Federal Reserve Bank of New York
Staff Reports

Does Going Easy on Distressed Banks Help the Macroeconomy?

Sean Hundtofte

Staff Report No. 823
September 2017
Revised January 2018

Does Going Easy on Distressed Banks Help the Macroeconomy?

Sean Hundtofte

Federal Reserve Bank of New York Staff Reports, no. 823
September 2017; revised January 2018
JEL classification: G01, G2, H12

Abstract

During banking crises, regulators often relax their requirements and refrain from closing troubled banks. I estimate the real effects of such regulatory forbearance during the U.S. savings and loan crisis by comparing states' economic outcomes by the amount of forbearance they receive. As instruments, I use historical variation in deposit insurance of similar financial intermediaries (thrifts) and exploit geographic variation in principal supervisory agent (PSA). The evidence suggests a policy-induced real estate boom during forbearance (1982-89), followed by a bigger bust in real estate and real GDP. The relationship does not appear driven by the ex ante size, industry exposure, or systematic cyclicality of a state.

Key words: financial crises, regulatory policy

Hundtofte: Federal Reserve Bank of New York (email: sean.hundtofte@ny.frb.org). This paper was previously circulated under the title "Does Going Easy on Distressed Banks Help Economic Growth?." The author thanks Andrew Metrick and Gary Gorton for their advice and the following for their comments: James Choi, Nicholas Barberis, Sriya Anbil, James Barth, Philip Bartholomew, John Geanakoplos, William Goetzmann, Matthew Grant, Stephen Karolyi, Peter Kelly, Toomas Laarits, Stefan Lewellen, Donal McKillop, Ben Matthies, Justin Murfin, Hoai-Luu Nguyen, Marina Niessner, Stefan Schneeberger, Meredith Startz, Heather Tookes, and Robert Van Order, as well as conference and seminar participants at the Contemporary Issues in Banking Conference, the FDIC, the Federal Reserve Bank of Philadelphia/Wharton Financial Institutions Center Conference on Financial Regulation, the Commercial-Housing-Urban-Macro Conference at the Federal Reserve Bank of St. Louis, the Bank for International Settlements, University of Oxford Saïd Business School, Rotterdam School of Management, Aalto University, the Federal Reserve Board, Temple University, the Federal Reserve Bank of New York, University of Edinburgh Business School, the AREUEA National Conference, and Yale School of Management. He also thanks Don Crocker and Phil Vincent for sharing their institutional knowledge of the crisis and bank resolution management, and Pat Relich and Philip Ostromogolsky for their help with data. This research benefited from the support of the Whitebox Fund and a CoreLogic Academic Research Council data grant. All errors are the author's alone. The views expressed in this paper are those of the author and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.

1 Introduction

In most recent crises, regulators avoid closing down undercapitalized banks (Laeven and Valencia, 2008). Administrations instead "kick the can down the road" and avoid the immediate recognition of losses in the banking sector. This non-enforcement of regulatory requirements is referred to as regulatory forbearance.

Despite the importance of financial crises, the impact of regulatory forbearance on aggregate output is not clear. Depending on the relative importance of different channels, growth could benefit by keeping banks open and maintaining the supply of credit (Ashcraft, 2005; Bernanke, 1983) or by avoiding capital impairments from transient losses (Shleifer and Vishny, 2010). On the other hand, growth could be harmed if highly leveraged banks take on socially undesirable, negative expected value projects, owing to moral hazard or misaligned incentives between bank management, shareholders, and creditors (Akerlof and Romer, 1993; Gorton and Rosen, 1995; Rajan, 1994). Empirically, how to best manage a crisis is not well understood.

In this paper, I investigate the effects of regulatory forbearance on economic growth in the context of the 1980's Savings and Loan ("S&L") crisis. I compare the outcomes of states in which a large fraction of distressed banks are promptly failed against the outcomes of states where banks are allowed to continue freely taking deposits and arranging loans. To instrument for regulatory forbearance from 1982 to 1989, I take advantage of operational and historical variation in regulators' scope for forbearance during the crisis arising from variation in supervisory authority and arbitrary patterns of bank expansion in the 1800s.

Using this geographic variation, I find that forbearance leads to a relative boom on some dimensions, followed by a broader, wide-spread bust that registers in aggregate output growth. Forbearance is estimated to initially lead to a greater supply of higher-risk loans, accompanied by greater house price appreciation, job creation and destruction. But, after normal regulatory requirements are re-imposed nationwide, forbearance is associated with larger contractions in real estate, and cumulative average declines of more than 3% in real

GDP, coinciding with a recession in 1990-1991.

At the root of the crisis is an interest rate shock to "thrift" balance sheets. Thrifts are banks that traditionally focus on encouraging savings (thrift) and providing home mortgages to their local communities.[1] In the early 1980s, high interest rates render many thrifts insolvent by reducing the market value of their primary asset: long-duration mortgages fixed at historical, lower, rates. Thrift insolvencies affect two different federal deposit insurance funds: the Federal Deposit Insurance Corporation (FDIC) insures both thrifts (savings banks) and non-thrifts (commercial banks), while the Federal Savings and Loan Insurance Corporation (FSLIC) insures only thrifts (savings and loans). Figure 1 diagrams bank supervision in place until 1989, after which deposit insurance and regulatory oversight is consolidated. Because of a concentrated exposure to thrifts, the FSLIC is forced into a policy of greater regulatory forbearance because of limited capital and human resources (Kane, 1987).[2]

Figure 2 illustrates the paths in real GDP growth between states who receive a high degree of forbearance versus others. I define forbearance as the asset-weighted proportion of banks in a state that are not failed, and have capital ratios lower than the minimum requirement of 3% in place at the beginning of the crisis (FDIC, 1997). Figure 2 illustrates a lack of consistent difference in economic growth before forbearance starts in 1982.[3] While forbearance is an active policy from 1982-1989 there is perhaps a small positive differential, and most clearly after forbearance ends,[4] the relationship turns significantly negative.

A natural concern with any naive causal interpretation of Figure 2 is that regulators could incorporate knowledge about current or future regional economic outcomes into a

[1] "Savings banks" and "Savings and Loans" are two forms of thrift institutions. Throughout this paper, I will use "bank" to refer broadly to financial intermediaries: both thrifts and commercial banks.

[2] The FSLIC had $6 billion in funds and 34 employees in 1980, but to deal with all of its insolvent institutions would have entailed costs exceeding $25 billion. In contrast, the FDIC had $11 billion in funds and over 3,500 employees, 460 of which were bank liquidators, and costs of approximately $11 billion.

[3] Forbearance of banks formally starts in 1982 with The Garn-St. Germain Act.

[4] In 1989, the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA) provides sufficient capital and a change in regulatory oversight to fail troubled institutions.

strategy of which banks to fail.[5] In order to address potential endogeneity, I exploit the unique situation that in the U.S. at this time there are two significant federal deposit insurance funds for thrifts: one for savings banks, which is limited in its geographic exposure, and another for savings and loans. The modern savings bank model first arrives in the U.S. from Scotland to Philadelphia in 1816, and by the early 1900s only 19 states gain state savings bank charters, whereas savings and loans (building societies) arrive in Philadelphia in 1831 and proceed to spread nationwide.

The first instrumental variable I use is therefore whether a state offers a savings bank charter. State savings banks receive deposit insurance (and supervision) from the FDIC rather than the overwhelmed FSLIC. As a result, states with savings bank charters tend to receive less forbearance. Whether a state receives a savings bank charter prior to the 20th century is statistically unrelated to a host of pre-crisis observables or to a state's 'Beta' with previous business cycles.

As an alternative source of variation, I introduce a second instrumental variable: the average of forbearance in state j's Federal Home Loan Bank (FHLB) district, excluding state j itself. Twelve FHLB districts were drawn up in the Great Depression, and each has persistent operational differences during the crisis. This instrument takes advantage of persistent differences in the speed of bank closures between different supervisory districts of the same regulator.

Regulatory districts could be related to different economic regions of the country and the limited diffusion of savings banks naturally relates to a state's distance from Philadelphia. Hence, I control for general economic region and allow growth to flexibly vary over time by Bureau of Economic Analysis (BEA) region. I allow for overall, constant, differences between states as in a Differences-in-Differences framework, and so the resulting exclusion restriction for the historical savings bank instrument is: within a particular

[5]It should be noted that the typical concept of where to apply forbearance–as a temporary measure to weather a downturn until an economy returns to 'normal'–should bias against the main finding of this paper, a contemporaneous positive and subsequent negative relationship to output growth in the cross-section.

(BEA) region, whether a state has a saving bank charter is unrelated to economic changes that arise precisely at the start of the crisis, except through its relationship to the amount of undercapitalized-but-not-failed institutions. The exclusion restriction for the within-regulator instrument is that forbearance in the rest of an FHLB district is unrelated to economic changes in a particular state during the crisis–compared to the average change for the BEA region–except through an effect on regulatory forbearance.

In various robustness checks, I find that the instruments are statistically unrelated to a host of ex-ante economic observables, nor do the instruments happen to select for states with greater systematic covariation with previous nationwide business cycles. In addition to lacking a-priori reasons for the instruments to be related to non-regulatory changes in economic outcomes that arise during the 1980s, I examine previous placebo business cycles and find no evidence that either instrument or the raw measure of forbearance positively or negatively covary with states' excess growth relative to national GDP growth.

To address questions of interpretation, I introduce additional covariates, such as the overall level of bank failures, as alternative treatment policy variables and find that point estimates are robust to their addition. Results are also similar looking at alternative capital thresholds (5% was the previous capital minimum). Finally, narrowing the analytical focus to county-level outcomes on either side of state-boundaries, I find a similar time-varying relationship of regulatory forbearance to growth in county-level incomes.

