DISCUSSION PAPER SERIES

DP15025
(v. 2)

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Reint Gropp, Steven Ongena, Joerg Rocholl and Vahid Saadi

FINANCIAL ECONOMICS

CEPR

ISSN 0265-8003

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Discussion Paper DP15025
First Published 10 July 2020
This Revision 26 September 2021

Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

The Cleansing Effect of Banking Crises

Abstract

We assess the cleansing effects of the 2008-2009 financial crisis. U.S. regions with higher levels of supervisory forbearance on distressed banks see less restructuring in the real sector: fewer establishments, firms, and jobs are lost when more distressed banks remain in business. In these regions, the banking sector has been less healthy for several years after the crisis. Regions with less forbearance experience higher productivity growth after the crisis with more firm entries, job creation, and employment, wages, patents, and output growth. Forbearance is greater for state-chartered banks and in regions with weaker banking competition and more independent banks.

JEL Classification: G01, G21, G28, O43

Keywords: cleansing effect, banking crises, supervisory forbearance, Productivity Growth

Reint Gropp - reint.gropp@iwh-halle.de
Halle Institute for Economic Research (IWH), University of Magdeburg and CEPR

Steven Ongena - steven.ongena@bf.uzh.ch
University of Zurich, Swiss Finance Institute, KU Leuven and CEPR and CEPR

Joerg Rocholl - joerg.rocholl@esmt.org
ESMT Berlin, CEPR, and ECGI and CEPR

Vahid Saadi - vahid.saadi@ie.edu
IE Business School

Acknowledgements
We would like to thank our discussants (in order of their engagement) Giovanni Dell'Ariccia, Jesper Rangvid, Gilbert Cette, Philippos Petroulakis, Francisco Covas, Alvaro Remesal, Sergio Vicente, and José-Luis Peydró. We also thank participants at the 2017 Arne Ryde conference on financial intermediation, the BIS-IMF-OECD joint conference on weak productivity, the conference on the Real Effects of Financial Crises at Goethe University in Frankfurt, the 2018 Chicago Financial Institutions Conference, the 1st Biennial Bank of Italy and Bocconi University conference on “Financial Stability and Regulation”, the 26th Finance Forum, the III Madrid-Barcelona Workshop on Banking and Corporate Finance, the 6th Emerging Scholars in Banking and Finance Conference, and seminar attendees at the University of Gothenburg, Humboldt University and Free University of Berlin, Bank of Canada, and IE Business School. Ongena acknowledges financial support from ERC ADG 2016 - GA 740272 lending.

THE CLEANSING EFFECT OF BANKING CRISES

Reint Gropp§
IWH, University of Magdeburg and CEPR

Steven Ongena*
University of Zurich, Swiss Finance Institute, KU Leuven and CEPR

Jörg Rocholl†
ESMT Berlin, CEPR, and ECGI

Vahid Saadi+
IE Business School, IE University

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§ Halle Institute for Economic Research (IWH), University of Magdeburg and CEPR; Email: reint.gropp@iwh-halle.de
* University of Zurich, Swiss Finance Institute, KU Leuven and CEPR; Email: steven.ongena@bf.uzh.ch
† ESMT Berlin, CEPR, and ECGI; Email: joerg.rocholl@esmt.org.
+ IE Business School, IE University; Email: vahid.saadi@ie.edu.

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1. Introduction

Recessions are periods of low opportunity costs of time and resources and hence can facilitate a productivity-enhancing reallocation of resources and improve productivity growth (Foster, Grim, and Haltiwanger, 2016). However, recessions can also slow productivity growth by intensifying credit frictions, for instance, through the accumulation of legacy assets in the banking sector (Caballero, Hoshi and Kashyap, 2008). In this paper, we focus on the 2008-2009 financial crisis to study the interaction between these two channels and to investigate whether the restructuring of inefficient banks during the recession might have resulted in higher productivity growth in subsequent years.

It is well known that inefficient banks exert a strain on growth by misallocating capital in the real sector (Peek and Rosengren, 2005 and Caballero, Hoshi and Kashyap, 2008). There are several reasons why inefficient lending relationships can be persistent in the absence of a crisis. First, Dewatripont and Maskin (1995) show that, in markets with ex-ante asymmetric information, sunk costs can encourage banks to maintain lending to inefficient borrowers even after the type of the borrower is revealed. Second, Caballero et al. (2008) argue that, for marginal banks, i.e., banks close to the regulatory minimum, it might be optimal to refinance inefficient projects due to soft budget constraints. Finally, gambling for resurrection due to limited liability can motivate bank equity holders to postpone the realization of losses and continue lending to nonperforming borrowers. In *good times* and in markets characterized by asymmetric information, therefore, there will exist a set of inefficient banks and firms that ensure each other's survival.

In this paper, we examine whether banking crises under certain circumstances give rise to an opportunity to eliminate these persistent, inefficient lending relationships and facilitate redistribution of funds to borrowers with a higher marginal product of capital. In particular, we examine the effect of tough versus lenient supervisory intervention during the crisis and its subsequent effects on productivity. Being tough during a crisis can result in enhanced reallocation of capital and increased efficiency of capital allocation and can trigger creative destruction by new entrants to the market in the real sector and ultimately higher productivity growth (Schumpeter, 1942 and Aghion and Howitt, 1994).

For banks close to the minimum capital requirement, loan loss provisioning is costly in good times since they may fall below the minimum. Hence, these banks have an incentive to reduce their restructuring activity for their nonperforming assets. This process in turn can result in evergreening of unproductive firms. These unproductive firms, rather than exiting, stay in the market and can reduce productivity growth. In addition, competition can be distorted: given that loans to such firms are essentially a subsidy to an inefficient firm, new, more efficient firms have a more difficult time entering the market or increasing their market share. This channel further reduces productivity. The occurrence of a financial crisis can cleanse the market of such inefficient banks and firms. Marginal banks fall below capital requirements, and supervisors intervene, closing the bank, restructuring it, or placing their bad assets in a bad bank. This choice implies that funds are now redistributed to better-performing existing or new firms, which in addition no longer have subsidized competitors and hence can grow more quickly. We aim to test these hypotheses in this paper, using data from the United States.

Our identification relies on regional differences in supervisory forbearance in the U.S. As we explain later, there are reasons why a supervisor might choose to be forbearing on a distressed bank instead of closing and restructuring its assets. Forbearance implies that legacy assets remain on the balance sheet and the bank continues to have incentives to avoid realizing losses. Hence, its low quality borrower firms continue to receive financing and presumably none of the positive effects of them disappearing from the market will be realized. Hence, we posit that the long-term effects of the financial crisis should, ceteris paribus, depend on the degree of forbearance by the supervisor.

The supervisor's decision to close or restructure a bank or to forbear is not exogenous to expectations of output growth. Agarwal, Luca, Seru and Trebbi (2014) show that supervisors might be laxer if they are more concerned with local economic performance. One can think of other such dependencies between forbearance and economic expectations. For example, a supervisor might be more willing to close a bank if low expectations of future growth render it less credible that a distressed bank will recover at all. Conversely, if the supervisor expects a quick recovery of the local economy, he or she might be more willing to exercise forbearance because healthy recovery of the local economy improves the health of the bank as well, increasing the returns to forbearance. Since such expectations are unobserved omitted variables, they bias the ordinary least squares (OLS) estimate of the effect of forbearance on economic outcomes.

To address this potential endogeneity question, we use an instrumental variable (IV) that correlates with the propensity of the banking supervisor to forbear on a distressed bank while being unlikely to be a driver of productivity growth. We use two arguments to construct our instrumental variable. *First*, several articles provide evidence of *revolving doors*, that is, career transition between supervisory institutions and supervised corporations in banking and other sectors (Tabakovic and Wollmann, 2018; Shive and Forster, 2017; Luca, Seru, and Trebbi, 2014; Cohen, 1986). Revolving doors between banks and supervisors can reduce the incentives to be tough on distressed banks if supervisors consider a career move to a bank in the future. *Second*, while regular and intermittent bank examinations in the U.S. are performed by eight local supervisors, when a bank is in distress and is likely to fail, the important decisions about its fate are most likely made at the Federal Deposit Insurance Corporation (FDIC). By law, the FDIC must act as the receiver of the assets and liabilities of the said bank and decide on the resolution mechanism. Arguably, this relative importance of the FDIC should be particularly more salient during the period of 2007 to 2010, when many banks were candidates to be closed.

Combining the two arguments above, we suggest that, in the period from 2007 to 2010, FDIC decisions matter significantly more than those of other local supervisors. Focusing on the FDIC, we posit that the revolving door incentives of its supervisors might make them more lenient on banks that are geographically close since they are more likely to be the banks that FDIC supervisors envision as alternatives if they plan to switch to banking. The reason is that the FDIC headquarters are in Washington, D.C., which is the job market for the type of talent that a senior banking supervisor possesses. Therefore, and especially during the intense period of 2007 to 2010, distance to Washington, D.C., can matter for a supervisor's treatment of a distressed bank.[1] Finally, the geographical preferences of former

[1] The literature on banking documents the importance of geographical distance between banks and their customers (Degryse and Ongena, 2005; Hauswald and Marquez, 2006; Agarwal and Hauswald, 2010) and between banks and their supervisors (Lambert, 2019) and how this distance matters for the transmission and quality of information. Dam and Koetter (2012) showed that political influence on banks during election years decays with distance from the municipality in which the election occurs.

bankers moving to the supervisory institutions can result in a relatively greater presence of former bankers from around Washington, D.C., at the FDIC and thus closer personal ties between FDIC personnel and banks that are physically closer to it. We provide visual evidence that physical distance and personal ties are negatively correlated across the contiguous United States, later, we provide more direct statistical evidence for the first stage negative correlation of distance and forbearance.[2] For this variable to be a valid instrument, we further need the exclusion restriction assumption that this distance is not a driver of productivity growth across the U.S. economy.

We create a cross-sectional sample of Metropolitan Statistical Areas (MSAs) using averages from the two periods from 2007 to 2010 and from 2011 to 2015 to test our ideas. Our findings show that, *during the crisis,* MSAs with more supervisory forbearance on distressed banks experience lower exits at the establishment and firm levels and, similarly, fewer job losses in their real sector. One standard deviation higher supervisory forbearance during the crisis would lead to approximately a 2.9 percentage point lower rate of establishment exits and job destructions. We further show that higher forbearance on banks results in a weaker banking sector in the second period (2011-2015), reflected in relatively lower bank capital and higher nonperforming assets. Consequently, and in accordance with our predictions, *postcrisis* new job creation and job reallocation, as well as wages, employment, patents, and output growth, are lower for MSAs in which supervisory forbearance was higher during the crisis. One standard deviation higher forbearance during the crisis leads to a 3.6 percentage point lower postcrisis rate of establishment entry and job creation. Overall, our results show that, for every job lost due to lower supervisory forbearance during the crisis, there will be 1.05 new jobs created after the crisis.

Our paper closely relates to the literature on real effects of financial distress in the banking industry. Ivashina and Scharfstein (2010) show that the collapse of Lehman results in a significant decline in loan availability. This negative shock, however, is not confined to the U.S. capital market and has a far-reaching global impact, as shown by Puri, Rocholl and Steffen (2011) for the German retail lending market and by Damar, Gropp and Mordel (2020)

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[2] It is no surprise that distance is not a particularly strong correlate of forbearance in an IV setting. Therefore, we report inference statistics that are robust to weak instruments.

in the case of Canadian households' consumer credit. Moreover, Popov and Rocholl (2017) show that the German banks that are exposed to the U.S. banking sector experience a negative funding shock that temporarily lowers labor demand by these banks' borrowers. Our paper adds to this literature by going beyond the short-term crisis-period dynamics and shedding light on the longer term and postcrisis effects of heterogeneous policy responses undertaken during the crisis.

More recently, Schivardi, Sette, and Tabellini (2017) show that undercapitalized Italian banks engage in zombie lending, but the aggregate productivity effects are small. Similarly, Acharya, Eisert, Eufinger, and Hirsch (2019) find that the ECB's Outright Monetary Transaction program indirectly recapitalizes banks, but banks that remain undercapitalized continue lending to their zombie borrowers. In our setting, we use the TARP experiment and find that the recapitalization of banks in the U.S. through TARP does not foster restructuring in the real sector.

Foster, Grim and Haltiwanger (2016) argue that, unlike previous crises, the recent financial crisis has relatively less of a cleansing effect. They suggest that credit frictions could be one major factor that differentiates this crisis from the other post-1980s crises. In a related work, Homar and van Wijnbergen (2017) study all crises after 1980 and conclude that recapitalizing banks eliminates the problem of zombie banks, hence reducing the duration of crises. This paper, in contrast, shows that recapitalization, while providing short-term benefits during the crisis, does not yield cleansing effects and does not have a positive impact on long-term productivity growth.

The remainder of this paper is organized as follows: in section 2, we explain the data, sample selection, and structure of the final samples that we use in our estimations. section 3 covers the empirical strategy. We present the results in sections 4 and 5. Robustness checks are discussed in section 6. Section 7 concludes.

2. Data

In this section, we introduce the data sources and elaborate on the approach that we follow to generate the final sample. Our final sample consists of cross-sectional observations at the MSA level, containing information about the crisis period and the postcrisis period real outcomes, as well as supervisory forbearance and bank restructuring.

