BANK CONSOLIDATION AND SMALL BUSINESS LENDING IN THE AFTERMATH OF THE US FINANCIAL CRISIS: EVIDENCE FROM CALIFORNIA'S BANKING MARKETS

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ABSTRACT

In the last two decades, the extensive consolidation of the banking industry, and its likely consequences of increased presence of large banking institution as well as concentration in local banking markets, have raised concerns about the ability of small businesses to obtain funds. The effects of consolidation on small business lending may be more pronounced during a credit squeeze when the supply of loans becomes increasingly scarce. Our findings suggest that small business lending growth declined in California's moderately concentrated and highly concentrated urban banking markets relative to unconcentrated ones after the financial crisis of 2008. We also find that the effect of market share structure on small business lending growth is moderated by market concentration in the post-crisis era.

INTRODUCTION

The financial crisis of 2008 is likely to leave an important legacy on the global economy for years to come. The crisis, which reached its climax in September 2008 with the downfall of major U.S. financial institutions, revealed the structural deficiencies of the global financial system and highlighted the urgency of comprehensive reforms to promote stability and soundness of financial markets. The triggering event of the crisis is deemed to be the meltdown of the market for securitized financial products, particularly subprime mortgage-backed securities. The underlying factors of the crisis are, however, varied and had taken several years to evolve into the most severe economic downturn since the Great Depression. Even though the 18-month recession had ended in June of 2009, the economic recovery has remained weak compared to previous post-recession periods.

The U.S. Small Business Administration defines small businesses as independent firms having fewer than 500 employees. However, the vast majority of small businesses are small-scale operations; as of 2009, 89.9% of small firms employed fewer than 20 employees (U.S. Census Bureau). Representing more than 99% of all employer firms, small businesses have a significant impact on the U.S. economy. They generate more than half of the non-farm gross domestic product (GDP) and employ about half of all private sector employees. Small businesses also function as the engine of job growth in the nation's economy, generating 65% of all new jobs between 1993 and 2009 (U.S. Small Business Administration, n. d.).

Having access to reliable sources of credit is critical for the viability and success of small firms. Research findings indicate that small businesses using external financing, including loans from commercial banks and other financial institutions, are more likely to achieve higher profitability, liquidity, and growth (Haynes & Brown, 2009; Cole, 2010). Unlike their larger counterparts with direct access to money and capital markets, small businesses have limited sources of external funding which may become more-scarce during times of economic and financial distress. As banking institutions remain to be the most important source of credit for small firms, the negative effects of tightening of bank credit are particularly pronounced for small businesses (According to Ou and Williams, 2009, commercial banks and thrifts held 63.8% of the total small business debt followed by finance companies with 15.9% as of 2003).

Some of the decline in bank lending in the aftermath of the 2008 crisis may be explained by decreasing demand for credit; however, the supply side factors are also likely to have played a major role. The volume of small business loans (defined as business loans under $1 million) as well as their importance for banking institutions declined significantly during and after the financial crisis. Small business lending by depository institutions declined by 8.3% from 2008 to 2010. Small business loans constituted 15.3% of total bank assets in 2010, down from 16.8% in 2005. Likewise, the small business share of total business loans declined from 81.7% to 68.9% between 2005 and 2010 (Haynes and Williams, 2011). According to the survey conducted by the National Federation of Independent Business, only half of small businesses were able to obtain all or most of the loans they needed in 2009, down from 90% in the mid-2000s (Maltby, 2010).

The extensive bank consolidation in the last few decades raised concerns over the availability of banking services to small firms. Many argue that the consolidation of the industry along with increased concentration in local banking markets resulted in a lessening of competition and intensified the market power of remaining larger banking institutions. The declining position of small banks, in consequence, may have the greatest negative impact on small businesses relying on these institutions for banking services, particularly for sources of credit. According to Avery and Samolyk (2000), small business lending is more likely to be affected by consolidation than some other banking services because it is mostly local in nature. Large banks tend to be less focused on providing services to small customers since they may not find these transactions operationally efficient (Berger et al., 1999). Small banks are better suited than their larger counterparts to lend to small firms which are less capable of providing quantifiable financial data required for standardized business loans. In this regard, relationship lending offers an effective solution to the information asymmetry problem faced by small businesses. Moreover, the general decline in the supply of bank lending during a credit crunch is likely to exacerbate the vulnerability of small businesses to limited external financing options.

The goal of this paper is to investigate the impact of bank consolidation as well as its likely consequences of increased presence of large banks and concentration in local banking markets on small business credit in the tightened credit market of the post-crisis period. We use a dataset derived from banking markets in the state of California which has the largest population and the economy, and is home to the largest number of small businesses in the United States. California

has been one of the hardest-hit states by the recent financial crisis thus, supplies the basis for a natural experiment to study the effects of the crisis. Based on the Federal Housing Finance Agency (FHFA) State House Price Index, California's housing market experienced the third-largest decline with 43.7% between 2007 and 2012 (Federal Housing Finance Agency, 2012). Comparing small business loan growth in California's banking markets before and after the financial crisis enables us to test whether bank consolidation has had an impact the availability of small business credit in the period after the crisis.

Holding other factors constant, we find that small business lending growth declined in moderately concentrated and highly concentrated urban markets relative to unconcentrated ones after the financial crisis. On the other hand, our findings do not suggest that market concentration had an impact on small business lending growth in rural banking markets in the post-crisis era. Overall, our empirical results do not indicate a direct association between small business lending growth (except for commercial real estate loans under $250,000) and banking market share structure in California's urban and rural markets in the period after the financial crisis. However, our findings do indicate that the effect of market share structure on small business lending growth is moderated by market concentration. The increased market share of the largest banking institutions had a significantly negative effect on small business lending growth in moderately concentrated and, particularly in highly concentrated urban markets in the aftermath of the financial crisis.

RELATED LITERATURE

This study draws on two different streams of literature. First, we review past studies looking at the impact of consolidation in banking on small business lending. Then, we examine the literature on the availability of small business credit during credit crunches. Most consolidation activity involves large banks which tend to have disproportionately smaller portfolios of small business loans than small banks. However, the existing literature on bank consolidation and small business lending does not provide clear evidence of the negative or positive impacts of consolidation on the supply of small business loans. A variety of factors, including type of banking markets (urban or rural); market size; level of market concentration; type of consolidation (involving small or large institutions); acquiring institutions' organizational complexity and post-consolidation lending policy; responses of new entrants and other lenders in the same market to consolidation; and the study period are likely to influence the relationship between consolidation and the availability of small business lending (see, among others, Keeton, 1996; Berger et al., 1998; Peek and Rosengren, 1998; Strahan and Weston, 1998; Berger et al., 1999; Avery and Samolyk, 2000; Samolyk and Richardson, 2003; Avery and Samolyk, 2004; and Berger et al., 2004).

Bank consolidation and small business lending

Throughout much of its history, the U.S. banking industry consisted of a large number of small institutions operating mostly in local markets. However, factors including banking deregulation, advances in financial technologies, and financial globalization have dramatically transformed the industry since the 1980s. The disappearance of many community banks (which have traditionally played a significant role in small business lending) and the dominance of the industry by large banking organizations raised concerns about the availability of credit to small businesses in the new banking landscape, given the systematic differences in small business lending policies between the two groups.

There are important differences between small and large banks regarding their small business lending loan portfolios. The research findings indicate that large banks have relatively smaller small business loan portfolios than community banks. Strahan and Weston (1996) report that the smallest banks (institutions with less than $100 million in total assets) devote 97% of their total commercial and industrial loans to small businesses whereas small business loans constitute only 17% of the total commercial and industrial loans of the largest banking institutions (those with more than $5 billion in total assets). According to Strahan and Weston (1998), the overall volume of small business lending increases monotonically with banking company size; however, as institutions grow larger, small business lending growth slows and lending to large businesses increases rapidly. In addition, the ratio of small business loans to total assets rises until banking companies reach about $300 million in total assets and declines thereafter, while the share of lending to large businesses in total assets increases (also see Berger et al., 1995; Keeton, 1995; Levonian and Soller, 1996; and Hancock et al., 2005).

Relationship-based lending plays a critical role in small business finance since most small firms find it difficult to produce formal financial records required for transaction-based loans. Small banks are better-suited to process "soft" information and make relationship loans than larger banks which are more likely to give standardized loans to businesses able to provide "hard" financial data. Berger et al. (1999) argue that large banking institutions may choose to provide fewer services (including business loans) to small customers since doing business with large and small customers at the same time requires a different set of policies and procedures and, may be scope inefficient in the eyes of large banks. It may be particularly inefficient for large, complex banks to provide relationship-based services to informationally opaque small businesses along with transaction-based services to large, informationally transparent customers. Berger et al., however, point out that small firms which are able to provide quantifiable financial data may also have access to transaction-based loans from large banks.

