Pedro H. C. Sant'Anna. Difference-in-differences with a continuous treatment, 2024.

Robert Clark, Jean-François Houde, and Jakub Kastl. Chapter 15 - the industrial organization of financial markets. In Kate Ho, Ali Hortaçsu, and Alessandro Lizzeri, editors, *Handbook of Industrial Organization, Volume 5*, volume 5.1 of *Handbook of Industrial Organization*, pages 427–520. Elsevier, 2021.

Douglas W. Diamond and Philip H. Dybvig. Bank runs, deposit insurance, and liquidity. *Journal of Political Economy*, 91(3):401–419, 1983. ISSN 00223808, 1537534X. URL http://www.jstor.org/stable/1837095.

Douglas W. Diamond and Raghuram G. Rajan. Money in a theory of banking. *The American Economic Review*, 96(1):30–53, 2006. ISSN 00028282. URL http://www.jstor.org/stable/30034353.

Paul Edelstein and Donald P. Morgan. Local or state? Evidence on bank market size using branch prices. *Economic Policy Review*, 12(May):15–25, 2006.

Stefano Federico, Fadi Hassan, and Veronica Rappoport. Trade shocks and credit reallocation. Working Paper 31111, National Bureau of Economic Research, April 2023.

Robert C. Feenstra, John Romalis, and Peter K. Schott. U.S. Imports, Exports, and Tariff Data, 1989-2001. NBER Working Papers 9387, National Bureau of Economic Research, Inc, December 2002. URL https://ideas.repec.org/p/nbr/nberwo/9387.html.

Leo Feler and Mine Z. Senses. Trade shocks and the provision of local public goods. *American Economic Journal: Economic Policy*, 9(4):101–43, November 2017.

Erik P. Gilje, Elena Loutskina, and Philip E. Strahan. Exporting liquidity: Branch banking and financial integration. *The Journal of Finance*, 71(3):1159–1183, 2016.

João Granja and Nuno Paixao. Market Concentration and Uniform Pricing: Evidence from Bank Mergers. Staff Working Papers 21-9, Bank of Canada, February 2021.

Michael Greenstone, Alexandre Mas, and Hoai-Luu Nguyen. Do credit market shocks affect the real economy? quasi-experimental evidence from the great recession and "normal" economic times. *American Economic Journal: Economic Policy*, 12(1):200–225, February 2020. doi: 10.1257/pol.20160005. URL https://www.aeaweb.org/articles?id=10.1257/pol.20160005.

Elisabeth Honka, Ali Hortaçsu, and Maria Ana Vitorino. Advertising, consumer awareness, and choice: evidence from the u.s. banking industry. *The RAND Journal of Economics*, 48(3):611–646, 2017. doi: https://doi.org/10.1111/1756-2171.12188. URL https://onlinelibrary.wiley.com/doi/abs/10.1111/1756-2171.12188.

Mohammad Izadi and Vahid Saadi. Banking market structure and trade shocks. *Journal of Banking & Finance*, 153:106884, 2023. ISSN 0378-4266. doi: https://doi.org/10.1016/j.jbankfin.2023.106884. URL https://www.sciencedirect.com/science/article/pii/S0378426623001085.

Philippe D Karam, Ouarda Merrouche, Moez Souissi, and Rima A Turk. The Transmission of Liquidity Shocks: The Role of Internal Capital Markets and Bank Funding Strategies. IMF Working Papers 2014/207, International Monetary Fund, November 2014. URL https://ideas.repec.org/p/imf/imfwpa/2014-207.html.

Asim Ijaz Khwaja and Atif Mian. Tracing the impact of bank liquidity shocks: Evidence from an emerging market. *American Economic Review*, 98(4):1413–42, September 2008.

Shohini Kundu, Seongjin Park, and Nishant Vats. The deposits channel of aggregate fluctuations. *SSRN Electronic Journal*, 01 2021.

Sara Lazzaroni and Peter Bergeijk. Natural disasters' impact, factors of resilience and development: A meta-analysis of the macroeconomic literature. *Ecological Economics*, 107(C):333–346, 2014. URL `https://EconPapers.repec.org/RePEc:eee:ecolec:v:107:y:2014:i:c:p:333-346`.