2.1. Bank-level data

We construct the annual FDIC-insured commercial bank data from SNL Financial. Following Wheelock and Wilson (2000), we collect the variables that are needed to imitate the criteria that are at the core of CAMEL ratings, which are assigned by supervisors as an outcome of their regular evaluations of individual banks. CAMEL stands for capital adequacy, asset quality, management quality, earnings, and liquidity. Therefore, we use equity ratio, loan ratio, real estate assets, commercial and industrial (C&I) loans, other real estate owned, nonperforming assets, ROA, efficiency, and liquidity. We augment these data by adding size, age, and location information of each individual commercial bank from 2001 until 2015. It is essential for our study to link banks to their respective MSAs. We do so using the ZIP code information of the banks. We then use a link file between ZIP codes and MSAs provided by the Office of Workers' Compensation Plan of the United States Department of Labor[3] to map each bank to its respective MSA.

We obtain data on bank failures from the Federal Deposit Insurance Corporation (FDIC).[4] The FDIC assumes receivership of troubled banks and designs a plan to market their assets and liabilities. Approximately 94% of the failures from 1999 to 2014 ended up in assisted mergers, in which the acquiring institutions purchased and assumed certain assets and liabilities of failing banks. In the remaining cases, the FDIC pools the loans acquired from the failing banks according to known characteristics, such as size, performance status, type, collateral, and location, and sells them through sealed bid auctions.[5] Because both cases result in significant restructuring of the failing banks' loan portfolios, we do not distinguish between these two types and generally associate more failing banks with more restructuring of loan portfolios in the local banking market.

The FDIC data include, most crucial for our purpose, the name, city, FDIC certificate number and date of closures. We use these variables to identify the failing banks in our bank-level data. We generate a dummy variable called *failed*, which equals one for bank-year

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[3] http://www.dol.gov/owcp/regs/feeschedule/accept.htm
[4] https://www.fdic.gov/bank/individual/failed/banklist.html
[5] Bennet and Unal (2015) offer a detailed description of the FDIC's resolution mechanisms.

observations at which the bank fails and zero otherwise. We use this dataset to calculate the MSA-level measure of bank restructuring, defined as the failed banks' share of commercial and industrial loans weighted by their relative size. Furthermore, we estimate bank-level supervisory forbearance and consequently the aggregate MSA-level forbearance measure using the same data. We explain our approach in detail in Section 3.

Our final bank-level data contain 45,581 bank-year observations for the period of 2003 to 2014. On average, we observe approximately 3,800 unique banks each year, but the number of banks is larger in the early years of our data. Because our analysis is ultimately at the MSA level, banks not recorded as having their main offices in an MSA are not included in our analysis. The excluded banks have on average $194 million in assets, which in comparison to our final sample's average bank assets of $1.3 billion indicates that these banks are small local banks, and their exclusion should not be detrimental to our analysis. Approximately 66% of the banks in our sample are supervised by the Federal Deposit Insurance Corporation (FDIC). The Federal Reserve Board (FED) supervises approximately 14%, and the Office of the Comptroller of the Currency (OCC) supervises the remaining 20%. Finally, of the 5,224 unique banks that we observe in our sample, 4,196 (80%) are incorporated under a state charter, while the rest are federally chartered.

The overwhelming majority of banks are only active in one MSA. Based on the Summary of Deposits data from the FDIC, as of 2006, the median bank operates three branches in a single MSA. Banks in the 95th (99th) percentile operate 22 (121) branches across 3 (10) MSAs in 2 (3) states. To deal with banks that are active in more than one MSA, we use each bank's relative share of deposits in each MSA as weights to aggregate bank-level estimates of forbearance to an MSA-level estimate. The assumption here is that bank credit is closely correlated with bank deposit at the MSA level. This assumption is in line with the findings in Glije, Loutskina, and Strahan (2016) who show that banks transmit lending shocks only to areas where they have branches and therefore enjoy local information advantage. Our estimates using bank small business lending shows a correlation coefficient of 0.94 between shares of bank deposits and bank lending at the county level, which can be a lower bound for the same correlation at the larger MSA level.

2.2. MSA-level Economic Activity Indicators

We collect several variables at the MSA level that are generally used in the literature as measures of economic activity and proxies for the level and/or growth in productivity. The Census Bureau's Business Dynamics Statistics provide annual data on establishments for each MSA. The data include the number of active establishments and firms and total employment in each MSA, the number and rate of entries and exists, job creation and job destruction at both the intensive and extensive margins, and finally the rate of reallocation. Reallocation is defined as the sum of the job creation rate and the job destruction rate. To proxy for labor productivity growth, we use average annual wage growth at the MSA level. The data come from the Quarterly Census of Employment and Wages. For each MSA, we collect the average annual private sector wage across all industries.

The Patent Technology Monitoring Team (PTMT) of the U.S. Patent and Trademark Office publishes the annual number of utility patents, i.e., patents for innovation.[6] We collect these data at the MSA level for the period under study. Finally, we use the U.S. Department of Commerce Bureau of Economic Analysis data on regional economic accounts. These data provide different measures of production per MSA and industry in an annual frequency. In this study, we use annual GDP growth and per-capita GDP growth for each MSA from 2001 to 2014.

3. Empirical strategy

3.1. Supervisory forbearance and real economic outcomes during the crisis period

We start by studying the relationship between supervisory forbearance in the banking sector and real economic outcomes during the crisis period, defined as the years 2007 to 2010. We extend the NBER definition of the end date of the recession because the number of bank failures in 2010, as depicted in Figure 1, continues to be much greater than the precrisis period.[7] The regressions that we estimate are as follows:

$$\bar{y}_i^{\{2007\leq t\leq 2010\}} = \beta_0 + \beta_1 \bar{x}_i^{\{2007\leq t\leq 2010\}} + \mathrm{B}X_i + \epsilon_i \quad (1)$$

where the outcome variables are establishment and firm exit rates and the rate of job

[6] https://www.uspto.gov/web/offices/ac/ido/oeip/taf/cls_cbsa/explan_cls_cbsa.htm
[7] http://www.nber.org/cycles/sept2010.html

destruction, in aggregate as well as by firm exits (extensive margin) or layoffs (intensive margin) separately. All of these outcome variables are averaged over the four years (2007-2010) of annual data. Our variable of interest, shown by $\bar{x}_i^{\{2007\leq t\leq 2010\}}$, is the MSA-level supervisory forbearance during the period from 2007 to 2010. We also use an alternative measure, called *Bank Restructuring*, to check for the robustness of our results to the choice of independent variable. Bank restructuring is defined as the share of commercial and industrial loans restructured by the FDIC in an MSA during the crisis. We include only commercial and industrial loans because we are interested in the production and service sectors and less so in the retail and mortgage markets. Nevertheless, in unreported results, we confirm the findings if we use total bank assets.

3.2. Supervisory forbearance and real economic outcomes during the postcrisis period

In the next step, we study the relationship between growth in productivity proxies during the postcrisis period (i.e., between 2011 and 2014) and supervisory forbearance during the crisis. Hence, we estimate:

$$\bar{y}_i^{\{t\geq 2011\}} = \gamma_0 + \gamma_1 \bar{x}_i^{\{2007\leq t\leq 2010\}} + \Gamma X_i + \varepsilon_i \qquad (2)$$

where $y_i^{\{t\geq 2011\}}$ represents the outcome variables: average annual rate of establishment and firm entries, job creation (in aggregate and separately by new entrants (extensive margin) and continuers (intensive margin)), average annual rate of reallocation, employment, wage, number of patents, and GDP per capita growth from 2011 to 2014, at the MSA level. Again, as in (1), $\bar{x}_i^{\{2007\leq t\leq 2010\}}$ is the variable of interest, i.e., MSA-level average supervisory forbearance during the period from 2007 until 2010. Finally, in both regressions in (1) and (2), we control for MSA-level house price growth during the crisis and precrisis (2000 to 2006) bank-to-GDP ratio and GDP growth. These variables control for MSAs' exposure to the bust in housing prices and to the banking crisis, as well as considering MSAs' structural growth differences. Note that we do not control for state fixed effects. The reason has to do with the United States' dual banking supervisory system. Commercial banks in the U.S. are supervised by both federal and state supervisors. This setting leaves little room for variations in supervision *within* states. Hence, adding state fixed effects will limit the analysis to a within-state comparison of MSA-level outcomes, while there is little variation in the quality of supervision within each state.

The variable of interest is these models is supervisory forbearance. Supervisory forbearance is defined as in Hoffman and Santomero (1998). The supervisor might find it optimal to grant some time to a distressed bank with the hope that management turnaround, orderly disposal of assets, or profit generation can enable the bank to absorb the losses and return to a healthy state.[8] We estimate the level of forbearance for individual banks headquartered in the same state where the MSA is located and aggregate them up to the level of the MSA using the share of deposits (as of 2007) in the MSA.[9] If during the crisis, banks in an MSA benefit from higher levels of supervisory forbearance, we would expect to observe lower restructuring in real economy in the region during the crisis. The cleansing hypothesis would then predict lower growth for these regions during the postcrisis period. Therefore, β_1 and γ_1 in regression models (1) and (2), respectively, are expected to have a negative sign when we study the effect of supervisory forbearance.

3.3. Measuring supervisory forbearance

To measure MSA-level supervisory forbearance, we first estimate a binary model of bank failure in a pooled OLS regression model following Wheelock and Wilson (2000), where the predictor variables are chosen such that they replicate the CAMEL ratings:[10]

$$failed_{i,t} = \alpha_0 + \alpha_1\, equiry\ ratio_{it-1} + \alpha_2 loan\ ratio_{it-1} + \alpha_3 real\ estate_{it-1} +$$

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[8] Hoffman and Santomero (1998) defined forbearance as the following: “An institution which is experiencing financial distress may be able to resolve its problems if given time. The granting of time for a management turn-around, the orderly disposal of problem assets, and/or the generation of positive profits against which to charge off losses is defined as forbearance. As this suggests, forbearance can occur for two separate reasons. Either the firm is thought to be bankrupt but the timing of the liquidation is deferred for market reasons, or the firm is perceived as salvageable if given enough time to recover from an unexpected and large loss. In the first case it is sometimes alleged that immediate liquidation of assets is not possible in the real world. It is argued that pressure to liquidate assets can lead to returns, which do not reflect fair market value. Therefore, to achieve maximum return an institution is given leeway to liquidate its assets as favorable bids are received. However, the institution is viewed as managing to liquidation, rather than solvency”.

[9] This variable measures the supervisory forbearance enjoyed by banks headquartered in the same state as each MSA. In Section 4.3, we also study the effect of forbearance on banks headquartered outside of the state of the MSA and discuss the different implications.

[10] The true form of the failure model, whether linear or non-linear, is unobservable to the econometrician. Hence, we stick to the linear model in the main analysis but check for the sensitivity of the results by alternatively using the logistic regression model, in which the results (not reported) remain similar to what we report in the main text.

$$\alpha_4 C\&I_{it-1} + \alpha_5 other\ real\ estate_{it-1} + \alpha_6 NPA_{it-1} + \ \alpha_7 ROA_{it-1} + \ \alpha_8 liquidity_{it-1} + \alpha_9 efficiency_{it-1} + \alpha_{10} \log{(assets)}_{it-1} + \alpha_{11} \log(age)_{it-1} \ + \sum_{j=1}^{2} \alpha_{11+j} GDPG_{t-j}^{MSA_i} + Industry_i + \varepsilon_{i,t} \qquad (3)$$

In this model, $failed$ is a dummy variable that equals one for the bank-year observations in which the bank is closed and zero otherwise. The variables that predict failure are defined as follows: *equity ratio* is the total equity capital as a percent of assets; *loan ratio* is total loans and leases, net of unearned income divided by total assets; *real estate* is total domestic offices' real estate loans divided by total consolidated loans and leases (net of unearned income and gross of reserve); *C&I* is total domestic commercial and industrial loans divided by total loans and leases; *other real estate* is the sum of foreclosed real estate, other real estate owned and direct and indirect real estate investments as a percentage of total assets; *NPA* is total nonperforming assets (nonperforming loans plus other real estate owned plus other nonaccrual assets) divided by total assets; *ROA* is net income as a percentage of average total assets; *liquidity* is liquidity ratio (i.e., cash and balances due plus securities plus fed funds sold and repos plus trading account assets minus pledged securities divided by total liabilities); and finally, *efficiency* is the noninterest expense less amortization of intangible assets divided by net interest income on a fully taxable equivalent basis and noninterest income.

Furthermore, we control for contemporaneous and lagged GDP growth at the MSA level and the local industry mix. To construct this latter variable, we measure the average share of output of each industry at the 1-digit SIC code level (11 sectors in total) during the 2001-2006 period in each MSA and add these shares to the regression equation (3). The idea is to account for structural industry differences among the MSAs, which might affect banks' health.

We estimate (3) using bank-level data from 2001 to 2015. The residual term in regression (3) with a reversed sign is then a measure of forbearance for each individual bank. For example, a positive estimate of forbearance for a bank tells us that this surviving bank would have to be closed had the supervisor followed the estimated closure rule consistently across all banks and years throughout the sample period. Conversely, a negative estimate implies that the supervisors have been too tough on the specific bank, again relative to what the model predicts. Note that, for our analysis, only the relative values of these estimates are important. Next, to calculate an annual MSA-level measure of forbearance, we calculate the deposit-weighted average of bank-level forbearance on banks headquartered in the state of each particular MSA in each year. Finally, we calculate the average from 2007 to 2010 to construct a time-invariant aggregate measure of forbearance at the MSA level. In Section 5, we demonstrate that this measure exhibits the known characteristics of supervisory forbearance in the U.S. banking sector.