A number of empirical studies found that small and large banks differ significantly in the way they process and issue small business loans. The findings of Cole et al. (2004) indicate that large banks use a "cookie-cutter" approach (e.g., utilizing credit-scoring models) where the lending decision to small businesses is often based on standard, quantitative information gathered from

the borrower's financial statements. Large banking institutions are also more likely to supply small business loans when the borrower is larger, maintains formal financial records, and has a longer track record. On the other hand, in small banks, lending decisions are more likely to be made using a "character" approach. Small banks put less emphasis on financial variables but rather utilize private information about the borrower obtained through pre-existing relationships (the findings of Berger et al., 2005 suggest similar conclusions. Also see Berger and Udell, 2006 for the review of the research literature regarding the comparative advantages of small and large banking institutions in small business lending).

Small business lending during a credit crunch

By definition, a credit crunch is a general decline in the quantity of credit available to borrowers as financial institutions tighten their lending standards and/or raise the cost of credit. According to Bernanke and Lown (1991, p. 207), "a bank credit crunch [is] a significant leftward shift in the supply curve for bank loans, holding constant both the safe real interest rate and the quality of potential borrowers." Credit crunches are typically related to supply-side factors, including "more stringent examination standards, introduction of new capital regulations, the impact of loan losses on bank equity capital, and increased banker risk aversion" (Shrieves & Dahl, 1995, p. 5) (Syron, 1991; Peek & Rosengren, 1993 and 1995; Hancock & Wilcox, 1994; and Brinkmann & Horvitz, 1995, among others, look at the effects of capital regulations and regulatory enforcement on the supply of bank loans). Nevertheless, an overall contraction in lending provided by financial institutions may also be associated with decreasing demand for loans by borrowers due to declining aggregate demand and economic activity.

Small businesses are particularly vulnerable to tightening of bank credit as they have fewer options of external credit (than their larger competitors) and are more likely to rely on relationship loans from local financial institutions. In this respect, permanent (e.g., failure of the lender) or temporary (e.g., declined lending capacity of the lender) loss of a long-term relationship with a lender during an economic or financial crisis may dramatically decrease the availability of funds to a small business since it may not be easy to establish a new relationship with (or transfer the existing relationship to) a new lender. In fact, Bernanke (1983) observes that the tightening of credit during the Great Depression had the most significant impact on households, farmers, unincorporated businesses, and small corporations as these small borrowers had the highest direct or indirect reliance on bank credit. Bernanke argues that the financial crisis of the early 1930s reduced the effectiveness of intermediation between borrowers (particularly, of those aforementioned) and lenders as well as increased its cost. Thus, borrowers either were not able to obtain funds or for a given safe interest rate, they faced higher effective cost of credit when they were able to borrow.

Hancock and Wilcox (1998) analyze the effects of declines in bank capital on lending and aggregate economic activity during the credit crunch of the early 1990s. The results of Hancock and Wilcox indicate that small banks cut their lending (particularly, commercial and industrial

loans) significantly more than large banks in response to capital pressures. On the other hand, other studies looking at the early 1990s credit crunch reached different conclusions. The findings of Berger and Udell (1994) suggest that small banks reduced their lending proportionately less than the banking industry as a whole which contradicts the common perception that customers of small banks were the most adversely affected borrowers from tightening of bank credit. Likewise, based on a sample of banks operating in the state of New Jersey, Bernanke and Lown (1991) showed that large banks reduced commercial and industrial lending considerably more than small banks during the period.

Supply-side factors (along with reduced demand for loans) may have had a significant negative impact on bank credit in the aftermath of the financial crisis of 2008 given that the crisis originated and evolved in the financial sector. Ivashina and Scharfstein (2010) examine the availability of bank credit to large corporate borrowers in the period after the crisis. Their findings suggest that even though some of the decline in new lending can be attributed to decreasing demand for credit, the supply of funds may also have declined during the crisis. Ivashina and Scharfstein show that banks with more deposit financing (which is a more stable source of funding) cut their lending less than the ones relying more heavily on volatile funding sources (e.g., short-term debt). It may be possible to infer from their findings that large banks decreased lending (including small business loans) disproportionately more than small banks during and after the financial crisis since the former, on average, have a lower deposits-to-assets ratio than the latter.

EMPIRICAL MODEL AND RESULTS

Description of the dataset

Our study relies on the Reports of Condition and Income (Call Reports) and Thrift Financial Reports (TFRs) which are filed quarterly by all commercial banks and thrifts insured by the Federal Deposit Insurance Corporation (FDIC). The June 30 Call Reports and TFRs include data on the number and outstanding amount of loans to small businesses. Small business lending data are reported by original amount of loans rather than the size of the borrower. Loans to small businesses are defined as loans under $1 million. Two types of small business loans are reported by banking institutions: loans secured by nonfarm nonresidential properties or commercial real estate loans, and commercial and industrial loans. Furthermore, loans to small businesses are divided into three categories with respect to their outstanding balance: $100,000 or less, more than $100,000 through $250,000, and $250,000 through $1,000,000.

Deposit balances of individual institutions as well as county totals are gathered from the FDIC's 'Summary of Deposit Surveys,' which collect deposit balances for banking institutions as of June 30 of each year. The balanced panel dataset we exploit in the empirical work to follow consists of 368 observations from 26 urban and 20 rural banking markets in the state of California and

covers the period from 2004 through 2011. Urban and rural markets are analyzed separately because of their significantly different characteristics. We follow the convention in the literature and define urban and rural banking markets as Metropolitan Statistical Areas (MSAs) and non-MSA counties, respectively. As of 2011, 97.7% of the total population in California lives in urban markets, hence the research findings for urban markets are particularly significant. Since Call Reports and TFRs do not include data on the geographical origination of small business loans, we extracted the market-level data from a total of 9,415 observations gathered from 936 different commercial banks and thrifts which had operated branches in the state between 2004 and 2011. Due to limited data sources, our paper is one of the few studies looking at the effect of bank consolidation on small business lending at the market-level.

Variables and a priori expectations

The variables used in the regressions are described in Table 1, along with sources where data were obtained. The data are annual and all dollar amounts are converted to year 2011 constant dollars using the Consumer Price Index (CPI). Small business loans are defined as commercial real estate loans (CRE), and commercial and industrial loans (CI) under $1 million. Following the taxonomy of the Call Reports and TFRs, we stratify small business lending into two groups based on loan amounts: loans under $250,000 and loans more than $250,000 through $1 million.

In December 2008, the National Bureau of Economic Research (NBER) announced that the US economy had entered into a recession in December of the previous year. In the US financial services industry, the initial signs of the financial crisis started to emerge in 2007 with the collapse of the market for securitized financial products, particularly subprime mortgages. The crisis culminated in the second half of 2008 with the freeze of global financial markets and the downfall of a number of major US financial institutions. In our sample, the post-crisis era encompasses banking data beyond the June 30, 2008 Call Reports and TFRs. Table 2 supplies the descriptive statistics for all variables for the pre- and post-crisis periods classified by urban and rural banking markets. Tables 3 and 4 show the correlation matrices for independent variables from the urban and rural banking market samples, respectively. The results indicate that the growth rate of all sizes of small business loans showed a significant decline between the periods of 2004–2008 and 2009–2011 both in urban and rural banking markets. This decline was even more pronounced for larger loans and in urban markets. The deposit market share of the largest banking institutions is almost 20 percentage points higher in urban markets (about 64%) than rural markets (about 46%). Urban and rural banking markets in California are, on average, considered to be moderately concentrated (in which the Herfindahl-Hirschman Index [HHI] of deposit market concentration is between 0.1 and 0.18) and highly concentrated (in which the HHI of deposit market concentration is over 0.18), respectively. Also, over 70% of rural markets and only about 10% of urban markets are categorized as highly concentrated.

Following the approach by Avery and Samolyk (2004), we construct annual estimates (as of June 30) of small business lending for every institution in a given banking market and sum up each

institution's loan volume to calculate the total small business lending in the market. For example, if Bank A (A) and Bank B (B) are the only two banks operating branches (and collecting deposits) in Market K (K) then K's total small business lending (SBL) is calculated as the following: SBLK = (Deposit AK / Deposit ATotal) * SBL ATotal + (Deposit BK / Deposit BTotal) * SBL BTotal. This method assumes a reasonable correspondence between the geographical distribution of an institution's deposits and small business lending (in other words, the former is a good proxy for the latter). Avery and Samolyk conduct different tests to assess the validity of this key assumption and find that there is a reasonably high correlation (0.87 and 0.8 for urban and rural markets, respectively) between the geographical distribution of deposits and small business loans. The change in small business lending is measured as the annual percentage growth rate from the previous year. In order to limit the impact of extreme outliers, we winsorized three observations in each tail for the small business lending growth variables.