This paper contributes a within-country analysis of GDP growth to the literature that compares GDP growth across different crises in cross-country analysis (Boyd et al., 2005; Dell'Ariccia et al., 2008). Another strand of literature measures the effects of a single financial crisis on different sectors of an economy or its borrowers, employing novel identification strategies such as the timing of a foreign crisis or the uncertain timing of a large bank failure (Caballero et al., 2008; Ivashina and Scharfstein, 2010; Peek and Rosengren, 2000; Santos, 2010). A principal contribution of this paper is bridging these two literatures, using plausibly exogenous spatial variation in a particular regulatory response for better

identification of a differential effect of regulatory policy on aggregate output growth.

A consensus view from the historical literature examining the S&L crisis seems to be that regulatory forbearance proved costly to taxpayers, as it encouraged unscrupulous behavior by banks and "desperate plays." In more recent work, Kandrac and Schlusche (2017) examine a natural experiment of a reduction in supervisory resources available in the S&L crisis and, similarly to this paper, find that banks engage in riskier lending in response to looser supervision.

The only previous analysis of any real outcomes related to the S&L crisis, however, is provided by Bernanke and Lown (1991), who examine the relationship between bank capital and loan growth at commercial banks during the 1990-1991 recession. Bernanke and Lown (1991) argue against a "credit-crunch" view of the recession held by observers at the time. In contrast, I find a strong relationship between preceding policy and subsequent growth.

In contrast to forbearance in Japan, with its government-directed lending and an associated lack of creative destruction (Caballero et al., 2008), I find that in the short-run at least, the unfettered "de-regulatory gamble" of the S&L crisis is positively related to higher job-creation and job-destruction at the same time, measures associated with greater creative destruction. Similarly to Japan, the evidence presented in this paper suggests a misallocation of credit with long-run consequences.

The evidence is consistent with contemporary reports of a thrift industry growing into new and unwise investments. Rajan (1994) illustrates that liberal credit policies by banks, focusing on a particular asset class (e.g. Acquisition, Development and Construction, or ADC, Loans), can exacerbate speculation at the expense of future earnings and true economic value creation. Consistent with this, I find a significant increase in "High Risk" loans, and that banks are lending into worsening fundamentals, such as vacancy rates.[6] In bank-level analysis, I find that it is not only forborne banks, but also their neighbors and

[6] "High Risk" is an FDIC categorization of commercial real estate lending, which includes Acquisition, Development & Construction (ADC) loans for early stage (residential) projects.

the local banking industry which appear to shift allocations. In contrast to a simple equity-based version of moral hazard, it is not only the least capitalized banks that "stretch" into high risk lending, but rather the lending activity of banks in the same geographic area appears to be contaminated.

Focusing on the experiment in regulation provided by the S&L Crisis is broadly useful to our understanding of the lending channel. The results are consistent with a causal, supply-side, interpretation of stylized facts from broader, correlative, studies of business cycles and financial crises (Jordà et al., 2013, 2014; Leamer, 2007). The evidence is consistent with a simple view of forbearance as a rightward shift in an aggregate loan supply curve.

Historical empirical research of forbearance during the S&L Crisis focuses on financial outcomes and generally finds that financial losses to the deposit insurance funds were exacerbated by forbearance. In this paper examining the real economy, I estimate some interim positives from forbearance, but after it ends, larger contractions in credit, real estate and economic growth.

2 Previous Studies of Financial Crisis Policy and Economic Growth

Previous estimates of the effects of forbearance on GDP growth rely on cross-country comparisons. Dell'Ariccia et al. (2008) look at systematic correlations between different policy responses and economic growth across various crises and find, on average, a weakly positive relationship between forbearance and growth. Their analysis focuses on concurrent outcomes and naturally depends on the timing of a crisis. My results agree with the cross-country/cross-crisis estimates if we restrict our attention to the first five years after the initial (1980) interest rate shock in the U.S.

A comparison of recent individual banking crises paints a different picture of the real effects of forbearance. During the early 1990s, Scandinavian regulators moved swiftly

to resolve undercapitalized institutions, separate assets into bad banks, arrange public takeovers, and force existing shareholders out of failed institutions. Japanese regulators failed to recognize losses in a timely manner and encouraged lending to less financially sound borrowers and industries (Caballero et al., 2008). Scandinavia enjoyed a quick recovery from its crisis (Jonung, 2009), while Japan is still recovering today.[7]

Japan provides an extended period of forbearance to study: Gibson (1995) finds Japanese banks passed their problems onto borrowers, lowering their investment activity. Peek and Rosengren (2005) find inefficient lending practices hurt bank profits. Hoshi and Kashyap (2004) find that the delay in bank recapitalization, coupled with government-encouraged lending, was at least partly to blame for the lost decade, and Caballero et al. (2008) find that lending to "zombie borrowers" stifled healthy product market competition.

Forbearance allows for lower levels of bank capital than observed in normal times. Bank capital is important to the extent it alleviates potential frictions in the credit channel and the traditional functions of financial intermediaries in screening, contracting, monitoring, and maturity transformation. Theoretically, low capital levels could exacerbate any of the classic frictions suggested by corporate finance: moral hazard or asymmetric information between bank management, shareholders, depositors and regulators. From an industrial organization perspective, allowing financially troubled banks to continue operating could also lead to excessive competition for deposits or loans amongst surviving banks.

Regulators too may suffer from distorted career incentives when their banking system is undercapitalized and may "pass the buck" onto the next administration. It might not be a coincidence that bank losses are only materially recognized in both Japan and the U.S. after new supervisory structures are put in place, and in the U.S. a new administration[8]) (Hoshi and Kashyap, 2015; Kane, 1989b).

Models that predict negative effects from lower-than-normal bank capital still allow

[7]It was once common to refer to the 1990s as Japan's "lost decade". Recently the phrase Ushinawareta Nijunen is also used to refer to the "lost two decades".

[8]Signing the act introducing the official policy of capital forbearance in 1982, President Reagan said, "I think we've hit a home run."

for unrelated benefits of forbearance. Avoiding the failure of a financial intermediary, for instance, could delay any costs from shutting down a credit factory, owing to imperfect credit markets (Ashcraft, 2005).

3 Background on Thrifts and the Crisis

Both savings banks and savings and loans are a form of financial intermediary referred to in the U.S. as "thrifts." In the 1800s, savings banks originally gathered community deposits and promoted thrift in local communities. Savings and loans[9] formed as cooperative organizations to promote savings and provide home financing opportunities for the depositing members.

While balance sheets differ in the 1800s, by the end of the 1970s the two forms of thrift institution have the same basic business plan: take local deposits and extending them back to the local community as consumer loans, mostly mortgages.[10] Prior to the crisis, the majority of residential mortgages in the U.S. are originated by thrifts. National savings banks and savings and loans share a federal regulator (the Federal Home Loan Bank Board or FHLBB, of which FSLIC was a subsidiary), but the supervision–and hence forbearance–of state-chartered institutions varies. States outsource the ultimate supervision of state-chartered savings banks to the FDIC, whereas savings and loans are supervised by the local Federal Home Loan Bank (FHLB). The main business of each district's FHLB is to make super-senior advances to its owners (the local savings and loan associations) and the head of each of the 12 FHLBs is the ultimate Principal Supervisory Agent (PSA) for savings and loans in its region.

As an identification strategy, I exploit this distinction between federal deposit insurance

[9] "Savings and loans" were first known as "Building Societies" when they formed in the UK, then "Building and Loan" societies after they arrived in the U.S.

[10] When legislation for federal charters is enacted in 1978, the act saves time by referring to both types of institution as "savings and loans." And in 1984, the GAO states, "Because of differences between FDIC's and the Bank Board's programs, two financially similar institutions, one insured by FDIC, and the other by FSLIC, are treated differently."

fund (FDIC/FSLIC) coverage of thrifts. In addition I exploit differences between FHLB districts as a separate instrumental variable (Further detail in Section 5).

The analysis of this paper tests a joint hypothesis that forbearance is relevant and that banks are important locally. At the beginning of this crisis, branching restrictions are still in place before being lifted nationwide in 1994. As a result, most bank lending, either residential or small businesses, is still done locally. Strahan (2003) pursues an analysis over a similar time period as this paper, and finds supporting evidence for the local nature of banking by observing changes in economic outcomes associated with the removal of branching restrictions.

3.1 The Savings and Loan Crisis

Before the crisis, thrift charters are far more restrictive than commercial bank charters. For example, thrifts could not lend to businesses and, until 1980, their deposits are non-demand in nature, i.e. they do not offer checking accounts.

In 1981-1982, the thrift industry experiences its worst financial operating results since the start of deposit insurance. As a result of exposure to long-term fixed rate residential mortgages, thrift net worth declines by about one-quarter as short-term deposit rates rise to historically unprecedented levels. The estimated costs to resolve underwater institutions are \$25-\$100 billion; the FSLIC has only \$6 billion in reserves (Kane, 1989a); and the federal government faces the choice of letting FSLIC fail (making up the difference with tax revenue) or to engage in forbearance.

In response to the interest rate shock, regulators lift interest rate caps, allow on-demand deposits, and raise deposit insurance limits to \$100,000 (from \$40,000) in 1980. The policy of explicit capital forbearance starts in 1982 with the passage of the Garn-St. Germain (or "Net Worth Certificate") Act in "an attempt to address [thrifts'] interest rate mismatch." This act allows regulators to ignore banks' undercapitalization, issue "net worth certificates" (fictional capital), and broaden the business lines thrifts can pursue (FDIC, 1997).

Regulators encourage growth and mergers between financial institutions, typically of the same charter, to "avoid much larger losses associated with traditional liquidations" (GAO, 1983). At the same time, in the early 1980s regulatory headcount is cut by funding freezes and the Reagan administration.[11]

In January 1982 nominal capital requirements are reduced to 3%. The FHLBB takes advantage of the flexibility afforded to it to move to a new accounting method using "appraised equity value." For purposes of capital calculations, banks are now allowed to use an average of assets over the previous four years and the current year's assets, benefiting rapidly growing institutions. The FHLBB's implementation of net-worth certificates assists the least-healthy banks (at the cost of the more healthy) compared to the FDIC's implementation (GAO, 1984). New thrifts are given 20 years to reach the required capital levels, so an entrant into the industry needs to have initial net worth of only 0.15 percent of assets. Thrift owners at this time who are also land developers can deed difficult-to-value land or other assets as capital contributions (Akerlof and Romer, 1993).