Sergio Mayordomo and Omar Rachedi. The china syndrome affects banks: The credit supply channel of foreign import competition. *Journal of Financial and Quantitative Analysis*, 57(8):3114–3144, 2022.

Justin R. Pierce and Peter K. Schott. The surprisingly swift decline of us manufacturing employment. *American Economic Review*, 106(7):1632–62, July 2016.

Justin R. Pierce and Peter K. Schott. Trade liberalization and mortality: Evidence from us counties. *American Economic Review: Insights*, 2(1):47–64, March 2020.

Sarah Quincy. "loans for the "little fellow:" credit, crisis, and recovery in the great depression". Working Paper 31779, National Bureau of Economic Research, October 2023. URL `http://www.nber.org/papers/w31779`.

Lawrence J. Radecki. The expanding geographic reach of retail banking markets. *Economic Policy Review*, 4(Jun):15–34, 1998.

Oliver Rehbein and Steven Ongena. Flooded through the back door: The role of bank capital in local shock spillovers. *Journal of Financial and Quantitative Analysis*, 57(7):2627–2658, 2022.

Tara Rice and Christian A. Johnson. "assessing a decade of interstate bank branching". *Washington and Lee Law Review*, (65), 2008.

Akira Sasahara. The Empirics of the China Trade Shock: A Summary of Estimation Methods and A Literature Review. Keio-IES Discussion Paper Series 2022-008, Institute for Economics Studies, Keio University, May 2022. URL `https://ideas.repec.org/p/keo/dpaper/2022-008.html`.

Ulrich Schuwer, Claudia Lambert, and Felix Noth. How Do Banks React to Catastrophic Events? Evidence from Hurricane Katrina*. *Review of Finance*, 23(1):75–116, 04 2018.

Tucker Smith. Human capital adjustments and labor market resilience: Evidence from linked education and earnings data. Technical report, Federal Reserve Bank of Dallas, 2024.

Chenzi Xu. Reshaping Global Trade: The Immediate and Long-Run Effects of Bank Failures*. *The Quarterly Journal of Economics*, 137(4):2107–2161, 04 2022.

Yuan Xu, Hong Ma, and Robert C Feenstra. Magnification of the 'china shock' through the u.s. housing market. Working Paper 26432, National Bureau of Economic Research, November 2019.

7 Appendix: County Responses

In this appendix, I analyze county level responses to increased import competition using a difference-in-differences regression design. I investigate three sets of county level outcomes: labor market responses, bank responses, and lending responses. Labor market responses include the average wage, the unemployment rate, manufacturing share. The bank responses include the log of deposits, the number of branches. The lending responses include the number and amount of small business loan originations and mortgage originations.

First, I divide counties into those above and below the median exposure level and plot the population weighted average of the outcome variables. Figure 3 plots the employment rate, average weekly wage, and deposits, showing that high exposure counties saw lower employment rates, lower weekly wages, and fewer deposits. Figure 9 shows the amount of small business and mortgage loan originations and the number of bank branches. The plots show that, at least temporarily, high exposure counties saw fewer loan originations. High exposure counties did, however, have more bank branches than low exposure counties, perhaps suggesting that branch consolidations that accompany bank acquisitions did not affect high exposure counties.

I then estimate the coefficients in the following equations:

$$Outcome_{c,t} = \beta(Post_t \times CountExp_c) + \gamma Post_t \times X_c + \delta_c + \delta_t + \epsilon_{c,t} \tag{7}$$

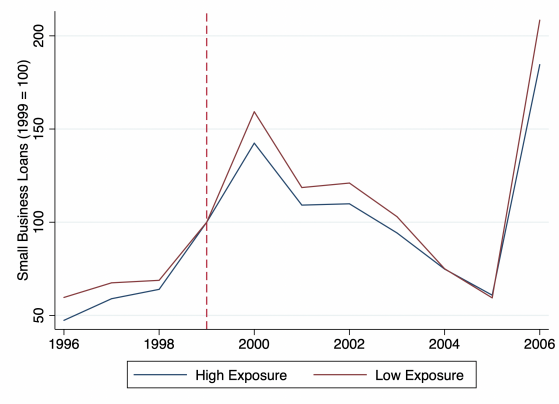
where X_c is a vector of time invariant county controls, δ_c are county fixed effects, and δ_t are time fixed effects. Event studies are shown in Figure 10 and Table 6 presents the aggregated coefficient estimates.