TABLE 1. DESCRIPTION OF VARIABLES

Variable Name	Description
Small business lending growth	
CRE>250k	Growth rate of CRE more than $250,000 through $1 million (Source: Call Reports).
CRE<250k	Growth rate of CRE under $250,000 (Source: Call Reports).
CI>250k	Growth rate of CI more than $250,000 through $1 million (Source: Call Reports).
CI<250k	Growth rate of CI under $250,000 (Source: Call Reports).
Event parameter	
POST	Equals 0 for observations from the years 2004 through 2008 and 1 for observations from the years 2009 through 2011.
Market share structure	
MSM	Deposit market share of medium-size institutions (total assets between $1 billion and $25 billion) for the previous year (Source: FDIC Summary of Deposits).
MSL	Deposit market share of the largest institutions (more than $25 billion in total assets) for the previous year (Source: FDIC Summary of Deposits).
Market concentration	
HHIM	Dummy variable for moderately concentrated banking markets in which the HHI of deposit market concentration from the previous year is between 0.1 and 0.18 (Source: FDIC Summary of Deposits).
HHIL	Dummy variable for highly concentrated banking markets in which the HHI of deposit market concentration from the previous year is over 0.18 (Source: FDIC Summary of Deposits).
HHINDEX	The HHI of deposit market concentration for the previous year (Source: FDIC Summary of Deposits).
CHHINDEX	Lagged growth rate of the HHI of deposit market concentration (Source: FDIC Summary of Deposits).
Market characteristics	
DEPO	Amount of deposits in a banking market (in 1000s) for the previous year (Source: FDIC Summary of Deposits).
CHDEPO	Lagged growth rate of deposits in a banking market (Source: FDIC Summary of Deposits).
INS	Lagged change in the number of institutions (Source: FDIC Summary of Deposits).
EFFRAT	Lagged change in the market average of the efficiency ratio. The ratio is defined as noninterest expense less amortization of intangible assets as a percent of net interest income plus noninterest income (Source: Call Reports).
NONCURAT	Lagged change in the market average of the noncurrent loans to loans ratio. The ratio is defined as total noncurrent loans and leases (loans and leases 90 days or more past due plus loans in nonaccrual status) as a percent of gross loans and leases (Source: Call Reports).
CAPRAT	Lagged change in the market average of the equity capital to assets ratio. The ratio is defined as total equity capital as a percent of total assets (Source: Call Reports).
Economic indicators	
POPU	Lagged growth rate of population (Source: US Census Bureau).
PCINCOME	Lagged growth rate of per capita income (Source: US Bureau of Economic Analysis).
HOUINDEX	Lagged growth rate of the House Price Index (Source: FHFA).
INVPLAN	Lagged change in the inventory plans component (percent increase minus percent decrease in the next three to six months as of June) of the Small Business Optimism Index (Source: National Federation of Independent Business Small Business Economic Trends Survey).
CAPEXPLAN	Lagged change in the capital expenditure plans component (percent planning a capital expenditure during next three to six months as of June) of the Small Business Optimism Index (Source: National Federation of Independent Business Small Business Economic Trends Survey).
MSAGDP	Lagged growth rate of the GDP in urban markets (Source: US Bureau of Economic Analysis).
UNEMP	Lagged change in the unemployment rate in rural markets (Source: California Employment Development Department).

TABLE 2. DESCRIPTIVE STATISTICS [a]

| | 2004–2008 | | | | 2009–2011 | | | |
| | Urban | | Rural | | Urban | | Rural | |
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
CRE>250k	0.0600	0.2024	0.0364	0.1724	-0.0700	0.0752	-0.0501	0.1078
CRE<250k *	0.0110	0.1432	-0.0469	0.1610	-0.1203	0.1187	-0.0832	0.1566
CI>250k	0.0450	0.1811	0.0515	0.2089	-0.0711	0.1117	-0.1060	0.2189
CI<250k *	-0.0086	0.1687	-0.0230	0.1185	-0.0675	0.1041	-0.0879	0.1300
POST	0	0	0	0	1	0	1	0
MSM *	0.2449	0.1120	0.2563	0.1887	0.2472	0.1078	0.2584	0.1896
MSL *	0.6482	0.1187	0.4551	0.2468	0.6396	0.1316	0.4741	0.2182
HHIM	0.7231	0.4492			0.8077	0.3967		
MSLxHHIM	0.4809	0.3148			0.5164	0.2788		
HHIL *	0.1000	0.3012	0.7300	0.4462	0.1026	0.3054	0.7167	0.4544
MSLxHHIL *	0.0602	0.1885	0.3248	0.3020	0.0666	0.2065	0.3368	0.2967
HHINDEX *	0.1418	0.0889	0.2798	0.1373	0.1362	0.0344	0.2816	0.1489
CHHINDEX	0.0009	0.1266	-0.0074	0.0641	0.0448	0.1461	0.0180	0.1467
DEPO *	3.07×10^7	6.76×10^7	5.77×10^5	5.25×10^5	3.21×10^7	7.32×10^7	5.43×10^5	4.93×10^5
CHDEPO *	0.0467	0.1770	0.0201	0.0467	0.0021	0.0990	-0.0245	0.1029
INS	0.5231	2.0316	0.0300	0.3881	-1.1923	2.9588	-0.1000	0.3025
EFFRAT	0.0167	0.2093	0.0028	0.3036	-0.0096	0.2689	0.0073	0.0704
NONCURAT	-0.0002	0.0035	-0.0009	0.0033	0.0152	0.0079	0.0168	0.0144
CAPRAT	0.0044	0.0172	0.0038	0.0109	-0.0012	0.0136	-0.0010	0.0176
POPU *	0.0108	0.0110	0.0048	0.0109	0.0131	0.0110	0.0053	0.0212
PCINCOME *	0.0483	0.0234	0.0499	0.0340	-0.0028	0.0376	0.0226	0.0488
HOUINDEX	0.1283	0.1123	0.1298	0.0852	-0.1402	0.0796	-0.1122	0.0104
INVPLAN	-1.6	3.8931	-1.6	3.8977	0.0	2.1742	0.0	2.1785
CAPEXPLAN	-0.6	3.7346	-0.6	3.7390	-3.0	4.5755	-3.0	4.5844
MSAGDP	0.0650	0.0341			0.0025	0.0340		
UNEMP	-0.0820	0.5727	-0.0820	0.5727			2.3450	1.3051
n	130		100		78		60	

[a] We test the following null hypothesis using a two-tailed test for all the variables: $H_0: \mu_{urban} = \mu_{rural}$. * denotes a significance level of 1less than 10%.

TABLE 3. CORRELATION MATRIX FOR THE URBAN MARKETS SAMPLE

	POST	MSM	MSL	HHIM	MSLxHHIM	HHIL	MSLxHHIL	HHINDEX	CHHINDEX	DEPO	CHDEPO
POST	1										
MSM	-0.0337	1									
MSL	0.0952	-0.7437	1								
HHIM	0.0041	-0.4061	0.1393	1							
MSLxHHIM	0.0570	-0.5521	0.3424	0.4318	1						
HHIL	0.0160	0.1830	-0.0684	0.0580	-0.5645	1					
MSLxHHIL	0.0041	0.0580	0.1543	0.2441	-0.5880	0.9363	1				
HHINDEX	0.0570	0.1543	-0.2616	-0.5645	-0.5505	0.9600	0.6944	1			
CHHINDEX	0.1571	0.2441	-0.0074	0.0237	-0.2330	0.1598	0.2464	0.7667	1		
DEPO	-0.0373	-0.1934	0.2849	-0.3248	-0.2362	0.2297	0.0486	0.3316	0.0756	1	
CHDEPO	0.0098	-0.1242	0.1933	-0.0615	-0.0548	0.0486	-0.0074	0.0959	0.0767	0.7568	1
INS	-0.1407	0.1098	-0.1363	-0.0444	-0.0608	-0.0468	0.0199	-0.0699	-0.1195	-0.1016	0.0198
EFFRAT	-0.3260	0.0212	-0.0228	0.0774	-0.0347	0.0199	0.0177	-0.0103	0.0205	0.0051	-0.0220
NONCURAT	-0.0548	0.0683	-0.1134	0.0079	0.0774	0.0143	0.0094	0.0205	0.1871	0.1871	-0.1120
CAPRAT	0.8023	0.0600	0.0079	-0.0672	0.0094	0.0177	0.2153	-0.0975	0.0056	-0.0337	0.0026
POPU	-0.1680	0.0807	-0.0672	0.0177	0.0143	0.0094	0.0143	0.0199	-0.0103	-0.0322	0.1266
PCINCOME	0.1007	-0.0447	0.0134	-0.0282	0.2153	0.0143	0.2051	-0.0643	0.0140	-0.0078	-0.0987
HOUINDEX	-0.6444	-0.0263	-0.0104	0.0112	0.2051	0.0112	-0.1387	0.2051	0.0930	0.0136	0.2332
INVPLAN	-0.7901	0.0448	0.0855	-0.0643	0.2044	0.0431	-0.0643	0.5831	0.0034	0.0415	0.0460
CAPEXPLAN	-0.2260	-0.0807	0.0091	-0.0337	0.0056	-0.0975	-0.4287	-0.0935	-0.0105	-0.0027	0.0208
MSAGDP	-0.6658	-0.0147	0.0439	-0.0150	0.0192	-0.0337	0.0094	-0.0139	0.0544	-0.2044	0.0773