New S&L charters grow as a result of deregulation. Observers describe a contemporaneous growth in aggressive business practices, gambling through lending (engaging in speculative loans in thinly capitalized institutions or investing in real estate outright), and outright fraud (FDIC, 1997). There is a thin line between bad investments (breaches of a duty of care) and fraudulent, criminal behavior. Many of the obituaries of the crisis explore the latter; in the words of one account, "examinations of the operation of many such thrifts show that the owners acted as if future losses were somebody else's problem" (Calavita et al., 1997). As it turns out, they often were.

1989 marks the final phase of the crisis with the passage of the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA). FIRREA brings with it a change in supervisory oversight and removes the variation in regulatory polices: the FSLIC is

[11] James Tobin recalled the reply when William Seidman of the FDIC asked the White House for more regulators: "Perhaps you don't understand what administration you are working for." (Akerlof and Romer, 1993)

closed down and the FDIC assumes responsibility for the insurance activities of the FSLIC, while supervisory oversight of Savings and Loans is removed to the new Office of Thrift Supervision (OTS). FIRREA ensures adequate capital for closing financial institutions, abrogates existing forbearance agreements, re-constricts bank mandates to pre-forbearance levels (e.g. no junk bond investments), and introduces the Resolution Trust Company (RTC) for faster resolution of ostensibly dead but not-yet-failed institutions.

Typically the financial crisis researcher's challenge is to disentangle the effects of bank failures from the effects of aggregate demand changes, as crises are typically accompanied by negative changes in economic output (Demirgüç-Kunt et al., 2006). The Savings and Loan crisis is one of the few instances where we observe a large number of bank failures contemporaneous with positive output growth (Claessens and Kose, 2013). A nationwide drop in output growth eventually occurs in the U.S. in 1990-1991, almost a decade after the start of en-masse forbearance of troubled financial institutions.

4 Measuring Forbearance and Description of Dataset

In this section, I describe the dataset and the key treatment policy variable used in analysis. The main historical dataset, obtained from the FDIC, combines quarterly Thrift Financial Reports (for FSLIC-insured institutions) and Call Reports (for FDIC-insured banks) filed from the first quarter of 1984 onwards. This data starts two years into the seven years of the official policy of forbearance owing to the start date of quarterly thrift financial reporting.[12] These are institution (bank company) level financial reports providing balance-sheet information. Forbearance is measured from the first date thrift report data is available (Q1 1984), to the introduction of the Resolution Trust Corporation (RTC) and the end of the FSLIC in 1989. Using the dataset, I generate a measure of forbearance of insured institutions located inside the 50 states.

[12]The start date of the institutional data (1984) happens to coincide with the Reinhart-Rogoff timing of the start-date of this crisis.

4.1 Definition of Capital Forbearance

I calculate a measure of forbearance of financial institution i at the end of year t as specified in (1). This is a simple capital-based measure of forbearance. Forbearance occurs if an institution is under 3% equity capital at the beginning of a year and not closed by the end of that year (FDIC, 1997). I then asset-weight these occurrences across a state, sum over the observation period, and divide by the total assets in a state.

$$forbearance_{ist} = \mathbb{1}\{Equity_{it}/Assets_{it} < 0.05, \neg failure_{ist}\} \tag{1}$$

$$f_{st} = \frac{\sum_{i \in I_{st}} forbearance_{ist} \cdot Assets_{it}}{\sum_{i \in I_{st}} Assets_{it}} \tag{2}$$

$$F_s = \sum_{t=1984}^{1988} f_{st} \tag{3}$$

Here, i indexes the institution, s indexes the institution's state, t indexes the year, I is the set of financial institutions, $failure$ is a binary indicator set to 1 if institution i fails, annual forbearance f is an asset-weighted sum of forbearance, and F is a cumulative sum of forbearance over the 1984-1988 period.[13] All variables are as of the beginning of each period, other than failure which indicates if an institution fails during period t.

4.2 Key outcome variables

The key state-level economic outcomes I examine are growth rates in real GDP, supplied by the US Department of Commerce's Bureau of Economic Analysis (levels of which are available from 1977 onwards); House Price Appreciation (HPA) from Core Logic (similar results are found using data from the Federal Housing Finance Agency) from 1977 onwards; business bankruptcy filings from the American Bankruptcy Institute available from 1980

[13] Results are similar whether including or not including failure surprises from 1989.

onwards (converted into per-capita rates). Job destruction and job creation rates[14] from the Census Bureau Business Dynamics Statistics (BDS). New business establishments are also provided by the US census. Figure 4 charts median levels of these outcome variables over time.

To shed light on channels for the relationship between forbearance and the real economy, I obtain patent filings from the USPTO, building permits and homeowner vacancy rates from the U.S. Census, total resolution costs associated with criminal cases from Akerlof and Romer (1993), commercial real estate vacancy rates from REIS, and total resolution costs from liquidating failed institutions from the FDIC. To improve comparability across states for variables such as patent filings, I normalize these outcomes as a share of pre-crisis GDP (1977).

Table 1 presents a summary of independent and dependent variables. Panel A's independent variables are observed at the institutional-level (the institution submitting a call report) and cover the period from the beginning of 1984 to the end of 1988. Bank-level variables are winsorized at the 1st and 99th percentiles. "High-risk loans" are a regulatory definition and include acquisition, development and construction (ADC) loans, large multifamily (5+ units) loans, and commercial (non-farm) real estate.

5 Empirical Methodology and Identification Strategy

I examine the relationship between the state-level measure of forbearance, F_s, and state economic outcomes, addressing potential endogeneity by using two instrumental variables. One instrument predicts supervision of thrifts: whether a state historically offered a state savings bank charter. The other instrument exploits within-FSLIC variation between supervisory districts in their operational styles and speed to resolve failed institutions.

[14] Job creation (destruction) rates are defined in Census calculations as the number of jobs created (destroyed) in period t divided by the average number of employed individuals in periods t and t-1.

The first and second stage regressions are:

$$F_s = \alpha + \beta^1 SavingsBankCharter_s + \beta^2 \bar{F}^d_{-s} + BEARegion_s + \gamma' X_{st} + \tilde{\varepsilon}_s \tag{4}$$

$$y_{st} = \alpha_s + \alpha_t + \delta^0 \mathbb{1}\{t \geq 1982\}\hat{F}_s + \delta^1 \mathbb{1}\{t \geq 1989\}\hat{F}_s + \tag{5}$$
$$BEARegion_{s,t\geq 1982} + BEARegion_{s,t\geq 1989} + \gamma' X_{st} + \tilde{\varepsilon}_{st}$$

Here, y is the economic variable of interest (e.g. real GDP growth), F is the continuous Forbearance treatment variable as estimated in equation (3), s indexes the state, t indexes the time period, α_t and α_s are time and state fixed effects respectively, X is a vector of controls for robustness tests, and ε is an error term. $BEARegion$ refers to the eight regions the Bureau of Economic Analysis splits the US into.[15] The variables of interest are δ^0 and δ^1, representing the estimates of differential effects of forbearance after the start of forbearance and after the end of forbearance respectively.

I cluster standard errors by state to allow for serial correlation in state-level errors. Regressions are estimated with both weighted and ordinary least squares. Weights used for WLS are the size of a state's economy at pre-crisis (1977) GDP levels. There are many reasons to focus on a weighted analysis: measurement problems with interstate commerce (where errors are likely to be greater with smaller states), the relevance of trade compared to a particular state's banks, and the fact that a small state's outcome may depend largely on a single industry or event.[16]

5.1 Instrumental Variables

My first instrumental variable is a binary indicator for the limited diffusion of savings bank charters prior to the 1930s ($SavingsBankCharter_s$). The second instrumental variable $\bar{F}^d_{-s}$

[15] New England, Mideast, Great Lakes, Plains, Southeast, Southwest, Rocky Mountain, Far West https://www.bea.gov/regional/docs/regions.cfm

[16] Alaska is an example of what I want to avoid in equal-weighted analysis: Alaska has a very small number of banks (ranging from 22 to 11 over this time period), and a large exposure to the energy industry, experiencing a crash in oil prices in the mid-1980s.

is the average of forbearance in FHLB district (d) that state s lies in, excluding s. In order to not pick up some overall geographic relationship, first stage regressions allow different regions to follow different economic paths, interacting BEA region dummies with the same time-period indicators as the policy variable of interest.

The first instrumental variable is relevant owing to historical diffusion of thrift charters. Savings banks arrive in the U.S. in Philadelphia in 1816 and their further diffusion (outside of geographic proximity to Philadelphia) is largely a puzzle to financial historians.[17] Between 1820 and the 1870s, savings banks are the fastest growing financial intermediary in the United States, at their peak controlling approximately a quarter of the banking assets in the United States. Subsequently, Savings & Loans prove more popular particular in the South and West of the country. There are no common reasons, and hence no clear economic reasons, suggested in the literature for the early but more limited later success of savings banks. Some previous suggestions include i) the timing of urban growth in a state given the later, more successful, arrival of community banks and savings and loans (with broader product offerings at the time), and ii) potential cultural differences in regional preferences for what might have been seen as a more paternalistic institution (Wadhwani, 2011).

Historically, the limited diffusion of savings banks means that by 1980, two similar types of financial institution are covered by two different regulatory authorities. State savings banks are insured and supervised by the FDIC, Savings and Loans by the FSLIC. During the Savings and Loan crisis, the FSLIC is forced to engage in forbearance as a result of its underfunded position and the "too many to fail" nature of its thrift problem.[18] Consequently, states with greater amounts of banking assets covered by FSLIC deposit insurance experience greater forbearance.

The exclusion restriction is that, controlling for other observables such as overall eco-

[17] A total list of states with charters is: Alaska, Connecticut, Delaware, Florida, Indiana, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, Rhode Island, Washington, Wisconsin, and Vermont.