Table 6: County Level Lending Responses

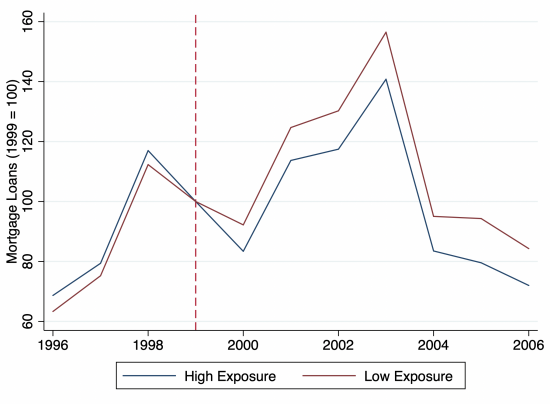
	Num CRA	Amt CRA	Num HMDA	Amt HMDA	Sold HMDA	Deposits	Branches
Post x CountyExp	-0.025**	-0.028	-0.081***	-0.143***	-0.211***	-0.047***	-0.012**
	(0.011)	(0.018)	(0.017)	(0.026)	(0.038)	(0.016)	(0.006)
... x Avg. Pay	-0.408***	-0.463***	-0.303***	-0.469***	-0.273*	0.374***	0.121***
	(0.038)	(0.062)	(0.066)	(0.099)	(0.146)	(0.083)	(0.032)
... x Manuf. Share	0.156**	0.150	-0.189	-0.330*	-0.164	0.383***	0.089*
	(0.076)	(0.126)	(0.123)	(0.190)	(0.269)	(0.127)	(0.047)
... x Educ.	-0.019***	0.078***	-0.074***	-0.158***	-0.209***	-0.043***	-0.028***
	(0.005)	(0.008)	(0.008)	(0.012)	(0.018)	(0.014)	(0.007)
N	28639	28639	28639	28639	28639	28620	28620
R^2	0.946	0.897	0.899	0.874	0.815	0.645	0.743

Note: Continuous difference-in-differences regression with time and county fixed effects. Dependent variables include the log of the number and amount of small business and mortgage loans originated, the amount of mortgage loans securitized, number of bank branches, and deposits in each county. Covariates include *CountyExp*, and the 1997 to 1999 averages of each county's average pay, manufacturing share, and percent of population with college degree. Covariates are interacted with an indicator *Post* which is equal to 1 for observations after the year 2000.

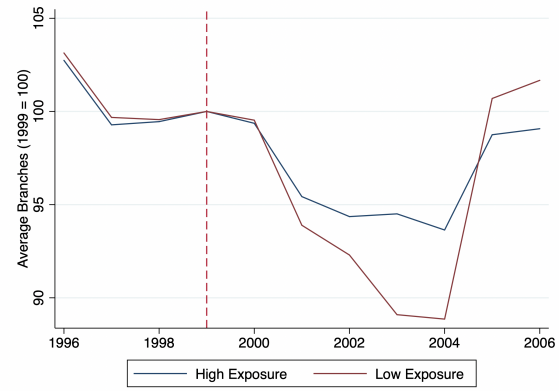
Figure 9: Trends in High and Low Exposure Counties



(a) Small Business Loans



(b) Mortgage Loans



(c) Bank Branches

Note: The figure presents the average employment rate, weekly wage, and deposits per capita at the county level, normalized so that the value in the year 2000 is equal to 1. Counties are divided into high and low based on the value of their exposure relative to the median.

8 Appendix: Robustness of Primary Results

To check the robustness of my analyses, I discretize the exposure measures and re-run the main analyses. 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.