3.4. Instrumental variable

The supervisor's decision to close a bank or to forbear might not be exogenous to expectations of output growth. As these expectations could thus constitute unobserved omitted variables, they bias the ordinary least square (OLS) estimate of the effect of forbearance on economic outcomes. To address this potential endogeneity question, we posit that the revolving door incentives of the FDIC supervisors during the 2007 to 2010 period might make them more lenient on banks that are geographically close to them. These banks are more likely to be the ones that FDIC supervisors envision as alternatives if they plan to switch to banking while preserving their geographical preferences. The reason is that the FDIC headquarters are located in Washington, D.C., which is the job market for the type of talent that a senior banking supervisor possesses. Therefore, and especially during the intense period of 2007 to 2010, distance to Washington, D.C., can matter to a supervisor's treatment of a distressed bank. Finally, geographical preferences of former bankers moving to the supervisory institutions can result in a relatively greater presence of former bankers from around Washington, D.C., at the FDIC and thus closer personal ties between the FDIC personnel and banks that are closer to it.

While information on the geographical preferences and/or past moving history of former supervisors and bankers is evidently not available, our instrumentation strategy merely requires that physical distance plays a salient and exogenous role in shaping such ties. While other elements such as weather and past migration of colleagues and friends may also play a role, a visual inspection of the relative probability of friendship links between Washington, D.C., and all other U.S. counties among the general population (Bailey, Cao, Kuchler, and Stroebel, 2018) in Figure 2 suggests that physical distance remains a key element in “linking” counties, even if social connections *per se* contain additional explanatory power, for bank lending for example (Rehbein and Rother, 2020).

Hence, we use MSAs’ distance to Washington, D.C., as an instrumental variable. The exclusion restriction assumption is that distance to D.C. is not an independent driver of MSA-level postcrisis productivity growth. To address skewness, we use *log(distance + 1)* as the instrument.[11]

4. Main results

We present the results in two subsections. First, we examine the effects of forbearance during the crisis on rates of establishment and firm exits from the market and rates of job destruction. We also show that banks in forbearing regions will be weaker after the crisis. Next, we analyze how postcrisis rates of entry of establishments and firms, as well as job creation and reallocation, differ in regions with differing intensities of restructuring/forbearance during the crisis. We also study the effects on wages, employment, number of patents, and output growth.

4.1. Crisis-period restructuring

Table 1 presents the summary statistics of our MSA-level cross sectional sample. It indicates that, during the crisis, 9.6% of the establishments and 7.5% of firms left the market in an average MSA in each year. The job destruction rate was on average 14.2%, of which 10.2 percentage points were through lay-offs by continuing firms, while 4.1 points were due to exiting firms. Table 3 presents the estimate of the failure models by linear and logistic binary regression models. The summary statistics of the variables used in estimating these models are presented in Table 2. The residuals from these two models are used to construct the MSA-level proxy of forbearance. We discuss the properties of this measure in more detail in Section 5. The model predicts higher failure likelihoods for marginal banks, i.e., banks

[11] One might argue that the distance to Washington, D.C., might also affect non-financial firms in the same way as it affects the banking sector. It might well be that firms closer to Washington have access to subsidies and rents that give them an advantage over firms farther away. As we will see later in the results, in fact, we show that regions farther away perform better after the crisis; thus, even if there are confounded effects, they work against what we find. Furthermore, since our focus is on the financial crisis, the distribution of TARP funds across industries is a relevant indicator of the relative significance of supervisory forbearance between financial and nonfinancial firms. In fact, only approximately 10% of the funds go to the non-financial sector and only to two automotive companies (GM and Chrysler).

with lower equity ratios and more nonperforming assets. Figure 3 shows the distribution of estimated MSA-level forbearance. Of the 262 MSAs in the final sample 152 (58%) have on average a positive value for forbearance, although forbearance at the bank level has a zero mean by construction. This outcome indicates that banks with negative estimates of forbearance are clustered in fewer MSAs. Stated differently, supervisors are tougher on banks if there are more banks in an MSA, consistent with prior evidence (see Section 5).

Panel A of Figure 4 presents the geographical distribution of supervisory forbearance, showing some preliminary evidence of higher values closer to Washington, D.C. Panel B of Figure 4 presents the geographical distribution of establishment exits during the crisis throughout the U.S. states. These two panels are suggestive of our main findings in this section. The formal tests of the first-stage regressions of the IV estimations are presented in Table 4. The usual tests of weak instruments are rejected, and the instrument is significantly correlated with the endogenous variables. The F-statistics (7.00 and 8.72) and P-values for the tests of weak instrument are based on Sanderson-Windmeijer (2016), which coincide with Kleibergen and Paap's (2006) F-statistics in our case of one endogenous regressor. While these tests reject the null of weak instruments, the F-statistics are smaller than 10, which conventionally is a threshold for a strong instrument.[12] It is not surprising that distance does not correlate too strongly with forbearance. Supervisors do care about bank fundamentals, market conditions, and the costs of alternative resolution mechanisms when deciding to move a bank to a purchase and assumption status. Therefore, while distance statistically significantly correlates with forbearance, it is not a primary reason for it, giving rise to F-statistics that might be interpreted as weak. Therefore, to improve upon standard inferences, we report two generally accepted statistics in the literature. First, we report the P-values of Anderson and Rubin's (1949) test statistic, which are robust to weak identification. Second, we report the 95% confidence intervals of the instrumented coefficient based on Chernozhukov and Hansen (2008), which is similarly robust to weak instrument.

Table 5 presents our 2SLS estimates of the model in (1). The estimates imply that the higher that the supervisory forbearance in a region is, the less that the extent is of restructuring in the real sector in the region during the crisis. We observe fewer

[12] The more accurate threshold is an F-statistic of 8.7, but the empirical literature conservatively relies on 10.

establishments and firms exiting the market, as well as lower job destruction rates by both existing and continuing firms. We report the Anderson-Rubin test statistics of the significance of the coefficient of the excluded instrument in the reduced form regression. This test is robust to the weak instrument problem, and that we can strongly reject the null is reassuring of the validity of the instrument. Furthermore, we report the 95% confidence intervals of the effect of *Forbearance* on each outcome variable, based on Chernozhukov and Hansen (2008), which is robust to the weak instrument problem. As shown in Table 5, the 95% confidence intervals for each outcome variable are negative, consistent with the 2SLS point estimates. The results are also economically significant. A one standard deviation higher supervisory forbearance during the crisis would lead to approximately a 2.9 percentage point lower rate of establishment exits and job destructions. One standard deviation of supervisory forbearance, according to our first-stage estimates in Table 4, is the difference between the levels of forbearance in two MSAs with a relative distance to Washington, D.C., of approximately 10 (for example, one being 100 km and the other 1,000 km away, considering reasonable geographical distances in the sample). These findings are robust to using *Bank Restructuring* instead of supervisory forbearance, as presented in Table A2. Our OLS results, however, in Table A1 are not statistically significant at conventional levels. We attribute this outcome to the endogeneity problem of forbearance that we discussed earlier in the paper. More specifically, the positive sign of the omitted variable bias (OVB) implies that, in areas more severely affected by the crisis, supervisors were more inclined to exert forbearance on distressed banks.

Table 3 shows that failing banks are more likely to be marginal in terms of satisfying capital requirements. Therefore, higher forbearance indicates more distressed banks staying in business and continuing to operate, perhaps even outliving the crisis. The consequence of this outcome will be a weaker banking sector down the road in highly forbearing regions. Figure 5 presents some suggestive evidence of this effect. MSAs with higher levels of supervisory forbearance see a sharp increase in their share of nonperforming assets during the crisis and carry this burden forward for several years after the financial crisis with significantly more nonperforming assets relative to other MSAs. We explicitly test for bank health differentials across MSAs with high levels of supervisory forbearance and others. The results are presented in Table 6 and show that banks in highly forbearing regions (those in the fourth quartile) show lower equity ratios, more nonperforming assets, and lower ROA from 2011 to 2014.

4.2. Postcrisis productivity

Next, we turn to the medium to long-term postcrisis effects of forbearance in the banking sector during the crisis, which are at the core of the paper. Our hypothesis predicts that, if distressed banks' assets are restructured during the crisis, there will be fewer impaired banks and impaired borrowers left in the market, in turn increasing the chances of other firms entering the market in the medium to long term. The lack of restructuring in the banking sector, imposed by supervisory forbearance, will hinder this process. Marginal banks that are kept alive will not be able to cut off their borrowers and will be more likely to engage in zombie lending. In this section, we show some evidence supporting this hypothesis.

The results of our 2SLS estimation of model (2) are presented in Table 7. We find that the higher that the level is of crisis-period supervisory forbearance in an MSA, the less entry that there is of new establishments to the market. The same holds for the entry rate of firms and the rate of job creation. Our results show comparable effects on job creation by new entrants and incumbents. Garcia-Macia, Hsie, and Klenow (2019) found that most of the growth in the economy is from incumbents since they comprise a larger share of employment. Following their findings and knowing that our variables are in terms of *rates*, our findings imply a larger number of jobs created by the incumbent firms.

Moreover, we find that the overall postcrisis reallocation rate (a measure of employment turnover) is higher in MSAs with less crisis-period forbearance. The higher job creation and reallocation rate results are complemented by the finding that, post crisis, employment also grows faster in less forbearing regions. The next question is whether these developments translate into higher productivity. Foster et al. (2016) argued that productivity growth in the U.S. is closely linked to high reallocation rates. Thus, our findings imply depressed productivity growth due to forbearance and vice versa. Consistent with this view, we find that postcrisis wage growth, a measure of enhancement in labor productivity, is faster in MSAs with less crisis-period forbearance. The number of patents granted, which can be viewed as a proxy for potential productivity growth, shows the same pattern as wages. Finally, we find similar indications using GDP per capita growth. The effects are economically significant. One standard deviation higher supervisory forbearance implies an 80% of the standard deviation lower MSA-level GDP per capita growth post-crisis. In short, our findings in this section indicate a better productivity growth path for regions with more restructuring in the banking industry and, in contrast, a worse productivity path for regions with more supervisory forbearance on distressed banks.

Our findings manifest the inherent trade-off between short-term pains and long-term gains in managing a financial crisis. In particular, in the case of supervisory forbearance, political incentives are the key determinants of the policies undertaken during the crisis; therefore, the likelihood that incumbent politicians forego long-term benefits (since they do not fully recuperate them) for the sake of less short-term distress is quite high. Our results in Table 8 show that, for every lost establishment (firm) due to lower supervisory forbearance during the crisis there will be 1.04 (1.24) new establishments (firms) that will enter into business after the crisis. Similarly, for every job lost due to lower supervisory forbearance during the crisis, there will be 1.05 new jobs created after the crisis. Therefore, the long-term costs of supervisory forbearance appear to be substantial.

Our results are robust to using a measure of bank restructuring instead of supervisory forbearance, as presented in Table A3. We define bank restructuring in each MSA as the total commercial and industrial loans belonging to the failed banks headquartered in the MSA as a share of MSA's total banking assets. We believe that our findings are largely driven by restructuring (or the lack thereof) of the incumbent banks, rather than entrance of new banks. In fact, Adams and Gramlich (2016) showed that the period from 2009 to 2013 is exceptional in the U.S. banking history in that only 7 new banks were chartered (fewer than 2 per year), whereas in the period from 1990 to 2008, more than 2,000 banks were formed (more than 100 per year). Low interest rates made traditional banking a less attractive business, while the heightened regulatory requirements of the Dodd-Frank Financial Reform Act increased entry barriers (Cochrane, 2014).

4.3. Redistribution of credit by banks under supervisory forbearance across in- and out-of-state branches

As long as banks are under distress and given time by supervisors in hopes of recovery, they might seek an asymmetric approach toward their home-state versus their out-of-state credit policies. In return for supervisory forbearance by the local supervisor, banks might be expected to preserve local jobs. To meet such expectations, banks can redistribute credit from their out-of-state branches to their home-state branches, which can help them in extending credit to borrowers that would otherwise go bankrupt and worsen local unemployment. The literature has documented the home bias effect in credit crunches using Italian data (Presbitero, Udell, and Zazzaro, 2014). The resulting redistribution of credit from afar toward geographically closer borrowers can also happen due to heightened risk aversion during a recession (Granja, Leuz, and Rajan, 2019). While the negative credit shock to banks' out-of-state branch borrowers can affect all types of borrowers similarly, the redistribution of this credit to the home-state borrowers of a distressed bank will more likely go to the weakest borrowers to feed the zombie firms at home. Therefore, in an MSA in which a large share of banking activity comes from branches of out-of-state distressed banks, the negative credit shock is less likely to be cleansing as long as it does not specifically target cutting credit from weaker borrowers.