[18] "The FSLIC's extensive use of forbearance is a result of an inadequate insurance fund in an industry in which many institutions were insolvent." (FDIC, 1997)

nomic region, the amount of pre-crisis S&L assets in a state is unrelated to changes in economic outcomes arising specifically during the S&L crisis, outside of any effect through differences in regulatory policy.

The second instrumental variable I use exploits the style and operational differences between regulatory districts. Each state lies in one of twelve Federal Home Loan Bank (FHLB) districts. FHLB districts are drawn up in 1932, with headquarter locations chosen so as not to coincide with Federal Reserve Bank locations. An FHLB is a legal entity with its own management, employees, board of directors, financial statements, and owners. In 1985, the bank board in D.C. transferred bank examination to the FHLBs in order to circumvent federal budget restrictions. As a result, individual FHLBs have an even greater degree of heterogeneity in staffing levels, speed of recruiting new staff, and organizational approaches, all of which result in variation in the ability to fail troubled institutions promptly. This instrumental variable is informed by discussion with professionals involved in resolution management who highlight regional style differences and non-capital reasons for slow resolution speeds. I control for BEA region, leading to an exclusion restriction that the amount of forbearance in neighboring states in a regulatory district is unrelated to within-region differences in a particular state's economic outcomes during the S&L crisis, outside of an effect through regulatory policy. Figure 3 presents the geographic distribution of the instrumented forbearance measure F_s as a heat map.

Quantitatively checking for balance by regressing ex-ante economic observables on instrumental variables (details provided in Appendix), I find no immediate significant differences associated with state savings bank charters or the average of forbearance in the regulatory district excluding a particular state. I test the instruments separately and find null results for 1977 GDP level, the state's economic "leverage" (ratio of banking sector assets to GDP), 1977 population, and the Herfindahl index of bank assets in a state, an indication of the banking concentration in a state. In addition, I check for industry exposures (Mining and Energy, Construction, Manufacturing, Transport, Trade, Service, Finance,

Government). In total, out of 24 regressions of these ex-ante observables on the two instrumental variables, two are marginally statistically significant (the average forbearance in a region has an economically small relationship to the service and finance industries).

5.2 County-level Analysis

As an additional, finer-grained, more-local comparison of county-level outcomes I apply a consistent definition of a county as being next to a state boundary if its centroid lies within 50 miles of the border, using centroid data provided by Holmes (1995). Using this definition, I then compare changes in outcomes of counties on opposite sides of a border. I examine BEA per-capita income as an available time series available at the county-level over this time period. To cleanly compare counties c on either side of state boundary b I allow each border to have its own time-varying relationship in the second stage equation as follows:

$$y_{c,s,b,t} = \alpha_c + \alpha_t + \delta^0 \mathbb{1}\{t \geq 1982\}\hat{F}_s + \delta^1 \mathbb{1}\{t \geq 1989\}\hat{F}_s + \beta_{b,t\geq 1982} + \beta_{b,t\geq 1989} + \tilde{\varepsilon}_{c,s,b,t} \tag{6}$$

6 Results

Table 2 presents the main results of this paper: the estimated effects of forbearance on annual real output (GDP) growth. Table 2 estimates the time-varying relationship of forbearance to outcomes after the official policy of capital forbearance starts in 1982 and after forbearance ends in 1989. While point estimates of the relationship during forbearance are mixed–and the positive point estimate is marginally statistically significant–there are larger and statistically clearer negative changes in GDP growth in the post-forbearance period.

The economic magnitudes of these estimates are that a one standard deviation increase in forbearance is associated with an approximate 1% lower annual growth rate in real GDP

on average in the years following forbearance. This compares with a mean annual growth of 3% in the 20 years of the dataset.

Table 2 presents estimates using both IVs. Column 1 presents estimates using only the IV of a dummy for a state savings bank charter–as savings banks had closure authority driven by the FDIC rather than the FSLIC which faced a binding "too-many-to-fail" constraint and respectively went easier on its undercapitalized thrifts. Column 2 presents estimates using the average forbearance in a regulatory district outside of a particular state as an instrument. The instruments conceivably have different LATEs, as one exploits across-regulator variation whereas the other exploits within-regulator variation in supervision, showing this is not just a Savings and Loan problem. Within Savings and Loans, negative post-FIRREA growth is associated with those states lying in districts that had slower-to-fail supervision. The relevance of each individual instrument's is corroborated in the data, with Kleibergen-Paap test statistics greater than 10.

The instrumented approach of Table 2 is used as any choice regulators may exercise of where to allocate forbearance could potentially bias naive OLS estimates. Accounts of the crisis, however, depict regulators overwhelmed and caught off-guard by the first systematic banking problems since the Great Depression. Regulatory choice could introduce a positive or negative bias: on the one hand, we might expect regulators to pick more distressed areas for forbearance in order to avoid recognition of transient losses, waiting until asset valuations and the economy have reverted to "normal" levels. This would attenuate point estimates of post-crisis estimates to zero. On the other hand, if regulators had misguided views of growth processes or perversely choose to fail banks in states where conditions are immediately negative, then regulators would pick exactly those regions for forbearance where growth might be increasing intra-forbearance, and then liquidate assets after growth and prices fall in other areas, increasing losses. Empirically, in untabulated results, naive estimates of OLS turn out to be similar to 2SLS.

All specifications allow the general region of a state to have a time-varying relation-

ship with outcomes, flexibly controlling for covarying economic growth by BEA region by interaction region indicators with time period indicators. Regressions are weighted by the pre-crisis size of a state in GDP, given the expectation of smaller measurement errors in output measures with larger states, and interest in national (weighted, aggregate) outcomes. In robustness checks in the Appendix I also examine OLS results which are similar and, as expected, slightly weaker (-0.75% for a one standard deviation difference in F_s). I focus on results using both instruments for the remainder of the paper.

I perform a series of additional robustness checks to address alternative explanations and measurement questions. Firstly, Appendix Table 1 does not find that the instruments are statistically associated with larger states, states with greater banking assets to GDP, greater banking market concentration, or states with particular exposures to certain industries. Appendix Table 2 finds that the relationship to real GDP growth holds using various shorter cutoff points for analysis; controlling for lagged GDP; allowing resolution costs to independently act as a separate treatment variable during/after forbearance; allowing Gas/Oil industry share of GDP as a separate treatment variable; removing Delaware and South Dakota; and allowing the overall level of undercapitalized institutions to compete as an additional treatment variable. Appendix Table 2 summarizes these robustness checks. Appendix Table 3 performs an additional test of whether the instruments or the raw forbearance measure are related to different systematic covariance and does not find that to be the case. The main analysis is not–by chance–picking up larger or more cyclical states.

To address remaining concerns on the comparability of state-level outcomes, Table 3 compares all counties in the U.S. that lie next to a state boundary. Owing to limited availability of county-level data over this time period, this analysis switches to a different but related outcome: growth in average per-capita income. Results are similar to the state-level analysis in that estimates are mixed during the period of forbearance and accompanied by arger magnitude, negative, changes post-forbearance. Estimated post-forbearance changes in average income growth are between -0.5% and -1.1% for a one standard deviation change

in forbearance.

The estimates of Table 2 and Table 3 describe an economically significant, cyclical, relationship of forbearance to aggregate output growth. Under more consistent regulatory policy, these estimates suggest GDP growth may not have been quite as high in the mid 1980s, but might have avoided turning negative in the early 1990s. At first glance, a negative long-term association with output growth is reminiscent of previous studies of forbearance in Japan, where inefficient, government-encouraged, forbearance of commercial borrowers propped up inefficient competitors and led to lower efficiency through 'sclerosis' and 'scrambling' (Caballero et al., 2008). In the US, in contrast, we find greater creative destruction – both job creation and job destruction rates are higher, not lower, with forbearance.

Table 4 condenses analysis across other key annual outcomes in the real economy: bankruptcies, new business establishments, job creation and destruction, and house prices, new building permits, and patent filings. During the period of forbearance, higher forbearance states have positive point estimates for all of these other outcomes other than bankruptcy filings and patent growth. During forbearance, the relationship is statistically significant for job creation, job destruction and house price appreciation. Moving from the 25th to the 75th percentile of forbearance is associated with approximately 0.2% greater job-creation, 0.25% job-destruction, and 2.2% house price appreciation. After forbearance ends, the relationship is statistically significant and negative for job creation and house price appreciation. Moving from the 25th percentile of forbearance to the 75th percentile is associated with approximately -4.5% HPA and -0.4% job creation rate after 1989, compared to sample averages of 6% for both variables.

7 How Could Regulatory Forbearance Affect the Real Economy?

"We have developers sitting there with empty buildings, and the lenders are giving them money to start another one. I have to blame the lenders. I want them to show me where these builders are going to get cash flow.... The laws of supply and demand are not governing market behavior. Continuing construction in the face of high vacancy seems related to the availability of financing for new buildings, rather than need."[19]

The estimated relationship with forbearance (F_s) captures not just a lack of otherwise-expected bank failures, but any endogenous responses in bank behavior. Many non-mutually exclusive models are potentially relevant to the economic consequences of less-capitalized-than-usual financial intermediaries, lending and competing in an uninhibited fashion.

7.1 A supply-induced leverage and collateral cycle

The concept of a leverage cycle, or collateral-driven business cycle, is not new (Geanakoplos, 2001; Kiyotaki and Moore, 1997) and empirically established in historical studies (Jordà et al., 2013, 2014; Leamer, 2007). If forbearance forestalls the recognition of some negative shock, it could simply extend a credit expansion with a larger subsequent crash. The model of Gorton and Ordoñez (2012) describes a dynamic where the longer the period investors have not questioned the quality of collateral before a (small) shock arrives, the larger the boom as well as subsequent crash. A broader drop in aggregate output growth associated with a sharp decline in real estate values is consistent with real estate's frequent role as collateral and frictions in the credit channel. A drop in collateral value can impair both borrowers' and banks' balance sheets, raising the effective cost of bank capital and credit

[19] Wayne Swearingen of Swearingen Co., a Dallas real estate firm, as quoted by Akerlof and Shiller (2015).

in general (Fisher, 1933).