Table 7: First Stage Effects of Exposure, Discrete Treatment

	Assets	Deposits	Borrowed Funds	Non.Perf Assets	Income
Post x High Exp	-0.040***	-0.045***	-0.196**	0.158***	-0.093***
	(0.013)	(0.015)	(0.094)	(0.033)	(0.018)
... x npr	-0.022***	-0.026***	-0.080	-0.359***	0.008
	(0.008)	(0.008)	(0.049)	(0.067)	(0.011)
... x asset	0.028***	0.020***	-0.128***	-0.049***	0.017**
	(0.005)	(0.006)	(0.030)	(0.013)	(0.007)
... x eqr	1.388***	2.560***	2.680***	-0.866	-0.925**
	(0.230)	(0.596)	(0.995)	(0.647)	(0.366)
N	158389	158388	158389	153168	150886
R^2	0.970	0.956	0.775	0.769	0.891
Mean	12.304	12.083	6.583	6.889	6.354
	Interest Exp	Loss Provisions	Salaries	Branches	Dep. Mkts
Post x High Exp	-0.027	0.066	-0.019	0.018	0.031
	(0.017)	(0.057)	(0.013)	(0.077)	(0.055)
... x npr	-0.036***	-0.281***	-0.029***	-0.097***	-0.046***
	(0.011)	(0.056)	(0.009)	(0.034)	(0.014)
... x asset	0.020***	-0.045**	0.024***	0.042**	0.082***
	(0.007)	(0.022)	(0.006)	(0.019)	(0.017)
... x eqr	4.174***	0.795	1.695***	-1.228	0.175
	(0.503)	(0.485)	(0.293)	(1.524)	(0.593)
N	158389	153724	158389	156681	156681
R^2	0.948	0.644	0.964	0.922	0.710
Mean	7.963	5.498	7.531	18.344	4.947

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: See notes for table 2.

Table 8: Impact of Exposure on Credit Origination, Discrete Treatment

	Regular DiD		Detrended DiD	
	amt cra	amt hmda	amt cra	amt hmda
Post x High Exp	-0.039	-0.014	-0.262***	0.027
	(0.078)	(0.037)	(0.078)	(0.037)
... x asset	-0.006	-0.008	0.004	-0.008
	(0.036)	(0.017)	(0.037)	(0.017)
... x npr	2.723	2.452	3.763	2.339
	(5.288)	(2.101)	(5.188)	(2.099)
... x eqr	-1.729	-0.496	-1.874	-0.486
	(1.329)	(0.510)	(1.330)	(0.511)
N	9128	27742	9128	27742
R^2	0.824	0.832	1.000	0.996