	INS	EFFRAT	NONCURAT	CAPRAT	POPU	PCINCOME	HOUINDEX	INVPLAN	CAPEXPLAN	MSAGDP
INS	1									
EFFRAT	0.1379	1								
NONCURAT	-0.1222	0.0239	1							
CAPRAT	0.1612	0.4687	-0.1666	1						
POPU	-0.0342	-0.0199	0.0465	0.0515	1					
PCINCOME	0.1812	-0.0728	-0.5622	0.1568	-0.0735	1				
HOUINDEX	0.1459	-0.0361	-0.7748	0.1730	0.0488	0.5006	1			
INVPLAN	-0.2874	-0.0855	0.0443	-0.1047	0.1606	0.0825	-0.1183	1		
CAPEXPLAN	-0.0755	-0.1048	-0.2817	0.1541	0.0813	0.4349	0.4123	-0.1385	1	
MSAGDP	0.1548	-0.1060	-0.5949	0.1162	0.2030	0.7415	0.6475	0.0086	0.3789	1

TABLE 4. CORRELATION MATRIX FOR THE RURAL MARKETS SAMPLE

	POST	MSM	MSL	HHIL	MSLxHHIL	HHINDEX	CHHINDEX	DEPO	CHDEPO	INS
POST	1									
MSM	0.0055	1								
MSL	0.0392	-0.5149	1							
HHIL	-0.0145	-0.2947	-0.0556	1						
MSLxHHIL	0.0194	-0.5116	0.6438	0.6800	1					
HHINDEX	0.0062	-0.0592	-0.3622	0.5442	0.1138	1				
CHHINDEX	0.1196	-0.1570	0.1776	0.1350	0.2427	0.3076	1			
DEPO	-0.0329	-0.0697	0.2295	-0.5018	-0.2991	-0.5759	-0.0192	1		
CHDEPO	-0.2857	0.0390	-0.1103	0.0022	-0.0674	-0.2244	-0.4029	0.0457	1	
INS	-0.1740	0.1316	-0.1312	-0.0706	-0.1256	-0.0629	-0.3949	-0.0766	0.1690	1
EFFRAT	0.0090	0.0132	-0.0049	0.1168	0.1007	-0.0290	-0.0607	0.0156	0.0244	0.1826
NONCURAT	0.6834	-0.0077	0.0381	-0.0213	0.0178	-0.0158	0.0467	-0.0184	-0.1043	-0.1078
CAPRAT	-0.1679	0.1257	-0.0780	0.0110	-0.0456	0.0119	0.0922	0.0054	0.0779	0.1828
POPU	0.0139	0.0366	0.0519	-0.0915	0.0005	-0.0966	0.0988	-0.0079	0.0644	0.0460
PCINCOME	-0.3146	-0.0145	0.0716	0.0889	0.1014	0.0192	-0.0981	-0.0559	-0.0480	0.0177
HOUINDEX	-0.8671	-0.0412	-0.0325	-0.0047	-0.0291	-0.0018	-0.1228	0.0300	0.3002	0.1750
INVPLAN	0.2260	-0.0037	-0.0014	0.0694	0.0634	0.0309	0.0287	-0.0142	0.0337	-0.1260
CAPEXPLAN	-0.2758	-0.0386	0.0063	-0.0233	-0.0261	0.0118	-0.0111	0.0098	-0.0989	0.1456
UNEMP	0.7901	0.0496	-0.0297	-0.0232	-0.0211	-0.0249	0.0616	-0.0409	0.0053	-0.1489

	EFFRAT	NONCURAT	CAPRAT	POPU	PCINCOME	HOUINDEX	INVPLAN	CAPEXPLAN	UNEMP
EFFRAT	1								
NONCURAT	0.0486	1							
CAPRAT	0.1831	-0.1236	1						
POPU	-0.0029	-0.0564	0.1101	1					
PCINCOME	0.0705	-0.3494	-0.0471	-0.1065	1				
HOUINDEX	-0.0596	-0.6546	0.0924	0.0203	0.2049	1			
INVPLAN	0.2155	0.0465	-0.0520	0.1485	0.1613	-0.2021	1		
CAPEXPLAN	-0.0830	-0.3636	0.1765	0.1158	0.3020	0.3665	-0.1385	1	
UNEMP	0.0414	0.7116	-0.1771	-0.1004	-0.4577	-0.7924	0.1328	-0.5415	1

In order to analyze the impact of the presence of large banks (which tends to increase as a result of consolidation since larger institutions are more heavily involved in mergers and acquisitions) on small business lending, we employ the market share structure variables (i.e., MSM and MSL) which control for, respectively, the share of market deposits held by medium-size and the largest banking institutions. Our primary focus is to study the relationship between bank consolidation and small business lending growth in the aftermath of the recent financial crisis. In order to do so, we include interaction terms between the market share structure variables and the event dummy variable POST which takes a value of 0 for observations from the years 2004–2008 and a value of 1 for observations from 2009–2011.

We also use deposit market concentration variables (i.e., HHIM, HHIL, HHINDEX, and CHHINDEX) to examine the effect of higher market concentration (a likely consequence of bank consolidation since, unlike a large institution, a small bank cannot capture a large share of a local banking market due to size limitations) on the availability of small business loans in local banking markets. HHIM and HHIL are entered as dummy variables for moderately concentrated (the HHI from the previous year is between 0.1 and 0.18) and highly concentrated (the HHI from the previous year is over 0.18) banking markets, respectively. The excluded group includes unconcentrated banking markets where the HHI from the previous year is below 0.1. The variable HHIM is not included in regression tests conducted for rural banking markets where the vast majority of markets are classified as highly concentrated. In this regard, the base group consists of moderately concentrated and unconcentrated banking markets. HHINDEX denotes the HHI for the previous year and CHHINDEX is defined as the lagged growth rate of the HHI. Again, our main focus is to study any possible effects of market concentration on the supply of small business credit for the period after the financial crisis therefore, we introduce interaction terms between the variables HHIM and HHIL, and the event dummy variable POST.

As mentioned previously, the existing literature does not provide conclusive evidence on whether bank consolidation has a positive or negative impact on small business credit and a number of factors are likely to affect the relationship between them. Nevertheless, in a recent study, Berger et al. (2007) look at the effects of "market size structure" (defined as the distribution of market shares of different size classes of banks in a local baking market), an important yet overlooked aspect of market structure in the previous literature, on the supply of small business loans. The findings of Berger et al. are not consistent with finding of previous studies that large banks may have a disadvantage in lending to small firms, particularly in case of providing relationship loans to informationally opaque businesses. Their results suggest that the probability that a small firm obtains credit from a bank of a certain size stratum is roughly proportional to the local banking market share of that size stratum. Also, in general, the association between market concentration and small business lending is not studied explicitly in the literature. On a first approximation, one may suggest that increased market concentration (hence, less competition) is likely to have a negative impact on the availability of small business loans since lack of competition may reduce banks' incentives to establish relationships with and provide services to small firm. However, DeYoung et al. (1999) (among others) argue that the effect of concentration on small business lending is complex and thus indeterminate.

Small and large banks tend to behave differently in terms of their lending practices during periods of credit squeeze. Berger et al. (1999) argue that large, organizationally complex, diversified institutions may fare better in times of financial crises and, hence, continue to supply credit to small businesses. On the other hand, small, undiversified banks may have to reduce lending to small borrowers during times of financial stress. Lending by large banks may particularly be resilient during local and regional economic downturns as these institutions have more geographically diverse loan and deposit portfolios. In contrast, however, anecdotal evidence suggests that small banks may have fared better than their larger competitors in the latest financial crisis as most small institutions entered the crisis with stronger capital positions and less exposure to subprime mortgage loans.

We include a number of market characteristics variables in our empirical specifications which are likely to influence small business loan growth. DEPO denotes the amount of deposits in a banking market and serves as a proxy for market size. We do not have an *a priori* expectation for DEPO. INS is defined as the change in the number of institutions. An increase in the number of banks operating in a banking market is likely to have a positive effect on small business lending growth, *ceteris paribus*. CHDEPO, POPU, and PCINCOME are included to control for the growth rate of deposits, population, and per capita income in a banking market, respectively. Holding other factors constant, the signs on the coefficients of CHDEPO, POPU, and PCINCOME are likely to be positive. We control for the financial condition and performance of banks in a given market by entering NONCURAT, EFFRAT, and CAPRAT as explanatory variables. We expect a negative association between NONCURAT, which controls for the change in the market average of the ratio of noncurrent loans to loans, and small business lending growth, *ceteris paribus*. EFFRAT and CAPRAT denote the change in the market average of the efficiency and equity-to-asset ratios, respectively. We have no *a priori* expectations for the signs on their coefficients.

We also employ economic indicators which could affect the small business loan growth rate. HOUINDEX denotes growth rate of the House Price Index published by the FHFA. We use the Metropolitan Statistical Areas and State Nonmetropolitan Areas Indexes as of the second quarter for urban and rural markets, respectively. This variable is hypothesized to have a positive effect on small business credit growth, *ceteris paribus*, as loans secured by real-estate (including personal residences) are a major source of financing for small business owners. The variables INVPLAN (change in the inventory plans) and CAPEXPLAN (change in the capital expenditure plans), which are two of the components of the Small Businesses Optimism Index conducted by the National Federation of Independent Business, allow us to examine possible effects of credit demand by small businesses on the response variable. We hypothesize that small business loan growth is likely to accelerate due to anticipated increases in inventory and capital expenditures. The variable MSAGDP accounts for the growth rate of the GDP in urban markets. The GDP data is not available for rural markets therefore, we enter UNEMP (change in the unemployment rate) to control for the macroeconomic conditions in rural banking markets. We expect that, holding other factors constant, the effects of MSAGDP and UNEMP on small business loan growth is positive and negative, respectively.