Making the connection from credit to the real economy, Table 4 found that forbearance was empirically associated with greater house price appreciation, but a larger drop in house prices post-forbearance. Table 5 examines bank lending and finds forbearance is associated with greater high risk lending and mortgage lending on average. One standard deviation in forbearance is associated with an approximately 15% greater share of balance sheet dedicated to High Risk Loans. This compares to a 0% pre-crisis baseline. In contrast, when turning to examine lending to corporations and small businesses (C&I loans), no significant differences are found and no crowding out effects as in the supply-side boom found by Chakraborty et al. (2016).

Table 6 formally tests whether this increase in real-estate related lending was accompanied by a difference in fundamentals. At the same time as being causally associated with new building and permit applications, point estimates for forbearance indicate that banks are lending into worsening real estate conditions. One standard deviation in forbearance is associated with a 0.5% or 1.2% increase in vacancy rates, compared to standard deviations of 0.75% and 2.7% in the two time series (residential and Commercial apartment vacancy rates) respectively. These findings are consistent with forbearance exacerbating speculation in real estate.

7.2 Moral Hazard (institution-level responses to equity-based incentives)

When considering the choices a highly levered financial institution faces with a government guarantee of its debts, the classic model that presents itself is moral hazard. A common narrative of the S&L crisis–and many others since–is that high leverage prompts banks to make "Tails I win, heads you lose" bets. Contemporary anecdotal examples of unwise or socially undesirable loans included junk bonds and housing construction in the middle of the Arizona desert. Under moral hazard, we would expect that banks in the worst equity positions, who receive the most forbearance, to engage in greater degrees of speculative

lending.

While these results are purely correlative, at the institution-level, the evidence does not support a simple model of shifting incentives to equityholders. Table 7 tests if the amount of high risk loans in an institution's portfolio increases as its equity position decreases, and also separates out institution-level forbearance from the overall forbearance a state is receiving. Higher equity ratios are associated with fewer high risk loans overall, but –most importantly- below the cutoff, it is banks higher in capital ratio that hold more high risk loans on average. This could be consistent with gambling to get on the other side of a cutoff. The evidence is inconsistent with predictions from a simple model of moral hazard.

Column 2 of Table 7 indicates that the overall state-level forbearance has separate explanatory power. This could occur when other banks in a state are forced to compete for business and reported profits, offering new loan products or lending terms for instance, and become affected by forbearance through competitive forces regardless of individual equity ratios. This is a variation on Gresham's Law, where risk-hungry institutions force careful institutions into taking greater risks (FDIC, 1997; Hemel, 1985). Controlling for individual bank capital levels, one standard deviation in a state's level of forbearance is associated with 2.5% greater share of balance sheet dedicated to high risk loans. This evidence is consistent with more speculative lending being partially determined by the general levels of forbearance in the local banking industry and is also consistent with models of (troubled) banking industry equilibriums such as (Gorton and Rosen, 1995; Rajan, 1994).

7.3 Lack of Creative Destruction

Lending under the U.S. policy of capital forbearance does not appear to mirror Japan's lost decade, outside of evidence of a misallocation of credit. Results in Japan appear to be associated with stifling innovation and a lack of healthy industry participant turnover. In the US, we observe relatively higher job creation and job destruction rates, as well as greater business starts and patent filings during the period of forbearance (Table 4).

7.4 Looting

Another alternative interpretation of the crisis is that, at some point, a lack of capitalization leads to a lack of care in lending. At some point, it is simply more efficient to engage in outright criminal/fraudulent activity such as tunneling for private benefit or "looting" and this was especially associated with S&Ls (Akerlof and Romer, 1993). Table 8 tests whether forbearance is related to bank failures where criminal prosecution was cited by regulators and finds no strong relationship between forbearance–as measured in this paper–and the dollar amount of bank assets involved in criminal prosecutions of bank management or owners of S&Ls, normalized either by pre-crisis GDP or total crisis resolution costs for a state.[20]

7.5 Fire Sales and Overall Financial Distress

The final mechanism I consider is a difference in the nature of failures. If failures were better-handled prior to 1989, for example, we might pick up the effect of additional losses through forced closures and fire sales of banking assets (Shleifer and Vishny, 2010), or some effect of the overall distress in a state or timing of impairments to a state's credit apparatus, such as informational capital held by banks (Ashcraft, 2005).

Table 9 repeats the same main (instrumented) analysis of Table 2 with total crisis failure costs on the left hand side–in volume of failed banking assets and in dollar costs (losses from resolving failed bank assets by the supervisor), normalized by a state's 1977 GDP. I find a statistically clear and economically significant prediction of total failures or failure costs by F_s. However, the total amount of failures do not appear to sap explanatory power of the relationship to real GDP growth (when tabulated in Appendix Table I). Holding the

[20] Another straightforward, but untestable, reason for a growth in negative value loans, often offered anecdotally by both professionals and economists involved in regulatory clean-up and examination of the S&L crisis, is incompetence. Under regulatory forbearance, bank managers are required to grow their way out of their problem and into new higher return activities (in order to sufficiently improve their capital position). Dealing with commercial real estate lending may not have been a pursuit the thrift industry was ready for.

overall amount of financial distress in a state constant, allowing it to enter estimation as a separate treatment variable, the time-varying relationship of forbearance to growth holds, while if anything, forbearance possibly exaggerated losses from fire-sale dynamics.

7.6 Summary of Channel Evidence

Many of the documented facts are consistent with a model of credit-exacerbated speculation, and–as previously documented albeit with more correlative analysis during the S&L crisis–with the delayed timing of failures as increasing resolution costs. There is an asymmetry in the effects on broader economic activity comparing the intra-forbearance period (1982-1989) to subsequent years - estimated effect sizes tend to be larger in the post-forbearance period. When capital controls are re-implemented in 1989, the role collateral plays in the extension of credit might be especially prominent, given the impairment of both banks' and borrowers' balance sheets, exacerbating (and exacerbated by) further reductions in leverage.

8 Conclusion

In this paper I have empirically described a time-varying relationship between regulatory forbearance and real GDP growth during the U.S. Savings and Loan Crisis. I have delivered a series of estimates of the real effects of regulatory forbearance: some positive and immediate, others negative and larger in magnitude.

The economic paths of states diverge after the policy of regulatory forbearance begins in 1982. Forbearance is estimated to lead to relative shifts in speculative/real-estate backed credit and to have initial seemingly positive impacts on some aspects of commercial and real estate activity, although this does not consistently register in terms of aggregate output growth in the short-run. Ultimately though, after regulatory oversight is consolidated and the policy of forbearance ends in 1989, high forbearance states suffer asymmetrically larger and clearer declines in house prices and aggregate output growth. These negative differences in GDP coincide with the nationwide recession in 1990-1991.

This paper contributes an identification strategy for the economic effects associated with regulatory forbearance. I improve upon existing cross-country analysis of financial crisis policy by exploiting the within-country regulatory experiment provided by a specific crisis. The findings provide further evidence for changes in bank lending distorting financial and economic outcomes–a claim made by casual observers at the time of the S&L crisis. The effects do not appear to be as simple to explain as moral hazard by individual, undercapitalized banks; or by the overall amount of failures a state experiences.

A growing empirical literature finds evidence for a bank-borrower relationship where banks pass their problems onto borrowers during crises. I document another side to the bank-borrower relationship: banks can pass on the "easy credit" of a deregulatory carte blanche, temporarily stimulating certain sectors of the economy.

Figure 1 Simplified Diagram of U.S. Bank Supervision in 1980

This figure illustrates the two different supervising entities and deposit insurers (the FDIC and FSLIC) of thrift banks (Savings Banks and Savings and Loans) at the beginning of the S&L crisis. The structure shown remains in place until 1989. "FHLBB" refers to the Federal Home Loan Bank Board, of which the FSLIC was a subsidiary and only insured S&Ls. "FRB" is the Federal Reserve Board, "FRS" refers to the Federal Reserve System. "OCC" is Office of the Comptroller of the Currency.

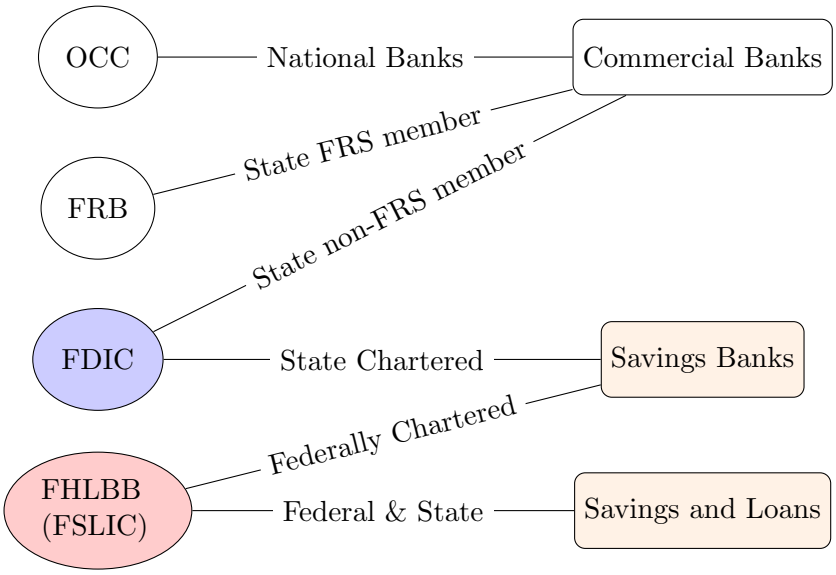

Figure 2 Real GDP Growth Associated with Forbearance

This figure plots mean real GDP growth by forbearance status of a state. "High Forbearance" is a binary indicator set to one for states in the top quartile of Forbearance as defined in equation (3). The official forbearance period shaded in grey is 1982-1989.

