

Article

Banking structure, economic resilience and unemployment trajectories in US counties during the great recession

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Abstract

How might the structure of banking affect economic resilience? We address this question by analyzing how the organizational structures of banks and banking markets were associated with unemployment trajectories in local economies during the Great Recession. Two county-level analyses yield convergent results. Increasing branch densities of giant derivative holding banks within local economies were associated with *greater* surges in unemployment, *weaker* employment recoveries and *stronger* recession effects on unemployment from 2007 through 2016. Increasing branch densities of community banks and credit unions and localism in banking were associated with *lower* unemployment spikes, *stronger* recoveries and *dampened* crisis effects. These findings advance sociological studies of finance by providing new quantitative evidence for links between the social structures of banking and economic performance. They also confound arguments that decentralized systems of small, locally based financial institutions are inherently fragile by design, suggesting instead that alternatives to ‘too-big-to-fail’ banking can enhance local economies’ capacities to adapt proactively, withstand crisis and sustain employment during recessions.

Key words: financial institutions, financial crisis, financial markets, economic crises, unemployment, economic sociology

JEL classification: G20 Financial Institutions, G01 Financial Crises, Z13 Economic Sociology

1. Introduction

How does the social structure of finance foster or undermine economic resilience, shaping adaptability within economies, actors’ capacities to manage shocks, or their abilities to rebound after downturns? How, if at all, did decentralized systems of community bank and

credit union alternatives to ‘too-big-to-fail’ banks buffer local economies from the Great Recession or support employment recoveries?

American finance has undergone profound change since the 1970s, ultimately with devastating consequences for employment and the broader economy. As officials deregulated the sector, finance grew in size and importance relative to the rest of the economy (Erturk *et al.*, 2008; Campbell, 2010; Krippner, 2011). Large banks consolidated, eroding boundaries between subsectors, and concentrating assets and flow within a handful of giant, global banking corporations that operated across markets, increasingly outside public controls on leverage and risk (Fligstein and Goldstein, 2010; Johnson and Kwak, 2011). Large banks also increasingly abandoned business models based on deposit taking and making and holding loans. They turned instead to market-based banking, pursuing a ‘derivative dream’ grounded in securitization, proprietary trading, vertical integration, and the high volume production and sale of loans and new products, funded by short-term borrowing in inter-bank and commercial paper markets (Davis, 2009; Tett, 2009; Hardie and Howarth, 2013; Goldstein and Fligstein, 2017).

Such changes prioritized innovation, shareholder value, and profit-making through fees and derivatives transactions over lending for productive investment, employment and jobs (Beunza and Stark, 2004; MacKenzie, 2008; Davis, 2009; Ho, 2009; Jung and Dobbin, 2012; Lazonick, 2013). They shifted the system from transactions based in partnerships and relational banking toward arm’s length relations mediated by abstract rating schemes, risk scoring, specialized analyst communities and flows of information on screens (Knorr Centina and Bruegger, 2002; Guseva, 2005; Rona-Tas and Hiss, 2010; Carruthers, 2013). They loosened ties between banks and the local economies they had served, re-embedding big banks in a self-contained world bound by ties to mortgage companies, private equity firms and other institutions centered in New York and Orange counties (Pozner *et al.*, 2010; Hardie and Howarth, 2013). And they fueled asset bubbles in housing, soaring inequality, and extraordinary accumulations of leverage and risk within the system, setting the stage for a chain reaction of asset devaluation and defaults, a credit crunch for small business and consumers as financial markets collapsed, waves of foreclosures and unemployment rates unseen since the Depression (Swedberg, 2010; Admati and Hellwig, 2013; Lin and Tomaskovic-Devey, 2013).

These central organizational tendencies of American banking and their effects on the economy are well established. Less explored are variations around those tendencies, and whether systems of smaller, locally owned and operating community banks and credit unions provided local economies with alternatives to ‘too-big-to-fail’ banks, and thus, potentially, with resources for resilience and recovery during the recession. Community banks, credit unions and kindred institutions represent historical commitments to Jeffersonian logics of community self-determination, decentralized local development and small-stakeholder capitalism. They are legacies of mobilization to limit branching and inter-state banking in the early 20th century, and public policies designed to expand credit access for small businesses and middle and working class communities (Marquis and Lounsbury, 2007; Marquis *et al.*, 2011; Schneiberg, 2013). Community banks and credit unions are also organized, operate and relate to local economies differently from money center bank corporations. They participated less heavily, if at all, in the ‘derivative dream’, and were less prone to abandon ‘boring bank’ practices of lending in local economies and relational banking for market-based practices like derivative investment or high volume transacting in new instruments.

Such differences raise the possibility that these institutions supported different outcomes from those associated with market-based banking via giant corporations, whether by helping local economies temper declines in employment or supporting recovery.

This article presents two analyses of how banking market organization shaped unemployment trajectories in local economies during the Great Recession. The broad hypothesis is that decentralized systems of community bank and credit union alternatives to too-big-to-fail bank corporations can serve as infrastructures for responses to crisis and resilience in local economies, moderating collapses in employment and fostering stronger recoveries. We assess this hypothesis by (a) developing new county-level data sets on the organizational structure of banking in local economies in the US from 1994 to 2016 and (b) analyzing whether those organizational structures were associated with drops and revivals of employment during the recession. Derivative bank giants gained considerable ground in local banking markets before the financial crisis. Yet, community banks and credit unions remained substantial and even dominant presences in a number of places. We exploit this variation to explore whether different bank types, localism and diversity in banking were associated with local unemployment shifts in the recession.

In conducting this study, we shed new light on how differences in firm types and the organization of finance affect economic performance, returning to classic institutionalist agendas of understanding how institutions shape responses to economic challenges (Zysman, 1983). Economic sociologists and organizational research on finance have focused on money-center banks and trading rooms in currency and securities markets, neglecting community banks or other alternatives (Abolafia, 2001; Knorr Cetina and Bruegger, 2002; Beunza and Stark, 2004; Sassen, 2006; MacKenzie, 2008; Ho, 2009; Fligstein and Goldstein, 2010; Hardie and Howarth, 2013; but see Schneiberg, 2013; Butzbach and von Mettenheim, 2014; Mencken and Tolbert, 2018). They have also shown how relational and transactional credit practices reflect foundational distinctions in how actors manage uncertainty and risk in financial relations (Carruthers and Stinchcombe, 1999; Uzzi, 1999; Guseva and Rona-Tas, 2001; Knorr Cetina and Preda, 2007), and have analyzed quantitatively how relational ties affect outcomes in dyadic transactions between banks and firms (Uzzi, 1999; Uzzi and Lancaster, 2003).

But, with few exceptions (Fligstein and Habinek, 2014; Goldstein and Fligstein, 2017), sociologists and organization scholars have yet to address quantitatively the effects of banking organization on the performance of economies, or how ecologies of banks with distinct relations and forms shape dynamics in markets and local economies. Nor have ecologists focused on relationships between organizational systems and the performance of economies, being preoccupied instead with evolutionary dynamics of density dependence, co-evolution and identity. We address this gap by analyzing relationships between the banking market structure, ecologies of alternatives to giant banks, and local economic performance during the Great Recession.

We also develop new insights into the organizational foundations of resilience in economic life. Geographers and economists have studied economic resilience, analyzing the capacities of regional economies to resist and rebound from economic shocks, and the factors that shape those capacities (Simmie and Martin, 2010; Chapple and Lester, 2010; Martin *et al.*, 2016; Doran and Fingleton, 2018). Yet, empirical work in this camp has largely looked past local economies' organizational or financial market structures to focus on their sectoral composition, industrial specialization or diversity, and pools of available skills or

human capital. Sociologists, in contrast, have explored how systems of small firms and non-profits serve as infrastructures in social life for individual and collective efficacy and robust social action in response to challenges (Klinenberg, 2002; Sampson *et al.*, 2005; Small, 2009; Blanchard *et al.*, 2012). But, they have barely begun to apply these ideas to local economies, and have yet to apply them to how actors in those economies respond to recession. We take that next step, extending sociological analyses of collective efficacy and resilience within the economy, while providing research on economic resilience with analyses of organizational and financial market structures largely missing in that work.

Finally, we advance recent work on how localism and alternatives to shareholder value corporations can help reconnect finance (and capitalist enterprise more generally) to the 'real economies' of job creation, investment in productive assets and local economic development. Analysts concerned with how financialization and the shareholder value revolution sever those links have looked toward smaller scale and more public or collective forms of capitalism for remedies. They have considered breaking up big banks and corporations, using state banks to secure stable funding for small businesses and development, and modifying bank and corporate charters to make them less exclusively attuned to financial market signals or maximizing shareholder value (Johnson and Kwak, 2011; Schneiberg, 2013; Block, 2014; Baradaran, 2015; Hockett and Omarova, 2017; Berk, 2018). They have shown that populating economies with locally owned small businesses can foster both inter-firm networks that enhance problem-solving capacities, and independent middle classes of business owners with local orientations as well as stakes and a willingness to invest in community infrastructure (Tolbert *et al.*, 1998; Blanchard and Matthews, 2006; Tolbert *et al.*, 2014). They have examined social enterprises, cooperatives and related forms that blend social welfare with profit-making or that embrace ownership and control structures which tie firms to the substantive interests of workers, producers, consumers and their communities (Alperovitz, 2011; Mair *et al.*, 2012; Davis, 2016; Rothschild, 2016; Schneiberg, 2017, 2020). We extend these arguments about localism and alternative forms into American banking. In so doing, we contribute new analyses and evidence for how systems of small, locally or cooperatively owned banks can re-link finance with the economy, enhance adaptive capacities, and support, rather than sacrifice, employment, local development and community welfare.

2. Theory/hypotheses: banking structure and economic resilience

To address how banking structures might shape responses to recession, we follow Martin and Sunley (2015) and others (Chapple and Lester, 2010; Hall and Lamont, 2013; Hassink, 2010; Boschma, 2015) who define resilience as the adaptive capacities of a local or regional economy to absorb and rebound from shock. Resilience refers to local economies' capacities to maintain, restore or even improve their performance trajectories in the face of recessions or other disruptions, if necessary, by reconfiguring their sector composition, internal organization and external linkages to move to a different developmental path. It refers to both resistance, or local economies' capacities to buffer themselves from shock and minimize declines in investment, employment or growth, and recovery, or their capacities to rebuild and restore or improve their performance trajectories after disruption and decline (Han and Goetz, 2015; Martin *et al.*, 2016; Doran and Fingleton, 2018).

Resilience rests on at least three kinds of action and decision processes, which are themselves shaped by structural contexts. It rests on individual-level decisions, notably whether banks curtail or continue lending during recession, and whether firms try to restore profits by cutting costs, wages and employees, selling assets or abandoning markets, rather than redeploying assets or seeking new markets and investment opportunities (Martin and Sunley, 2015). It rests on collaborative or interactive processes of intra- and inter-sectoral learning and recombination in which firms find new uses for resources, draw on resources and ideas from different domains to discover new possibilities, or transfer ideas and capabilities from one task, sector or product to another (Simmie and Martin, 2009; Boschma, 2015). It rests on collective processes in which firms and public officials forge networks, task forces or redevelopment coalitions to coordinate problem-solving, policymaking and implementation (Hill *et al.*, 2012; also Safford, 2009).

While resilience scholars usefully suggest that large banks' abilities to shift lending away from troubled regions can subvert resilience (Martin and Sunley, 2015), the main worry historically was that decentralization and localism left American banking and the economies it served more, rather than less, vulnerable to downturns, and less able to recover, than if banks had been able to branch and operate across state lines. A system of thousands of small, local banks is 'fragile by design' (Calomiris and Haber, 2014; also Morgan *et al.*, 2004; Mencken and Tolbert, 2018), as it prevented banks from diversifying their lending and borrowing profiles across regions. It left banks over-exposed to declining values, demands for funds or bank runs within their home territory, and unable to tap funds from other places to support recovery. It also left businesses and communities dependent on the banks that held the local credit monopoly, and thus over-exposed to credit shortages flowing from those banks' difficulties or failure.

Yet, the last financial crisis was rooted in the structures and practices of giant, nationally and globally operating banks. Moreover, the contemporary embodiments of localism and decentralization—community banks and credit unions—differed fundamentally from giant bank corporations like JP Morgan Chase or Bank of America in ownership and organization form, in the identities or 'moral sentiments' they embraced, in how they related to small businesses, local economies and communities, and in the strategies and asset allocations they carried into the crisis (Uzzi and Lancaster, 2003; Marquis and Lounsbury, 2007; FDIC, 2012; Schneiberg, 2013; Schenk, 2013; Butzbach and von Mettenheim, 2014; also Haveman and Rao, 1997). Such differences can foster both resistance to recession shocks in local economies and greater capacity for recovery via two related pathways. They can work via a lending channel, priming community banks and credit unions to respond differently from large banks in their small business and consumer lending to falling financial asset values, deterioration in client profitability during the recession, and improvements in local conditions as the recovery began. They can also support collaborative problem solving, deliberation and information sharing between banks and firms, and links between firms across sectors, enhancing prospects for learning, discovering new market opportunities or finding new ways to use and recombine existing assets and capabilities.

2.1 Ownership, organizational form and identity

Community banks are small, locally owned and operating deposit taking institutions whose personnel and fates are closely tied to the local economies and communities they serve. Like derivative bank giants, community banks are investor-owned for-profit enterprises. Yet their

stock is mostly privately held rather than publicly traded, and many community banks are family owned and operated, with owners actively involved in managing bank activities (Hein *et al.*, 2005; FDIC, 2012). Community banks are often organized as S corporations, closely held firms that have limits on the number of shareholders, and are treated like partnerships for tax purposes, with incomes and losses passed directly through to owners. They are thus insulated from securities market or share price pressures to maximize shareholder value, and pressures from that quarter to pursue risky investment strategies—or abandon communities.

Community banks also differ from derivative bank giants in their core strategies, dependencies and commitments. They derive funds and profits mainly from traditional banking activities and sources—deposit taking, lending, and interest income, rather than fees, trading profits or other non-interest sources associated with market-based banking—and concentrate heavily on loans to small business and agricultural enterprise (Cole, 2012; FDIC, 2012; GAO, 2012, p. 4). While their preeminence has been challenged in recent decades, community banks historically accounted for three quarters or more of total bank lending in this segment (Jagtiani and Lemieux, 2016a). Community banks also mostly operate within a local economy or community, and are thus more constrained than money center banks in their abilities to shift loan capital across regions. Moreover, their owners and officers are often socially embedded within their community, interacting regularly with clientele and cultivating ongoing personal ties with borrowers and depositors in their core business activities (Berger and Udell, 2002; Cole *et al.*, 2004; Hein *et al.*, 2005; Hoenig, 2010). Localism, small size, conventional lending and embeddedness tie community banks to the ‘real economy’, giving them a stake in the economic well-being of their business clients and communities, and anchoring their identities, orientations and day-to-day operations in providing banking services to firms and households there (Mencken and Tolbert, 2018).