Model specifications

We use three different specifications of a fixed effects model with robust standard errors to study the possible effects of bank consolidation on small business lending in the period after the financial crisis of 2008. We have chosen to study the effects of market share structure and market concentration on small business lending growth in two different specifications because of the high multicollinearity between the market structure interaction terms (i.e., POSTxMSM and POSTxMSL) and market concentration interaction terms (i.e., POSTxHHIM and POSTxHHIL).

In the first specification, we analyze the relationship between banking market share structure (defined in terms of deposit market share of medium-size and the largest banks) and small business lending growth, with principal focus being the post-crisis period. The specification has the following general form:

$$(\text{Small Business Lending Growth}) = f\,(\text{Event Dummy, Market Share Structure, Event Dummy x Market Share Structure, Market Concentration, Market Characteristics, Economic Indicators}) + \alpha + \varepsilon \qquad (1)$$

where α is the market fixed effect which contains all time invariant factors and ε is the idiosyncratic error term.

The next specification tests whether or not market concentration has had a negative impact on small business lending in the aftermath of the financial crisis. Interacting the event dummy variable POST with HHIM and HHIL (dummy variables for moderately concentrated and highly concentrated banking markets, respectively) enables us to estimate the marginal change in the latter variables associated with the financial crisis. The control variables are the same as the ones in Equation (1). The model is of the following general form:

$$(\text{Small Business Lending Growth}) = f\,(\text{Event Dummy, Market Concentration, Event Dummy x Market Concentration, Market Share Structure, Market Characteristics, Economic Indicators}) + \alpha + \varepsilon \qquad (2)$$

The last specification introduces two new interaction variables. We interact MSL (which denotes the share of market deposits held by the largest banks) first with HHIM and then with HHIL. Since our focus is the time period after the crisis, we further interact these interaction terms with POST, creating three-way interactions. The three-way interactions allow us to investigate whether the effect of large bank presence in local banking markets on small business lending is moderated by market concentration. The coefficient on POSTxMSLxHHIL, for example, indicates the change in the marginal impact of large bank presence on small business lending growth in highly concentrated banking markets after the financial crisis. We use the same control variables as the previous specifications. The specification takes the following form:

(Small Business Lending Growth) = f (Event Dummy, Market Share Structure, Market Concentration, Market Share Structure x Market Concentration, Event Dummy x Market Share Structure x Market Concentration, Market Characteristics, Economic Indicators) + α + ε   (3)

Results

The estimated fixed effects specifications generate the regression results reported in Tables 5–7. They explain between 19.6% and 46.4% of the variation in the small business lending growth in California's urban and rural banking markets. Table 5 includes results based on the specification in Equation (1) where we test whether banking market structure has an impact on small business loan growth. Table 6 presents the findings on the possible effects of market concentration on small business lending as specified in Equation (2). Finally, the results from estimating Equation (3) are presented in Table 7. For the sake of brevity, we do not discuss the details of the estimated coefficients on the control variables.

TABLE 5. EFFECTS OF MARKET SHARE STRUCTURE ON SMALL BUSINESS LENDING GROWTH [b]

	Urban Markets				Rural Markets			
	CRE>250k	CRE<250k	CI>250k	CI<250k	CRE>250k	CRE<250k	CI>250k	CI<250k
Intercept	-0.599	-0.844**	-0.471	-1.325***	0.490**	-0.008	0.331	-0.338
	0.553	*0.326*	*0.329*	*0.364*	*0.222*	*0.325*	*0.284*	*0.305*
POST	0.018	0.621***	0.008	0.266**	0.147	0.265**	-0.083	0.020
	0.142	*0.165*	*0.138*	*0.101*	*0.091*	*0.120*	*0.111*	*0.066*
MSM	0.837	0.520	0.303	1.548***	-0.203	0.020	-0.493	0.247
	0.506	*0.524*	*0.362*	*0.419*	*0.255*	*0.448*	*0.305*	*0.225*
POSTxMSM	-0.265	-0.381	-0.019	-0.239	-0.059	-0.163	-0.148	-0.241*
	0.263	*0.254*	*0.224*	*0.210*	*0.186*	*0.207*	*0.245*	*0.118*
MSL	0.919	1.232***	0.931*	1.571***	-0.112	-0.495	-0.805**	-0.126
	0.850	*0.327*	*0.504*	*0.530*	*0.291*	*0.364*	*0.348*	*0.296*
POSTxMSL	-0.127	-0.661***	-0.017	-0.109	-0.147	-0.392***	0.071	0.006
	0.174	*0.179*	*0.140*	*0.114*	*0.100*	*0.120*	*0.151*	*0.130*
HHM	0.019	-0.105**	-0.054	-0.060**				
	0.034	*0.039*	*0.040*	*0.024*				
HHL	0.111	-0.039	0.207*	0.139	-0.078**	0.079	-0.026	0.003
	0.114	*0.066*	*0.114*	*0.110*	*0.033*	*0.092*	*0.065*	*0.066*
HHINDEX	-0.435	-0.346	-0.877***	-0.503	0.183	0.684	1.379***	0.384
	0.539	*0.261*	*0.298*	*0.420*	*0.316*	*0.551*	*0.393*	*0.281*
CHHINDEX	-0.092	0.142	-0.169	0.118	0.075	0.201	-0.085	-0.031
	0.151	*0.163*	*0.123*	*0.126*	*0.220*	*0.268*	*0.209*	*0.119*
DEPO	-4.50×10^{-9}	-4.34×10^{-9}**	-4.54×10^{-9}*	-2.96×10^{-9}	-8.08×10^{-7}***	-3.17×10^{-7}	-4.81×10^{-7}	2.45×10^{-7}
	2.93×10^{-9}	*1.68×10^{-9}*	*2.45×10^{-9}*	*2.68×10^{-9}*	*2.66×10^{-7}*	*3.63×10^{-7}*	*3.97×10^{-7}*	*3.79×10^{-7}*
CHDEPO	0.112	-0.095	0.134	-0.060	-0.049	-0.648**	-0.326	-0.488**
	0.169	*0.151*	*0.099*	*0.194*	*0.289*	*0.252*	*0.347*	*0.216*
INS	-0.003	0.004	0.002	0.012***	0.027	-0.007	0.038	-0.018
	0.005	*0.004*	*0.002*	*0.004*	*0.029*	*0.023*	*0.043*	*0.027*
EFFRAT	0.004	-0.012	0.001	0.018	0.024	-0.003	-0.055	-0.014
	0.043	*0.052*	*0.055*	*0.027*	*0.020*	*0.026*	*0.047*	*0.020*
NONCURAT	0.495	-1.416	-0.467	-1.842	-0.038	-0.316	4.663*	1.025
	1.257	*1.568*	*2.554*	*1.578*	*1.040*	*1.440*	*2.664*	*1.952*
CAPRAT	0.209	-0.568	-0.008	-0.244	-2.052***	-3.139***	-1.594	-0.056
	0.675	*0.551*	*0.767*	*0.416*	*0.531*	*0.792*	*1.035*	*0.696*
POPU	1.730	1.550	1.300	-0.699	0.630	0.154	-1.403	-0.994
	1.129	*1.057*	*1.302*	*1.162*	*0.726*	*0.863*	*0.928*	*0.809*
PCINCOME	-0.417	2.478***	1.650**	2.356***	0.814***	0.882***	0.993**	0.495
	0.539	*0.553*	*0.764*	*0.523*	*0.284*	*0.286*	*0.458*	*0.290*
HOUINDEX	-0.038	0.358**	0.054	0.259	0.551**	0.712**	0.677*	0.385**
	0.114	*0.132*	*0.243*	*0.156*	*0.231*	*0.251*	*0.381*	*0.165*
INVPLAN	-0.008	-0.011***	-0.007*	-0.011***	-0.003	-0.001	0.002	0.001
	0.006	*0.003*	*0.004*	*0.003*	*0.003*	*0.004*	*0.006*	*0.003*
CAPEXPLAN	-0.001	-0.012***	-0.012**	-0.007**	-0.015***	-0.008**	-0.018***	-0.005*
	0.005	*0.002*	*0.005*	*0.003*	*0.005*	*0.003*	*0.006*	*0.003*
MSAGDP	0.341	-0.175	-0.092	-0.826**				
	0.605	*0.379*	*0.399*	*0.303*				
UNEMP					-0.025	0.025	-0.010	0.016
					0.024	*0.022*	*0.037*	*0.017*
R^2 (with-in)	0.196	0.446	0.267	0.340	0.366	0.361	0.338	0.238
n; # of groups	208; 26	208; 26	208; 26	208; 26	160; 20	160; 20	160; 20	160; 20

[b] Standard errors are reported in italics beneath the estimated coefficients.