We test this hypothesis by isolating the supervisory forbearance that spills over to each MSA from out-of-state banks. We collect data on the level of deposits that each bank holds in each of its branches across the country as of June 30, 2006. The assumption here is that the share of deposits correlates highly with the credit activity of the branch in each locality. The MSA-level out-of-state supervisory forbearance is then defined as the deposit-weighted sum of bank-level supervisory forbearance of out-of-state banks that have one or more branches in that specific MSA, averaged over the period from 2007 to 2010. Next, we run similar regressions as presented in Equations (1) and (2) and only replace this new variable with our previous variable, Forbearance, except that we do not need to instrument this new variable. The reason that out-of-state forbearance does not need instrumentation is that it is exogenous to the receiving state's supervisors' expectation of future economic activity and is simply imported into the state because of the distress of banks located in other states. Our results, presented in Tables 9 and 10 show that, in MSAs with high exposure to out-of-state banks under supervisory forbearance, the rates of establishment and firm exit, as well as job loss, during the crisis are higher than in MSAs with less exposure to out-of-state forbearance. During the postcrisis period, MSAs that had been more exposed to out-of-state forbearance exhibit some positive effects on job creation and reallocation rates, but these effects do not seem to improve productivity. Most of the other proxies for productivity growth exhibit a negative sign while being statistically insignificant. These findings suggest that banks that are under supervisory forbearance can redistribute credit to their home-state branches from out-of-state branches, consistent with the home bias hypothesis. It also suggests that the higher exit rates created by the decline of lending in out-of-state MSAs do not cleanse since they are not necessarily driven by cutting credit to the weakest borrowers.

5. Supervisory forbearance

The literature provides evidence that banks are treated differently by their corresponding supervisors, depending on whether they are chartered at the state or federal level. Agarwal et al. (2010) show that state supervisors might be more concerned about the local economy and hence treat banks less stringently in case of trouble. Furthermore, local competition might affect the treatment of troubled banks. Kang, Lowery, and Wardlaw (2014) argue that, in neighborhoods with scarce banking services, supervisors might be more willing to postpone bank closures. Supervisory forbearance can also be driven by local political factors that are rather stable over time, which in turn could imply that supervisory forbearance is persistent over time within a neighborhood, hence making some neighborhoods always more forbearing than others. Finally, Ashcraft (2005) show that the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA) allows supervisors to use the equity capital of other subsidiaries with the same holdings to pay for the losses of other failing subsidiaries. This relatively lower supervisory cost of closing subsidiaries than independent banks hence must be reflected in our supervisory forbearance measure. In this section, we test these properties of the supervisory forbearance using our estimated measure and confirm that it exhibits all of the known properties.

Banks in the U.S. are chartered either at the federal or state level. Federally chartered banks are supervised by federal supervisors, while state-chartered banks are examined intermittently by both national and state supervisors. Agarwal et al. (2010) find that there are inconsistencies in the stringency of the supervision by these two types of supervisors. In particular, they provide evidence that state supervisors more heavily weigh local economic factors and hence appear to be more lenient on distressed banks. We find similar results using our measure of forbearance. Figure 6 plots the distribution of supervisory forbearance across the two types of bank charters. We observe that the distribution of forbearance on state-chartered banks exhibits a longer right tail and has greater mass, whereas in the low and middle parts of the distribution, federal-chartered banks have greater mass. We confirm these findings formally in Table 11. The results indicate that federally chartered banks appear to be healthier in terms of equity, profitability, and efficiency, while at the same time, they seem to benefit less from supervisory forbearance.

We also find some evidence consistent with the findings in Kang et al. (2014). The results in Table 12 show that, in MSAs where there are fewer banks per capita, supervisors exert more forbearance. The reason is that the closure of one bank can marginally be more detrimental to providing banking services in the region. Conversely, in regions with more banks, it is easier for the supervisor to find a bank that is willing to acquire the assets of the failing bank; therefore, they hesitate less in closing banks.

Forbearance at the state level is highly persistent. Figure 7 shows that states with the highest level of forbearance in 2007 and 2008 stay highly forbearing for the rest of the sample period and vice versa. Furthermore, we formally test for the persistency of forbearance at the state level. Our between-state comparison of average state-level forbearance in Panel A of Table 13 indicates that, if in the last year a state was more forbearing than another one by one unit, it is also more forbearing by approximately one unit in this year. Moreover, the state fixed effects estimations also indicate that more forbearing states tend to become more so and vice versa. Moreover, if we rank states each year based on their level of forbearance, we can show that their rankings are also highly persistent. *Between* regressions show that, if a state was ranked one level higher last year relative to another state, it will be ranked by one level higher this year too. Finally, the fixed effect estimates show that there is a divergence in state-level forbearance; i.e., more forbearing states become more so and less forbearing states less so.

Finally, the cross-guarantee provision of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA) reduces the supervisor's expenses of closing banks and hence facilitates the restructuring of subsidiary banks relative to independent banks (Ashcraft, 2005). It further can result in closure of healthy subsidiaries with equity decreasing to less than the minimum requirements in case they must cover another subsidiary's losses in case of distress. We show that our supervisory forbearance also reflects this characteristic. We construct a measure of the relative share of subsidiary banks in an MSA relative to the total size of the banking sector, and we show that forbearance correlates positively with this measure, as presented in Table 14. The estimates indicate that supervisory forbearance is lower in regions where subsidiaries are more prevalent; therefore, banking restructuring in these regions happened more extensively during the crisis.

One could use the share of subsidiary banks in a region as an alternative IV in our regression models. Assuming that the relative presence of subsidiaries, ceteris paribus, does not impact real economic activity, finding that it affects supervisory forbearance makes it an IV candidate. In unreported results, we find that the first-stage results are valid, while the second-stage results, while having the correct sign, are not statistically significant.

6. Robustness

6.1. Mean reversion

One could argue that MSAs that are hit harder by the crisis and lose a larger proportion of their productive capacity have higher marginal productivity of capital and labor and hence will grow faster postcrisis. A similar argument is that such regions must catch up; hence, they will grow faster. To examine this hypothesis, we test for mean reversion in our variables of interest, using the following model:

$$\bar{y}_i{}^{post-crisis} = \alpha + \beta \bar{y}_i{}^{crisis} + \varepsilon_i \qquad (4)$$

where y_i represents the outcome variables under study, such as establishment entry rate, job creation rate, employment growth, wage growth, patent growth, and finally GDP per capita growth. The mean reversion hypothesis predicts a negative β. The results of our estimations of this model are presented in Table A4. For none of the variables do we find a significantly negative estimate for the mean reversion parameter, indicating that, for example, it is not true that MSAs with the largest loss in employment during the crisis generally experience faster employment growth after the crisis. It further indicates that, apart from the forbearance channel, there might exist other channels that undermine the overall recovery of hard-hit regions.

Finally, as we observe in Figure 7, supervisory forbearance is not mean reverting either. This outcome is also shown in our results in Table 13. That is, highly forbearing states do not become least forbearing and vice versa. Therefore, the results cannot be attributed to mean reversion or different timing of supervisory forbearance.

6.2. Recapitalization

Bank bailouts are widespread in times of high stress when regulators identify distressed banks and recapitalize them under certain restrictive conditions with the aim of releasing these restrictions and exiting as soon as the bank returns to a healthy state. Berger, Nistor, Ongena, Tsyplakov (2020) conceptualize this process of *Catch, Restrict, and Release* and provide empirical evidence of its ramifications. Recapitalization of distressed banks can eliminate the friction arising from legacy assets by allowing the distressed banks to realize losses and cut funding to their unprofitable borrowers (Giannetti and Simonov, 2014 and Homar and Van Wijnbergen, 2017). During the financial crisis, the U.S. government implements a large-scale bank recapitalization program, known as the Troubled Asset Relief Program (TARP). We focus on the Capital Purchase Program (CPP), which matters the most for banks. CPP is the main component of TARP and is a range of bank preferred stock and equity warrant purchase programs aimed at stabilizing the financial system starting in October 2008 (Berger and Roman, 2017). While the first recipients of CPP funds are involuntary and do not undergo a formal evaluation process, subsequent recipients have to apply and undergo an evaluation process that would assess the health and viability of the bank. We use the information on recipients and disbursements from October 2008 to December 2010 published by U.S. Department of the Treasury. If this recapitalization helps distressed banks to stay afloat, while at the same time enabling them to realize losses from credit to nonviable borrowers, we would expect to observe a cleansing effect in MSAs that received more TARP funds to recapitalize banks. Hence, in these MSAs we would observe more establishment exits and job destruction during the crisis and greater productivity growth subsequently. To test this idea, we first calculate the total amount of funds received by all banks headquartered in each state as a share of the size of the banking sector in the state. We then use this variable as our main independent variable and run similar regression models as in our main analysis. The results in Table A5 show that regions that received more TARP money in fact experienced fewer establishment exits and job destructions during the crisis, consistent with the findings of Berger and Roman (2017). This finding is however in sharp contrast to the idea that recapitalization of distressed banks helps them to realize losses and consequently favors the process of restructuring in the real sector. Furthermore, if we control for TARP in our results, they do not change. An alternative interpretation of TARP in our setting is to view it as one form of supervisory forbearance, rather than a solution to it. TARP certainly saves some distressed banks (supervisory forbearance), but it does not lead to productivity-enhancing cleansing forces in the real sector. Consistent with this view, we in fact find that postcrisis productivity is negatively affected by exposure to TARP funds, as presented in Table A6.

6.3. Bank restructuring

We check the robustness of our results to an alternative way of measuring supervisory forbearance. We proxy the extent of restructuring of banking assets in a region by constructing a variable called *Bank Restructuring,* which equals the share of commercial and industrial loans of failed banks in a region relative to the total banking sector's outstanding commercial and industrial loans. As discussed earlier, the FDIC restructures the assets of failed banks and either helps find an acquirer or sells them at auction. Both of these channels entail a substantial haircut, charge-offs, and revaluation and, therefore, overall restructuring. The summary statistics in Table 1 indicate that, during the crisis, failed banks accounted for 0.0 to 2.5% of all of the outstanding commercial and industrial loans in their MSAs. We use this measure and re-estimate our main results. The results are presented in Tables A2 and A3 and indicate that more banking restructuring during the crisis results in more concurrent restructuring in the real economy, followed by better productivity growth after the crisis. Otherwise, to force banks to recognize their zombie borrowers and stop refinancing them ex post requires strict policies. Bonfim, Cerqueiro, Degryse, and Ongena (2020) showed that *unconventional supervision* in the form of on-site, detailed inspection of banks' loan books, performed jointly by the supervisor and external auditors, is successful in forcing banks to recognize losses and reduce refinancing zombie firms.

6.4. Nonlinear effects of bank restructuring

The linear specifications that we used so far tell us that bank restructuring, on average, improves the efficiency of financial intermediation in a linear sense. However, we can improve the estimation in ways that help us to clarify the likely nonlinear effects of bank restructuring on real outcomes. After all, it is natural to believe that *too much* restructuring in the banking sector can have detrimental long-term effects on economic growth by impairing the process of financial intermediation. It is important to know whether there is an optimal level of restructuring, less than which there are marginal gains from more restructuring and greater than which there are marginal losses.

To analyze such possible nonlinear effects, we rely on a piecewise linear form of regression equation (2). We estimate the piecewise linear model using terciles of instrumented *Bank Restructuring*, and we plot the marginal effects of Bank Restructuring on our main outcome variables during the postcrisis period.

The marginal effect plots are presented in Figure 8. These plots imply an inverse-U shape for the marginal effect of bank restructuring on real outcomes in the longer run. In the lowest tercile, the effect of restructuring on all measures of postcrisis productivity growth is close to zero. The estimate for the middle tercile implies that increasing the intensity of bank restructuring, from the first tercile to the second tercile, contributes positively and significantly to postcrisis productivity growth. Finally, moving beyond the mid-range of restructuring reduces the positive outcomes implied the negative marginal effect estimated for the top tercile. This outcome can be interpreted as a negative consequence of *too much* restructuring. This finding complements our main results by showing that, although on average there are gains to make from bank restructuring, too much of it can be detrimental.

7. Conclusion

We show in this paper that restructuring of distressed banks during a crisis has positive long-term effects on productivity. During crises, officials' first priority is to contain the systemic implications of bank defaults. However, not all banks are systemically important. Resolving the impaired assets of such banks eliminates the problem of zombie lending and hence cleanses the market for loans to better borrowers and new entrants. Given the emergence of a banking crisis, keeping distressed banks alive, despite being less destructive for the crisis period, does not seem to be beneficial for long-term productivity growth.

Finally, our paper emphasizes the importance of long-term productivity considerations in the design of optimal bank resolution mechanisms. Our results indicate that the challenge is the inherent trade-off between the short- and long-term effects, which can exacerbate the political economy of the problem. For instance, in the short term, bailouts can look appealing to government officials, especially if the long-term costs bear less weight in their decision-making processes.

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Figures

Figure 1- Bank failures

This figure shows the annual number of bank failures in the United States. The data is collected from the FDIC list of bank failures.