Credit unions depart even further from corporate bank giants in form, identity and orientation. Like community banks, credit unions are typically small, locally owned and operating institutions engaged in conventional deposit and lending practices. Yet, credit unions are cooperatives that are owned and operated for their depositor-members, and are organized democratically, at least in principle, according to a ‘one member, one vote’ rule (Barron *et al.*, 1998; Hansmann, 1996; Emmons and Schmid, 1999; Walter, 2006). Members who bank with credit unions are the principal beneficiaries of the enterprise, not investor–owner shareholders; it is to members that credit unions return surplus earnings, via lower fees, lower rates or better terms on credit, better returns on savings or membership dividends. Credit unions unite the roles of consumption and ownership and eliminate the independent investor–owner as actor in the firm. In so doing, they eliminate incentives for firms to enhance shareholder value or benefit owners at clients’ or consumers’ expense, tying the firm instead to the interests of depositors, borrowers and their communities (Barron, 1995; Hansmann, 1996; Schneiberg, 2011).

History and law reinforce this focus. From their 20th century origins and at key legislative moments, credit unions have been charged with providing working households with small, unsecured consumer loans, filling in gaps left by other lenders (Barron *et al.*, 1998; Walter, 2006; Schenk, 2013; Butzbach and von Mettenheim, 2014). Credit unions pioneered consumer bank lending. While investing in mortgage securities in the early 2000s, they did so mainly through corporate credit unions, rather than on their own, and remained traditional institutions mainly serving working and middle class individuals. In addition, credit unions are subject to a

‘common bond’ requirement that their members are already affiliated through employment in the same organization, membership in an association, or co-residence in a community. They are, in effect, dedicated by charter, identity and law to their members and local communities (Frame *et al.*, 2002 ; Walter, 2006; GAO, 2012; Negro *et al.*, 2014), and are supported in this mission by their 501(c)(1) status as not-for-profit associations.

While credit unions have consolidated and loosened common bond limits, they, like community banks, remain qualitatively distinct subspecies of banking enterprise. Both are far less committed than big banks, if at all, to a one-sided pursuit of shareholder value or the ‘derivative dream;’ are far more tied instead to firms, employers and households in local economies; and are less inclined to abandon traditional banking practices and local borrowers for the pursuit of profits through derivatives transactions, lending in distant markets, subprime loans or other risky investments. By charter, form and focus, they face fewer pressures or incentives to engage in profit seeking and risk taking excess at the expense of core banking services to clients in local economies (Fogel *et al.*, 2011; Schenk, 2013; Chiorazzo *et al.*, 2018).

2.2 Relational banking

Reinforcing differences in form and orientation are how these institutions relate in their borrowing and lending practices to firms, clients and communities. Community banks and to some extent credit unions emphasize *relational banking practices* that grant loan officers substantial discretion in handling clients and crafting products, and that rely on interpersonal networks and long-term ties with borrowers to screen and manage loans. Large banks, in contrast, rely heavily on *transactional banking* based in arm’s length dealings with clients, abstract credit scoring, bureaucratic controls on lending decisions, standardized products and collateral requirement, and fee based services (Berger and Udell, 2002; Hein *et al.*, 2005; Hoenig 2010; Schenk, 2013). Community banks have supplemented relational practices with credit scoring for small business, and large banks also cultivate relationships with business clients. Yet basic differences persist today, with large banks typically relying on a handful of quantifiable criteria to judge small business clients, and remaining four and seven times more likely than small banks, respectively, to use credit scoring in underwriting and standardized packages in small business loans (Berger *et al.*, 2011; FDIC, 2018).

These differences reflect fundamental social structural distinctions in how actors manage uncertainty and risk in financial relations (Carruthers and Stinchcombe, 1999; Uzzi, 1999; Guseva and Rona-Tas, 2001; Knorr Cetina and Preda, 2007). They are also profoundly consequential for whether and how lending occurs. Proximity, discretion and ongoing personal ties foster exchanges of idiosyncratic ‘soft’ information between bankers and borrowers and in-depth knowledge of clients and local business conditions, supporting better screening of non-standard risks, closer monitoring of performance, learning, unsecured loans, and the ability to adjust loan terms over time. Such capacities are essential for lending to small businesses, who are far more idiosyncratic in nature and ‘information opaque’ than larger firms, who might lack collateral, and who sometimes fit poorly within—or even fail—standardized screens. It is by developing such capacities that community banks have remained competitive in small business lending and sustained high quality loan portfolios (Berger and Udell, 2002; Cole *et al.*, 2004; DeYoung *et al.*, 2012; Hein *et al.*, 2005; Fogel *et al.*, 2011; Chiorazzo *et al.*, 2018; FDIC, 2018).

Equally important, discretion and ongoing personal ties promote trust, patience and willingness to engage in joint problem solving, exploration and experimentation, rather than

quick decisions or denials of credit when unusual contingencies emerge (Uzzi, 1999; Keeton *et al.*, 2003; Uzzi and Lancaster, 2003; Kang *et al.*, 2013). Trust, networks and in-depth exchange of private information support reciprocity and commitment in bank–client relationships. They enable more effective conversations between a bank and a business client about local market conditions, the firm’s capabilities, developments in the business or owners’ lives, and future possibilities, enabling exploration and discovery as well as work-outs, customization and loan packages that plan and adjust for the future. They also enable bank officers to draw on relations with other local businesses when sorting out matters with a particular client, creating linkages for information flows, sourcing, supply or transfers of ideas across firms and sectors in local economies. Relational banking and cultivating ties with business owners and their communities can even foster networks of information and support in local economies, expanding stocks of social capital, a foundation for entrepreneurial activity (Portes and Sensenbrenner, 1993; Putnam, 2000; Aldrich and Ruef, 2006; Kwon *et al.*, 2013).

2.3 Implications for resilience

These characteristics and capabilities can support responses to the recent crisis from community banks and credits unions that enhance local economies’ capacities for resistance and recovery. They would first lead those institutions to react very differently from big banks to the financial crisis. Insofar as community banks and credit unions remained committed to ‘boring banking practices’, they participated less, if at all, in the ‘derivatives dream’. As such, they entered the financial crisis both less dependent than money center banks on markets for derivatives or high volume flows, and less burdened with inventories of mortgage backed securities, collateralized debt obligations, or special investment vehicles. Corporate credit union investments in mortgage securities notwithstanding, both institutions were far less leveraged and reliant on short term inter-bank or commercial paper markets to support such portfolios, and less vulnerable to inter-bank runs, rating downgrades and asset markdowns during the financial market collapse. They were thus less exposed to pressures from this quarter that drove market-based banking giants to engage in asset fire sales, to call in or refuse to roll over loans, cease lending and thereby spark credit crunches in mortgage and small business lending markets (Tett, 2009; Judd and McGhee, 2011; Admati and Hellwig, 2013).

Their features would also prompt community banks and credit unions to respond differently from big banks to changes in the ‘real economy’ during the recession, leaving them more inclined to sustain lending through the trough, and more willing to restore or increase loans, at least incrementally, as conditions improve (Uzzi and Lancaster, 2003; Judd and McGhee, 2011; Schenk, 2013; FDIC, 2018). Small in size and locally based, community banks and credit unions have neither incentives nor the capacity to exit local markets and shift loan capital from troubled local economies to more profitable lending opportunities in distant markets. Nor were these closely held or not-for-profit institutions under the stock market or share price based pressures faced by big banks to sustain profits by: (a) by cost cutting restructurings in which they shed riskier loans *en masse*, dropped clients, ceased lending to businesses and local communities as conditions and clients’ credit scores deteriorated; or, (b) by refraining from lending during the earliest stages of recovery, when returns and emerging opportunities remain uncertain. To the contrary, reciprocity, obligations and commitment rooted in charters, common bonds or personal ties would foster a willingness among officers and owner-managers to work out a plan, and to stick with business clients during the downturn and early recovery, foregoing some immediate gains and even

escalating commitments to clients struggling to turn things around (Kang *et al.*, 2013). Capital is geographically and temporally sticky in these institutions. Accordingly, regions where they operate in large numbers would be less vulnerable to banking 'flights to quality' during recessions (Tolbert *et al.*, 2014; Martin and Sunley, 2015; Mencken and Tolbert, 2018), and more likely to experience sustained credit availability, milder contractions and earlier restorations in local loan markets than troubled areas dependent on giant bank corporations.

Furthermore, both institutions have greater capacities than large banks to act effectively on these commitments, that is, to craft customized loan or relief packages as conditions change or for clients with unusual business plans, and otherwise sustain, fine-tune and then restore lending through downturns and recoveries. With ongoing access to in-depth, private information about clients and local markets, these institutions can better discern promising small business clients who fit poorly or fail conventional criteria during recession, who lack collateral, or whose credit scores recover more slowly than their capabilities as local conditions improve. They can also detect new opportunities, including possibilities for connecting clients to new buyers, resources and markets across sectors that would not be visible from a distance or through the lens of standardized underwriting screens. They have the trust, reciprocity and deep knowledge of clients and local markets to support in-depth conversations with clients about the issues the firm faces, and about how it might reconfigure operations, redeploy workers, or investigate new sources and customers to sustain operations or exploit emerging opportunities as economies recover. And their flexibility and abilities to customize let them act on those deliberations and private information, whether through work-outs for extenuating circumstances to help troubled clients, or contingent contracts that extend some credit to business clients with unusual plans or uncertain prospects, but provide for increases if clients make specified changes, solve problems or meet performance benchmarks during the loan term.

These distinctive reactions to crisis and recession can foster resilience within local economies in at least two ways. First, as local economies are increasingly populated by community banks and credit unions, they would be less subject to credit famines induced by the collapse of financial markets or local economic conditions, and less plagued by continued scarcity during the early stages of recovery. Smoother lending trajectories and sustained credit, in turn, give households and firms breathing room to adjust to downturns and recovery, opening up possibilities for problem solving and longer term strategies in the face of crisis. Credit support is especially important for local economies insofar as it gives small businesses latitude to explore new markets and investment opportunities, find new sources or customers, and otherwise retain and redeploy workers, rather than having to slash assets, costs and workers to sustain profits. It also provides latitude to exploit improving conditions, which can boost employment in the early stages of recovery. Small businesses are central to employment in local economies and rely heavily on community banks for their credit needs. Small firms also face a small but growing option in large credit unions, who can devote no more than 12.25% of their assets to small business loans, but have increased such lending since 1998, helping offset declines from big banks' cut backs during the recession (GAO, 2012, pp. 16–17).¹

1 Local banking ecologies might have also affected employment in local economies indirectly, via mortgage and housing market channel. Conservative lending practices that eschewed subprime mortgages and advantages in screening risks associated with community banks yielded lower foreclosure rates in places where those banks predominated (Fogel *et al.*, 2011), potentially reducing

Second, regular consultations, in-depth conversations and joint problem solving sessions with their bankers can also upgrade small businesses' information, learning and planning capacities. Ongoing ties and consultations can not only improve small firms' knowledge of local economic conditions and shifting opportunities, but also expose firms to new ideas, and provide them with fora for exploring options for using capabilities and workers in ways they had not considered. Upgrades in firms' adaptive capacities should be especially pronounced as bankers' network ties and information sources increasingly span multiple markets in local economies. Ties and consultations with such broadly linked banks can supply small businesses with a correspondingly wider array of ideas, examples and potential contacts, and with options for redeploying or combining resources, workers and capabilities not just within, but also across sectors.

We thus expect that local economies which are heavily populated by community banks and credit unions, and characterized by localism in banking markets, will have greater capacities for resistance and buffering against crises, manifested by less severe spikes in unemployment, and greater capacities for recovery, indexed by greater improvements in unemployment after the downturn. We also expect inverse relationships between resilience and the predominance of large, market-based bank corporations in local economies, given those institutions' global reach and corporate forms; their embeddedness in the small worlds of high finance rather than the local worlds of clients and communities in local economies; their participation in market-based banking, the derivatives dream and shareholder value revolution; their leverage ratios and asset portfolios on the eve of the crisis; and their embrace of transactional and fee-based banking grounded in the high volume production and sale of loans and new instruments (e.g. Tett, 2009; Admati and Hellwig, 2013; Goldstein and Fligstein, 2017). In their responses to financial crisis and economic declines, these institutions will expose, rather than buffer, local economies from a credit crunch shock, fostering greater unemployment during the recession, and perhaps weaker recoveries.

Finally, diversity across banking types might itself foster resilience. Community bank and credit unions may benefit local economies most when they coexist with large banks. Subjecting large banks to competition from that quarter may prompt them to lend more broadly and support small businesses, while accessing funds nationally or globally through their extra-local branch networks and market-based bank operations. Conversely, competing with larger banks might prompt community banks and credit unions to modernize their practices, to move beyond established clients and temper overly cozy relations or liabilities of 'over-embeddedness' (Uzzi, 1999; Kang *et al.*, 2013), or to lend to small businesses more broadly, over longer distances, by mixing relational screening with small business credit scoring (Berger *et al.*, 2011). More generally, diversity promotes varied credit opportunities in local markets, whether by making loans available to a broader range of clients, or providing small firms with a wider array of loan options as economies falter and recover. We thus expect local economies to be more resilient when their banking systems are diverse, that is, when firms and households can access both community banks' and credit unions' specialized commitments and relational capacities and large, market-based banks' capacities to tap capital markets.

local dislocation and unemployment via that path. Housing bubbles and foreclosures could mean insolvencies for local business, whether directly, by leaving owners insolvent, or indirectly, by forcing out or leaving insolvent residents who would patronize those business, contributing to unemployment in those ways.

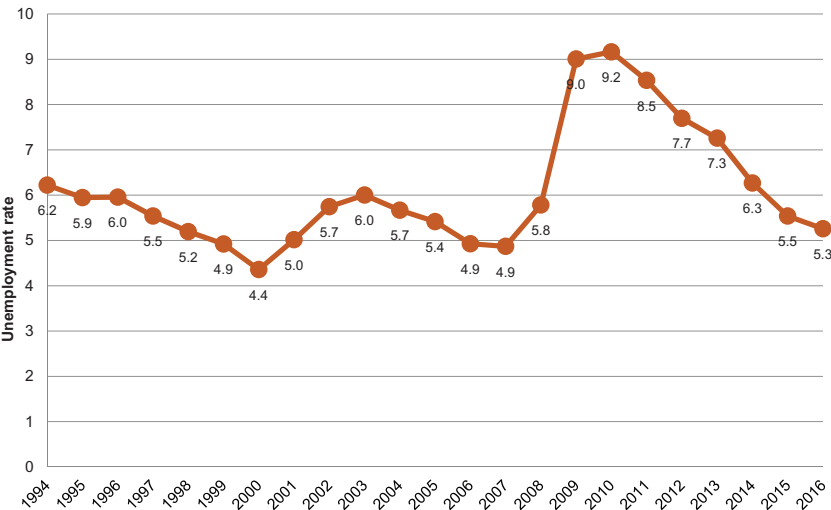


Figure 1 Average unemployment rate in local (county) economies, 1994–2016.