***, **, and * denote 1%, 5%, and 10% significance, respectively.

TABLE 6. EFFECTS OF MARKET CONCENTRATION ON SMALL BUSINESS LENDING GROWTH [c]

	Urban Markets				Rural Markets			
	CRE>250k	CRE<250k	CI>250k	CI<250k	CRE>250k	CRE<250k	CI>250k	CI<250k
Intercept	-0.483	-0.423	-0.394	-1.227***	0.519**	0.063	0.462*	-0.173
	0.555	*0.313*	*0.297*	*0.379*	*0.221*	*0.300*	*0.251*	*0.296*
POST	-0.022	0.224***	0.065	0.226***	0.041	-0.013	-0.151	-0.117
	0.066	*0.053*	*0.084*	*0.060*	*0.066*	*0.065*	*0.115*	*0.069*
HHIM	0.038	-0.062	-0.037	-0.045*				
	0.033	*0.050*	*0.032*	*0.022*				
POSTxHHIM	-0.097**	-0.124***	-0.065**	-0.082***				
	0.037	*0.040*	*0.024*	*0.028*				
HHIL	0.290*	0.096	0.392***	0.290**	-0.090*	0.050	-0.056	-0.035
	0.154	*0.083*	*0.136*	*0.139*	*0.046*	*0.089*	*0.064*	*0.066*
POSTxHHIL	-0.255**	-0.248***	-0.258***	-0.215**	0.030	0.075	0.068	0.088*
	0.121	*0.086*	*0.092*	*0.091*	*0.052*	*0.065*	*0.057*	*0.044*
HHINDEX	-0.677	-0.330	-1.218***	-0.708*	0.124	0.533	1.458***	0.467*
	0.443	*0.241*	*0.276*	*0.385*	*0.298*	*0.496*	*0.332*	*0.261*
CHHINDEX	-0.176	-0.007	-0.268**	0.048	0.072	0.190	-0.103	-0.057
	0.152	*0.148*	*0.126*	*0.127*	*0.223*	*0.245*	*0.202*	*0.117*
MSM	0.725	0.281	0.217	1.453***	-0.165	0.113	-0.571**	0.147
	0.491	*0.481*	*0.343*	*0.410*	*0.222*	*0.406*	*0.233*	*0.198*
MSL	0.774	0.638*	0.841*	1.451**	-0.077	-0.403	-0.832**	-0.149
	0.844	*0.343*	*0.447*	*0.546*	*0.277*	*0.345*	*0.344*	*0.286*
DEPO	-4.23×10^{-9}*	-4.94×10^{-9}***	-3.75×10^{-9}**	-2.74×10^{-9}	-8.50×10^{-7}***	-4.18×10^{-7}	-6.44×10^{-7}	3.85×10^{-8}
	2.08×10^{-9}	1.57×10^{-9}	1.76×10^{-9}	1.94×10^{-9}	2.70×10^{-7}	2.78×10^{-7}	3.84×10^{-7}	3.80×10^{-7}
CHDEPO	0.176	0.023	0.208	-0.008	0.035	-0.427*	-0.370	-0.497**
	0.170	*0.144*	*0.122*	*0.194*	*0.275*	*0.213*	*0.312*	*0.191*
INS	-0.002	0.006	0.003	0.013***	0.028	-0.005	0.033	-0.022
	0.005	*0.004*	*0.002*	*0.004*	*0.027*	*0.026*	*0.044*	*0.028*
EFFRAT	-0.011	-0.015	-0.014	0.005	0.031	0.014	-0.045	-0.001
	0.045	*0.043*	*0.052*	*0.026*	*0.025*	*0.032*	*0.048*	*0.023*
NONCURAT	0.277	-0.752	-0.739	-2.028	-0.235	-0.828	4.916*	1.262
	1.026	*1.679*	*2.520*	*1.554*	*1.014*	*1.459*	*2.713*	*1.872*
CAPRAT	0.500	-0.296	0.300	0.001	-2.295***	-3.766***	-1.546	-0.080
	0.669	*0.538*	*0.811*	*0.429*	*0.551*	*0.813*	*1.032*	*0.722*
POPU	1.720	1.058	1.452	-0.717	0.447	-0.312	-1.179	-0.757
	1.075	*1.001*	*1.229*	*1.127*	*0.664*	*0.798*	*0.887*	*0.775*
PCINCOME	-0.470	2.342***	1.544*	2.316***	0.768**	0.768**	0.953*	0.439
	0.513	*0.612*	*0.753*	*0.530*	*0.306*	*0.325*	*0.479*	*0.315*
HOUINDEX	-0.042	0.377***	0.019	0.257	0.524**	0.639**	0.664*	0.353**
	0.106	*0.120*	*0.228*	*0.157*	*0.225*	*0.232*	*0.353*	*0.163*
INVPLAN	-0.007	-0.010***	-0.007	-0.011***	-0.003	-0.001	0.002	0.001
	0.007	*0.004*	*0.004*	*0.003*	*0.003*	*0.004*	*0.005*	*0.003*
CAPEXPLAN	-0.001	-0.012***	-0.012**	-0.008**	-0.015***	-0.007**	-0.018***	-0.005
	0.005	*0.002*	*0.005*	*0.003*	*0.005*	*0.003*	*0.006*	*0.003*
MSAGDP	0.311	-0.222	-0.095	-0.852***				
	0.606	*0.403*	*0.408*	*0.307*				
UNEMP					-0.027	0.020	-0.011	0.013
					0.023	*0.020*	*0.033*	*0.016*
R^2 (with-in)	0.213	0.443	0.290	0.356	0.361	0.321	0.337	0.233
n; # of groups	208; 26	208; 26	208; 26	208; 26	160; 20	160; 20	160; 20	160; 20

[c] Standard errors are reported in italics beneath the estimated coefficients. ***, **, and * denote 1%, 5%, and 10% significance, respectively.

The coefficients on MSM and MSL in Table 5 indicate the marginal external effect of replacing the market share of banks in the base group (i.e., small banks with less than $1 billion in total assets) with market shares of medium-size and large banks (see Rosen, 2007 for a similar interpretation of banking market structure variables). In all four regressions estimated for urban markets, the coefficients on MSM (significant in one regression) and MSL (significant in three regressions) are positive providing some evidence that an increase in the market shares of the largest banks and medium-size banks, with an equal decline in the market share of small banks,

had a positive impact on small business lending growth in the period before the financial crisis, *ceteris paribus*. The findings for rural markets are, however, inconclusive as the estimated coefficients on MSM and MSL are mostly negative but not significant.

TABLE 7. EFFECTS OF MARKET SHARE STRUCTURE ON SMALL BUSINESS LENDING GROWTH MODERATED BY MARKET CONCENTRATION [d]