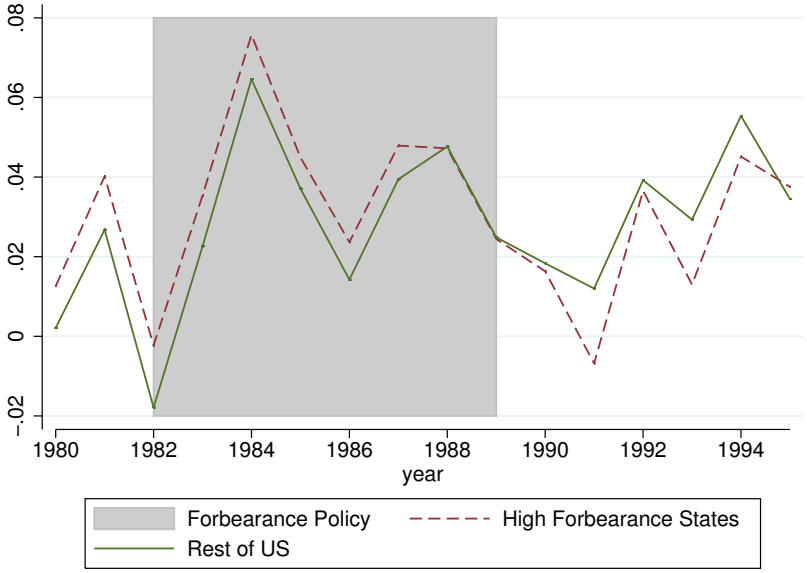

Figure 3 Geographic Variation in Instrumented Forbearance

This figure illustrates the within-region geographic distribution of residual variation in F_s, as predicted by two instrumental variables: a dummy for a state offering savings bank charters and F^d_{-s}. Darker states have greater within-region forbearance.

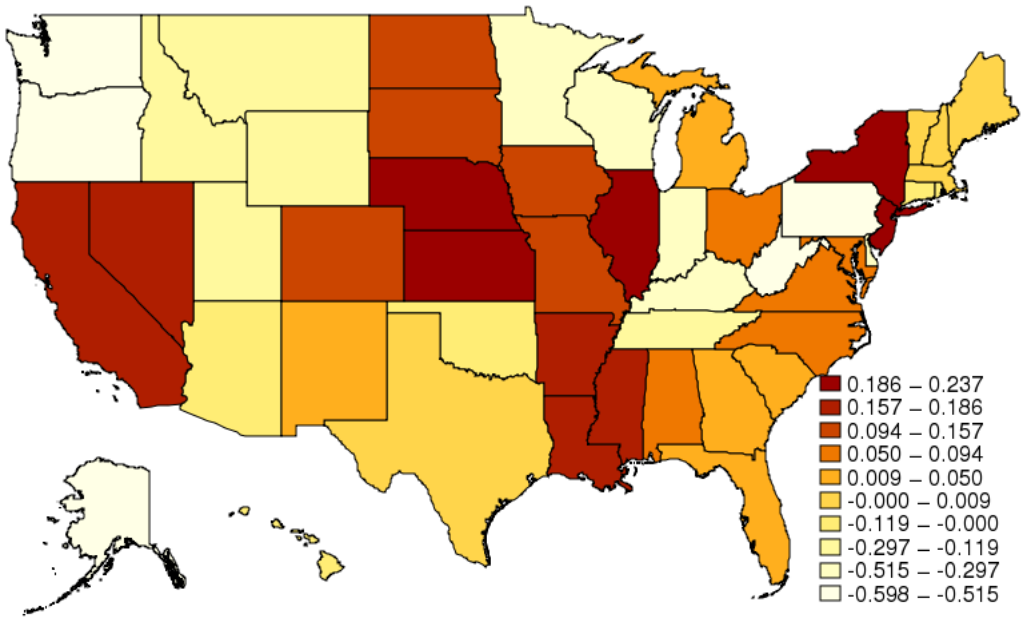

Figure 4 Medians of Economic Time Series

This figure plots medians of state-level economic time series. New business starts and Business Bankruptcy (BK) filing rates are normalised: new business establishments are z-scores constructed at the state level, business bankruptcies are presented as the number of filings per 10,000 population.

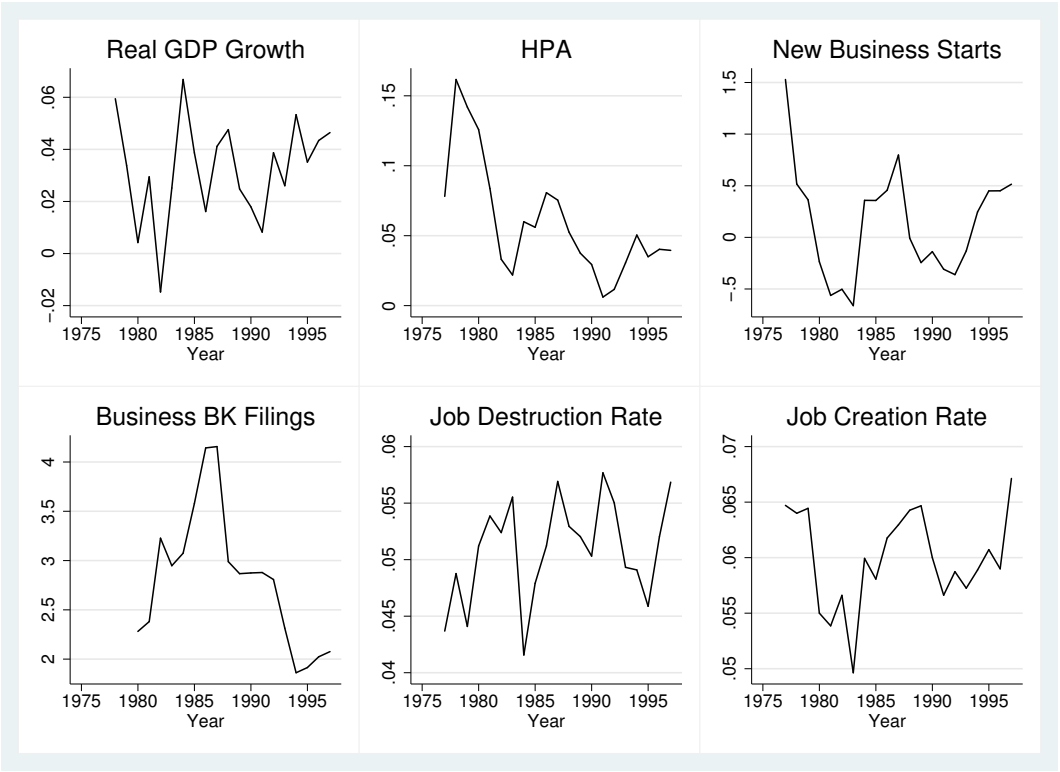

Table 1 Summary Statistics

The table presents the number of observations, mean, standard deviation, minimum and maximum of each variable.

Variable	#Obs	Mean	Std. Dev.	Min	Max
Institution-level					
Assets ($mln)	88,864	222	1,944	0.342	154,000
Equity ($mln)	88,864	12	95	-1,287	8,009
Non-perf. Asset Ratio	87,959	0.017	0.028	0.00	0.88
Residential mortgages/Assets	88,864	0.20	0.20	0	1
High Risk Loans/Assets	88,864	0.19	0.14	0	1
ROA	88,589	0.005	0.0214	-0.88	0.89
NIM	88,582	0.041	0.022	-0.53	4.0
State-level					
Growth in real GDP	1000	0.03	0.03	-0.06	0.11
HPA	1050	0.06	0.07	-0.16	0.39
New Firm Starts (z-score)	1050	0.0	1.0	-3.57	3.84
Business Bankruptcy Filing Rate (per 10,000 capita)	900	2.80	1.82	0.14	16.23
Job Destruction Rate	1050	0.05	0.01	0.03	0.10
Job Creation Rate	1050	0.06	0.01	0.03	0.12
State Savings Bank Charter	50	0.34	0.47	0.00	1.00
Forbearance (F_s)	50	0.79	0.47	0.00	1.62

Table 2 Relationship of Forbearance to Output Growth

This table reports estimates of 2SLS regressions, defined in equation (4) of the text. The dependent variable (real-per GDP growth) is observed at the state level. F_s is the state-level Forbearance measure as defined in equation (3). The instruments used in the first stage are i) a binary indicator for a state savings bank charter, and ii) the average forbearance in the same FHLB district excluding that particular state (F^d_{-s}). "Post-1982" is a binary indicator for the period forbearance began as an official policy, and equals 1 for the years 1982 onwards, 0 otherwise. "Post-1989" is a binary indicator for the period after forbearance ends as an official policy, and equals 1 for the years 1989 onwards, and 0 otherwise. "BEA Region" refers to Bureau of Economic Analysis region. Estimates use 1977 GDP as state-level weights.

	(1)	(2)	(3)
Dependent Variable:	Real GDP Growth		
Instrumental Variables:	$SavingsBankCharter_s$	$\bar{F}^d_{-s}$	*Both*
Post-1982 * $\hat{F}_s$	0.013*	-0.0046	0.0027
	(0.0079)	(0.0060)	(0.0057)
Post-1989 * $\hat{F}_s$	-0.022**	-0.027***	-0.025***
	(0.011)	(0.0070)	(0.0073)
BEA Region*time-period FEs	Y	Y	Y
State and Year FEs	Y	Y	Y
First-stage Kleibergen-Paap F stat.	16.6	22.9	29.6
N	1000	1000	1000
R^2	0.65	0.65	0.65

Standard errors clustered by state in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3 Relationship of Forbearance to Output Growth: County-level Analysis

This table reports estimates of 2SLS regressions of income growth at the county-level, conditional on a county lying next to a state boundary as detailed in Section 4. The dependent variable ("Per-capita Income Growth") is the growth rate in average BEA per-capita income and observed at the county level. F_s is the state-level Forbearance measure as defined in equation (3). Instruments used in the first stage are i) a binary indicator for a state savings bank charter, and ii) the average forbearance in the same FHLB district excluding that state (F^d_{-s}). "Post-1982" is a binary indicator for the period forbearance began as an official policy, and equals 1 for the years 1982 onwards, 0 otherwise. "Post-1989" is a binary indicator for the period after forbearance ends as an official policy, and equals 1 for the years 1989 onwards, and 0 otherwise. Estimates use 1977 population as weights.