3. Context: unemployment trajectories and bank organization in local economies

To address relations between banking structure and unemployment during the recession, we follow a common practice and take counties as proxies for local economies and banking markets (Tolbert *et al.*, 1998; Moller *et al.*, 2009; Hooks *et al.*, 2010; Fogel *et al.*, 2011; Han and Goetz, 2015; Jagtiani and Lemieux, 2016a), supplementing descriptive findings with MSA-level data. This choice is especially suitable as both bank structure and unemployment trajectories vary substantially across counties.

Figure 1 charts the average unweighted unemployment rate for counties from 1994 to 2016. County unemployment rates surged, on average, by 4.3% from 2007 to 2010, and fell or recovered, on average, by 3.9% from 2010 to 2016. Yet, as Figure 2’s charts of spikes and recoveries show, unemployment trajectories varied dramatically. Some counties saw no unemployment surges, and the bottom 25% experienced surges of 2.9% or less, but others proved more vulnerable to recession, with 25% experiencing surges of 5.6% or more, and top 10% surges of 7.6% to 13.3%. Similarly, where some counties had weak recoveries after 2010—the bottom 25% experienced recoveries of 2.3% or less and some continued to lose ground—others bounced back more strongly, with 25% experiencing recoveries of 7.9% or more, and the top 10% recoveries of 10.3% to 13.5%. As resilience research consistently finds, local economies differ markedly in their capacities to resist and recover from recessions (Chapple and Lester, 2010; Davies, 2011; Fingleton *et al.*, 2012; Han and Goetz, 2015; Doran and Fingleton, 2018).

Less well understood is how banking structures also varied across local economies, with alternatives to ‘too-big-to-fail’ banks remaining in a surprising number of banking markets through the mid-2000s. Viewing matters in the aggregate does warrant a skeptical stance: that globalization and the consolidation of assets and flows in corporate banking behemoths have relegated banking organized along ‘Jeffersonian’ lines—community banks and credit

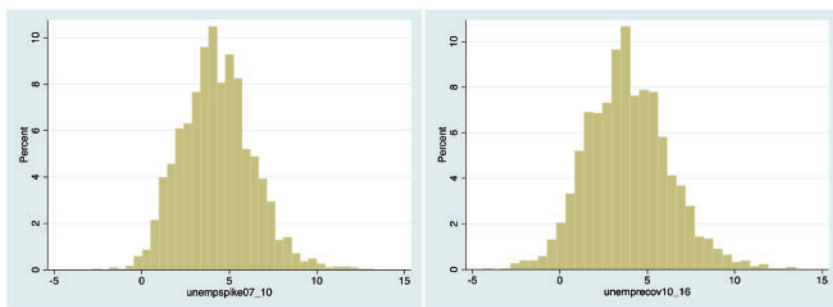


Figure 2 Unemployment spikes (2007–2010) and employment recoveries (2010–2016) by county.

unions—to the sidelines, if not history’s ash heap. The number of community banks and credit unions operating in the US have declined dramatically since the mid-1980s, with the nation’s roughly 6600 community banks and 7000 credit unions accounting, respectively, for only 14% and 6.7% of bank assets by 2012 (FDIC, 2012; Backup, 2013; Schenk, 2013). Community banks have even lost ground in their traditional area of strength, with their share of small business lending falling by 34 percentage points from 1997 to 2015 (Jagtiani and Lemieux, 2016a).

Average trends in local markets based on geocoded branch and deposit data (described below) also seem to support a consolidation narrative. (a) From 1994 to 2009, the largest derivative bank corporations² increased their deposit and branch shares of county and MSA banking markets, on average, by one half, and the branches per capita they operated, on average, by 65% and 55%. (b) Community bank³ deposit and branch shares of local markets declined steadily, on average, from 1994 to 2016, especially in metropolitan markets. After 2010, their per capita branch densities also fell. (c) As banks consolidated, localism, or how much banks operating in a county or MSA, on average, do their deposit or branch business there, declined by roughly a third.

Yet, closer analysis of local market trends reveals layering, the persistence of alternatives and diversity, rather than wholesale displacement, uniform centralization or

- 2 Our measures for top derivative banks isolates the bank holding companies with the 50 largest derivatives holdings in that year to capture the shares of the big commercial banking corporations that led the shift from ‘boring banking’ to market-based banking, the ‘derivatives dream’, and the high volume production and sale of loans and instruments. Heading this list in 2006 are the usual suspects,; JP Morgan Chase, Bank of America, Citigroup, Wachovia Corporation, HSBC Holding PLC, Bank of New York, Wells Fargo and Company, State Street Corporation, ABN AMRO Holdings, PNC Financial, Suntrust Bank, National City Corporation, Mellon Financial Corporation, Northern Trust, Keycorp, US Bancorp, Royal Bank of Scotland, Fifth Third Bancorp, Merrill Lynch, Countrywide Financial, Capital One Financial, Regions Financial, First Horizon, BB&T Corporation and Deutsche Bank. Section 6 describes the data and methods used to reconstruct local banking structure.
- 3 The FDIC coding of community banks combines an inflation adjusted size threshold (banks with assets less than \$1 billion in 2010 dollars) with limits on the number of states and MSA in which banks operate, a threshold for high loan to asset ratios, and other measures to reflect the character of community banks as small, locally operating and embedded institutions that concentrate on traditional lending practices.

Table 1 Prevalence of three bank types, localism and diversity in county banking markets, 2006

	Mean	Standard deviation	25%	50%	75%	90%
Prevalence deposit shares						
Top 50 derivative bank hcs	21.9%	23.3%	0%	16.1%	36.3%	55.3%
Community banks	57.5%	32.1%	30.1%	58.3%	88.1%	100%
Credit unions	4.9%	10.2%	0%	0%	4.8%	16.9%
Prevalence branch shares						
Top 50 derivative bank hcs	18.1%	18.5%	0%	14.3%	30.4%	42.8%
Community banks	54.4%	29.6%	30.2%	52.4%	78.6%	100%
Credit unions	13.3%	13.0%	0%	11.3%	21.1%	35.7%
Prevalence per 10k branch densities						
Top 50 derivative bank hcs	0.808	0.933	0	0.671	1.25	1.79
Community banks	3.32	3.23	1.19	2.42	4.31	9.75
Credit unions	0.692	0.939	0	0.500	0.964	1.56
Market structure						
Localism (deposit markets)	0.33	0.24	0.12	0.30	0.50	0.68
Localism (branch networks)	0.30	0.23	0.11	0.26	0.45	0.63
Diversity (deposit markets)	0.52	0.32	0.23	0.62	0.79	0.97
Diversity (branch networks)	0.63	0.33	0.43	0.75	0.89	0.95

homogenization. Growth in derivative bank average deposit shares, branch shares and densities halted with the financial crisis in county and MSA markets, with shares dipping slightly and branch densities sharply after 2009. Community bank declines in deposit and branch shares from 1994 to 2016 were notably modest, amounting, respectively, to only 6 and 5 percentage points in the counties, and 9 and 4 percentage points in MSAs. Branches operated per capita actually increased in both places from 1998 to 2010. Even in the aggregate, community banks retained an outsize role in small business lending, losing ground to big banks mainly after 2005, and accounting for 46% of this segment as late as 2013 (Backup and Brown, 2014; Jagtiani and Lemieux, 2016a). Credit unions grew in aggregate assets, members and deposit shares since the 1990s (Anderson and Liu, 2013), while increasing their deposit shares in county and MSA markets by a half or more from 1994 to 2016. And diversity, or how much deposit taking and branches were spread across bank types in local markets, held remarkably steady after increases in the 1990s, with top derivative banks moving into counties dominated by community banks, and credit unions expanding alongside large banks in metropolitan markets.

Shifting from aggregates and averages to map variation across counties provides even more striking evidence of diversity and the persistence of alternatives in American banking. Table 1 describes the distributions of bank types and structures across counties in 2006 using three measures for the prevalence of different banks in local banking markets, and indices of localism and diversity for market structure. The first prevalence measures—shares in county deposit markets and branch networks—provide intuitive, easily interpretable measures of the weight of each bank type in local markets. Branch densities per capita, in contrast, reflect canonical strategies in organizations studies for measuring the prevalence of forms, and arguably best tap the accessibility of loans and other bank services for firms and households in local economies. The indices combine data from banks (localism) or across

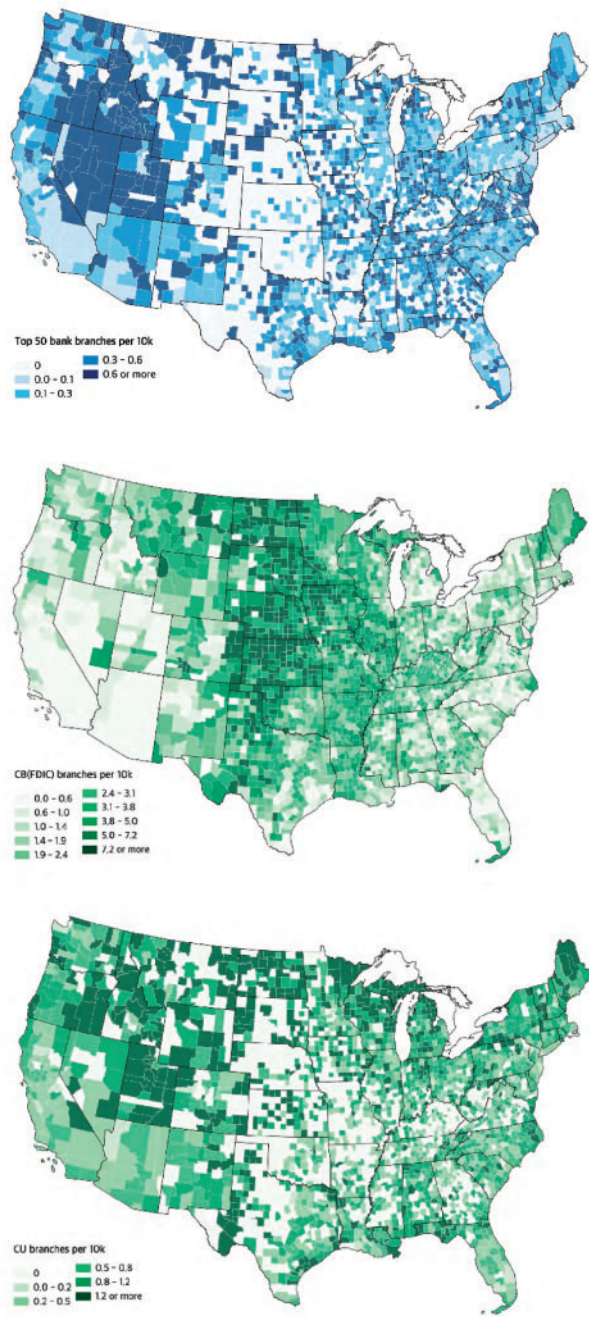


Figure 3 Branch densities per capita of the largest derivative bank corporations, community banks and credit unions, by county, 2006.

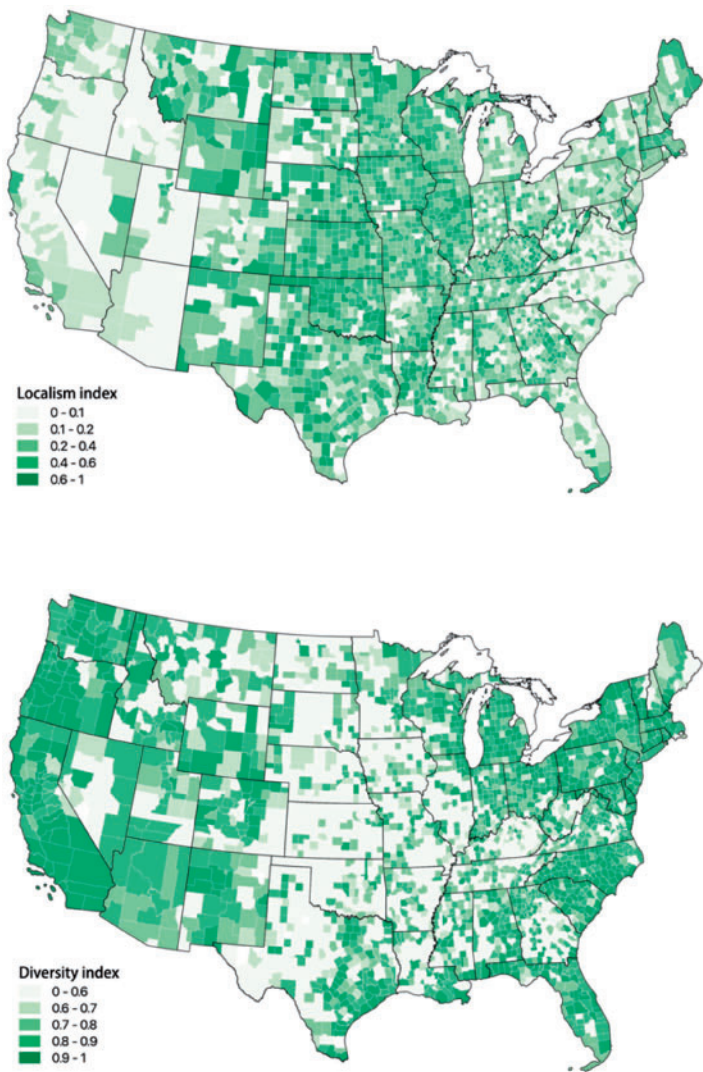


Figure 4 Localism and organizational diversity in banking markets, by county, in 2006.

bank types (diversity) to tap the structure of local banking markets. Figure 3 maps branch densities for the three institution types across counties; Figure 4 maps localism and diversity in branching. Together, they depict the geography of banking in the US on the eve of the crisis.

This disaggregated view reveals striking variability and regionalism, further complicating narratives of displacement and homogenization. In 2006, the top 50 derivative bank giants held 36% or more of deposits, 30% or more of branches in a quarter of counties, and 55% and 43% or more of deposits and branches, respectively, in a tenth. They show concentrated and dominant branch densities, deposit and branch shares in many of the richest and most

densely populated counties of the Southwest, East coast, Florida and the Gulf coast. These banks were creatures of the largest metropolitan areas in those regions. They took a third or more of deposits in the half the MSAs, half or more in a quarter, and 65% or more of deposits in metropolitan areas in the Northeast, Southeast, Southwest and the old industrial belt—in Arizona (Phoenix, Tucson, Flagstaff, Yuma), Ohio (Cincinnati, Cleveland, Dayton, Columbus), in Dallas, Salt Lake, the bank centers of New York and Winston Salem—while taking at least half the deposits in Atlanta, San Francisco, New Orleans, Miami, Houston and Detroit. However, large derivative banks were strikingly absent from local markets in the heartland, with no branches or deposit reported at all in 25% of US counties in 2006.