Standard errors in parentheses

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

Note: See note to table 3

Table 9: Effect of Bank Exposure on Local Credit Supply, Discrete Treatment

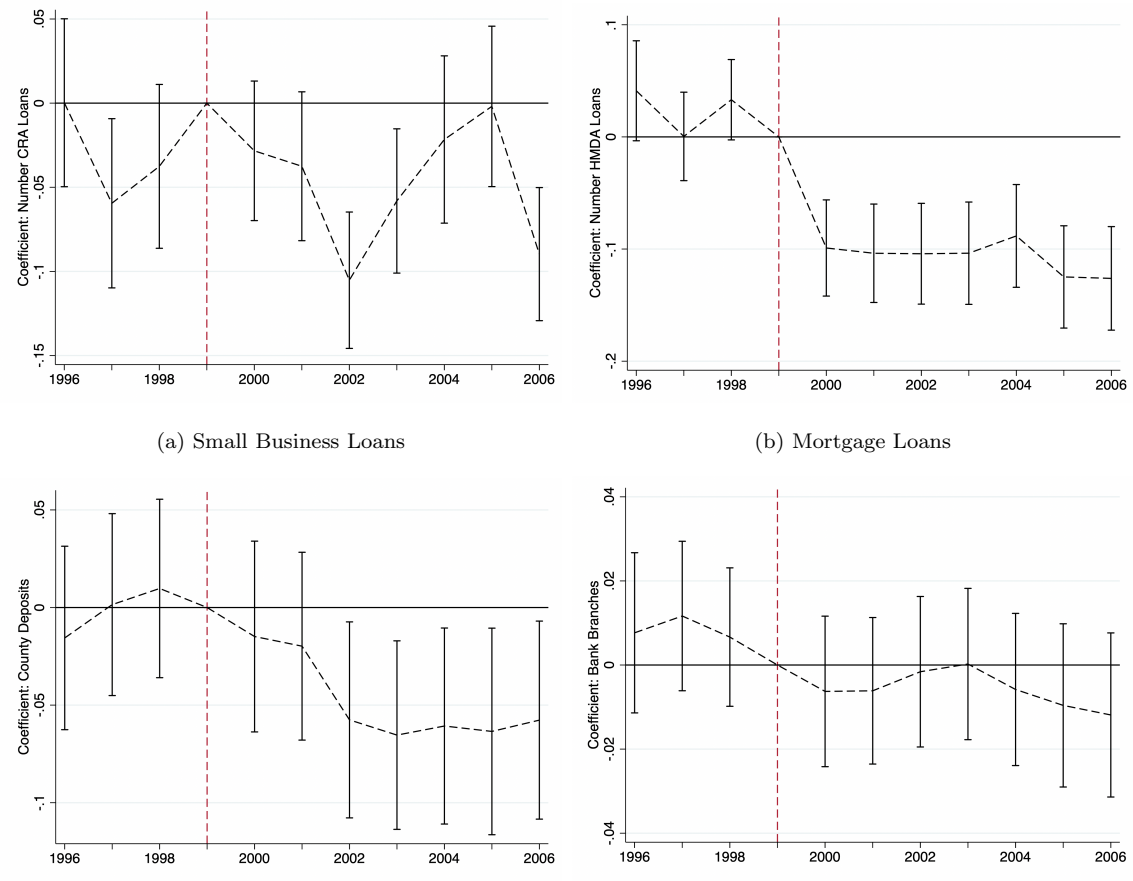
Panel A: All Counties	Small Business Loans		Mortgage Loans	
	Number	Amount	Number	Amount
Post x High Exp	-0.169***	-0.249***	0.066***	0.265***
	(0.004)	(0.015)	(0.003)	(0.012)
N	197109	196750	240460	240460
R^2	0.243	0.858	0.238	0.828
Panel B: High Exposure Counties	Small Business Loans		Mortgage Loans	
	Number	Amount	Number	Amount
Post x High Exp	-0.186***	-0.223***	0.041***	0.214***
	(0.007)	(0.024)	(0.005)	(0.019)
N	78559	78451	96386	96386
R^2	0.214	0.851	0.232	0.834
Panel C: Low Exposure Counties	Small Business Loans		Mortgage Loans	
	Number	Amount	Number	Amount
Post x High Exp	-0.159***	-0.269***	0.078***	0.289***
	(0.005)	(0.020)	(0.004)	(0.015)
N	118550	118299	144074	144074
R^2	0.261	0.861	0.242	0.823

Standard errors in parentheses

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

Note: See note to table 4

Figure 10: County Lending Responses to China Shock



(a) Small Business Loans

(b) Mortgage Loans

(c) Deposits

(d) Bank Branches

Note: Dependent variables include the logarithm of the number of Small Business Loans and Mortgage Loans originated by all FDIC insured banks in a given county in a year. The event study plots the coefficient for each county's exposure measure interacted with a year dummy.