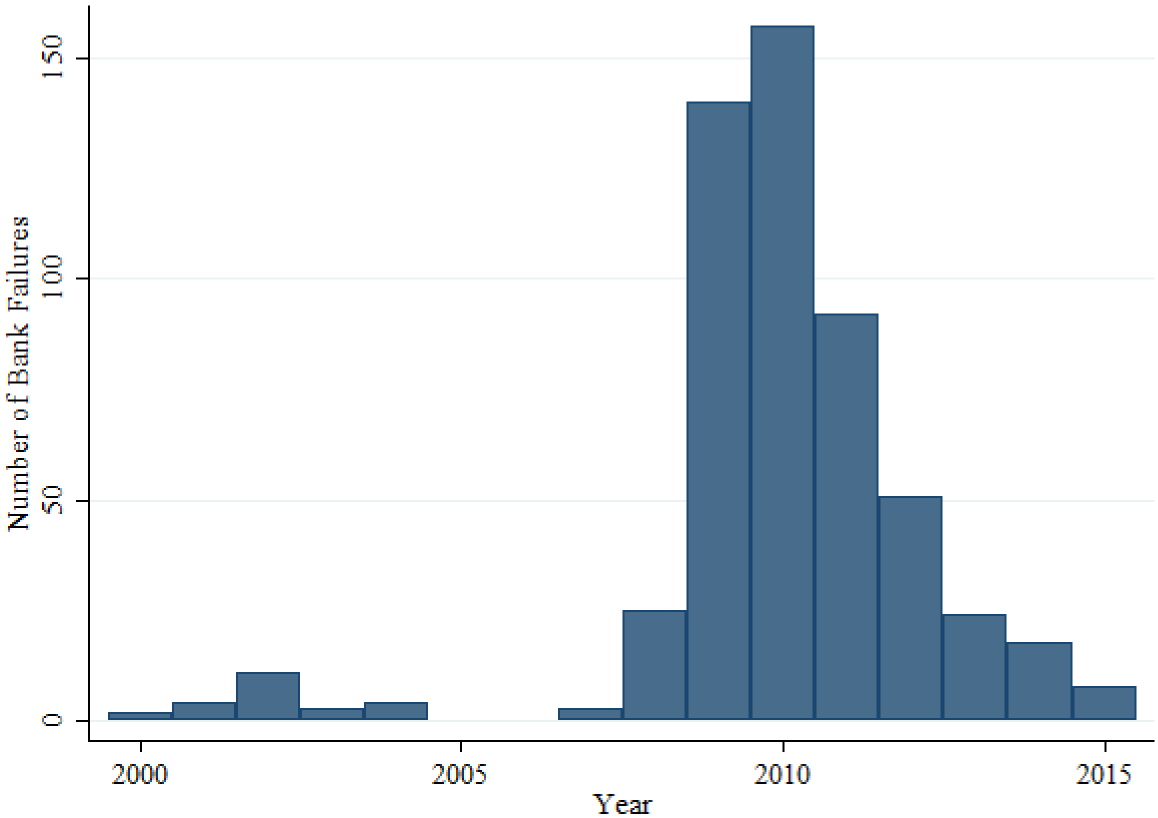


Figure 2- Bank failures

This figure shows the degree of connectedness between Washington, D.C., and counties in the contiguous United States measured by the relative probability of friendship links between Washington, D.C., and the destination county. This measure was constructed by Bailey, Cao, Kuchler, and Stroebel (2018) and is also employed in Rehbein and Rother (2020). This figure was kindly provided to us by Simon Rother.

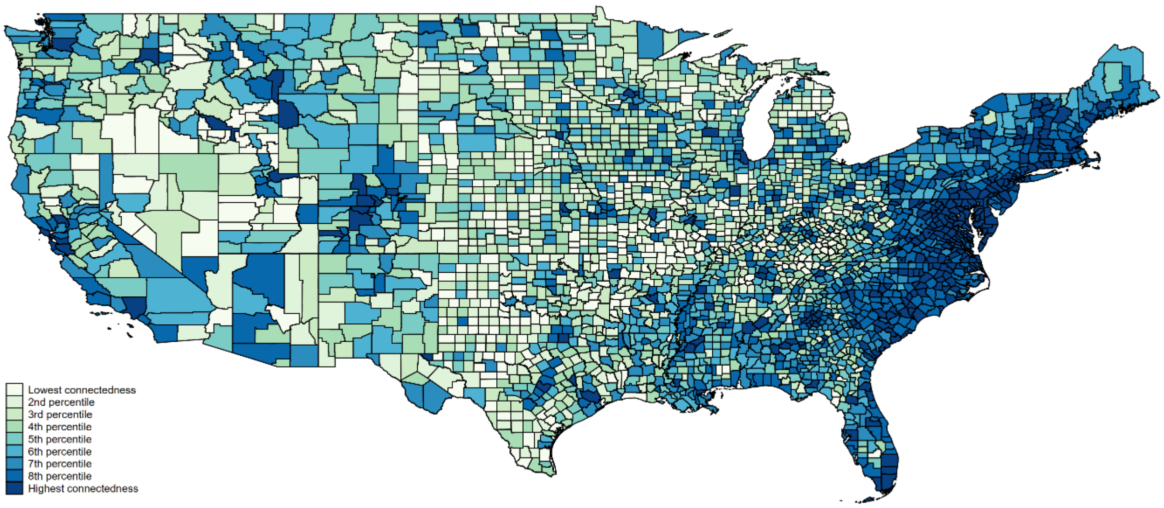


Figure 3- MSA-level Supervisory forbearance

This figure shows the distribution of our estimated measure of supervisory forbearance on banks that are headquartered in the same state as the MSA, using a linear binary model. The data are the MSA-level average of bank-level estimates during 2007-2010.

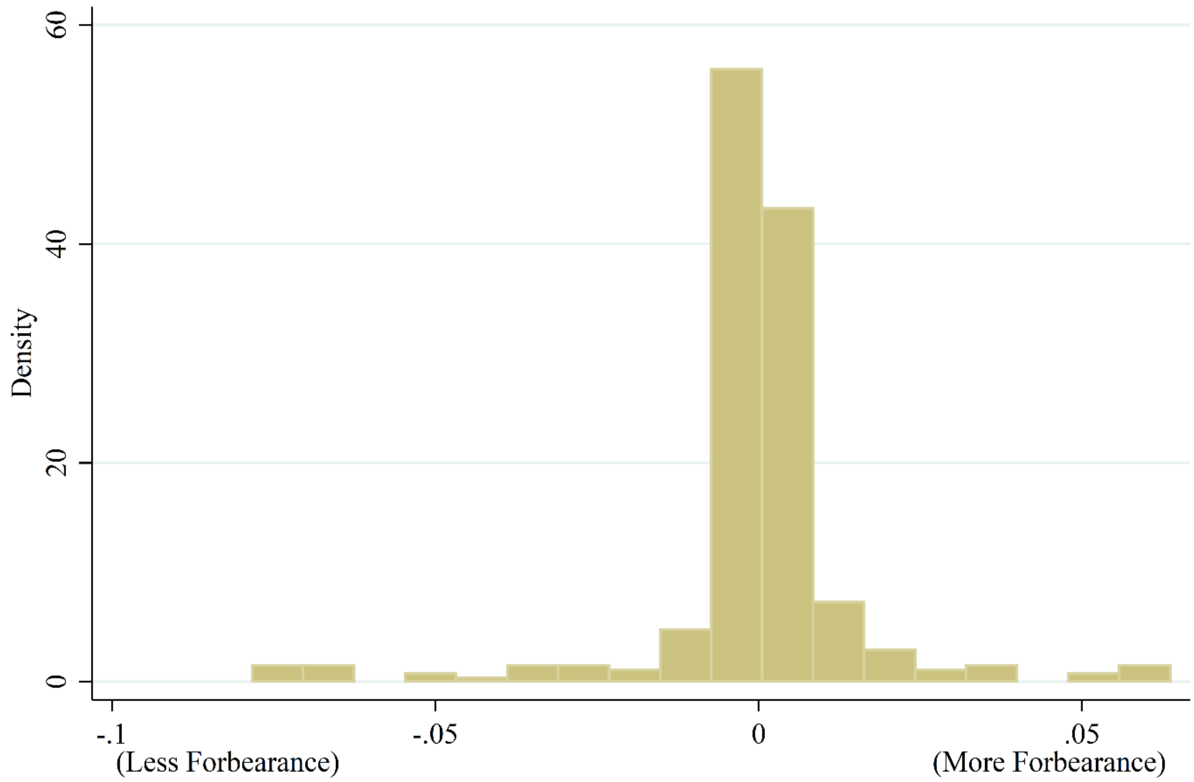
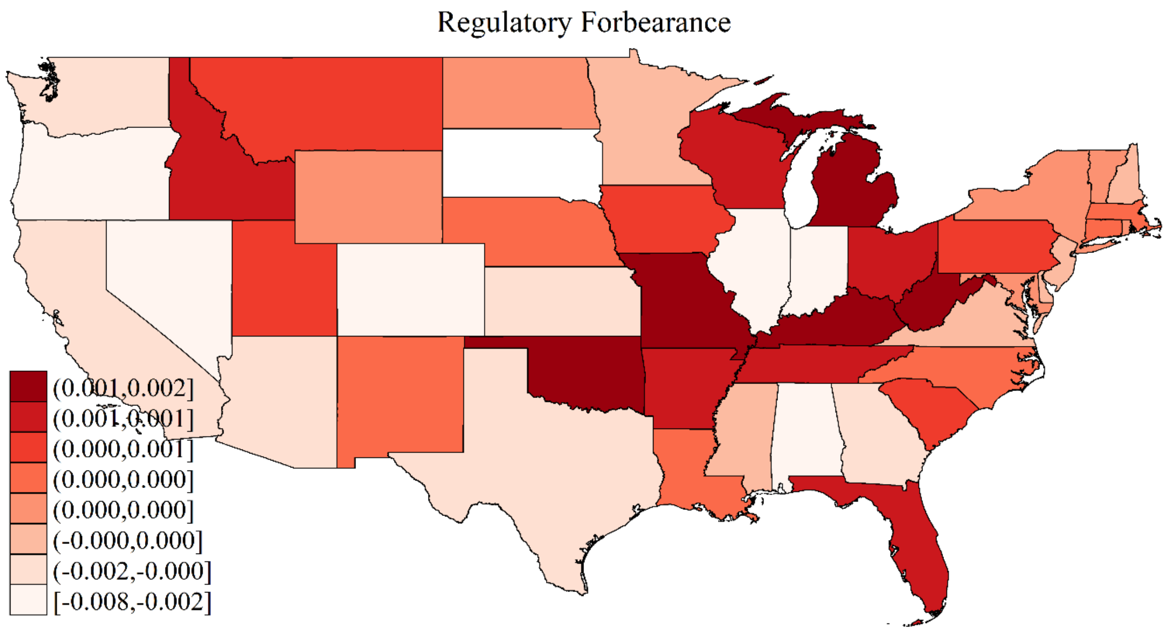


Figure 4- Geographical Distribution of Supervisory forbearance and Establishment Exits

The figure on the top shows the geographical distribution of supervisory forbearance in MSAs where banks are headquartered. We take the average of our MSA-level measure to construct the state-level variable. The figure in the bottom shows the average rate of establishment exits for each U.S. state during the years from 2007 to 2010.



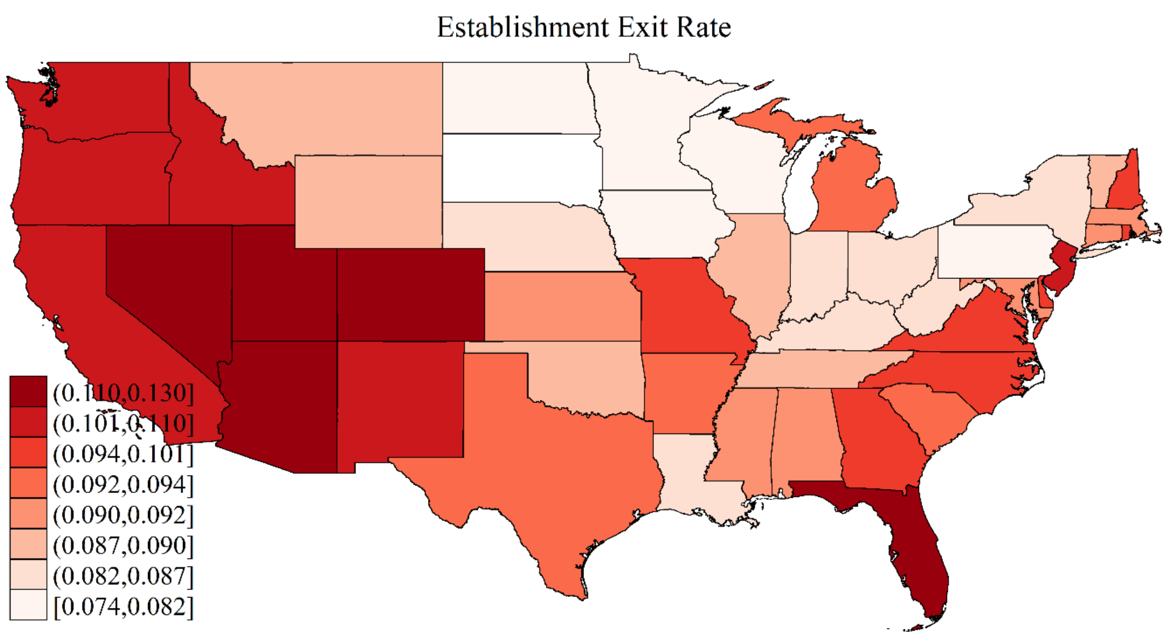


Figure 5- Non-performing Assets and Supervisory forbearance

This figure plots the average MSA-level banks' non-performing assets across quartiles of average supervisory forbearance during the crisis period.