Community banks and localism displayed almost mirror image geographies. Community banks were not much of a presence in counties (and metropolitan areas) of western states like California and Arizona, in counties along the Gulf coast, in Florida, the Carolinas or Virginia, or in the band of places running from New York, Connecticut and New Jersey through the Ohio Valley of the old industrial belt. But they persisted and even dominated local markets in a broad swath of heartland counties, with concentrated deposit taking, branch shares and per capita densities running from the Dakotas and parts of the Upper Midwest, down through Illinois and Plains states into the heart of Texas. In 2006, community banks held 30% shares or more of deposits and branches in three quarters of the counties. They held at least 58% and 52% of deposits and branches in half the counties, and were the only game in town for 10%, or over 300 American counties. Community banks even held 26.3% or higher shares of deposits in half the nation's MSAs, concentrated mainly in small and medium-sized cities in the regions noted above.⁴ Localism in banking likewise persisted in a tier of county markets, overlapping with community banks, but spread more broadly in Texas, Oklahoma and a band extending east through the Deep South. Banks doing business in a county took, on average, half or more of their deposits in that county in a quarter of counties. In 10%, banks in a county collected, on average, two thirds or more of their deposits in that locale.

Credit unions overlapped more with derivative holding giants. They were scattered throughout the country, with concentrations in the northeast, upper Midwest and the West, reflecting their historical associations with large corporate and public employing organizations whose workforces comprised the members of many affinity group credit unions. Credit unions played a relatively small role in county markets, holding, on average, barely 5% of deposits collected and 13% of branches in 2006. But they did hold at least 17% or one sixth of the deposits, and over a third of branches in 10% of the counties. They also took nearly

4 In 2006, community banks held 40% or more of deposits in cities like, Bismark, Grand Forks and Fargo; Iowa City, Ames, Des Moines, Sioux City; Lincoln, Nebraska; Topeka, Lawrence and Manhattan, Kansas; Springfield, Champaign-Urban, Peoria and Decatur in Illinois; Rochester, Mankato, Duluth, Eau Claire, Wausau and Fon de Lac in Minnesota and Wisconsin; Amarillo, Lubbock and Waco, Texas; Little Rock in Arkansas; Lexington and Bowling Green, Kentucky; Missoula, Great Falls and Billings, Montana; Springfield, Jefferson and Joplin, Missouri; Albany, Macon and Valdosta, Georgia; as well as Santa Fe and Las Cruces, New Mexico; Springfield, Farmingham, Worcester and Pittsfield in Massachusetts; Bangor, Maine; and San Luis Obispo, California.

13% of deposits, on average, in metropolitan markets, and 26% or more of deposits in 10% of those markets.⁵

These geographies and overlaps between ecologies produced substantial organizational diversity in many local markets. Diversity was low in many of the heartland counties where community banks dominated, and in places in Nevada, Utah and parts of the Deep South where big banks held sway. But overlaps between bank types produced high levels of deposit and branch diversity along the East, West and Gulf coasts, in the industrial belt and parts of the upper Midwest.⁶

In sum, there was substantial variation in the structure of banking across local economies in the US in 2006. Derivative bank giants dominated many of the largest and richest local markets. But community banks and credit unions remained strong presences in many places, even after decades of change, reflecting legacies of localism and new forms of diversity, and providing ample analytical leverage for assessing associations between banking structure and how local economies traversed the recession.

4. Methods and data

We use two analytical strategies to assess relationships between the banking organization and local unemployment trajectories during the recession. We first use a cross-period strategy to assess whether banking structure and other conditions within counties on the eve the financial crisis in 2006 were associated with unemployment rate spikes in counties from 2007 through 2010, and recoveries from 2010 to 2016. Here, we follow recent work on economic resilience, decomposing local economies' responses to recession shocks into distinct phases, including resistance, or how well local economies minimize employment decline or unemployment surges, and recoverability, or how extensively or quickly employment recovers after any drop or shock (Han and Goetz, 2015, 2018; Martin and Sunley, 2015; Martin *et al.*, 2016; Doran and Fingleton, 2018). We analyze two dependent variables—unemployment rate spikes and declines—and ask two questions. (a) Were differences across counties in the prevalence of different bank types, localism and diversity right before the recession associated with unemployment surges and recoveries in local economies as they traversed the

5 Cities with above average credit union shares included usual small and medium sized city suspects (Eugene and Portland, Ithaca, Boulder, Durham-Chapel Hill, Madison), but also but some heartland places where community banks prevail (Iowa City, Davenport, Rochester, Waco) and even some larger metro areas with high big bank shares (San Diego, Sacramento, San Jose, Seattle, Spokane, Tampa, Jacksonville, San Antonio, El Paso, Dayton, Providence).

6 Community bank centers like Iowa City, Springfield, Illinois, Manhattan, Kansas and sunbelt places, especially in Arizona (Phoenix, Tucson, Prescott, Yuma), Nevada (Las Vegas, Reno, Carson City) and Arkansas (Little Rock, Fayetteville) fall in the lowest 25th percentile of metropolitan areas on branch diversity. The top decile of diverse MSAs is a roster of small and some medium sized cities: Boulder, Eugene, Colorado Springs, Santa Fe, Burlington, Tallahassee, Charleston, Hartford, Harrisburg and Santa Rosa. Larger cities like Providence, Birmingham, Boston, Oklahoma City, Seattle, Sacramento, Denver, Philadelphia, Pittsburgh fall in the top quartile, Minneapolis, Chicago, Houston, Dallas, Washington DC, Los Angeles and San Francisco in the top half. Overall, metropolitan banking markets were quite organizationally diverse, far more so than counties in 2006, with medians of 0.84 and 0.92, and means of 0.82 and 0.91, respectively, on the deposit and branch diversity indices (with maximum values of one).

recession? (b) Do those associations persist in the face of controls for the size of local economies, their demographic characteristics and economic composition, local housing market conditions, and adjustments for spatial clustering in banking?

We implement this strategy mainly via structural equation modeling (SEM) that simultaneously estimates associations for each outcome, fitting the two models below.

$$\begin{aligned}
 uspike(2007 - 10)_i &= \alpha + \beta_1 * unemp2007_i + \sum \beta_2 * Bank_structure_i \\
 &+ \sum \beta_3 * Basic_controls_i + \sum \beta_4 * Demographics_i \\
 &+ \sum \beta_5 * Econ_composition_i + \sum \beta_6 * Housing_market_i \\
 &+ \varepsilon_{i_spike} \\
 \\
 emprecov(2010 - 16)_i &= \alpha + \beta_1 * uspike(2007 - 10)_i + \sum \beta_2 * Bank_structure_i \\
 &+ \sum \beta_3 * Basic_controls_i + \sum \beta_4 * Demographics_i \\
 &+ \sum \beta_5 * Econ_composition_i + \sum \beta_6 * Housing_market \\
 &+ \varepsilon_{i_recov}
 \end{aligned}$$

This approach lets us analyze unemployment spike and employment recovery as functions of the set of banking variables and controls for other features of local economies, while allowing the unemployment rate right before the recession to affect the size of unemployment spike in the recession, the unemployment spike to affect the subsequent recovery, and for correlated errors across models. The interest here is in the coefficients for banking structure variables in each equation (the vectors of β_2 s).

As robustness checks to address spatial clustering in banking, we extend the SEM approach to control for region, to adjust for regional clustering, to fit multi-level models with random intercepts for region, and to fit models within regions. Following Kubrin *et al.* (2018, 2019), we also test for spatial correlations using Moran's I and fit spatial models that directly address bank structure effects from adjacent counties using spatial lags of our banking variables.⁷

In our second approach, we use time series analyses of annual panel data to see if local banking structure moderated the effects of the broader crisis on unemployment in counties. The dependent variable is the unemployment rate at time t and the question is whether banking structures at $t-1$ amplified or dampened the impact of the broader recession shock on local economies. We fit unconditional and conditional 'recession effect' models (Halaby, 2004; Angrist and Pischke, 2009), using time varying data and fixed effects models, and indexing recession effects in counties with dummy variables for each year from 2006 to 2016.

$$\begin{aligned}
 unemp_{i_t} &= \alpha + \sum \beta_1 Controls_{i_t-1} + \sum \beta_2 * BankStructure_{i_t-1} \\
 &+ \sum \tau * YearDummy_t + u_i + \varepsilon_{i_t-1}
 \end{aligned}$$

7 We thank an anonymous reviewer for this suggestion. In fitting spatial models, we followed the specifications used in our SEM approach as closely as possible. However, spatial routines required estimating spike and recovery models independently, rather than simultaneously, and thus did not allow for correlated errors across models. We fit all spatial models using a first order contiguity spatial weights matrix (W), normalized with the largest eigenvalue of 1, to capture banking structure effects from adjacent counties.

$$\begin{aligned} unemp_{i,t} = & \alpha + \sum \beta_1 Controls_{i,t-1} + \sum \beta_2 * BankStructure_{i,t-1} \\ & + \sum \tau_1 * YearDummy_t + \sum \tau_2 * (YearDummy_t * BankStructure_{i,t-1}) \\ & + u_i + \varepsilon_{i,t-1} \end{aligned}$$

The first model gives the unconditional recession effects on local unemployment rates for each year, captured by the coefficients for the year dummy variables (the vector of τ s). As 2007 is the omitted year, τ aus return increments in unemployment rates over or under the 2007 baseline. These give the effects of the broader financial crisis and recession on unemployment rates in local economies for each year from 2008 through 2016, net of local banking structure and economic conditions included in the controls. The second model adds interaction terms between year dummies and our bank variables to let recession effects (the τ aus) vary by the local structure of banking. The interest here is in the coefficients for the interaction terms (the τ_2 s), which lets us determine whether prevalence of different bank types, localism or diversity increased or decreased shock effects of the crisis on local economies, yielding different unemployment trajectories. To address spatial clustering in banking, we also fit fixed effect panel spatial autoregressive models with spatial lags for banking structure variables as controls.

4.1 Dependent variables

With no consensus about how to measure resilience from employment data and various evolving approaches (Chapple and Lester, 2010; Davies, 2011; Fingleton *et al.*, 2012; Hill *et al.*, 2012; Han and Goetz, 2018; Lapuh, 2018), we follow Martin *et al.* (2016), Doran and Fingleton (2018) and others who tap resilience via declines and recovery in employment performance, and anchor the beginnings and ends of each phase in fixed time points. We opt for a simple, easily interpretable measure of performance, using unemployment rates in the counties. We measure declines using the *spike in unemployment rates*, calculated as the peak year rate of 2010 minus the pre-crisis rate in 2007; *recoveries in employment* as the peak year rate minus the rate in 2016; and annual *unemployment rates* as our performance measure for time series analyses. Data come from the Bureau of Labor Statistics *Local Area Unemployment Statistics*.

4.2 Banking structure

To tap the organizational structure of local banking, we used measures of: (a) the prevalence of community banks, credit unions and the largest derivative holding bank corporations in local economies; and (b) the degree of localism and organizational diversity in county banking markets.

We built measures of local banking structure using annual geocoded branch and deposit data on all banks and credit unions operating in the US from 1994 through 2016 collected from the FDIC *Summary of Deposits and Statistics on Depository Institutions* archives and the National Credit Union Association *Quarterly Call Reports*.⁸ These are branch and

8 Ideally, we would develop prevalence measures based on commercial and industrial or small business lending (SBL) within local economies, as it mainly through those channels that we think banking structure might impact unemployment and resilience. However, while geocoded SBL data do exist as a product of Community Reinvestment Act requirements, the CRA only requires reports from banks with assets of a billion dollars or more. Unlike deposit and branch data, geocoded small

organizational level data, with place locators that permit data aggregation to broader geographies, and the creation of variables for banking structure and the presence of different institutions at the county level. The FDIC *SoD* provides branch-level data on the location and deposits collected for each branch of all commercial banks and saving associations in the US, linked to bank-level data on assets, ownership, headquarters, and whether the bank is a part of a bank holding company. The FDIC *SDI* provides bank and holding company-level data on derivatives holdings. The NCUA *QCRs* provide organizational-level data on assets, members, deposits and more for all credit unions operating in the US, and branch location data beginning in 2010.

To create county level measures of bank types and local bank structure, we first linked the two FDIC data sets, which let us associate derivatives holdings to banks, identify our two commercial bank types, and link those types to their local branches, branch activity and deposits. We operationalized the largest market-based banking corporations as the banks or bank holding companies with the 50 largest holdings of derivatives. We identified these banks by calculating, for each year, the total value of derivatives held by each bank holding company or standalone bank not part of a holding company, and assigned top derivative bank codes to the branches and deposits taken by the year's top 50 derivatives holders. To identify community banks, we followed a protocol used by FDIC economists for isolating smaller, locally based banks committed to a traditional lending practice. This protocol goes beyond defining community banks using a fixed asset size threshold, typically \$1 or \$10 billion, opting instead for an annually varying inflation adjusted size threshold normed to \$1 billion in 2010. It also modifies the size threshold code to adjust for banks' asset mix and geographical spread, eliminating banks that have abandoned traditional lending as a core activity, but including large banks that only do a local business.⁹

With bank codes assigned, we calculated for each county, for each year, the total bank branches and deposits for all banks, top derivative bank corporations, and community banks doing business there. We conducted a similar operation for credit unions with the NCUA *QCR* data, which did coding for institution type, aggregating organization and

business data are not available for community banks and credit unions, the majority of institutions in this study. In fact, the only attempt of which we are aware to geocode SBL for smaller banks (but not credit unions) was forced to assume that the distributions of the banks' SBL across counties mirrors the distributions of their deposits, and used the geocoded *SoD* data on deposit to allocate each bank's aggregate small business lending across counties (Jagtiani and Lemieux, 2016a,b). Such an approach cannot be used for credit unions.

- 9 To keep the focus on banks that retain traditional lending as a core activity, the FDIC coding excludes bank organizations with no loans or core deposits, with foreign assets greater than 10% of total assets, or with more than 50% of its assets in specialty banking or banks (credit card specialists, trust and industrial loan companies, bankers' banks, or non-bank banks that make commercial loans or take deposits, but not both). To keep the focus on small and 'locally' operating banks with a traditional lending emphasis, the coding includes banking organization with assets that fall below the inflation adjusted threshold indexed to \$250 million in 1985 and \$1 billion in 2010, and banking organizations that exceed those thresholds but meet a series of criteria for a locally oriented traditional lending business. These criteria combine high loan to asset and deposit to asset ratios, operations in two or fewer large MSAs and three or fewer states, operating fewer than an annually adjusted number of branches indexed to 40 in 1985 and 75 in 2010, and a maximum branch deposit size threshold (FDIC, 2012).

branch level data by county to estimate the total credit union branches and deposits in local markets.¹⁰ We then combined the credit union and bank data sets to calculate the total bank plus credit union branches and deposits for each county.