	(1)	(2)	(3)
	Per-capita Income Growth		
Instrumental Variables:	$SavingsBankCharter_s$	$\bar{F}^d_{-s}$	*Both*
Post-1982 * $\hat{F}_s$	0.008***	-0.022	-0.0097
	(0.0020)	(0.031)	(0.018)
Post-1989 * $\hat{F}_s$	-0.012**	-0.025**	-0.020***
	(0.0048)	(0.012)	(0.0059)
Border FEs interacted with time-period indicators	Y	Y	Y
Year and County FEs	Y	Y	Y
N	38,304	38,304	38,304
R^2	0.39	0.27	0.34

Standard errors clustered by state in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4 Forbearance and Other Outcomes in the Real Economy

This table summarizes the second-stage estimates of 2SLS regressions, as defined in equation (4) of the text. The dependent variables (shown in left-most column) are annual outcomes observed at the state level. F_s is the state-level Forbearance measure, defined in equation (3). The instruments used in the first stage arei) a binary indicator for a state offering a savings bank charter, and ii) the average forbearance in a state's FHLB district, excluding that particular state. Variables are described in Section 4: "Job Creation Rate" and "Job Destruction Rate" are the number of new jobs and number of lost jobs over the year divided by the average number of jobs. "New business starts" is an in-sample, state-level z-score of new business establishments. "Business BK Filing Rate" is the number of corporate bankruptcy filings per 10,000 capita. "House Price Appreciation" is HPA as measured by CoreLogic. "New Building Permits" are number of building permits as recorded by U.S. Census normalized by 1977 GDP. "Patent Filings" are normalized by 1977 GDP. End date for analysis is 1997, and start dates differ by time series: 1976 for HPA, 1980 for bankruptcy filings, 1977 for job rates, 1977 for patents and 1978 for new building permits. Estimates use 1977 State GDP as weights.

	Forbearance		Post-Forbearance		
Dependent Variable	$\delta^0(\hat{F}_s)$	Std Err	$\delta^1(\hat{F}_s)$	Std Err	R^2
Job Creation Rate	0.0042**	(0.0020)	-0.0081***	(0.0021)	0.78
Job Destruction Rate	0.0057***	0.0016	-0.00072	(0.0023)	0.76
New Business Starts	0.26	(0.30)	-0.62**	(0.30)	0.55
Business BK Filing Rate	-0.11	(0.27)	0.062	(0.52)	0.71
House Price Appreciation (HPA)	0.047**	(0.018)	−0.095***	(0.026)	0.55
New Building Permits	0.060	(0.038)	-0.030	(0.068)	0.80
Patent Filings	-0.00008	(0.00059)	-0.0015	(0.0019)	0.88

Standard errors clustered by state in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 Differences in Lending Activity

This table reports the second stage estimates of 2SLS regressions using state-level observations, as defined in equation (4) of the text. "High Risk Loan Share" is total high risk loans divided by banking assets. "Mtg. Share" is total residential real estate loans divided by banking assets. "C&I Share" is total Commercial and Industrial loans divided by total banking assets. Controls left unreported. Estimates are presented using 1977 State GDP as weights.

Time Period:	1988		
	High Risk Loan Share	Mtg. Share	C&I Share
Forbearance ($\hat{F}_s$)	0.32^{***}	0.26^{***}	0.050
	(0.10)	(0.072)	(0.043)
BEA Region controls	Y	Y	Y
N	50	50	50
R^2	0.54	0.75	0.43

Heteroskedasticity-robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6 Forbearance and Real Estate Fundamentals

This table reports the second stage estimates of 2SLS regressions, as defined in equation (4) of the text. The unit of observation is state-level annual real estate outcomes. "Owner Vacancy Rates" are vacancy rates of residential homeownership as reported by the US Census Bureau. "Apt. Vacancy Rates" are commercial real estate (Apartment building) vacancy rates as reported at the MSA-level by REIS, with averages taken if more than one MSA is provided in a particular state. Controls are left unreported. Estimates are presented using 1977 State GDP as weights.

	Change in Owner Vacancy Rate (%)	Change in Apt. Vacancy Rate (%)
Time Period (Data Availability):	1986-1989	1982-1989
Forbearance ($\hat{F}_s$)	1.07***	2.52***
	(0.24)	(0.82)
BEA Region controls	Y	Y
N	50	29
R^2	0.36	0.49

Heteroskedasticity-robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7 Bank-level Analysis: Differences in High Risk Lending

This table reports estimates of OLS regressions. The unit of observation is bank-year, conditional on not failing each year, over the time period 1984-1989. The dependent variable for each specification is High Risk Loans/Total Assets, where High Risk Loans are loans falling into a number of categories as defined by the FDIC (details in Section 4).

	(1)	(2)
	High Risk Loans/Assets	
$\mathbb{1}\{Below\ 3\%\ Equity\ Capital\}$	-0.040***	-0.047***
	(0.012)	(0.011)
Equity Capital Ratio	-0.46***	-0.49***
	(0.097)	(0.087)
$\mathbb{1}\{Below\ 3\%\}$ * Equity Capital	1.39***	1.43***
	(0.38)	(0.38)
F_s		0.050***
		(0.029)
Constant	0.24***	0.19***
	(0.013)	(0.025)
N	84,753	84,753
R^2	0.009	0.021

Standard errors clustered at two levels, institution and year, and shown in parenthesis.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8 Forbearance and Fraud/Crime

This table reports estimates from the second stage of 2SLS regressions with state-level observations, as defined in equation (4) of the text. The dependent-variables are constructed using the numerator of S&L resolution costs reported by the RTC and FDIC as having involved criminal prosecution, taken from Akerlof and Romer (1993). F_S is the state-level Forbearance measure, defined in equation (3). The instruments used in the first stage are i) a binary indicator for a state offering a savings bank charter, and ii) the average forbearance in a state's FHLB district, excluding that particular state. "BEA Region" refers to Bureau of Economic Analysis region. Estimates are shown using 1977 GDP as state-level weights.

	(1) Criminal Costs as Share Pre-Crisis GDP	(2) Criminal Costs as Share Total Resolution Costs
Forbearance($\hat{F}_s$)	-0.0081	-0.45
	(0.0083)	(0.38)
BEA Region Controls	Y	Y
N	50	50
R2	0.28	0.035

Heteroskedasticity-robust standard errors shown in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9 Forbearance and Resolution Costs

This table reports estimates from the second stage of 2SLS regressions with state-level observations, as defined in equation (4) of the text. Total Failed Assets equals cumulative failures from 1984 to 1993. Resolution Costs are total dollar costs for the crisis as reported by the FDIC. Total Failed Assets and Resolutions Costs are both normalized by 1977 GDP. F_s is the state-level Forbearance measure, defined in equation (3). Instruments used are: i) a binary indicator for a state offering a savings bank charter, and ii) the exclusive average forbearance in that state's FHLB district. Weights used are a state's 1977 GDP.

	(1) Total Failed Assets as % Pre-Crisis GDP	(2) Total Resolution Costs as % Pre-Crisis GDP
Forbearance($\hat{F}_s$)	0.061^{***}	0.029^{**}
	(0.013)	(0.012)
BEA Region Dummies	Y	Y
N	50	50
R2	0.71	0.81

Heteroskedasticity-robust standard errors shown in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

I Appendix: Robustness Checks

Table 1 of this Appendix checks for balance by instrumental variables, testing for differences in ex-ante observables. Table 2 performs a series of additional robustness checks of the time-varying relationship of instrumented forbearance to output growth during and after the Savings & Loan Crisis. Overall, the estimates remain largely unchanged: post-forbearance outcomes are worse while there is no clear statistical difference in output growth during forbearance. In untabulated results, I also pursue county level analysis (examining cumulative payroll growth and changes in the number of establishments) and find similar results each way. The robustness tests applied by row of Appendix Table 2 are as follows:

Row 1. Ends time period under analysis in 1993 to check robustness to time period.

Row 2. Ends time period under analysis in 1991.

Row 3. Adds lagged Real GDP Growth as control to account for AR(1) nature of process.

Row 4. Controls for exposure to Oil/Energy and the influence of changes in petrol prices by allowing for changes in trend by state-level pre-crisis exposure to energy and oil industries (as share of GDP).

Row 5. Adds additional treatment variable of the total level of failed institutions (up until 1993, as % pre-crisis GDP), whether promptly failed or not, interacted with post-1982 and post-1989 time period indicators. This is to examine if analysis is picking up simply more or less distressed states.

Row 6. Examines point estimates if Delaware and South Dakota are removed from the estimation. As pointed out by Jayaratne and Strahan (1996), over this time period these states attract business from new incorporations and credit card banking.

Row 7. Presents OLS estimates

Row 8. Test alternative minimum capital definition for forbearance of 5%.

I.1 Cyclicality

A final concern is that forbearance may happen to correlate with pro-cyclical states that experience greater upturns and downturns. One observation inconsistent with a "pro-cyclical" alternative is that the decrease in bankruptcy filings associated with forbearance is counter-cyclical to the rising national median rates over the period 1982-1989. A clear test is to examine covariance with historical business cycles and see if the suggested pro-cyclicality holds. I estimate the covariance of the two instrumental variables and the raw measure of forbearance itself with nominal GDP growth in the preceding two decades and find no evidence for this. Appendix Table 3 illustrates that there are not systematically greater betas associated with forbearance or the instruments. I examine nominal GDP growth owing to the lack of availability of BEA regional deflators prior to 1977. Similar null results are found when predicting recessions.

Appendix Table 1: Pre-Crisis Balance of Instruments

This table checks for pre-existing differences in observables by instrumental variables, examining 1977 GDP levels, economic "leverage" (ratio of banking sector assets to GDP), 1977 population, the Herfindahl index of bank assets in a state, an indication of the banking concentration in a state, and industry exposures (Mining and Energy, Construction, Manufacturing, Transport, Trade, Service, Finance, Government).