	Urban Markets				Rural Markets			
	CRE>250k	CRE<250k	CI>250k	CI<250k	CRE>250k	CRE<250k	CI>250k	CI<250k
Intercept	-0.669	-0.552	-0.035	-1.299***	0.612**	-0.332	0.313	-0.378
	0.541	*0.397*	*0.323*	*0.415*	*0.234*	*0.257*	*0.304*	*0.290*
POST	-0.055	0.253***	0.063	0.202***	0.087	0.073	-0.147	-0.102
	0.077	*0.052*	*0.088*	*0.056*	*0.056*	*0.070*	*0.097*	*0.059*
MSM	0.739	0.327	0.197	1.455***	-0.157	-0.052	-0.587***	0.112
	0.500	*0.468*	*0.354*	*0.414*	*0.234*	*0.408*	*0.206*	*0.201*
MSL	1.055	0.858	0.278	1.575**	-0.411	0.031	-0.513	0.238
	0.835	*0.542*	*0.485*	*0.601*	*0.280*	*0.348*	*0.446*	*0.287*
HHIM	0.057	0.078	-0.342***	-0.019				
	0.143	*0.224*	*0.111*	*0.150*				
HHIL	0.556	0.066	-0.032	0.357	-0.275*	0.425*	0.145	0.222
	0.419	*0.271*	*0.230*	*0.263*	*0.159*	*0.220*	*0.186*	*0.144*
HHINDEX	-0.889*	-0.553**	-1.473***	-0.923**	0.129	0.665	1.446***	0.468*
	0.441	*0.207*	*0.256*	*0.413*	*0.320*	*0.526*	*0.296*	*0.258*
CHHINDEX	-0.151	0.038	-0.232*	0.072	0.041	0.249	-0.075	-0.022
	0.151	*0.149*	*0.128*	*0.128*	*0.236*	*0.262*	*0.212*	*0.111*
MSLxHHIM	-0.065	-0.231	0.488**	-0.064				
	0.227	*0.360*	*0.184*	*0.237*				
POSTxMSLxHHIM	-0.087	-0.224***	-0.089**	-0.077				
	0.061	*0.056*	*0.042*	*0.045*				
MSLxHHIL	-0.337	0.151	0.832***	-0.018	0.417	-0.640	-0.403	-0.499
	0.441	*0.443*	*0.297*	*0.322*	*0.334*	*0.419*	*0.388*	*0.340*
POSTxMSLxHHIL	-0.355**	-0.512***	-0.535***	-0.356***	-0.035	-0.092	0.135	0.141
	0.162	*0.114*	*0.143*	*0.125*	*0.084*	*0.128*	*0.098*	*0.106*
DEPO	-2.98×10^{-9}	-4.81×10^{-9}***	-3.06×10^{-9}*	-1.94×10^{-9}	-7.68×10^{-7}**	-1.99×10^{-7}	-6.45×10^{-7}	6.61×10^{-8}
	2.01×10^{-9}	*1.70x*	1.69×10^{-9}	1.72×10^{-9}	2.90×10^{-7}	2.78×10^{-7}	3.78×10^{-7}	3.70×10^{-7}
CHDEPO	0.168	-0.011	0.185	-0.020	0.047	-0.543**	-0.328	-0.462**
	0.171	*0.137*	*0.126*	*0.196*	*0.289*	*0.223*	*0.327*	*0.211*
INS	-0.002	0.006	0.001	0.012***	0.036	0.004	0.033	-0.021
	0.005	*0.004*	*0.002*	*0.004*	*0.026*	*0.032*	*0.042*	*0.028*
EFFRAT	-0.011	-0.020	-0.018	0.005	0.012	0.006	-0.033	0.010
	0.044	*0.047*	*0.051*	*0.028*	*0.027*	*0.027*	*0.050*	*0.021*
NONCURAT	0.312	-1.321	-1.045	-2.122	-0.182	-0.568	4.714*	1.064
	1.119	*1.595*	*2.496*	*1.526*	*1.105*	*1.474*	*2.717*	*1.847*
CAPRAT	0.502	-0.271	0.390	0.009	-2.075***	-3.458***	-1.768	-0.286
	0.688	*0.553*	*0.822*	*0.434*	*0.583*	*0.810*	*1.140*	*0.689*
POPU	1.922	1.279	1.779	-0.589	0.532	0.096	-1.312	-0.859
	1.204	*1.035*	*1.302*	*1.223*	*0.647*	*0.757*	*0.937*	*0.906*
PCINCOME	-0.446	2.419***	1.586**	2.346***	0.858**	0.858**	0.908*	0.403
	0.510	*0.582*	*0.743*	*0.524*	*0.316*	*0.341*	*0.486*	*0.338*
HOUINDEX	-0.031	0.379***	0.008	0.258	0.524**	0.680***	0.650*	0.341*
	0.106	*0.119*	*0.226*	*0.156*	*0.236*	*0.237*	*0.353*	*0.169*
INVPLAN	-0.007	-0.011***	-0.007	-0.011***	-0.003	-0.001	0.003	0.001
	0.007	*0.004*	*0.004*	*0.003*	*0.003*	*0.004*	*0.006*	*0.003*
CAPEXPLAN	-0.001	-0.012***	-0.013**	-0.008**	-0.015***	-0.008***	-0.018***	-0.005*
	0.005	*0.002*	*0.005*	*0.003*	*0.005*	*0.003*	*0.006*	*0.003*
MSAGDP	0.310	-0.212	-0.094	-0.840**				
	0.626	*0.375*	*0.405*	*0.308*				
UNEMP					-0.029	0.025	-0.011	0.014
					0.023	*0.020*	*0.034*	*0.017*
R^2 (with-in)	0.212	0.464	0.301	0.357	0.365	0.333	0.341	0.244
n; # of groups	208; 26	208; 26	208; 26	208; 26	160; 20	160; 20	160; 20	160; 20

[d] Standard errors are reported in italics beneath the estimated coefficients. ***, **, and * denote 1%, 5%, and 10% significance, respectively.

In regressions, we estimated for urban markets, the coefficients on POSTxMSM and POSTxMSL are all negative yet insignificant in all but one of the cases. In the second column of Table 5, the statistically significant coefficient on POSTxMSL implies that a 1% increase in the market share of the largest banks (accompanied by a 1% decline in the market share of small banks) results in, on average, 0.67 percentage points decline in the growth rate of CRE under $250,000 in the post-crisis era, *ceteris paribus*. The coefficients on POSTxMSM and POSTxMSL in regressions estimated for rural markets are mostly negative but again insignificant in most cases (except in regressions where CRE<250k and CI<250k are entered as dependent variables). Overall, the findings do not provide enough evidence to suggest an association between banking market structure and small business loan growth in the aftermath of the financial crisis in both urban and rural markets in California.

In regressions, we estimated using California's urban banking market data (see Table 6), the coefficients on the concentration variable HHIL are all positive and statistically significant in most cases suggesting that small business lending growth in highly concentrated markets was higher relative to the excluded group, namely unconcentrated banking markets before the financial crisis, *ceteris paribus*. The findings for moderately concentrated markets are not conclusive as the coefficients on HHIM have mixed signs and are not statistically significant. Finally, the coefficients on HHIL are mostly negative but insignificant in the regression tests conducted for rural markets.

The coefficients on POSTxHHIM and POSTxHHIL are all negative and statistically significant at conventional levels in estimated regressions. These findings indicate that, holding other factors constant, the small business lending growth rate (for all loan categories) in moderately concentrated, and particularly in highly concentrated banking markets declined compared to unconcentrated banking markets in the aftermath of the financial crisis. In first column of Table 6, the coefficients on POSTxHHIM and POSTxHHIL indicate that the growth rate of CRE more than $250,000 through $1 million in moderately concentrated and highly concentrated markets declined by, on average, 9.7 and 25.5 percentage points, respectively, relative to unconcentrated markets in the period after the crisis, *ceteris paribus*. The results for rural banking markets, however, do not suggest any association between small business lending growth and market concentration since the coefficients on POSTxHHIL are only marginally significant in one of the regressions.

In regressions, we estimated both for urban and rural banking markets (see Table 7), the coefficients on MSLxHHIM and MSLxHHIL have mixed signs and they are mostly statistically insignificant. These results do not provide any evidence suggesting that market concentration has a moderating effect on the association between market share structure and small business lending in the pre-crisis-era. On the other hand, in regressions estimated for urban markets, the coefficients on POSTxMSLxHHIM (significant in two regressions) and POSTxMSLxHHIL (significant in all regressions) are all negative indicating that, holding other factors constant, the relationship between market share structure of local banking markets and small business lending growth is moderated by market concentration in the period after the financial crisis. In other

words, in moderately concentrated and, particularly in highly concentrated markets, the increased market share of the largest banking institutions has a significantly negative effect on small business lending growth after the crisis. For example, in the first column of Table 7, the coefficient on POSTxMSLxHHIL implies that in highly concentrated markets, the growth rate of CRE more than $250,000 through $1 million declines by 0.36 percentage points when the market share of the largest banks increases by 1% (accompanied by a 1% decline in the market share of small banks) in the aftermath of the financial crisis of 2008, *ceteris paribus*. It is important to note that the findings from Table 5 (where MSL is not interacted with the market concentration variables) do not imply a significant negative relationship between banking market structure and small business lending in the post-crisis era. Thus, the negative effect of the increased market share of the largest banks on small business loan growth becomes more evident in California's more concentrated banking markets. In regressions estimated using observations from rural markets, the coefficients on POSTxMSLxHHIL do not yield similar results since they have mixed signs and are all insignificant.

In order to examine the sensitivity of our main findings to alternative specifications, we performed robustness tests (the results are not shown in tables due to space constraints). First, we estimated all three specifications without control variables (i.e., variables controlling for market characteristics and economic indicators). In regressions estimated for both urban and rural markets, the signs of the coefficients on the key variables (i.e., POSTxMSM and POSTxMSL from Table 5; POSTxHHIM and POSTxHHIL from Table 6; and POSTxMSLxHHIM and POSTxMSLxHHIL from Table 7) did not change. In regressions estimated for urban markets, the statistical significance of the coefficients on POSTxMSL, POSTxHHIL, and POSTxMSLxHHIL in general remained unchanged. On the other hand, the statistical significance of the coefficients on POSTxHHIM and POSTxMSLxHHIM declined, and POSTxMSM improved. The statistical significance of the coefficients on variables POSTxMSM, POSTxMSL, POSTxHHIL, and POSTxMSLxHHIL in regressions estimated for rural markets mostly did not change.

Next, we estimated the original specifications by using pooled ordinary least squares (OLS) (with and without robust standard errors as well as with standardized beta coefficients) and robust regression (to correct for influential outliers) analyses. In regressions estimated using observations from both urban and rural markets, the signs of the coefficients on the key variables remained the same except in a few cases. In regressions estimated for urban markets, the statistical significance of the coefficients on POSTxMSM generally improved and POSTxMSL remained the same. However, there was a general decline in the statistical significance of the coefficients on variables POSTxHHIM, POSTxHHIL, POSTxMSLxHHIM, and POSTxMSLxHHIL. There was no appreciable change in the statistical significance of the coefficients on the key variables in regressions estimated for rural markets.

We then estimated all the specifications by combining the samples for urban and rural banking markets. Since the variable HHIM is not included in regression tests conducted for rural banking markets, we had to exclude it from the tests using the combined samples. Overall, regression

results were inconclusive as the coefficients on the key variables had mixed signs and they were mostly statistically insignificant, presumably because urban and rural markets have significantly different characteristics, as frequently cited in the research literature on the banking industry. Finally, we estimated our specifications using six new response variables, namely growth rate of CRE and CI under $100,000, more than $100,000 through $250,000, and under $1 million. The results were generally similar to those presented in Tables 5–7. Overall, the results from the robustness tests support our main findings.