We measured the *prevalence of community banks, the 50 largest derivative holding bank corporations, and credit unions* in local economies by calculating branch densities, or the number of branches in a county per 10 000 residents for each bank type. We originally used deposit shares, and experimented with branch shares, all of which yielded similar results, but settled on branch densities, following well established empirical strategies in the organizational literature for measuring the prevalence of forms in markets (Carroll and Hannan, 1995; Haveman *et al.*, 2007). Branches represent the basic public-facing organizational unit of banks. They are the points through which contacts and banking transactions, including lending, are typically initiated and executed, at least for most of the study period. Absent geocoded business loan data, branch locations are the best proxy for where banks provide firms and individuals with loans and other financial services to support operations and employment. In addition, per capita branch densities more directly capture the presence and availability of banks and their different types in local communities—and access to them for most personal and business customers—than market shares. And unlike prevalence measures based on market shares, densities for different bank types are calculated independently of one another, leaving community and

10 Unlike FDIC data, NCUA data report deposits taken by credit union, not by branch; do not include branch data until 2010; and only report branch locations, complicating efforts to measure credit union presence in counties. With only organizational-level data on deposits, we first followed prior work and assigned credit union-level data, like deposits, to the county or city in which they were headquartered to calculate credit union local market shares (Barron *et al.*, 1998; Negro, Visentin and Swaminathan, 2014). This is reasonable for majority of smaller, locally operating credit unions, and was able to exploit annual time series data on deposits for all years from 1994 to 2016. Yet it over-assigns deposits to credit unions' home counties, vastly inflating credit union activity in places that headquarter the largest, often multi-state operators, while ignoring how credit unions branch across counties, miscoding potentially hundreds of counties as lacking any credit union presence.

After consulting with industry experts on branching, we opted instead to use the *Call Report* data from 2010 to 2016, which do geolocate branches, to calculate average counts of credit union branches per county for that period and then extrapolate those counts backward through the aughts. Projecting backward risks introducing its own sources of measurement error. But the distribution of credit union branches displays striking stability over time as far back into the late 1980s, according to industry observers and the available evidence. In the aggregate, there were roughly 19 500 credit union offices (headquarters and standalone branches) in 2003, only 5% fewer than the nearly 20 500 15 years earlier in 1988; and the number of credit union deposit collecting branches fluctuated around 20 500 over the subsequent 14 years, rising slowly for 7 years to 21 440 in 2010, falling slightly after that and then steadying at 20 600 through 2016. Moreover, pairwise inter-year correlations of branch counts per county for the seven year 2010–2016 period for which do have credit union branch locations run from 0.9910 to 0.9992, indicating stability not just in overall numbers, but also the geography of credit union branching. Finally, despite significant consolidation and declines in the number of credit unions over the past two decades, credit union members, deposits and asset have grown, and merged credit unions, with regulatory encouragement, typically absorb, rebrand and maintain rather than close branches, providing an additional warrant for this measurement strategy.

top bank measures unaffected by complications in geolocating credit union deposits or branches.¹¹

We used an *index of localism* to tap how much local markets were served by banks that had most or all of their branches there. For each bank doing business in a county, we calculated the number of branches it operated there as a proportion of all of that bank's branches. These proportions increase as banks concentrate their business in one county, reaching one for banks that operate all of their branches there. We then calculated the average of those proportions for all banks doing business in each county, weighed by each bank's share of the county's total branches. The index is 1 if all banks in the county operate all their branches in that county, and decreases toward zero as those banks operate more of their branches outside the county (i.e. become less local).¹²

Finally, we used an *index of diversity* to tap how much local banking markets are characterized by organizational heterogeneity. For each county, we calculated a normalized Blau index using the proportions of branches operated there by community banks, credit unions, the top bank corporations and other banks. The index is

- 11 There are two main concerns with using deposit and ultimately branch data to proxy the distribution of banking services and lending across counties. Banks are notorious for collecting deposits from communities, particularly poorer minority communities, to which they do not subsequently lend, and may also rely on sources other than deposit to fund loans. In addition, information and communication technology enables banks (and online non-bank lenders) to make loans in places where they have no deposit business or even offices. Both concerns raise issues of measurement error insofar as the highlighted practices loosen connections between distributions of business lending, deposit taking and bank offices.

Such issues do not, in our estimation, introduce comprehensive or systematic error. Transfers of funds across regions, tapping sources other than deposit to fund loans and heavy reliance on ICT to lend without branches mainly characterize large, inter-state and market based bank corporations, rather community banks and credit unions which are more locally based and traditionally oriented. Moreover large banks' leveraging of technology for SBL in places where they do not have branches seems much more pronounced after the crisis, in 2014, than pre-crisis (Jagtiani and Lemieux 2016a,b). Measurement error from these sources should be confined mainly to prevalence measures for large banks in the post-crisis period.

Furthermore, there is no evidence that we have seen that bank offices are no longer key loci for small business lending even in the age of ICT, or that even large banks are less likely to loan in areas where they have more branches per capita. Even today, very few banks, small or large, take small business applications online (FDIC, 2018). Nor do we see a case that measurement errors from transfers of funds across regions are related to unemployment shifts in local economies in ways that would systematically bias our estimates of associations between bank structure, surges and recoveries. Indeed, Jagtiani and Lemieux's (2016a,b) work in geocoding SBL mentioned in note 7 generate distributions of SBL lending across counties with and without smaller banks estimates that bear a striking resemblance to the branch density distributions for top 50 derivative and community banks in Figures 3 and 4, especially for the late 1990s and mid 2000s. This suggests that using deposit and especially branch densities to proxy distributions of SBL and other bank services across counties is a reasonable approximation for a first study of this type.

- 12 This index only considers bank branches, excluding credit unions to avoid measurement error from those data.

$$IQV = \left(1 - \sum_{i=1}^k p_i^2\right) * \left(\frac{k}{k-1}\right)$$

where p is the proportion of total (bank and credit union) branches operated by bank type i , and k is the number of bank types. This index goes beyond tracking the prevalence of particular bank types to combine shares of all bank types into a single measure of local banking structure. It is a measure of evenness which takes on values of 0 when all of the branches in a county are operated by one type of bank, increases in value as the proportion of branches operated by other banks increase, and reaches a maximum value of 1 when branches are distributed equally across bank types.

4.3 Controls

We controlled as much as possible for factors that could be correlated with banking structure and affect unemployment shifts in local economies, drawing heavily on resilience research. Basic controls in all models comprised *the sizes of local economies* and *local banking markets* using combinations of the natural logs of population, total branches, total deposits and total establishments within the county; *population density*; and additional measures of the organizational structure of local economies, *the density of non-profit organizations*, *the presence of a research I or II university in a county*, and *the presence of a research university in an adjacent county*. Size measures were highly correlated so we used the log of population and total deposits for size controls. We included size and population density to eliminate confounds due to larger banks being drawn to dense, urban and high growth economic regions that might be prone to bigger employment shifts over time versus rural economies where community banks prevail. We controlled for non-profit density, the number of non-profits per 10 000 residents, to address possible associations between types of banks and the presence of non-profit, community or mutual benefit organizations that could promote social capital, community-mindedness, or local problem-solving capacities that independently buffer local economies from shocks. We included research universities for their impacts on local development, the new knowledge economy and resilience (Simmie and Martin, 2009; Hill *et al.*, 2012; Owen-Smith, 2018).

We controlled for *demographic composition of local economies* using proportions of residents with less than high school and high school education, proportions African-American, Hispanic, Asian-American and Native-American, and median household income. Labor force composition and the pool of available skills and human capital contribute directly to firms' capacities to withstand, redeploy and pursue new investments in the face of economic shocks (Chapple and Lester, 2010; Hill *et al.*, 2012; Martin *et al.*, 2016; Han and Goetz, 2018). Moreover, large bank tendencies to concentrate subprime mortgage lending in poorer, minority communities might yield associations between large banks and unemployment surges via labor market disadvantages faced in those communities, rather than big banks' lending or credit-scoring practices.

We controlled for the *economic composition of local economies* to manage confounds due long standing associations between different types of banks, firms and sectors, and sector effects on performance. For resilience scholars, economies' vulnerability to recessions and abilities to recover rest critically on industrial diversification and how much they rely on small business, cyclically sensitive industries like construction, or knowledge based, 'new

economy' sectors (Hill *et al.*, 2012; Han and Goetz, 2018; Boschma, 2015; Martin and Sunley, 2015; Doran and Fingleton, 2018). Community bank associations with smaller unemployment surges, for example, might be artifacts of their focus on small business lending or sectors or places generally less exposed to drops in demand or employment. We thus controlled for: the proportion of county employment in firms with less than 500 employees; the proportion of firms with less than 500 employees; the proportions of employment in nine industries, including manufacturing, construction, and health, professional, scientific and technical services; and a Herfindahl index of local industrial specialization across 11 sectors.

We controlled finally for *housing market conditions*, including how much local economies experienced a housing bubble and collapse. We used overall growth in housing units, growth in owner-occupied housing, foreclosure rates, and change in housing prices using a housing price index. Controlling for these factors will help isolate whether banking structure associations with unemployment might be attributed to mortgage market lending and an asset bubble channel (Davies, 2011), rather than how banks lent or not to support employment through the recession.

We obtained data on population, population density, demographic composition, housing units and occupancy from Census and American Community Survey sources; on the sectoral composition of local economies from the Bureau of Labor Statistics *Quarterly Census of Employment and Wages* series, and the Census Bureau's *County Business Patterns*; and on firm size from the *CBP* and the Small Business Administration *Statistics of US Businesses*. We obtained data on foreclosures from RealtyTrac, and on housing prices from a developmental index created for a subset of counties by the Federal Housing Finance Agency. We calculated non-profit densities using the National Center for Charitable Statistics annual *Business Master Files*, and geolocated research universities using the Carnegie Classifications database at Indiana University.

Appendix Tables A1 and A2 provide the basic descriptive statistics for the cross period and panel data sets used in our analysis.

5. Results

We present results from our two, complementary analyses, beginning first with cross-period analyses of the relations between banking structure on the eve of the crisis, unemployment spikes from 2007 to 2010, and subsequent recoveries from 2010 to 2016.

5.1 Cross-period analyses of unemployment spikes and recoveries

5.1.1 SEM estimates

Tables 2 and 3 present SEM estimates of the relationships of banking structure and other factors with unemployment spikes and recoveries in counties. We estimated models of both outcomes simultaneously via SEM routines in STATA v15.2, with robust standard errors to manage heteroskedasticity. Table 2 models relations using per capita branch densities of our three bank types. Table 3 uses indices of localism and diversity. In both tables, models 1a and 1b serve as baselines that include the bank structure variables and a basic set of controls. Model sets 2a and b through 5a and b add additional blocks of variables, controlling for the economic composition of local economies, their demographic features, housing market conditions, first without the housing price index that is only available for 2389 counties, and then with it. Tables 2 and 3 report unstandardized coefficients.

Table 2 SEM estimates of relationships between branch densities by institution types in local banking markets, unemployment spikes from 2007 to 2010 and employment recoveries from 2010 to 2016

	(1a) Basic controls		(2a) Economic composition		(3a) Demographic conditions		(4a) Housing market		(5a) Housing market + HPI	
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov
Banking organization										
Top 50 branch per cap	0.194*** (0.0427)	-0.214*** (0.0678)	0.217*** (0.0406)	-0.228*** (0.0655)	0.201*** (0.0421)	-0.403*** (0.0940)	0.145*** (0.0428)	-0.164*** (0.0676)	0.116*** (0.0571)	-0.0660 (0.0780)
Community bank	-0.163*** (0.0177)	0.250*** (0.0360)	-0.162*** (0.0174)	0.207*** (0.0347)	-0.161*** (0.0162)	0.333*** (0.0526)	-0.162*** (0.0169)	0.263*** (0.0362)	-0.228*** (0.0233)	0.329*** (0.0475)
Credit union	-0.166*** (0.0308)	0.209*** (0.0547)	-0.144*** (0.0380)	0.164*** (0.0596)	-0.128*** (0.0273)	0.231*** (0.0644)	-0.129*** (0.0289)	0.186*** (0.0547)	-0.211*** (0.0517)	0.237*** (0.0798)
Basic controls										
Unemployment 2007	0.337*** (0.0230)		0.357*** (0.0244)		0.281*** (0.0251)		0.358*** (0.0238)		0.394*** (0.0260)	
Unemployment spike		2.131*** (0.132)		2.047*** (0.126)		2.786*** (0.224)		2.152*** (0.129)		2.054*** (0.124)
Non-profit density	-0.00725*** (0.00222)	0.0137*** (0.00467)	-0.00595*** (0.00181)	0.0117*** (0.00404)	-0.00461*** (0.00124)	0.0108*** (0.00313)	-0.00701*** (0.00213)	0.0143*** (0.00490)	-0.00718*** (0.00270)	0.0124*** (0.00526)
R1 or R2 in county	-0.401*** (0.127)	0.618*** (0.210)	-0.262*** (0.121)	0.577*** (0.186)	-0.364*** (0.129)	1.109*** (0.286)	-0.345*** (0.113)	0.626*** (0.200)	-0.256*** (0.109)	0.580*** (0.176)
R1 or R1 in adj county	-0.0353 (0.0706)	0.281** (0.114)	-0.0887 (0.0697)	0.275** (0.108)	0.0309 (0.0724)	-0.0298 (0.153)	-0.148** (0.0681)	0.402*** (0.116)	-0.146** (0.0688)	0.311*** (0.112)
Log population	0.381*** (0.113)	-0.557*** (0.198)	0.278*** (0.104)	-0.437*** (0.176)	0.391*** (0.0984)	-0.896*** (0.246)	0.0641 (0.111)	-0.299 (0.198)	-0.219* (0.119)	0.103 (0.190)
Log deposits	-0.259*** (0.0868)	0.533*** (0.152)	-0.137 (0.0854)	0.253* (0.139)	-0.239*** (0.0782)	0.567*** (0.187)	-0.152* (0.0845)	0.469*** (0.151)	0.00136 (0.0913)	0.165 (0.143)

continued

Table 2 Continued

	(1a) Basic controls		(2a) Economic composition		(3a) Demographic conditions		(4a) Housing market		(5a) Housing market + HPI	
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov
Population density	8.69e-07 (7.28e-06)	-1.92e-05 (1.26e-05)	2.32e-05** (1.16e-05)	-3.59e-05*** (1.25e-05)	-2.13e-05* (1.26e-05)	5.17e-05 (3.43e-05)	1.80e-05** (7.12e-06)	-3.27e-05** (1.31e-05)	-6.96e-06 (8.40e-06)	3.80e-05** (1.85e-05)
Economic composition										
Small business share			-0.918 (1.038)	6.952*** (1.638)						
Agric/nat resources			-0.756 (0.576)	-5.978*** (1.082)						
Construction			7.219*** (1.039)	-8.482*** (1.529)						
Manufacturing			0.941** (0.457)	1.348* (0.703)						
Trade/transport/utilities			-3.194*** (0.797)	4.881*** (1.252)						
FIRE			-2.522 (1.727)	6.127** (2.734)						
Education/health			-4.229*** (0.620)	2.485** (1.015)						
Prof/Sci/Tech			-3.315*** (1.011)	4.009** (1.663)						
Government			-1.389*** (0.458)	1.103* (0.645)						
Herfindahl			1.884 (1.236)	-2.622 (1.652)						