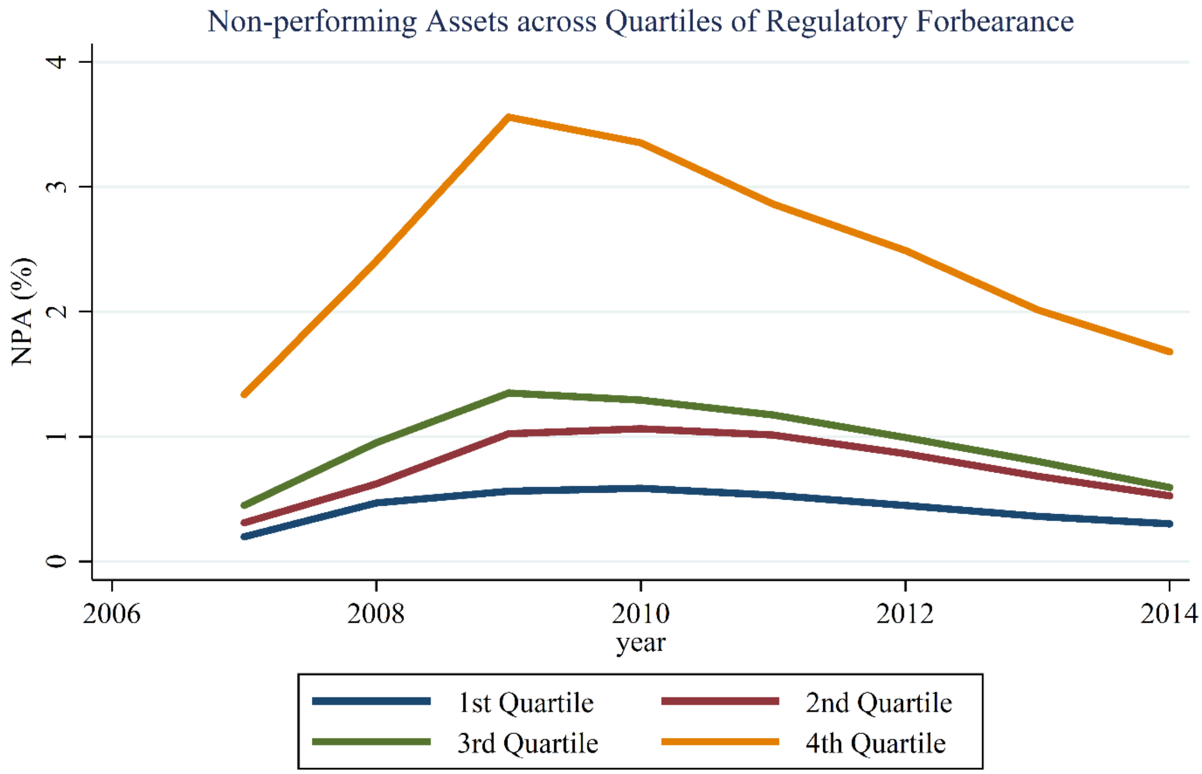


Figure 6- Supervisory forbearance on State- versus Federally Chartered Banks

This figure plots the probability distribution function of estimated supervisory forbearance at the individual bank level separately for state-chartered and federally chartered banks. We use a Gaussian kernel function with a bandwidth equal to 0.005.

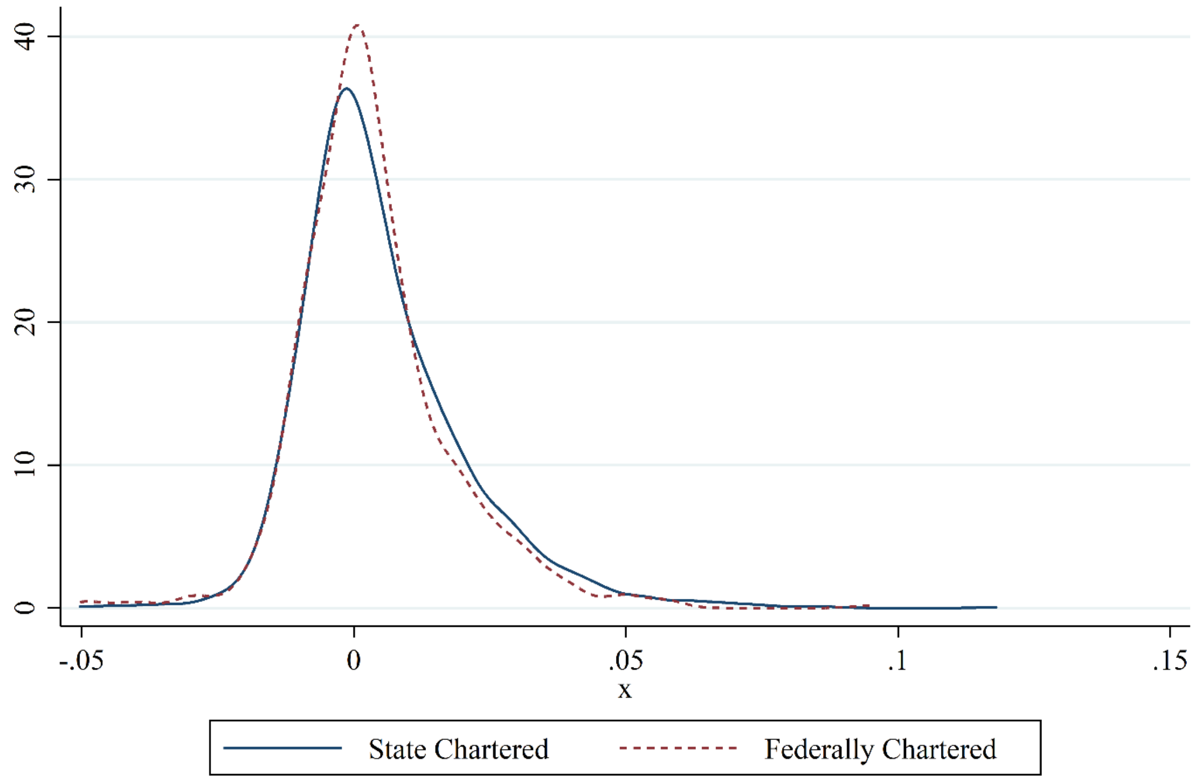


Figure 7- Relative Persistence of Supervisory forbearance at the State Level

This figure plots the average state-level supervisory forbearance separately for four portfolios of states constructed based on the quartiles of state-level supervisory forbearance averaged in 2007 and 2008. We fix the states in each portfolio, follow them through time, and plot the annual average forbearance in each year.

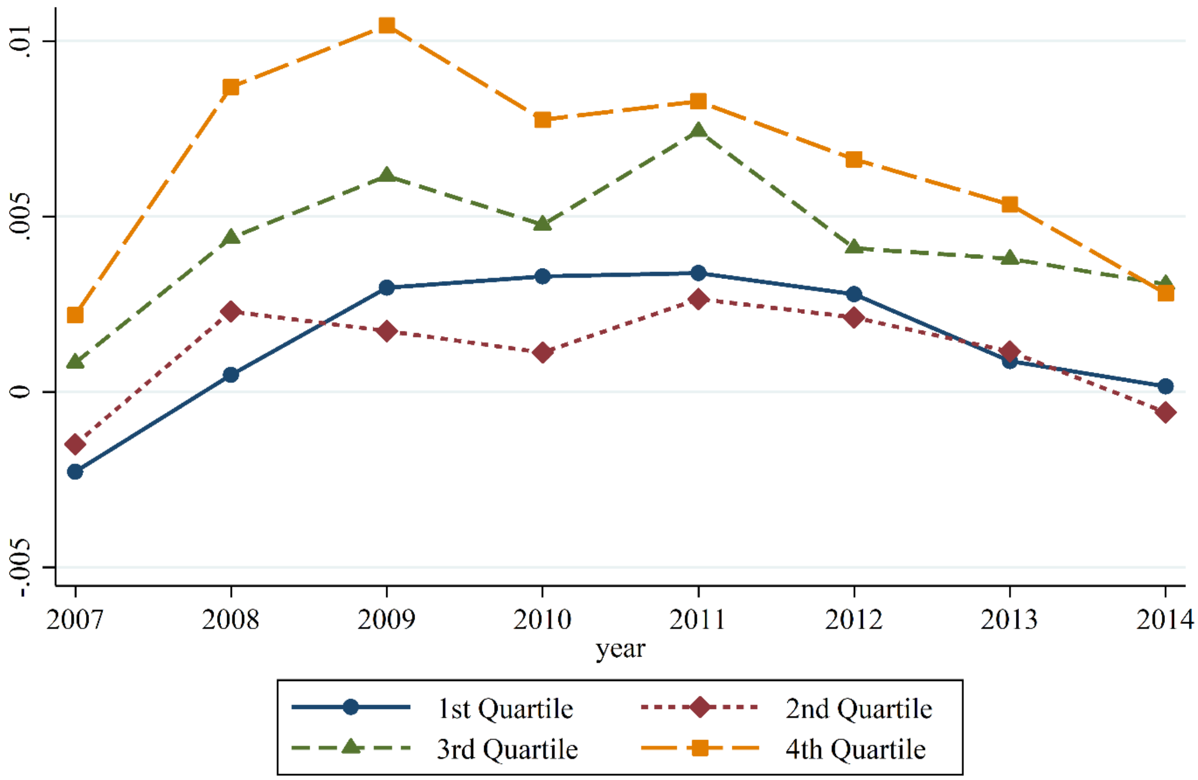
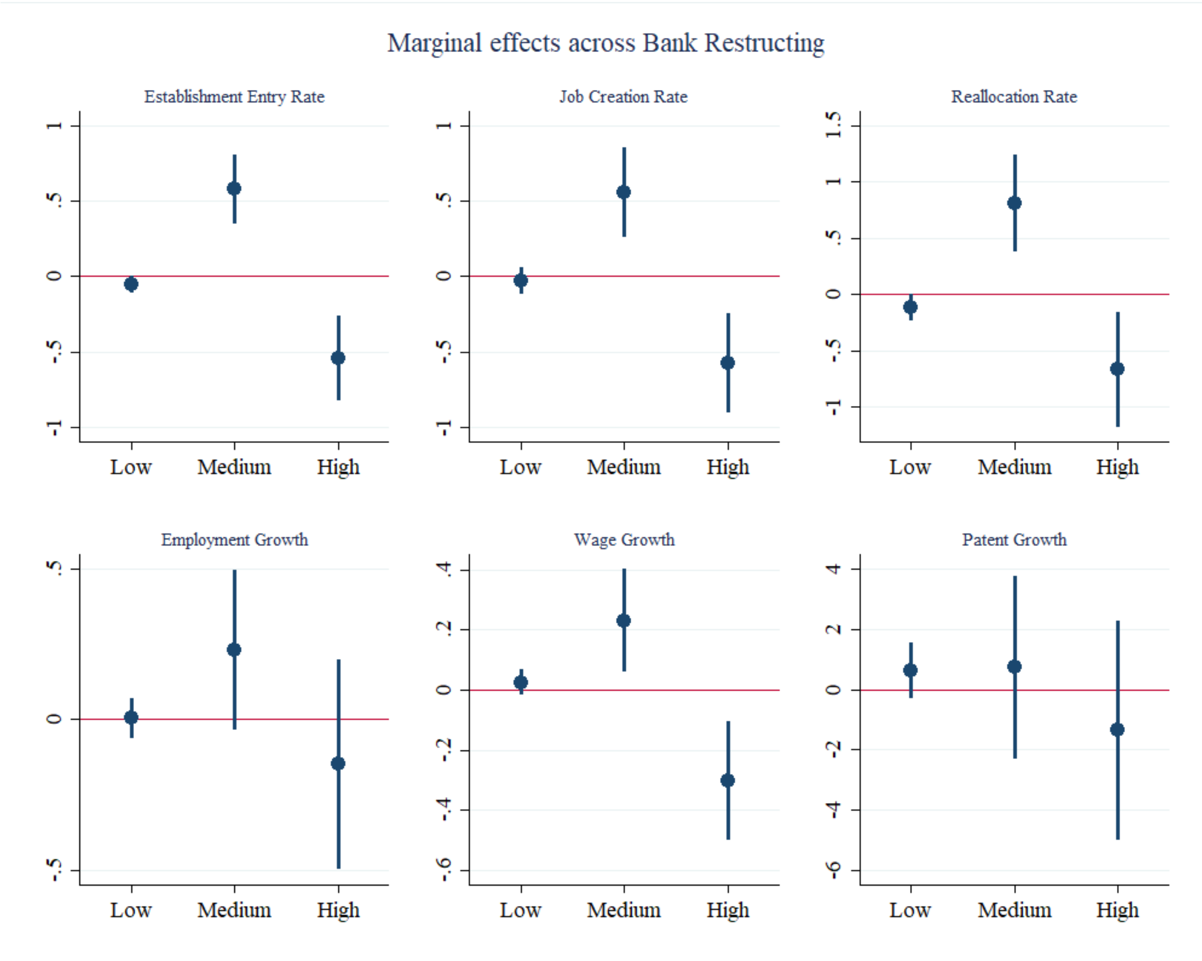


Figure 8- Non-linear Effects of Bank Restructuring

This figure presents marginal effects of Bank Restructuring on the outcome variables, in a piecewise linear framework. The models are estimated across three linear splines of the instrumented *Bank Restructuring* with knots at the terciles of its distribution, creating the three intervals denoted by Low, Medium, and High on the x-axis, respectively. The coefficient estimates represent marginal effects, i.e., the change in the slope from the preceding interval.