CONCLUDING REMARKS

The U.S. banking industry experienced a widespread consolidation in the last three decades which raised concerns over the availability of banking services to small businesses. The issue becomes particularly important during a credit crunch when bank credit tends to become less accessible for small firms which typically have limited financing alternatives.

Using market-level data derived from banking markets in the state of California, we study the possible effects of market consolidation on the availability of small business loans in the aftermath of the financial crisis of 2008. More specifically, we test whether or not increased concentration in local banking markets as well as greater market presence of large banks had a negative impact on the small business credit supply in the period after the crisis. This paper is one of the few studies looking at the relationship between bank consolidation and small business lending at the market level. It contributes to the literature on the effects of bank consolidation on small business lending in local banking markets as well as the literature looking at the availability of bank credit to small businesses during a credit crunch.

This study has significant policy implications. Our empirical results suggest that small business loan growth declined in highly concentrated and moderately concentrated urban markets relative to unconcentrated ones in the post-crisis era. The results for rural markets, however, do not indicate an association between market concentration and small business loan growth in the period after the crisis. Overall, the empirical evidence do not suggest a direct relationship between banking market share structure and small business lending growth in the aftermath of the financial crisis. However, we find evidence suggesting that market concentration moderates the effect of market share structure on small business lending growth. In this respect, some of the concerns over the adverse effects of market consolidation on small business lending seem to be valid, especially during a credit squeeze.

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REFERENCES

Avery, R. B. & Samolyk, K. A. (2004). Bank Consolidation and Small Business Lending: The Role of Community Banks, *Journal of Financial Services Research*, 25, 291–325.

Avery, R. B. & Samolyk, K. A. (2000). Bank Consolidation and the Provision of Banking Services: The Case of Small Commercial Loans, *Federal Deposit Insurance Corporation Working Paper* Series, 00-01.

Berger, A. N., Rosen, R. J. & Udell, G. F. (2007). Does Market Size Structure Affect Competition? The Case of Small Business Lending, *Journal of Banking and Finance*, 31, 11–33.

Berger, A. N. & Udell, G. F. (2006). A More Complete Conceptual Framework for SME Finance, *Journal of Banking and Finance*, 30, 2945–2966.

Berger, A. N., Miller, N. H., Petersen, M. A., Rajan, R. G. & Stein, J. C. (2005). Does Function Follow Organizational Form? Evidence from the Lending Practices of Large and Small Banks, *Journal of Financial Economics*, 76, 237–269.

Berger, A. N., Bonime, S. D., Goldberg, L. G. & White, L. J. (2004). The Dynamics of Market Entry: The Effects of Mergers and Acquisitions on Entry in the Banking Industry, *Journal of Business*, 77, 797–834.

Berger, A. N., Demsetz, R. S. & Strahan, P. E. (1999). The Consolidation of the Financial Services Industry: Causes, Consequences, and Implications for the Future, *Journal of Banking and Finance*, 23, 135–194.

Berger, A. N., Saunders, A., Scalise, J. M. & Udell, G. F. (1998). The Effects of Bank Mergers and Acquisitions on Small Business Lending, *Journal of Financial Economics*, 50, 187–229.

Berger, A. N., Kashyap, A. K. & Scalise, J. M. (1995). The Transformation of the U.S. Banking Industry: What a Long, Strange Trip It's Been, *Brookings Papers on Economic Activity*, 2, 155–218.

Berger, A. N. & Udell, G. F. (1994). Did Risk-Based Capital Allocate Bank Credit and Cause a 'Credit Crunch' in the U.S.?, *Journal of Money, Credit, and Banking*, 26, 585–628.

Bernanke, B. S. & Lown, C. S. (1991). The Credit Crunch, *Brookings Papers on Economic Activity*, 2, 205–247.

Bernanke, B. S. (1983). Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression, *The American Economic Review*, 73, 257–276.

Brinkmann, E. J. & Horvitz, P. M. (1995). Risk-Based Capital Standards and the Credit Crunch, *Journal of Money, Credit and Banking*, 27, 848–863.

Cole, R. (2010). Bank Credit, Trade Credit or No Credit: Evidence from the Surveys of Small Business Finances, *US Small Business Administration Office of Advocacy, Banking and Financial Economic Research*, June.

Cole, R., Goldberg, L. G. & White, L. J. (2004). Cookie-Cutter versus Character: The Micro Structure of Small Business Lending by Large and Small Banks, *Journal of Financial and Quantitative Analysis*, 39, 227–251.

DeYoung, R., Goldberg, L. G. & White, L. J. (1999). Youth, Adolescence and Maturity of Banks: Credit Availability to Small Business in an Era of Banking Consolidation, *Journal of Banking and Finance*, 23, 463–492.

Federal Housing Finance Agency. (2012). State HPI Summary, Available from <http://www.fhfa.gov/Default.aspx?Page=215&Type=summary>.

Hancock, D., Peek, J. & Wilcox, J. A. (2005). The Effects of Mergers and Acquisitions on Small Business Lending by Large Banks, *US Small Business Administration Office of Advocacy, Banking and Financial Economic Research*, March.

Hancock, D. & Wilcox, J. A. (1998). The 'Credit Crunch' and the Availability of Credit to Small Business, *Journal of Banking and Finance*, 22, 983–1014.

Hancock, D. & Wilcox, J. A. (1994). Bank Capital and the Credit Crunch: The Roles of Risk-Weighted and Unweighted Capital Regulations, *Journal of the American Real Estate and Urban Economics Association*, 22, 59–94.

Haynes, G. W. & Williams, V. (2011). Lending by Depository Lenders to Small Businesses, 2003 to 2010, *US Small Business Administration Office of Advocacy, Banking and Financial Economic Research*, March.

Haynes, G. W. & Brown, J. R. (2009). How Strong Is the Link Between Internal Finance and Small Firm Growth? Evidence from the Survey of Small Business Finances, *US Small Business Administration Office of Advocacy, Banking and Financial Economic Research*, July.

Ivashina, V. & Scharfstein, D. (2010). Bank Lending During the Financial Crisis of 2008, *Journal of Financial Economics*, 97, 319–338.

Keeton, W. R. (1996). Do Bank Mergers Reduce Lending to Businesses and Farmers? New Evidence from Tenth District States, *Federal Reserve Bank of Kansas City, Economic Review*, Q III, 63–75.

Keeton, W. R. (1995). Multi-Office Bank Lending to Small Businesses: Some New Evidence, *Federal Reserve Bank of Kansas City, Economic Review*, Q II, 46–57.

Levonian, M. & Soller, J. (1996). Small Banks, Small Loans, Small Businesses, *Federal Reserve Bank of Saint Francisco, Weekly Letter*, 96–02.

Maltby, E. The Credit Crunch That Won't Go Away: Forget the Improving Economy, Entrepreneurs Still Find It Hard to Get Loans; Here's Why We're in This Mess and How We May Get Out of It, *Wall Street Journal*, 21 June 2010.

Ou, C. & Williams, V. (2009). Lending to Small Businesses by Financial Institutions in the United States, *US Small Business Administration Office of Advocacy, Banking and Financial Economic Research,* July.

Peek, J. & Rosengren, E. S. (1998). Bank Consolidation and Small Business Lending: It's Not Just Size That Matters, *Journal of Banking and* Finance, 22, 799–819.

Peek, J. & Rosengren, E. S. (1995). The Capital Crunch: Neither a Borrower nor a Lender Be, *Journal of Money, Credit, and Banking*, 27, 625–638.

Peek, J. & Rosengren, E. S. (1993). Bank Regulation and the Credit Crunch, *Federal Reserve Bank of Boston Working Paper*, 93–2.

Rosen, R. (2007). Banking Market Conditions and Deposit Interest Rates, *Journal of Banking and Finance*, 31, 3862–3884.

Samolyk, K. A. & Richardson, C. A. (2003). Bank Consolidation and Small Business Lending Within Local Markets, *Federal Deposit Insurance Corporation Working Paper Series*, 03-02.

Shrieves, R. E. & Dahl, D. (1995). Regulation, Recession, and Bank Lending Behavior: The 1990 Credit Crunch, *Journal of Financial Services Research*, 9, 5–30.

Strahan, P. E. & Weston, J. P. (1998). Small Business Lending and the Changing Structure of the Banking Industry, *Journal of Banking and Finance*, 22, 821–845.

Strahan, P. E. & Weston, J. P. (1996). Small Business Lending and Bank Consolidation: Is There Cause for Concern?, *Federal Reserve Bank of New York, Current Issues in Economics and Finance*, 2, 1–6.

Syron, R. F. (1991). Are We Experiencing a Credit Crunch?, *Federal Reserve Bank of Boston New England Economic Review*, July/August, 3–10.

U.S. Small Business Administration. Research and Statistics, Available from <http://www.sba.gov/advocacy/7495>.

U.S. Census Bureau. Statistics of U.S. Businesses, Available from
<http://www.census.gov/econ/susb/>.
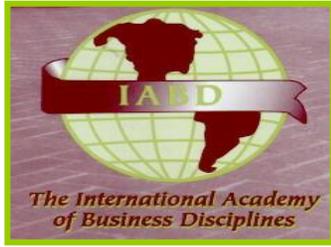
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