continued

Table 2 Continued

	(1a) Basic controls		(2a) Economic composition		(3a) Demographic conditions		(4a) Housing market		(5a) Housing market + HPI	
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov
Demographic composition										
Median hh income			3.64e-06 (4.33e-06)	2.52e-05 ^{***} (8.89e-06)						
Percent less high school			0.0289 ^{***}	-0.0846 ^{***}						
Percent high school			(0.00798)	(0.0189)						
			0.0195 ^{***}	-0.0407 ^{***}						
Percent black			(0.00611)	(0.0146)						
			0.0103 ^{***}	-0.0286 ^{***}						
Percent Hispanic			(0.00313)	(0.00718)						
			-0.000515	-0.0121						
Percent Native American			(0.00345)	(0.00812)						
			-0.0325 ^{***}	0.0435 ^{***}						
Percent Asian/Pac Islander			(0.00636)	(0.0164)						
			0.0271	-0.0721 ^{**}						
			(0.0170)	(0.0355)						
Housing market conditions										
Growth housing units					0.0239 ^{***} (0.00402)	-0.00460 (0.00595)	0.0123 ^{***} (0.00382)	0.0107 ^{**} (0.00535)		
Growth owner occ					0.00311	-0.0490 [*]	0.00469	-0.0287		
					(0.0169)	(0.0269)	(0.0190)	(0.0286)		
Foreclosure rates					0.409 ^{***}	-0.469 ^{***}	0.374 ^{***}	-0.313 ^{***}		
					(0.0437)	(0.0869)	(0.0496)	(0.0876)		
HPI appreciation							0.00926 ^{***}	-0.0240 ^{***}		

continued

Table 2 Continued

	(1a) Basic controls		(2a) Economic composition		(3a) Demographic conditions		(4a) Housing market		(5a) Housing market + HPI	
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov
Constant	3.110 ^{***} (0.421)	-8.189 ^{***} (0.984)	3.987 ^{***} (0.997)	-12.35 ^{***} (1.661)	1.431 ^{***} (0.587)	-5.748 ^{***} (1.341)	4.454 ^{***} (0.443)	-9.854 ^{***} (1.183)	(0.00127) 4.374 ^{***}	(0.00201) -6.655 ^{***}
var(e.spike)	2.585 ^{***} (0.0864)		2.344 ^{***} (0.0823)		2.476 ^{***} (0.0840)		2.380 ^{***} (0.0826)		2.109 ^{***} (0.0805)	
var (e.recov)	6.394 ^{***} (0.921)		5.411 ^{***} (0.784)		11.25 ^{***} (2.220)		6.359 ^{***} (0.873)		4.711 ^{***} (0.679)	
cov (e.spike e.recov)	-3.505 ^{***} (0.360)		-3.092 ^{***} (0.318)		-4.935 ^{***} (0.582)		-3.380 ^{***} (0.329)		-2.711 ^{***} (0.288)	
Observations	3087	3087	2912	2912	3087	3087	3087	3087	2388	2388

Robust standard errors in parentheses.

*** $P < 0.01$.

** $P < 0.05$.

* $P < 0.1$.

Table 3 SEM estimates of relationships between localism and organizational diversity in local banking markets, unemployment spikes from 2007 to 2010 and employment recoveries from 2010 to 2016

Variable	(1a) Basic controls		(2a) Economic composition		(3a) Demographic conditions		(4a) Housing market		(5a) Housing market + HPI	
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov
Banking organization										
Localism	-1.140*** (0.169)	1.207*** (0.294)	-1.162*** (0.170)	0.994*** (0.281)	-1.156*** (0.165)	2.013*** (0.404)	-0.810*** (0.163)	0.932*** (0.271)	-0.987*** (0.194)	0.794*** (0.295)
Diversity	0.328** (0.142)	-0.338 (0.223)	0.165 (0.152)	-0.117 (0.224)	0.437*** (0.137)	-0.790*** (0.299)	0.474*** (0.141)	-0.521** (0.236)	0.372** (0.169)	-0.614** (0.252)
Basic controls										
Unemployment 2007	0.357*** (0.0246)		0.381*** (0.0250)		0.296*** (0.0251)		0.383*** (0.0259)		0.417*** (0.0274)	
Unemployment spike		2.051*** (0.125)		1.968*** (0.115)		2.683*** (0.202)		2.049*** (0.123)		1.973*** (0.115)
Non-profit density	-0.0106*** (0.00344)	0.0175*** (0.00632)	-0.00843*** (0.00292)	0.0138*** (0.00522)	-0.00688*** (0.00218)	0.0145*** (0.00484)	-0.0102*** (0.00331)	0.0178*** (0.00657)	-0.00918** (0.00389)	0.0142*** (0.00658)
R1 or R2 in county	-0.384*** (0.143)	0.573*** (0.219)	-0.244* (0.127)	0.545*** (0.185)	-0.255* (0.131)	0.879*** (0.271)	-0.297** (0.128)	0.537*** (0.207)	-0.198* (0.118)	0.464*** (0.179)
R1 or R1 in adj county	-0.0145 (0.0739)	0.265** (0.114)	-0.0530 (0.0717)	0.236* (0.105)	0.0508 (0.0740)	-0.0562 (0.150)	-0.134* (0.0711)	0.378*** (0.114)	-0.0911 (0.0707)	0.246** (0.107)
Log population	0.673*** (0.178)	-1.076*** (0.289)	0.550*** (0.150)	-0.814*** (0.244)	0.628*** (0.112)	-1.404*** (0.288)	0.346** (0.167)	-0.840*** (0.286)	0.110 (0.175)	-0.450* (0.273)
Log deposits	-0.433*** (0.128)	0.854*** (0.208)	-0.278** (0.114)	0.459** (0.181)	-0.378*** (0.0866)	0.874*** (0.207)	-0.335*** (0.119)	0.811*** (0.203)	-0.213 (0.132)	0.546*** (0.206)
Population density	1.24e-05 (1.01e-05)	-3.57e-05* (1.65e-05)	3.55e-05*** (1.22e-05)	-5.01e-05*** (1.38e-05)	-1.33e-05 (1.45e-05)	3.28e-05 (3.72e-05)	3.18e-05 (8.33e-06)	-5.10e-05 (1.58e-05)	3.05e-06 (8.14e-06)	2.25e-05 (1.81e-05)

continued

Table 3 Continued

Variable	(1a) Basic controls		(2a) Economic composition		(3a) Demographic conditions		(4a) Housing market		(5a) Housing market + HPI	
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov
Economic composition										
Small business share			-2.982** (1.206)	9.622*** (1.830)						
Agric/nat resources			-0.423 (0.596)	-6.391*** (1.056)						
Construction			8.558*** (1.081)	-9.698*** (1.547)						
Manufacturing			0.662 (0.464)	1.833*** (0.679)						
Trade/transport/utilities			-4.035*** (0.818)	5.697*** (1.257)						
FIRE			-4.520** (1.791)	8.845*** (2.682)						
Education/health			-4.471*** (0.644)	2.456** (0.986)						
Prof/Sci/Tech			-2.482** (0.999)	2.648* (1.530)						
Government			-7.731*** (0.458)	1.458** (0.648)						
Herfindahl			1.879 (1.214)	-2.510 (1.587)						

continued

Table 3 Continued

Variable	(1a) Basic controls		(2a) Economic composition		(3a) Demographic conditions		(4a) Housing market		(5a) Housing market + HPI	
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov
Demographic composition										
Median hh income			1.35e-05*** (4.59e-06)	7.08e-06 (9.06e-06)						
Percent less high school			0.0453*** (0.00903)	-0.112 (0.0214)						
Percent high school			0.0216*** (0.00633)	-0.0409*** (0.0145)						
Percent black			0.0110*** (0.00325)	-0.0294*** (0.00711)						
Percent Hispanic			-0.00144 (0.00356)	-0.0102 (0.00811)						
Percent Native American			-0.0270*** (0.00596)	0.0298* (0.0143)						
Percent Asian/Pac Islander			0.0146 (0.0172)	-0.0458 (0.0338)						
Housing market conditions										
Growth housing units					0.0276*** (0.00445)	-0.00808 (0.00602)	0.0160*** (0.00411)	0.00705 (0.00548)		
Growth owner occ					0.00452 (0.0176)	-0.0485* (0.0266)	-0.00730 (0.0200)	-0.0130 (0.0285)		
Foreclosure rates					0.392*** (0.0433)	-0.397*** (0.0809)	0.375*** (0.0499)	-0.284*** (0.0815)		
HPI appreciation							0.0113*** (0.00129)	-0.0263*** (0.00204)		

continued

Table 3 Continued

Variable	(1a) Basic controls		(2a) Economic composition		(3a) Demographic conditions		(4a) Housing market		(5a) Housing market + HPI	
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov
Constant	2.086*** (0.591)	-6.225*** (1.130)	4.988*** (1.032)	-13.26*** (1.657)	-0.289 (0.714)	-2.242 (1.475)	3.392*** (0.603)	-7.567*** (1.325)	2.767*** (0.582)	-4.021*** (1.101)
var(e.spike)	2.708*** (0.0967)		2.442*** (0.0890)		2.576*** (0.0904)		2.495*** (0.0912)		2.203*** (0.0870)	
var (e.recov)	6.125*** (0.851)		5.100*** (0.693)		10.70*** (1.994)		5.962*** (0.790)		4.461*** (0.608)	
cov (e.spike e.recov)	-3.486*** (0.348)		-3.036*** (0.299)		-4.892*** (0.551)		-3.314*** (0.315)		-2.670*** (0.274)	
Observations	3085	3085	2911	2911	3085	3085	3085	3085	2387	2387

Robust standard errors in parentheses.
*** $P < 0.01$.
** $P < 0.05$.
* $P < 0.1$.

The results confirm four of five core expectations. The top derivative bank corporation coefficients were positive and significant in spike models, and negative and significant in recovery models. Increased branch densities of derivative trading megabanks were associated with larger unemployment spikes in counties from 2007 to 2010, and weaker recoveries from 2010 to 2016. Coefficients for community banks, credit unions, and localism displayed the opposite pattern. They were negative and significant in spike models, and positive and significant in recovery models. Increased branch densities for community banks and credit unions, and increased localism in banking markets, were associated with smaller spikes in unemployment in the counties, and stronger recoveries net of those spikes thereafter. Contrary to expectation, coefficients for diversity were positive in spike, and negative in recovery models, suggesting a pro- rather than counter-cyclical pattern.

Association magnitudes were generally small. Standard deviation increases in top bank corporation branch densities were associated with at most barely a tenth of a standard deviation increases in unemployment spike, and 0.16 standard deviation decreases in recoveries. The same increases in credit union densities and localism were associated at most with decreases in spikes of 0.08 and 0.13 standard deviations, respectively, and increases in recoveries of 0.09 and 0.20 standard deviations. Yet community bank branch densities exhibited stronger associations, with decreases in unemployment spikes of roughly a quarter (0.26), and increases in recoveries of nearly a half (0.46) of a standard deviation. Moreover, the results for community banks, credit unions, localism and (with one exception) top derivative banks were consistent and significant across all models, holding up even when factoring in the composition of local economies, the size of their small business sector, their income, educational levels, ethno-racial composition and the sizes of their housing booms and busts.

There were two small shifts in coefficients in the presence of controls. Recovery coefficients for localism, top derivative bank and community bank densities increased slightly when controlling for demographic characteristics in models 3a and 3b. This might reflect, for example, how big banks often served richer, more educated urban communities that would otherwise be less vulnerable to recessions or recover more quickly. In addition, top derivative bank and localism coefficients decreased in magnitude when controlling for housing market conditions. This suggests that any bank structure effects on unemployment worked partly through a housing market channel, by shaping the size of the bubble and bust in local economies.

Two other sets of results regarding controls were also noteworthy. Coefficients for non-profit densities and the presence of research universities in counties were negative and significant in all spike models, and positive and significant in all recovery models, a pattern paralleling those for community banks, credit unions and localism. Local economies with denser ecologies of non-profits and research universities experienced smaller spikes in unemployment and stronger recoveries.

Second, the models produced sensible results for other features of local economies, lending credibility to the analysis. Local economies fared worse during the recession as they relied more heavily on agriculture, manufacturing and construction. Agriculture was associated with weaker recoveries; manufacturing and construction with greater unemployment spikes and weaker recoveries. Local economies fared better as they were more dependent on trade, transportation and utilities, FIRE, government and 'new economy' sectors (education and health, and professional, scientific and technical services). All save FIRE were associated with smaller unemployment spikes, and all with larger recoveries. Local

Table 4 Robustness checks for cross-period models of branch densities, unemployment spike and recoveries

A. Full sample SEM/GSEM and spatial lag models									
Variable	SEM with regional dummies		SEM with regions and clustering		GSEM multi-level random intercept		Spatial regression with spatial lags of X		
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov	
Top 50 branch per cap	1.064*** (0.293)	-0.908** (0.372)	0.149*** (0.0250)	-0.0970*** (0.0371)	0.149*** (0.0260)	-0.0980*** (0.0371)	0.0411 (0.0352)	-0.0423 (0.0329)	
Community bank	-0.652*** (0.237)	0.331 (0.316)	-0.105* (0.0625)	0.108 (0.121)	-0.100* (0.0575)	0.109 (0.120)	-0.0337** (0.0145)	-0.0169 (0.0135)	
Credit union	-0.970*** (0.326)	0.477 (0.445)	-0.160*** (0.0487)	0.144*** (0.0375)	-0.146*** (0.0481)	0.143*** (0.0480)	-0.0975*** (0.0315)	-0.0186 (0.0295)	
Spatial lag T50							0.247*** (0.0792)	0.150** (0.0735)	
Spatial lag CB							-0.277*** (0.0202)	-0.0855*** (0.0192)	
Spatial lag CU							-0.236*** (0.0672)	-0.0896 (0.0629)	
Observations	3087	3087	3087	3087	3087	3087	3087	3087	
B. SEM by region									
	Northeast		Midwest		South		West		
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov	
Top 50 branch per cap	-0.129 (0.120)	0.0527 (0.156)	0.0600 (0.0656)	0.0772 (0.0706)	0.0844 (0.0615)	0.0154 (0.110)	0.187* (0.104)	-0.144* (0.0759)	
Community bank	-0.0856	0.0768	-0.0281*	0.00839	-0.240***	0.445***	-0.100	0.0270	

continued

Table 4 Continued

B. SEM by region	Northeast		Midwest		South		West	
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov
Credit union	(0.0784) -0.381*** (0.127)	(0.0758) 0.342** (0.152)	(0.0156) -0.122*** (0.0361)	(0.0197) 0.145*** (0.0430)	(0.0320) -0.0643 (0.0683)	(0.0893) -0.224 (0.156)	(0.0875) -0.321*** (0.0784)	(0.0603) 0.120 (0.0890)
Observations	217	217	1050	1050	1415	1415	405	405

Robust standard errors in parentheses.
*** $P < 0.01$.
** $P < 0.05$.
* $P < 0.1$.