Tables

Table 1- Summary Statistics of the MSA-level Sample

This table presents the summary statistics of the variables in the MSA-level cross sectional sample as defined in Section 2.

	Obs.	Mean	Std. Dev.	Min.	Max.
Independent variables					
Forbearance	262	-0.0013	0.0291	-0.2153	0.0937
Bank Restructuring (%)	262	0.0778	0.3260	0.0000	2.5126
Crisis period destruction variables					
Establishment Exit Rate	262	0.0961	0.0155	0.0653	0.1493
Firm Exit Rate	262	0.0752	0.0138	0.0479	0.1244
Job Destruction Rate	262	0.1427	0.0201	0.0843	0.2420
Job Destruction Rate by Deaths	262	0.0410	0.0093	0.0190	0.1128
Job Destruction Rate by Continuers	262	0.1017	0.0128	0.0614	0.1465
Post-crisis period productivity variables					
Establishment Entry Rate	243	0.0925	0.0159	0.0643	0.1483
Firm Entry Rate	243	0.0679	0.0158	0.0381	0.1203
Job Creation Rate	243	0.1316	0.0187	0.0813	0.2167
Job Creation Rate by Births	243	0.0424	0.0107	0.0207	0.0843
Job Creation Rate by Continuers	243	0.0892	0.0115	0.0576	0.1432
Reallocation Rate	243	0.2233	0.0267	0.1507	0.3093
Employment Growth	243	0.0337	0.0361	-0.1271	0.1834
Wage Growth	243	0.0641	0.0306	-0.0321	0.2560
Patent Growth	242	0.3855	0.6920	-0.8571	5.3333
PCGDP Growth	243	0.0164	0.0458	-0.1069	0.1704
Control variables					
House Price Growth during Crisis	262	-0.0247	0.0668	-0.2370	0.1412
Pre-crisis Bank-to-GDP Ratio	262	0.4242	1.0732	0.0080	12.2624
Pre-crisis GDP Growth	262	0.0568	0.0204	0.0122	0.1488
Instrumental variable					
Distance (km)	262	1510.0	1188.6	0.0000	3932.0
Log(Distance + 1)	262	6.9505	0.9956	0.0000	8.2772

Table 2- Summary Statistics of the Bank-year-level Sample

This table presents the summary statistics of the variables in the bank-year panel used to estimate the measure of the bank failure model in equation (3).

	Obs.	Mean	Std. Dev.	Min.	Max.
failed	45,581	0.007	0.081	0.000	1.000
equity ratio	45,581	10.94	5.199	2.990	94.44
loan ratio	45,581	66.02	15.81	0.000	94.37
real estate	45,581	73.92	18.63	0.000	100.0
C&I	45,581	14.90	11.38	0.000	70.21
other real estate	45,581	0.514	1.125	0.000	8.250
NPA	45,581	1.965	3.112	0.000	20.44
ROA	45,581	0.398	2.273	-17.420	17.190
liquidity	45,581	24.95	18.93	1.970	265.5
efficiency	45,581	75.54	29.81	12.92	267.1
assets	45,581	1.318	6.694	0.005	72.26
age	45,581	59.65	47.60	1.000	230.0
GDPG	45,581	0.039	0.035	-0.082	0.149

Table 3- Models of Bank Failure

This table presents the results of the linear and logistic binary regression models. The residuals from this model are used to calculate the *Forbearance* measure. The variables are chosen as in Wheelock and Wilson (2000). *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Failure models	
	Linear	Logistic
Equity ratio	-0.0012***	-0.7549***
	(0.000)	(0.045)
Loan ratio	0.0002***	0.0094
	(0.000)	(0.011)
Real estate	-0.0002***	0.0207
	(0.000)	(0.014)
C&I	-0.0002***	0.0278
	(0.000)	(0.017)
Other real estate	-0.0048***	-0.1610***
	(0.001)	(0.047)
NPA	0.0076***	0.1661***
	(0.000)	(0.021)
ROA	-0.0042***	-0.0872***
	(0.000)	(0.016)
Liquidity	0.0003***	-0.0434***
	(0.000)	(0.013)
Efficiency	0.0002***	0.0069***
	(0.000)	(0.001)
Ln(assets)	0.0016***	0.1165
	(0.000)	(0.075)
Ln(age)	-0.0006*	-0.0321
	(0.000)	(0.079)
L1.GDPG	0.0211*	-7.9228***
	(0.011)	(2.188)
GDPG	0.0705***	7.8188***
	(0.011)	(2.427)
Constant	-0.0215***	-3.7171*
	(0.007)	(2.012)
Industry shares	Yes	Yes
Adj. R-squared	0.119	
Pseudo R-squared		0.605
Observations	45,581	45,581

Table 4- First-stage Regression Results

This table presents the results of the first-stage regression in our two-stage least square instrumental variable model. The data is the cross-sectional MSA-level sample. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Forbearance	Bank Restructuring
Log(Distance + 1)	-0.0031***	0.0554***
	(0.001)	(0.019)
House Price Growth during Crisis	0.0189	-0.6943
	(0.042)	(0.437)
Pre-crisis Bank-to-GDP Ratio	0.0035**	0.0057
	(0.002)	(0.012)
Pre-crisis GDP Growth	-0.0073	0.6181
	(0.060)	(0.793)
Constant	0.0194**	-0.3627***
	(0.008)	(0.127)
Observations	262	262
F-test of excluded instruments	7.00	8.72
Prob > F	0.008	0.003

Table 5- Supervisory Forbearance and Real Outcomes during the Crisis

This table presents the results of the regression model presented in equation (1) using a two-stage least squared (2SLS) estimator. The data is the cross-sectional MSA-level sample. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Establishment Exit Rate	Firm Exit Rate	Job Destruction Rate	Job Destruction Rate by Deaths	Job Destruction Rate by Continuers
Forbearance	-0.9952**	-0.7370**	-1.0323**	-0.5119**	-0.5233*
	(0.461)	(0.353)	(0.506)	(0.246)	(0.284)
House Price Growth during Crisis	-0.0855*	-0.0756**	-0.1064**	-0.0415*	-0.0651**
	(0.046)	(0.034)	(0.048)	(0.023)	(0.026)
Pre-crisis Bank-to-GDP Ratio	0.0043	0.0036*	0.0042	0.0022	0.0021
	(0.003)	(0.002)	(0.003)	(0.001)	(0.001)
Pre-crisis GDP Growth	0.2128***	0.2074***	0.2701***	0.0991**	0.1712***
	(0.081)	(0.064)	(0.093)	(0.046)	(0.052)
Anderson-Rubin P-values	0.000	0.000	0.001	0.000	0.009
Weak-IV Robust 95% Confidence interval	(-0.98,-0.34)	(-1.0,-0.23)	(-1.0,-0.28)	(-1.0,-0.15)	(-1.0,-0.07)
Observations	262	262	262	262	262

Table 6- Supervisory Forbearance and Post-Crisis Bank Health

This table presents the estimates of the relation between crisis-period supervisory forbearance and banks' quality after the crisis. *Highly Forbearing* is a dummy variable that equals one for banks that are in MSAs in the fourth quartile of supervisory forbearance and zero otherwise. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Equity ratio	NPA	ROA
Highly Forbearing	-0.5032**	0.7511***	-0.0631
	(0.207)	(0.070)	(0.040)
ln(Assets)	-1.8815***	-0.0853***	0.0589***
	(0.117)	(0.017)	(0.015)
Year Fixed Effects	Yes	Yes	Yes
Adj. R-squared	0.057	0.045	0.015
Observations	13939	13950	13935

Table 7- Supervisory Forbearance and Real Outcomes after the Crisis

This table presents the results of the regression model presented in equation (2) using a two-stage least squared (2SLS) estimator. The data is the cross-sectional MSA-level sample. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Establishment Entry Rate	Firm Entry Rate	Job Creation Rate	Job Creation Rate by Births	Job Creation Rate by Continuers	Reallocation Rate	Employment Growth	Wage Growth	Patent Growth	GDP per capita Growth
Forbearance	-1.243**	-1.094**	-1.243*	-0.610*	-0.631*	-1.620*	-0.953**	-0.789**	-8.481*	-0.731**
	(0.612)	(0.549)	(0.670)	(0.312)	(0.378)	(0.977)	(0.459)	(0.354)	(4.598)	(0.358)
House Price Growth during Crisis	-0.089**	-0.088***	-0.087**	-0.043**	-0.043**	-0.115**	0.040	0.009	-0.211	-0.053**
	(0.035)	(0.032)	(0.036)	(0.017)	(0.021)	(0.046)	(0.028)	(0.023)	(0.194)	(0.022)
Pre-crisis Bank-to-GDP Ratio	0.007**	0.007**	0.007*	0.003*	0.004**	0.009*	0.005	0.004	0.044*	0.004*
	(0.004)	(0.003)	(0.004)	(0.002)	(0.002)	(0.006)	(0.003)	(0.002)	(0.025)	(0.002)
Pre-crisis GDP Growth	0.275***	0.279***	0.273***	0.175***	0.098	0.365***	0.093	0.016	-0.331	-0.237***
	(0.089)	(0.083)	(0.101)	(0.047)	(0.068)	(0.123)	(0.075)	(0.059)	(0.630)	(0.058)
Anderson-Rubin P-values	0.007	0.006	0.023	0.012	0.054	0.053	0.005	0.001	0.019	0.006
Weak-IV Robust 95% Confidence interval	(-1.0,-0.23)	(-1.0,-.20)	(-1.0,-0.03)	(-1.0,-0.07)	(-1.0,0.12)	(-1.0,0.28)	(-1.0,-0.20)	(-1.0,-0.24)	(-1.0,-0.42)	(-1.0, -0.14)
Observations	245	245	245	245	245	245	245	239	244	246

Table 8- Trade-off between the Short and the Long Run

This table presents the results of a trade-off analysis. In columns 1 and 2, we regress average post-crisis establishment entry rate on the average crisis-period rate of establishment exit. We do the similar in columns 3 and 4 for average firm entry rate and in columns 5 and 6 for average job creation rate. The data is the cross-sectional MSA-level sample. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively

	Post-crisis					
	Establishment Entry Rate		Firm Entry Rate		Job Creation Rate	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Establishment Exit Rate (Crisis)	0.862***	1.043***				
	(0.051)	(0.190)				
Firm Exit Rate (Crisis)			0.908***	1.235***		
			(0.060)	(0.258)		
Job Destruction Rate (Crisis)					0.595***	1.046***
					(0.062)	(0.277)
House Price Growth during Crisis	0.030***	0.050**	0.020**	0.050*	0.019	0.077*
	(0.008)	(0.022)	(0.008)	(0.025)	(0.013)	(0.040)
Pre-crisis Bank-to-GDP Ratio	0.001**	0.000	0.001**	0.000	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pre-crisis GDP Growth	0.108***	0.06	0.109***	0.029	0.132**	-0.014
	(0.030)	(0.057)	(0.033)	(0.068)	(0.053)	(0.109)
Adj. R-squared	0.750	0.730	0.713	0.661	0.545	0.362
Observations	262	262	262	262	262	262

Table 9- Out-of-state Forbearance and Real Outcomes during the Crisis

This table presents the results of the ordinary least squared regression model presented in equation (1) using out-of-state supervisory forbearance as the variable of interest. Out-of-state supervisory forbearance is the exposure of each MSA to supervisory forbearance on banks that are headquartered in other states but have branches in each particular MSA. The data is the cross-sectional MSA-level sample. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Establishment Exit Rate	Firm Exit Rate	Job Destruction Rate	Job Destruction Rate by Deaths	Job Destruction Rate by Continuers
Out-of-state Forbearance	0.0918*	0.0963**	0.1135***	0.0590***	0.0528**
	(0.051)	(0.045)	(0.043)	(0.022)	(0.024)
House Price Growth during Crisis	-0.1055***	-0.0899***	-0.1268***	-0.0515***	-0.0756***
	(0.015)	(0.013)	(0.019)	(0.010)	(0.012)
Pre-crisis Bank-to-GDP Ratio	-0.0011	-0.001	-0.0018*	-0.0009	-0.0009
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Pre-crisis GDP Growth	0.2662***	0.2475***	0.3259***	0.1268***	0.1994***
	(0.055)	(0.046)	(0.066)	(0.033)	(0.039)
Adj. R-squared	0.4	0.398	0.347	0.26	0.308
Observations	262	262	262	262	262

Table 10- Out-of-state Supervisory forbearance and Real Outcomes after the Crisis