9 Appendix: Additional Figures and Tables

Table 10: Effect of Bank Exposure on Mortgage Quality, Discrete Treatment

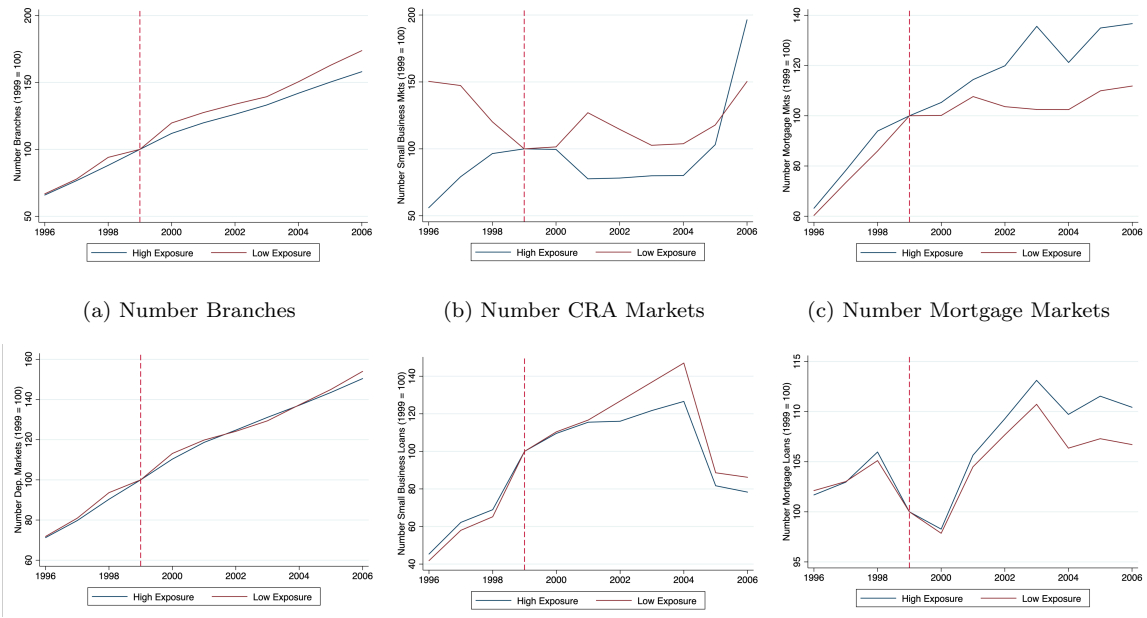
	Debt to Income	Mortgage Size	Borrower Income
Post x High Exp	-0.009	-0.013***	-0.074***
	(0.007)	(0.004)	(0.009)
...x Assets	-0.021***	-0.011***	-0.010***
	(0.002)	(0.001)	(0.003)
... x npr	-1.176*	0.436*	0.848
	(0.608)	(0.261)	(0.669)
... x eqr	-0.077	-0.093***	-0.455***
	(0.060)	(0.035)	(0.084)
N	354174	365812	354252
R^2	0.572	0.800	0.806

Standard errors in parentheses

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

Note: See notes to table 5.

Figure 11: Trends in High and Low Exposure Banks



(a) Number Branches (b) Number CRA Markets (c) Number Mortgage Markets

(d) Number Deposit Markets (e) Number CRA Loans (f) Number Mortgage Loans

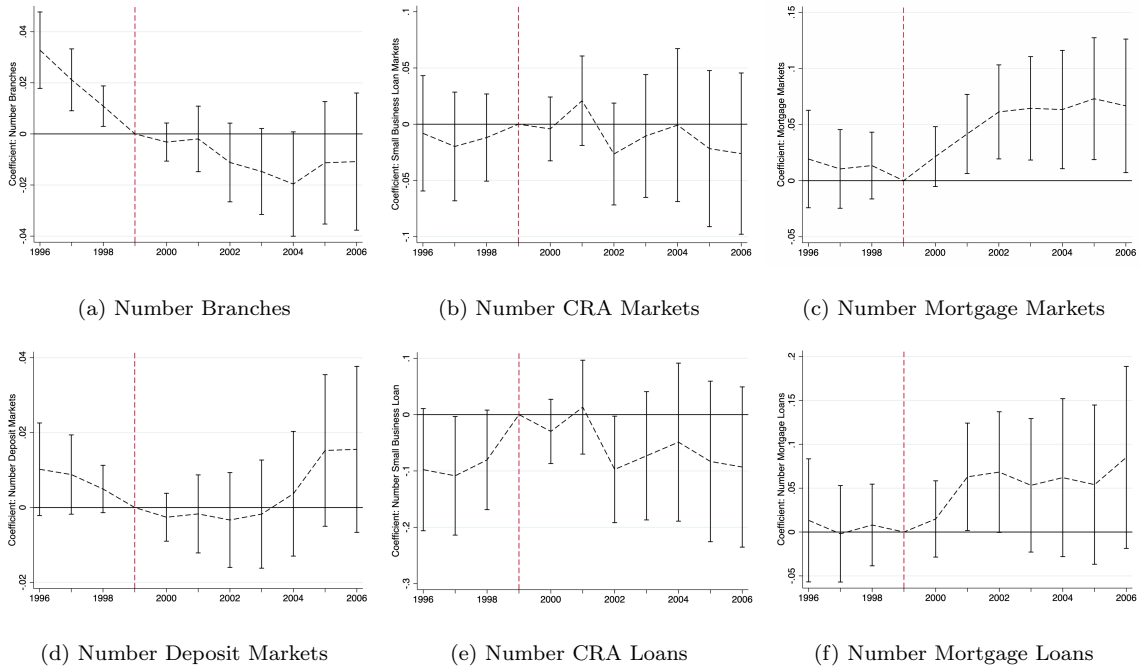
Note: Additional tables show trends in high and low exposure counties.