Note: All models include basic controls (unemployment rate for spike models, unemployment spike for recovery models, non-profit densities, presence of R1 or R2, presence of R1 or R2 in adjacent county (for SEM/GSEM models), log population, log deposits, and population density). Full sample SEM and spatial models include dummy variables (or random intercepts) for region; spatial lag models also include lags for deposits, the presence of R1 or R2 as well as the spatial lags for banking structure variables.

Table 5 Robustness checks for cross-period models of localism, diversity, unemployment spike and recoveries

A. Full sample SEM/GSEM and spatial lag models								
Variable	SEM with regional dummies		SEM with regions plus clustering		GSEM multi-level random intercept		Spatial regression with spatial lags of X	
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov
Localism	−0.766*** (0.159)	0.414* (0.237)	−0.766* (0.395)	0.414 (0.274)	−0.769* (0.399)	0.420 (0.276)	−0.265* (0.148)	−0.0386 (0.134)
Diversity	0.173 (0.135)	−0.0560 (0.185)	0.173 (0.295)	−0.0560 (0.401)	0.189 (0.299)	−0.0582 (0.403)	−0.189 (0.132)	−0.0371 (0.120)
Spatial lag localism							−2.616*** (0.328)	−1.164*** (0.301)
Spatial lag diversity							0.924*** (0.263)	0.476** (0.239)
Observations	3085	3085	3085	3085	3085	3085	3085	3085
B. SEM by region								
	Northeast		Midwest		South		West	
	Spike	Recov	Spike	Recov	Spike	Recov	Spike	Recov
Localism	0.136 (0.488)	0.305 (0.524)	−0.229 (0.221)	−0.0823 (0.259)	−0.580** (0.250)	0.468 (0.507)	−2.371*** (0.419)	−0.293 (0.652)
Diversity	0.221 (0.546)	−0.326 (0.381)	0.0148 (0.187)	0.387* (0.225)	0.577*** (0.211)	−0.921** (0.430)	−1.032** (0.442)	−0.00615 (0.371)
Observations	217	217	1049	1049	1414	1414	405	405

Robust standard errors in parentheses.

*** $P < 0.01$.

** $P < 0.05$.

* $P < 0.1$.

Note: All models include basic controls (unemployment rate for spike models, unemployment spike for recovery models, non-profit densities, presence of R1 or R2, presence of R1 or R2 in adjacent county (for SEM/GSEM models), log population, log deposits, and population density). Full sample SEM and spatial models include dummy variables (or random intercepts) for region; spatial lag models also include lags for deposits, the presence of R1 or R2 as well as the spatial lags for banking structure variables.

economies with larger small business sectors also recovered more strongly. In contrast, lower income communities experienced weaker recoveries. Minority, more heavily black communities, and economies with less educated members were more vulnerable to decline and had weaker recoveries. So were counties that experienced substantial housing bubbles and collapse, indexed by growth in housing units, greater housing price appreciation and higher foreclosure rates.

5.1.2 Regions and spatial effects

These associations between banking structures and unemployment trajectories generally persist in the face of controls for regions and possible spillover effects associated with spatial clustering in banking. Analyses in [Tables 4](#) (branch densities) and [5](#) (localism and diversity)

first address clustering by extending the SEM approach using the full sample. They add controls for the four census regions, adjust for clustering of observations within regions, and fit multilevel generalized SEMs with random intercepts for regions. The tables then address spatial issues by fitting SEM models by region (Panel B) and modeling bank structure spillover effects across counties directly using spatial lags in a spatial autoregression framework (Panel A, last models).

These results from the first three models in Panel A broadly replicate the findings above, albeit with weaker associations. Coefficients for top 50 bank corporations are positive and significant in all spike models and negative and significant for recoveries. Coefficients are negative and significant in spike models for community banks, credit unions and localism, and positive and significant for credit unions (and positive but not significant for community banks and localism) in recovery models. None of the coefficients for diversity reach significance. Even with adjustments for region, top 50 bank corporations continue to display pro-cyclical patterns, and community banks, credit unions and localism, counter-cyclical patterns, especially during the onset of recession.

SEM results in Panel B also suggest differential impacts of banking structures by region. Where the top 50 bank corporations were pro-cyclically associated with unemployment in Western states, likely due to their heavy concentrations in California, Nevada and Arizona, community banks were counter-cyclically associated with unemployment in the Midwest and South; credit unions in the Northeast, Midwest and West; and localism in the South and West.

The results from the spatial models in Panel A also suggest further that unemployment shifts in counties were associated not just with their own banking structures, but also with those in adjacent counties. Consistent with previous findings, coefficients for *spike* models were negative and significant for community banks, credits unions, localism and all of their spatial lags, and positive and significant for the top 50 bank density spatial lag. Local economies were not only buffered from recession surges in unemployment by community banks, credit unions and localism in their own banking markets, but may also have received support during the trough—or at least protection from spillovers—from community banks, credit unions and localism in adjacent counties. They may have even experienced pro-cyclical spillovers from top derivative banks in adjacent counties in the onset of recession.

However, spatial lag coefficients in *recovery* models were positive and significant for top 50 bank branch densities and diversity, and negative and significant for community banks and localism. Firms seeking funds for recovery might have been hampered by small, local and community based banking in adjacent counties, benefiting instead from variety and from access to cross regional flows and global sources of funds through derivative bank giants with branches in nearby markets.

5.2 Time series analysis of recession effects

Our second analysis considers whether bank market organization moderated the effects of the financial crisis and recession on unemployment in local economies, fitting fixed effects regressions to panel data and time varying variables from 2005 to 2016. In Table 6, we first estimate unconditional ‘recession effects’, using period effects indexed by year dummy variables to capture the impact of broader economic forces on unemployment within counties for each year. Coefficients for year variables give increments in

Table 6 Fixed effects models of recession effects on unemployment rates and their dependence on banking structures within local economies, 2006–2016

Variable	(1) Main effect	(2) Top 50 holding co	(3) Community Bank	(4) Credit union	(5) Localism	(6) Diversity
Year dummies						
2006	0.0443 (0.0290)	0.0219 (0.0392)	0.0823** (0.0396)	0.0290 (0.0373)	0.0913* (0.0468)	−0.0247 (0.0646)
2008	0.856*** (0.0293)	0.737*** (0.0401)	1.125*** (0.0397)	0.893*** (0.0376)	1.065*** (0.0466)	0.587*** (0.0651)
2009	3.900*** (0.0317)	3.816*** (0.0418)	4.657*** (0.0417)	4.043*** (0.0393)	4.247*** (0.0485)	3.220*** (0.0659)
2010	3.883*** (0.0328)	3.754*** (0.0425)	4.758*** (0.0432)	4.040*** (0.0402)	4.327*** (0.0494)	3.152*** (0.0664)
2011	3.205*** (0.0352)	3.096*** (0.0446)	3.996*** (0.0452)	3.359*** (0.0424)	3.660*** (0.0513)	2.658*** (0.0690)
2012	2.450*** (0.0360)	2.242*** (0.0456)	3.223*** (0.0449)	2.571*** (0.0430)	2.979*** (0.0510)	1.784*** (0.0700)
2013	1.983*** (0.0388)	1.865*** (0.0478)	2.585*** (0.0467)	2.091*** (0.0455)	2.322*** (0.0528)	1.658*** (0.0722)
2014	0.975*** (0.0411)	0.870*** (0.0501)	1.374*** (0.0477)	1.080*** (0.0474)	1.252*** (0.0539)	0.865*** (0.0746)
2015	0.354*** (0.0452)	0.337*** (0.0536)	0.583*** (0.0508)	0.439*** (0.0511)	0.527*** (0.0567)	0.451*** (0.0768)
2016	0.0637 (0.0494)	0.0916 (0.0569)	0.126** (0.0541)	0.115** (0.0547)	0.0880 (0.0598)	0.368*** (0.0792)
Interaction terms						
2006 × Bank structure		0.0302 (0.0313)	−0.00704 (0.00886)	0.0190 (0.0334)	−0.160 (0.121)	0.0974 (0.0884)
2008 × Bank structure		0.145*** (0.0320)	−0.0823*** (0.00887)	−0.0523 (0.0337)	−0.708*** (0.125)	0.429*** (0.0887)
2009 × Bank structure		0.108*** (0.0317)	−0.228*** (0.00885)	−0.199*** (0.0335)	−1.181*** (0.127)	1.073*** (0.0891)
2010 × Bank structure		0.160*** (0.0317)	−0.254*** (0.00901)	−0.215*** (0.0335)	−1.503*** (0.128)	1.165*** (0.0902)
2011 × Bank structure		0.143*** (0.0323)	−0.229*** (0.00927)	−0.208*** (0.0338)	−1.520*** (0.129)	0.887*** (0.0921)
2012 × Bank structure		0.249*** (0.0323)	−0.226*** (0.00921)	−0.161*** (0.0340)	−1.832*** (0.129)	1.073*** (0.0917)
2013 × Bank structure		0.153*** (0.0327)	−0.165*** (0.00929)	−0.141*** (0.0341)	−1.133*** (0.129)	0.576*** (0.0924)
2014 × Bank structure		0.134*** (0.0331)	−0.104*** (0.00940)	−0.133*** (0.0341)	−0.936*** (0.130)	0.252*** (0.0927)
2015 × Bank structure		0.0330 (0.0339)	−0.0520*** (0.00941)	−0.111*** (0.0344)	−0.545*** (0.130)	−0.0538 (0.0924)
2016 × Bank structure		−0.0289 (0.0347)	−0.00137 (0.00935)	−0.0638* (0.0340)	0.0399 (0.130)	−0.360*** (0.0916)

continued

Table 6 Continued

Variable	(1) Main effect	(2) Top 50 holding co	(3) Community Bank	(4) Credit union	(5) Localism	(6) Diversity
Constant	−22.34*** (3.332)	−22.80*** (3.330)	−20.60*** (3.277)	−21.70*** (3.324)	−26.41*** (2.437)	−30.77*** (2.482)
Observations	31 861	31 872	31 872	31 872	31 861	31 861
R-squared	0.724	0.725	0.745	0.725	0.729	0.730
Number of counties	2991	2993	2993	2993	2991	2991

Standard errors in parentheses.

*** $P < 0.01$.

** $P < 0.05$.

* $P < 0.1$.

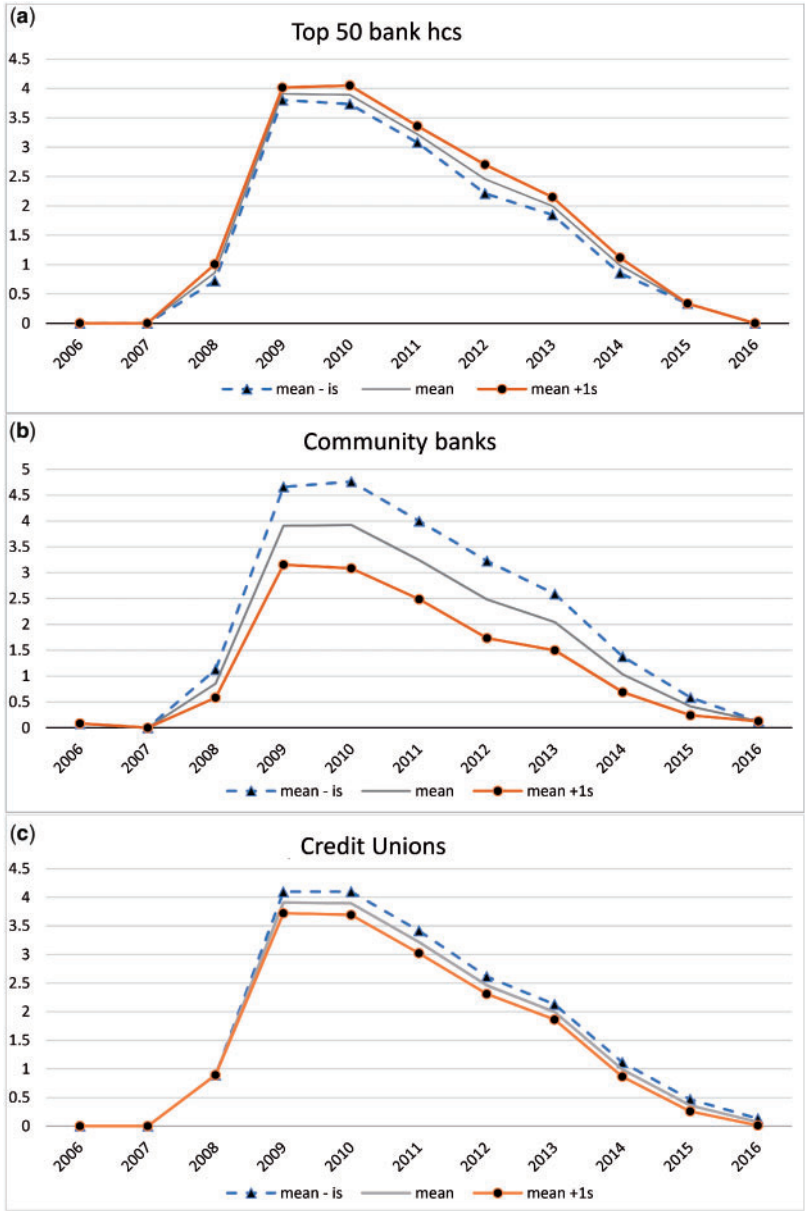
Note: All models include controls for banking structure (branches per 10k capita for top 50 derivative holding banks community banks, credit unions, indices of localism and diversity), log population, log total deposits, population density, non-profit density, demographic characteristics (median household income, percent less than high school educated, percent high school only, percent black, percent Hispanic), economic composition (percent of firms with less than 500 employees, proportion of labor force employed in agriculture/natural resources, manufacturing, construction, FIRE, trade/transportation/utilities, education/health care, government, science and technical and Herfindahl index for specialization) and housing market conditions (growth in housing units, foreclosure rates).

unemployment rates over their 2007 lows resulting from wider economic forces. These tap the effects of the financial crisis and recession within counties for each year from 2008 through 2016. We then add interaction terms between year dummies and each of the five banking structure variables to determine whether recession effects on unemployment vary by banking structure. Negative coefficients for interactions indicate reduced recession effects and a buffering effect of local banking structure; positive coefficients indicate an amplifier effect. All models include banking structure variables and a full set of controls, but omit results for the latter to ease presentation.