This table presents the results of the ordinary least squared regression model presented in equation (2) using out-of-state supervisory forbearance as the variable of interest. Out-of-state supervisory forbearance is the exposure of each MSA to supervisory forbearance on banks that are headquartered in other states but have branches in each particular MSA. The data is the cross-sectional MSA-level sample. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Establishment Entry Rate	Firm Entry Rate	Job Creation Rate	Job Creation Rate by Births	Job Creation Rate by Continuers	Reallocation Rate	Employment Growth	Wage Growth	Patent Growth	GDP per capita Growth
Out-of-state Forbearance	0.081	0.071	0.095*	0.036	0.058*	0.231***	-0.016	-0.006	-1.594	-0.008
	(0.067)	(0.066)	(0.052)	(0.023)	(0.034)	(0.064)	(0.034)	(0.025)	(1.770)	(0.028)
House Price Growth during Crisis	-0.065***	-0.067***	-0.063***	-0.031***	-0.031**	-0.081***	-0.023	0.023**	-0.069	-0.040***
	(0.015)	(0.015)	(0.016)	(0.008)	(0.012)	(0.022)	(0.015)	(0.010)	(0.135)	(0.014)
Pre-crisis Bank-to-GDP Ratio	0.000	0.000	0.000	0.000	0.000	-0.003*	0.001	0.000	0.034	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.039)	(0.001)
Pre-crisis GDP Growth	0.314***	0.314***	0.312***	0.194***	0.118**	0.419***	0.126**	0.048	-0.208	-0.215***
	(0.054)	(0.053)	(0.063)	(0.029)	(0.053)	(0.070)	(0.049)	(0.034)	(0.771)	(0.047)
Adj. R-squared	0.292	0.304	0.225	0.257	0.103	0.2	0.032	0.012	-0.005	0.08
Observations	245	245	245	245	245	245	245	239	244	246

Table 11- Federal versus State Supervisors

This table presents the results of a model in which we compare the health and supervisory forbearance of banks that are supervised by federal versus state supervisors. *Federally-chartered* is a dummy variable indicating banks that are supervised by national, as opposed to state, supervisors. The data is the bank-year panel from 2003 to 2014. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Equity ratio	NPA	ROAA	Forbearance	
				Linear	Logistic
Federally chartered	0.3066***	-0.2440***	0.0972***	-0.0003	-0.0007**
	(0.070)	(0.034)	(0.027)	(0.001)	(0.000)
Log(Assets)	-0.3587***	-0.0413***	0.1059***	-0.0002	0.0000
	(0.025)	(0.008)	(0.008)	(0.000)	(0.000)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.015	0.197	0.083	0.006	0.002
Observations	42006	42006	42006	42006	42006

Table 12- Bank Competition and Supervisory forbearance

This table presents the results of a model in which we compare the bank-level supervisory forbearance based on the level of competition in the banking industry in the MSA in which the bank is active. *Bank per tsd.* measures the number of banks in each MSA, normalized by the population (in thousand) of the MSA. The data is the bank-year panel from 2001 to 2015. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Forbearance	
	Linear	Logistic
Bank per tsd.	-0.0454***	-0.0033***
	(0.003)	(0.001)
Log(Assets)	0.0003***	0.0001**
	(0.000)	(0.000)
Year Fixed Effects	Yes	Yes
Adj. R-squared	0.055	0.003
Observations	40317	40317

Table 13- State-level Persistence of Supervisory forbearance

This table presents the between-state comparison of state-level averages of supervisory forbearance. The sample is generated by annually averaging bank-level forbearance estimates up to the state level. We regress contemporaneous forbearance (in Panel A) and states' rank in terms of forbearance (in Panel B) on their one-year lag values, using between and fixed effects estimations. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Forbearance			
Panel A	Between estimate		Fixed effects estimate	
	Linear	Logistic	Linear	Logistic
L1.Forbearance (Linear)	1.0877***		0.4591***	
	(0.024)		(0.099)	
L1.Forbearance (Logistic)		0.9590***		0.0212
		(0.017)		(0.062)
Adj. R-squared	0.977	0.984	0.221	-0.001
Observations	561	561	561	561

	State rank in Forbearance			
Panel B	Between estimate		Fixed effects estimate	
	Linear	Logistic	Linear	Logistic
L1.State rank (Linear)	1.0120***		0.4654***	
	(0.033)		(0.057)	
L1.State rank (Logistic)		1.0047***		0.2727***
		(0.020)		(0.071)
Adj. R-squared	0.950	0.980	0.223	0.074
Observations	561	561	561	561

Table 14- Supervisory Forbearance on Subsidiary Banks

This table presents the results of a model in which we compare the bank-level supervisory forbearance based on the share of subsidiary banks in the MSA in which the bank is active. *Subsidiary share in MSA* measures the size of subsidiary banks relative to the total size of the banking sector in an MSA. The data is our cross-sectional sample of MSAs. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Forbearance		Bank Restructuring
	Linear	Logistic	
Subsidiary share in MSA	-0.0256**	-0.0042*	0.4056**
	(0.013)	(0.002)	(0.182)
House Price Growth during Crisis	0.0214	-0.0018	-0.7414*
	(0.040)	(0.007)	(0.412)
Pre-crisis Bank-to-GDP Ratio	0.0030*	0.0000	0.0127
	(0.002)	(0.000)	(0.015)
Pre-crisis GDP Growth	-0.0448	-0.007	1.3146
	(0.062)	(0.017)	(0.797)
Constant	0.0063	0.0008	-0.1136*
	(0.005)	(0.001)	(0.066)
Adj. R-squared	0.055	0.006	0.114
Observations	262	262	262

Appendix

Table A1- Supervisory forbearance and Real Outcomes during the Crisis – OLS Results

This table presents the results of the regression model presented in equation (1) using the OLS estimator. The data is the cross-sectional MSA-level sample. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Establishment Exit Rate	Firm Exit Rate	Job Destruction Rate	Job Destruction Rate by Deaths	Job Destruction Rate by Continuers
Forbearance	0.03	0.0319	0.0217	0.0093	0.012
	(0.025)	(0.025)	(0.037)	(0.013)	(0.029)
House Price Growth during Crisis	-0.1079***	-0.0924***	-0.1294***	-0.0529***	-0.0769***
	(0.015)	(0.013)	(0.019)	(0.010)	(0.011)
Pre-crisis Bank-to-GDP Ratio	0.0005	0.0007**	0.0003	0.0002	0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pre-crisis GDP Growth	0.2660***	0.2473***	0.3248***	0.1262***	0.1989***
	(0.055)	(0.046)	(0.066)	(0.033)	(0.039)
Adj. R-squared	0.396	0.392	0.341	0.251	0.305
Observations	262	262	262	262	262

Table A2- Bank Restructuring and Real Outcomes during the Crisis

This table presents the results of the regression model presented in equation (1) using a two-stage least squared (2SLS) estimator. The data is the cross-sectional MSA-level sample. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Establishment Exit Rate	Firm Exit Rate	Job Destruction Rate	Job Destruction Rate by Deaths	Job Destruction Rate by Continuers
Bank Restructuring	0.0549***	0.0407**	0.0570**	0.0282**	0.0289**
	(0.020)	(0.016)	(0.023)	(0.011)	(0.014)
House Price Growth during Crisis	-0.0662**	-0.0613***	-0.0863***	-0.0315*	-0.0550***
	(0.030)	(0.024)	(0.033)	(0.016)	(0.019)
Pre-crisis Bank-to-GDP Ratio	0.0005	0.0008	0.0002	0.0002	0.0001
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Pre-crisis GDP Growth	0.1861***	0.1876***	0.2424***	0.0854**	0.1571***
	(0.062)	(0.052)	(0.076)	(0.038)	(0.044)
Anderson-Rubin P-values	0.000	0.000	0.001	0.000	0.009
Weak-IV Robust 95% Confidence interval	(0.03,0.21)	(0.02,0.16)	(0.02,0.23)	(0.01,0.11)	(0.01,0.12)
Observations	262	262	262	262	262

Table A3- Bank Restructuring and Real Outcomes after the Crisis

This table presents the results of the regression model presented in equation (2) using a two-stage least squared (2SLS) estimator. The data is the cross-sectional MSA-level sample. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Establishment Entry Rate	Firm Entry Rate	Job Creation Rate	Job Creation Rate by Births	Job Creation Rate by Continuers	Reallocation Rate	Employment Growth	Wage Growth	Patent Growth	GDP per capita Growth
Bank Restructuring	0.092**	0.081**	0.092**	0.045**	0.047*	0.120*	0.070**	0.060**	0.627*	0.054*
	(0.041)	(0.037)	(0.044)	(0.020)	(0.026)	(0.064)	(0.034)	(0.026)	(0.350)	(0.029)
House Price Growth during Crisis	-0.045*	-0.049**	-0.043*	-0.022*	-0.021	-0.057*	0.006	0.039**	0.091	-0.027
	(0.024)	(0.023)	(0.024)	(0.013)	(0.015)	(0.033)	(0.021)	(0.016)	(0.199)	(0.017)
Pre-crisis Bank-to-GDP Ratio	0.002***	0.002***	0.002***	0.001**	0.002***	0.002***	0.001	0.000	0.008*	0.001***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.004)	(0.000)
Pre-crisis GDP Growth	0.263***	0.269***	0.261***	0.169***	0.092	0.349***	0.084	0.006	-0.411	-0.244***
	(0.077)	(0.072)	(0.090)	(0.042)	(0.063)	(0.107)	(0.066)	(0.050)	(0.653)	(0.051)
Anderson-Rubin P-values	0.007	0.006	0.023	0.012	0.054	0.053	0.005	0.001	0.019	0.007
Weak-IV Robust 95% Confidence interval	(0.02,0.82)	(0.02,0.77)	(0.00,0.77)	(0.00,0.39)	(-0.01,0.40)	(-0.03,0.98)	(0.02,0.73)	(0.02,0.60)	(0.03,4.0)	(0.01,0.64)
Observations	245	245	245	245	245	245	245	239	244	246

Table A4- Mean Reversion

This table presents the tests of mean reversion hypothesis based on the regression equation in (4). The data is the MSA-level cross sectional sample. We regress average post-crisis growth rate of the outcome variables on their average crisis-period growth rates. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Crisis-period means of:					
Post-crisis means of:	Establishment entry rate	Job creation rate	Employment growth	Wage growth	Patent growth	PCGDPG
Establishment entry rate	0.918***					
	(0.019)					
Job creation rate		0.693***				
		(0.073)				
Employment growth			-0.040			
			(0.064)			
Wage growth				0.072		
				(0.091)		
Patent growth					0.024	
					(0.069)	
GDPPCG						-0.090
						(0.061)
Const.	0.002	0.038***	0.016***	0.019***	0.095***	0.005**
	(0.002)	(0.009)	(0.001)	(0.002)	(0.010)	(0.001)
Adj. R-squared	0.888	0.530	-0.001	0.001	-0.002	0.008
Obs.	294	294	294	275	291	283

Table A5- Bank Recapitalization and the Cleansing Effect

This table presents the results of the regression model presented in equation (1) using a two-stage least squared (2SLS) estimator. The data is the cross-sectional MSA-level sample. The variable TARP is the total size of TARP funds received by banks in each state relative to the size of the states' banking sector. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Establishment Exit Rate (OLS)	Establishment Exit Rate (2SLS)	Job Destruction Rate (OLS)	Job Destruction Rate (2SLS)
TARP	-0.0002**	-0.0028**	-0.0004**	-0.0029**
	(0.000)	(0.001)	(0.000)	(0.001)
House Price Growth during Crisis	-0.1085***	-0.1248***	-0.1311***	-0.1471***
	(0.015)	(0.018)	(0.019)	(0.021)
Pre-crisis Bank-to-GDP Ratio	0.0007**	0.0021	0.0006	0.002
	(0.000)	(0.002)	(0.000)	(0.002)
Pre-crisis GDP Growth	0.2531***	0.1177	0.3031***	0.1715*
	(0.055)	(0.083)	(0.066)	(0.102)
Adj. R-squared	0.400		0.355	
Observations	262	262	262	262

Table A6- Bank Recapitalization and Productivity after the Crisis

This table presents the results of the regression model presented in equation (1) using a two-stage least squared (2SLS) estimator. The data is the cross-sectional MSA-level sample. The variable TARP is the total size of TARP funds received by banks in each state relative to the size of the states' banking sector. Heteroscedasticity-robust standard errors are presented in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

	Establishment Entry Rate (OLS)	Establishment Entry Rate (2SLS)	Job Creation Rate (OLS)	Job Creation Rate (2SLS)	Employment Growth (OLS)	Employment Growth (2SLS)	Wage Growth (OLS)	Wage Growth (2SLS)
TARP	0.000	-0.003**	-0.000**	-0.003**	-0.000**	-0.003**	0.000	-0.002**
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
House Price Growth during Crisis	-0.063***	-0.081***	-0.060***	-0.077***	-0.024*	-0.038*	0.021**	0.010
	(0.015)	(0.020)	(0.016)	(0.021)	(0.014)	(0.021)	(0.009)	(0.014)
Pre-crisis Bank-to-GDP Ratio	0.001***	0.003	0.002***	0.003**	0.001	0.002**	0.000	0.001
	(0.000)	(0.002)	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)
Pre-crisis GDP Growth	0.334***	0.183**	0.308***	0.165	0.140***	0.012	0.041	-0.055
	(0.053)	(0.089)	(0.059)	(0.107)	(0.049)	(0.090)	(0.031)	(0.063)
Adj. R-squared	0.305		0.24		0.062		0.016	
Observations	262	262	262	262	262	262	255	255