	(1) 1977 GDP	(2) Pop.	(3) Leverage	(4) Herfindahl	(5) Mining %	(6) Construction	(7) Manu.	(8) Trans.	(9) Trade	(10) Service	(11) Finance	(12) Govt.
$\bar{F}^{d}_{-s}$	150596.5	5092923.9	44.2	-0.023	-0.030	-0.0023	-0.026	-0.0012	-0.000034	0.044*	0.015*	0.0012
	(89682.7)	(3647315.1)	(114.2)	(0.025)	(0.021)	(0.0065)	(0.034)	(0.0059)	(0.0074)	(0.023)	(0.0087)	(0.022)
BEA Region Dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	50	50	50	50	50	50	50	50	50	50	50	50
R2	0.29	0.31	0.30	0.29	0.40	0.46	0.59	0.44	0.46	0.34	0.33	0.30

	(1) 1977 GDP	(2) Pop.	(3) Leverage	(4) Herfindahl	(5) Mining %	(6) Construction	(7) Manu.	(8) Trans.	(9) Trade	(10) Service	(11) Finance	(12) Govt.
$SavingsBankCharter_s$	-97345.0	-3822805.6	-80.0	-0.013	0.00035	0.0012	0.038	0.0011	-0.00082	-0.042	-0.0014	0.0037
	(81493.6)	(3092769.4)	(52.7)	(0.023)	(0.0047)	(0.0032)	(0.022)	(0.0046)	(0.011)	(0.027)	(0.0053)	(0.029)
BEA Region Dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	50	50	50	50	50	50	50	50	50	50	50	50
R2	0.27	0.31	0.32	0.29	0.35	0.46	0.60	0.44	0.46	0.38	0.29	0.30

Heteroskedasticity-robust standard errors shown in parenthesis. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Appendix Table 2: Summary of Robustness Checks

This table reports a summary of multiple weighted 2SLS estimates of (4). Instrumental variables used are an indicator for whether a state offers savings bank charters, and the average forbearance in a state's FHLB district, excluding that particular state. BEA region controls are used throughout. A description of each specific test is shown in bold. Row (1) abbreviates the dataset to 18 years in total, Row (2) shortens the dataset to 16 years. Row (3) adds lagged real GDP growth as a control. Row (4) allows for changes in trend by state-level exposure to the energy and oil industries, specifically using the 1977 share of GDP as an additional treatment variable. Row (5) adds as an additional treatment variable (interacted with time period) the cumulative sum of failed banking assets from 1984-1993. Row (6) compares point estimates removing DE and SD, which are known to have had unusual growth in financial and economic activity. Row (7) presents unweighted estimates. Row (8) uses a 5% minimum capital requirement to measure forbearance.

Robustness Check	Intra-Forbearance δ^0	Post-Forbearance δ^1	R^2
1. End analysis in 1993	0.0027	-0.033***	0.71
2. End analysis in 1991	0.0027	-0.029***	0.74
3. Lagged RGDP growth	-0.0011	-0.021***	0.68
4. Pre-crisis Energy/Oil GDP (%total) as treatment	0.0040	-0.027***	0.62
5. Distress as treatment	0.0050	-0.026***	0.68
6. Remove Delaware and South Dakota	0.0037	-0.026***	0.68
7. OLS estimation	-0.0027	-0.015*	0.53
8. Alternative definition F_s (5% capital)	0.0046	-0.018***	0.65

Appendix Table 3: Preceeding Relationship of Output Growth to IVs and High Forbearance States

This table estimates the systematic covariation of states' nominal gdp growth over the period 1964-1977 with the two instrumental variables and forbearance. The dependent variable is a state's nominal GDP growth. The independent variables studied are: a binary indicator for a state offering a savings bank charter, the average measure of forbearance in an FHLB district excluding that particular state, and F_s.

	(1)	(2)
	GDP Growth (%)	
GDP Growth * $StateBankCharter_s$	-0.40	
	(0.25)	
GDP Growth * F^d_{-s}	-0.055	
	(0.30)	
GDP Growth * Forbearance (F_s)		0.006
		(0.17)
GDP Growth	1.35***	1.17***
	(0.33)	(0.17)
State FEs	Y	Y
N	700	700
R^2	0.32	0.32

Standard errors clustered at the state level shown in parenthesis.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

References

Akerlof, G. A. and P. M. Romer (1993). Looting: the economic underworld of bankruptcy for profit. *Brookings Papers on Economic Activity*, 1–73.

Akerlof, G. A. and R. J. Shiller (2015). *Phishing for Phools: The Economics of Manipulation and Deception*. Princeton University Press.

Ashcraft, A. B. (2005). Are banks really special? new evidence from the fdic-induced failure of healthy banks. *The American Economic Review 95*(5), 1712.

Bernanke, B. S. (1983). Non-monetary effects of the financial crisis in the propagation of the great depression. Report, National Bureau of Economic Research.

Bernanke, B. S. and C. S. Lown (1991). The credit crunch. *Brookings papers on economic activity*, 205–247.

Boyd, J. H., S. Kwak, and B. Smith (2005). The real output losses associated with modern banking crises. *Journal of Money, Credit and Banking*, 977–999.

Caballero, R. J., T. Hoshi, and A. K. Kashyap (2008). Zombie lending and depressed restructuring in japan. *The American Economic Review*, 1943–1977.

Calavita, K., H. N. Pontell, and R. Tillman (1997). *Big Money crime: Fraud and Politics in the Savings and Loan Crisis*. Univ of California Press.

Chakraborty, I., I. Goldstein, and A. MacKinlay (2016). Housing price booms and crowding-out effects in bank lending.

Claessens, S. and M. M. A. Kose (2013). *Financial Crises Explanations, Types, and Implications*. International Monetary Fund.

Dell'Ariccia, G., E. Detragiache, and R. Rajan (2008). The real effect of banking crises. *Journal of Financial Intermediation 17*(1), 89–112.

Demirgüç-Kunt, A., E. Detragiache, and P. Gupta (2006). Inside the crisis: An empirical analysis of banking systems in distress. *Journal of International Money and Finance 25*(5), 702–718.

FDIC (1997). *History of the Eighties: Lessons for the Future*. Federal Deposit Insurance Corporation.

Fisher, I. (1933). The debt-deflation theory of great depressions. *Econometrica: Journal of the Econometric Society*, 337–357.

GAO (1983). The FSLIC insurance fund - recent management and outlook for the future. *GGD-84-3*.

GAO (1984). Net worth certificate programs: Their design, major differences, and early implementation.

Geanakoplos, J. (2001). Liquidity, default and crashes: Endogenous contracts in general equilibrium.

Gibson, M. S. (1995). Can bank health affect investment? evidence from japan. *Journal of Business*, 281–308.

Gorton, G. and R. Rosen (1995). *Banks and derivatives*, pp. 299–349. MIT Press.

Gorton, G. B. and G. Ordoñez (2012). Collateral crises. Report, National Bureau of Economic Research.

Hemel, E. I. (1985). Deregulation and supervision go together. *Outlook of the Federal Home Loan Bank System*.

Holmes, T. J. (1995). The effects of state policies on the location of industry: evidence from state borders.

Hoshi, T. and A. K. Kashyap (2004). Japan's financial crisis and economic stagnation. *Journal of Economic Perspectives*, 3–26.

Hoshi, T. and A. K. Kashyap (2015). Will the us and europe avoid a lost decade? lessons from japan's postcrisis experience. *IMF Economic Review 63*(1), 110–163.

Ivashina, V. and D. Scharfstein (2010). Bank lending during the financial crisis of 2008. *Journal of Financial economics 97*(3), 319–338.

Jayaratne, J. and P. E. Strahan (1996). The finance-growth nexus: Evidence from bank branch deregulation. *The Quarterly Journal of Economics 111*(3), 639–670.

Jonung, L. (2009). The swedish model for resolving the banking crisis of 1991-93. seven reasons why it was successful. Report, Directorate General Economic and Monetary Affairs (DG ECFIN), European Commission.

Jordà, O., M. Schularick, and A. M. Taylor (2013). When credit bites back. *Journal of Money, Credit and Banking 45*(s2), 3–28.

Jordà, O., M. Schularick, and A. M. Taylor (2014). The great mortgaging: housing finance, crises, and business cycles. Report, National Bureau of Economic Research.

Kandrac, J. and B. Schlusche (2017). The effect of bank supervision on risk taking: Evidence from a natural experiment.

Kane, E. J. (1987). Dangers of capital forbearance: The case of the fslic and "zombie" s&ls. *Contemporary Economic Policy 5*(1), 77–83.

Kane, E. J. (1989a). Changing incentives facing financial-services regulators. *Journal of Financial Services Research 2*(3), 265–274.

Kane, E. J. (1989b). The high cost of incompletely funding the fslic shortage of explicit capital. *The Journal of Economic Perspectives*, 31–47.

Kiyotaki, N. and J. Moore (1997). Credit cycles. *The Journal of Political Economy 105*(2), 211–248.

Laeven, L. and F. Valencia (2008). Systemic banking crises: a new database. *IMF Working Papers*, 1–78.

Leamer, E. E. (2007). Housing is the business cycle. Report, National Bureau of Economic Research.

Peek, J. and E. S. Rosengren (2000). Collateral damage: Effects of the japanese bank crisis on real activity in the united states. *American Economic Review*, 30–45.

Peek, J. and E. S. Rosengren (2005). Unnatural selection: Perverse incentives and the misallocation of credit in japan. *American Economic Review 95*(4), 1144–1166.

Rajan, R. G. (1994). Why bank credit policies fluctuate: A theory and some evidence. *The Quarterly Journal of Economics*, 399–441.

Santos, J. A. (2010). Bank corporate loan pricing following the subprime crisis. *Review of Financial Studies*.

Shleifer, A. and R. W. Vishny (2010). Fire sales in finance and macroeconomics. Report, National Bureau of Economic Research.

Strahan, P. E. (2003). The real effects of us banking deregulation. *Review-Federal Reserve Bank Of Saint Louis 85*(4), 111–128.

Wadhwani, R. D. (2011). *Why does the US have a weak mutual savings bank sector?*