Table 11: FDIC Income Statement and Balance Sheet Items

Code	Item Description	Units	Frequency
EQTOT	Total Equity Capital	Thousand USD	Quarterly
ILNLS	Loan and Lease Income	Thousand USD	Quarterly
EDEP	Deposit Interest Expense	Thousand USD	Quarterly
ESAL	Salaries and Benefits	Thousand USD	Quarterly
EOTHINT	Other Interest Expense	Thousand USD	Quarterly
OTHBRF	Other Borrowed Funds	Thousand USD	Quarterly
COREDEP	Core Deposits	Thousand USD	Quarterly
LNCI	Commercial and Industrial Loans	Thousand USD	Quarterly
NPERF	Non-Performing Assets	Thousand USD	Quarterly
LNRE	Real Estate Loans	Thousand USD	Quarterly
LNCON	Consumer Loans	Thousand USD	Quarterly
NETINCQ	Quarterly Net Income	Thousand USD	Quarterly
ROEQ	Quarterly Return on Equity	Ratio	Quarterly
ELNLOS	Provisions for Loan and Lease Loss	Thousand USD	Quarterly
ELNATQ	Provisions for Credit Loss	Thousand USD	Quarterly
EQ	Equity	Thousand USD	Quarterly
ASSET	Assets	Thousand USD	Quarterly
DEP	Total Deposits	Thousand USD	Quarterly

Note: The table provides an overview of the data items drawn from the FDIC's collection of call reports.

Figure 12: Bank Responses to Increased Import Competition

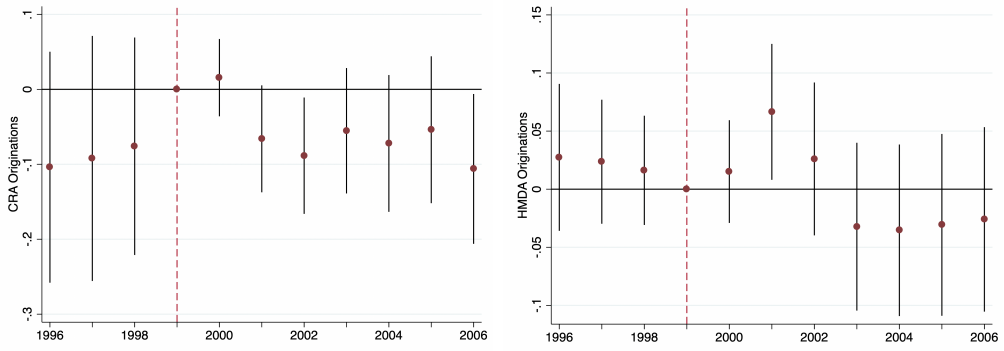


(a) Number Branches (b) Number CRA Markets (c) Number Mortgage Markets

(d) Number Deposit Markets (e) Number CRA Loans (f) Number Mortgage Loans

Note: Continuous difference-in-difference regressions with bank and year fixed effects. Standard errors are clustered at the bank level, and the coefficient for year 1999 is standardized to zero.

Figure 13: RAW Bank Level Event Studies, Credit Origination



(a) CRA Raw (b) HMDA Raw

Note: Estimates show the impact of a one standard deviation increase in bank exposure on each balance sheet item. Data come from FDIC's Quarterly Call Report. Regressions include bank and year fixed effects and time-invariant bank characteristics interacted with year-indicator variables. Standard errors are clustered at the bank level