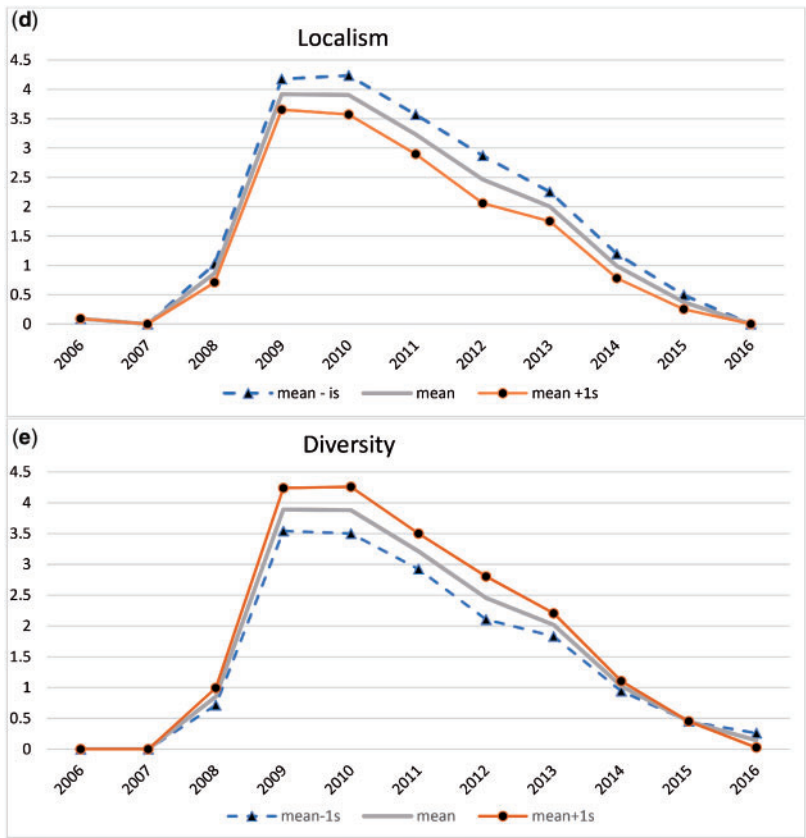
5.2.1 Recession effects

The coefficients in model 1 track growing and then declining unconditional effects of the recession on unemployment. In 2008, recession effects were modest, increasing unemployment in counties by .86%, on average, over their 2007 levels, net of the size and other characteristics of those local economies. But the effects increased markedly as the crisis reverberated through county economies, boosting unemployment, on average, by 3.9% and 3.88% over 2007 levels, respectively, in 2009 and 2010. After that, the recession effects on local economies declined, falling to 3.2% in 2011, 1.98% in 2013, 0.35% in 2015, and disappearing in 2016.

Model 2 adds interactions terms between year variables and the top derivative bank branch densities within counties. It reveals significant positive coefficients for the year variables combined with significant positive coefficients for the interaction terms. Increasing derivative bank branch densities within counties were associated with *increased* effects of the crisis/recession on unemployment, yielding higher unemployment shocks during the



Figures 5 (a–e) Unemployment shocks conditional on banking structure in local economies, 2006–2016.



Figures 5 (Continued)

recession. This amplifying effect appeared immediately with the onset of recession in 2008, peaked in 2012, and persisted through 2014.

Model 3 through 5’s analyses of community banks, credit unions and localism reveals the opposite pattern: positive coefficients for year variables along with significant negative coefficients for the interaction terms. Increased community bank densities, credit union densities and localism were associated with *decreased* effects of the crisis/recession on unemployment rates, and counties experiencing lower unemployment shocks due to recession. These dampening effects appeared for community banks and localism at the onset of recession, and a year later for credit unions, peaked in 2010, and declined thereafter, disappearing or nearly so by 2016.

Figure 5a–e uses the coefficients from models 2 through 6 to chart how recession effects on unemployment in counties varied by bank structure. Gray lines in each chart plot recession effects with bank structures set at their means. They give how much the crisis boosted unemployment in counties over their 2007 rates (0 in the graph). Solid lines graph recession effects for branch densities and indices a standard deviation above their means, dotted lines give effects for these variables at standard deviation below their means. Vertical gaps from

the gray lines give boost or drops in recession effects associated with standard deviation shifts in bank structure.

The figures show how local economies traversed the recessions as their banking structures varied, depicting opposite recession effect patterns for different bank types and structures. In the top 50 derivative bank [Figure 5a](#), the solid (high branch density) line runs above the mean effect and dotted, low density lines. Counties increasingly populated by top derivative banks experienced stronger recession shocks, i.e. greater annual increases in unemployment rates due to the crisis and recession. On average, standard deviation increases in top bank branches were associated with annual increases in unemployment rates within local economies that were .11 and .25% higher than otherwise. Diversity, depicted in [Figure 5e](#), returned a similar pattern, likely due to its association with derivative bank densities and market shares.

In contrast, the solid high density or value lines for community banks, credit unions and localism in [Figure 5b–d](#) ran below the mean effect and dotted low density lines. Counties with higher densities of community banks and credit unions and greater localism experienced smaller annual increases in unemployment rates during the recession. Standard deviation increases in community bank and credit union branch densities were associated, respectively, with annual increases in unemployment rates due to recession that were 0.17–0.84%, and 0.10–0.20% lower than otherwise. Increases in localism were associated with reductions in unemployment rate increases of 0.12–0.41%.

Notably, replicating the foregoing using non-profits densities as moderators for recession effects yielded patterns observed for community banks, credit unions and localism. Models and graphs (not shown) showed significant negative coefficients for interaction terms, with solid line maximums running well below dotted line minimums. Increased non-profit densities came with smaller crisis effects on local economies.

5.2.2 Regions and spatial effects

As a final robustness check, we reran the analysis using fixed-effect spatial autoregression models for panel data, including spatial lags for all five banking structure variables (and log deposits) to model spatial clustering and possible spillover effects from banking markets in adjacent counties. The results, shown in the Appendix in [Table A3](#), are virtually identical to those just reported.

6. Conclusion

Our results provide consistent evidence that the organizational structure of banking mattered for how local economies traversed the Great Recession. Increasing branch densities of derivative bank giants in local economies were associated with *increased* surges in unemployment rates there, *weaker* employment recoveries, and *stronger* effects of the crisis and recession on unemployment from 2008 through 2016. Increasing localism and branch densities of community banks and credit unions, in contrast, were associated *lower* spikes in unemployment, *stronger* recoveries thereafter, and *dampened* recession effects in local economies. Adjusting for regional clustering in banking weakened associations in the cross-period analyses, and some associations of banking structure with recoveries lost significance. Yet incorporating spatial effects in the time series models left associations of banking structure with recession effects unchanged, and results in cross-period analyses for

unemployment spikes and, in most cases, recoveries were consistent with our first results. Furthermore, spatial model for cross-period analyses revealed some spillovers that paralleled key findings. Local economies seem to have been buffered from surges in unemployment not only by community banks, credit unions and localism in their own banking markets, but also by those in adjacent markets. Conversely, they may have experienced greater unemployment surges due to spillovers from derivative bank activities in nearby places.

We present this research as a first step in the study of banking structure and resilience, and note two related limits of this study. First, while we had the organizational data to build good measures of local bank structure, we lacked specific measures of the mechanisms that we think drive our results. These include local market dynamics as mixes of banks change, the use of local networks, firm-bank interactions, learning as well as decision-making by banks and firms to reallocate loans or employees in response to the recession. Second, we relied on the density of organizations—bank branches—to proxy lending by different types, introducing measurement error into the analysis. Both issues reflect the limited availability of geocoded data, and reaffirm the value of supplementing quantitative analysis of association with qualitative studies of process. Yet, future research might also be able to make headway regarding mechanisms by collecting data on small business births or deaths, subtypes of non-profits that tap small business networks or collective capacities (e.g. local boards of trade or chambers of commerce) or surveys of business spending, if available, and by observing whether associations between bank structure and unemployment change when including measures of those factors. There might also be possibilities for combining HMDA mortgage lending data with Community Reinvestment Act data on small business loans to more directly measure bank lending within counties, though as noted, CRA lending data do not exist for community banks or credit unions.

Limits notwithstanding, our results clearly call into question the generality of arguments that decentralized systems of thousands of small, locally based financial institutions are inherently fragile by design (Calomiris and Haber, 2014). Far from exposing local economies to financial crisis and recession, community banks and localism in American banking, if anything, buffered local economies from unemployment effects of the crisis, and helped strengthen revivals, serving in this regard as sources of resilience and recovery. In this period, it was centralization and the predominance of giant, market-based bank corporations that left local economies more exposed to financial crisis and recession, and more vulnerable to unemployment shocks, dislocation and slow recoveries.

These result shed new light on how the social structures of finance shape economic life, addressing core concerns in economic and organizational sociology, and returning to ‘old institutionalist’ preoccupations with how institutions shape patterns of economic adaptation and performance in response to challenges (Zysman, 1983). Sociologists have identified core mechanisms by which actors manage uncertainty and risk in financial relations, providing rich contrasts between network based mechanisms grounded in relational exchange and embedded ties, and transactional based mechanisms grounded in classification, credit scoring and standardization (Carruthers and Stinchcombe, 1999; Uzzi, 1999; Guseva and Rona-Tas, 2001; Uzzi and Lancaster, 2003; Knorr Cetina and Preda, 2007). They have also deepened our understanding of profound transformations in the organization and social structures of finance over last three decades (Knorr Cetina and Bruegger, 2002; Beunza and Stark, 2004; MacKenzie, 2008; Fligstein and Goldstein, 2010; Pozner *et al.*, 2010; Krippner, 2011; Hardie and Howarth, 2013; Quinn, 2017). With good reason, scholars and

policymakers have focused intently on the new central tendencies in finance, especially those associated with the rise of giant bank corporations committed to ‘market-based banking’ grounded in securitization, derivative transactions and the high volume production of loans and new products. These changes had extraordinary consequences, including the highest rates of foreclosures and unemployment since the 1930s.

We advance this work by quantitatively analyzing the impacts of these organizational and social structures of finance on the performance of the economies it serves. Like Goldstein and Fligstein (2017), Fligstein and Goldstein (2010) and others, we focus on organizations, their business strategies and how those might shape performance outcomes. But we look beyond downgrades and defaults in financial markets to consider performance consequences in the ‘real economy’, and we look beyond one type of institution to consider the impacts of both largest, market based bank corporations and existing alternatives to too-big-to-fail banks.

Our findings also open new lines of inquiry into the organizational foundations of economic resilience. Sociologists have begun to consider how organizations support resilience in social life. They have traced, for example, how child care centers and the clusters of organizations to which they are linked (Small, 2009), vibrant zones of retail establishments (Klinenberg, 2002), and ecologies of non-profits within neighborhoods (Sampson *et al.*, 2005) can foster individual and collective efficacy in responding to challenges and shocks. Geographers and economists have focused, in contrast, on resilience in the economy, identifying conditions and processes that shape local economies’ capacities to resist and recover from economic shocks (Simmie and Martin, 2009; Hassink, 2010; Chapple and Lester, 2010; Martin and Sunley, 2015; Doran and Fingleton, 2018). However, sociological work on organization and resilience has largely neglected the economy, and research on economic resilience has yet to systematically consider the organizational or financial market structures of local economies. Our study brings these two streams together to shed new light on the organizational foundations of collective efficacy, robust action and resilience in the economy, linking that work with sociological analyses of finance, while laying groundwork for future research on how alternatives to corporations serve as infrastructures for economic resilience (see also Hall and Lamont, 2013).

Finally, we extend recent work on the effects of localism and alternative organizational forms within contemporary capitalism. Financialization, consolidation and the shareholder value revolution have reconfigured and even severed linkages between finance and large corporations, on the one hand, and employment, communities and local economic development, on the other. They have led big banks to prioritize propriety trading and the production and sale of loans and new financial instruments over traditional lending for productive investment, job creation or development (Tett, 2009; Davis, 2009; Hardie and Howarth, 2013; Goldstein and Fligstein, 2017). They have also rendered corporate profits and CEO compensation increasingly dependent on financial transactions, securities market reactions, and ‘liquidation regimes’ that sacrifice jobs, growth and stability for short term share price gains (Lazonik and O’Sullivan, 2000; Ho, 2009; Krippner, 2011; Jung and Dobbin, 2012; Tomaskovic-Devey *et al.*, 2015). In response, analysts have considered how small scale and public or collective forms of capitalism support or could even restore those connections. They have looked to policies that break up bank and corporate giants (Johnson and Kwak, 2011; Berk, 2018), and how ecologies of small, locally owned firms can provide business owners with stakes in local communities, while fostering social capital and local

problem-solving capacities (Tolbert *et al.*, 1998; Blanchard and Matthews, 2006; Tolbert *et al.*, 2014). They have looked, too, to alternative enterprises—to public banks for local or small business development, to bank or corporate charters that incorporate multiple stakeholders or public purposes, and to cooperatives, social enterprises and other forms that blend social welfare with profit-making or whose ownership structures tie firms to the well-being of workers, producers, consumers, citizens and their communities (Alperovitz, 2011; Schneiberg, 2011; Mair *et al.*, 2012; Block, 2014; Baradaran, 2015; Davis, 2016; Rothschild, 2016; Hockett and Omarova, 2017). What we add here are arguments and new findings about these principles in contemporary banking. Systems of small, locally or cooperatively owned banks can help reconnect finance with communities, sustain rather than sacrifice employment in the pursuit of profits, and foster connectivity and adaptive capacity within local economies.

We would hardly suggest that localism, community banks or kindred forms could serve as the sole or principal platform for managing for the current crisis. The US government's failure to mount a coordinated response or provide resources and infrastructure for local adaptation in the crisis of 2020 dramatically reveal the limits of relying on decentralization, local adaptability, or community based responses alone for robustness or resilience. Leaving states and localities to fend for themselves has produced far more devastating tradeoffs between health, economy and employment in the USA than in European nations with vigorous central state coordination. Rather, the argument here is for diversity and hedging over institutional monocropping—for the benefits of tempering excesses of market-based banking via national and global bank corporations with more varied, decentralized systems of community banks, credit unions, public banks and alternatives to large corporations (Schneiberg, 2011, 2013, 2020). It is also ultimately an argument for crafting and linking responses and infrastructure across multiple levels.

Whether and how ecologies of community banks, credit unions, non-profits and other local organizations will figure in the current crisis is an open empirical question. But it is already clear that stable funding, whether from the state or in the form of patient private lending, is one key piece of helping firms stay afloat and retain, rather than shed workers. The ability of firms to pivot and find new uses for employees, capabilities and plant is another. Moreover, it seems likely that small firms in particular will be better able to hold onto their workers and pivot where they have a banker in their court—one who can help a business owner solve problems, who is willing to consider work outs and customization, who has both in-depth knowledge of the local scene and a stake in how well business clients do, and who can connect them to firms, sources or markets in other sectors. This would be especially true if these locally rooted capabilities were directly supported by broader infrastructures and policies grounded in central state coordination and resources. Yet it might also be true that local ecologies of community banks, credit unions and kindred institutions can substantially enhance firms' and workers' capacities to make good use of state support and work with government agencies, amplifying their impacts, and enhancing administrative capacities (Schneiberg, 2011, 2017).

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