Does Going Easy on Distressed Banks Help the Macroeconomy?

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Abstract

During banking crises, governments often refrain from closing or taking over troubled banks. I estimate the effects of this "regulatory forbearance" on the macroeconomy by comparing states with differing levels of forbearance during the U.S. Savings and Loan Crisis. I use the diffusion of a particular bank charter during the 1800s to instrument for the extent of forbearance. High forbearance states initially experience greater lending and real estate activity, but subsequently suffer larger declines in real estate, credit, and aggregate output growth after forbearance ends in 1989. Estimated magnitudes indicate that stricter regulatory policy could have avoided the 1990-1991 recession.

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I. Introduction

When faced with a systemic banking crisis, regulators often avoid closing banks. In the recent financial crisis, as in most crises over the past 30 years, political administrations instead "kick the can down the road" and hope that economic conditions improve (Acharya et al., 2011). This act of not closing insolvent banks is referred to as regulatory forbearance.

Despite the economic importance of policy response to a financial crisis, the impact of such regulatory forbearance on the real economy is not well understood. Empirical evidence suggests that the forced closure of banks disrupts the credit supply and dampens economic growth (Ashcraft, 2005; Bernanke, 1983). Enforcing capital requirements through bank closures can also lead to unnecessary losses from forced asset sales (Shleifer and Vishny, 2010). On the other hand, highly leveraged banks may engage in socially undesirable behavior, owing to moral hazard or misaligned managerial incentives (Akerlof and Romer, 1993; Gorton and Rosen, 1995; Rajan, 1994).

I investigate the effects of regulatory forbearance in the context of the United States Savings and Loan ("S&L") crisis. I take advantage of geographic variation in regulators' scope for forbearance during this crisis, arising from arbitrary patterns of bank expansion in the 1800s. Using this historical institutional variation as an instrument for the forbearance of undercapitalized banks from 1982 to 1989, I compare the outcomes of states in which a large fraction of distressed banks were promptly failed against the outcomes of states where similar banks were allowed to continue to operate. I estimate that forbearance had an immediate, positive, effect on lending and real estate activity. However, after forbearance is removed and coincident with a nationwide recession in 1991, the estimated impacts are more widespread: contractions in real estate and credit are accompanied by an average decline of more than 3% in real GDP.

At the center of this crisis were "thrifts", banks that traditionally focused on encouraging saving and providing home mortgages to their local community.[1] In the early 1980s, high interest rates rendered many thrifts insolvent by reducing the market

[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.

value of their primary asset: long-duration mortgages fixed at lower rates. These thrift insolvencies affected two different federal deposit insurance funds. Specifically, the Federal Deposit Insurance Corporation (FDIC) insured both thrifts (savings banks) and non-thrifts (commercial banks), while the Federal Savings and Loan Insurance Corporation (FSLIC) insured only thrifts. Because of its limited human and capital resources and its concentration of losses, the FSLIC was forced into a policy of greater regulatory forbearance (Kane, 1987).[2] Differences in regulatory policy continued until 1989 when management of the two deposit insurance funds was consolidated. Figure 1 diagrams pre-crisis bank supervision.

The existence of two deposit insurance funds with two different responses to the same thrift problem provides a natural experiment in regulatory policy. Because of differences in regulatory oversight, some states experienced greater forbearance than others. I exploit this variation to contribute to the study of financial crises and identify a link between prolonged regulatory forbearance and aggregate output growth.

To investigate the relationship between forbearance and the broader economy, I first develop a state-level measure of forbearance as the key independent variable of interest. I define forbearance as the sum of asset-weighted residuals from a simple model of bank failure, which uses an extensive set of annual historical institutional and state-level explanatory variables. In this paper, then, "forbearance" is the econometrically surprising lack of failures in a particular state compared to national norms.

Figure 2 illustrates the difference in real GDP growth between states in the top quartile of this measure of forbearance ("High Forbearance" states) and others. Before the official start of forbearance in 1982 there are no consistent differences between high and low forbearance states.[3] During the forbearance period, a small positive differential develops. Most strikingly, after forbearance ends seven years later in 1989,[4] the relationship to growth is clearly negative.

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

A natural concern before proceeding to a formal difference-in-differences analysis is that the parallel trends assumption does not hold. For example, regulators may incorporate knowledge about future regional economic outcomes into strategic decisions of which banks to fail. In order to address such endogeneity concerns, I instrument for forbearance to explicitly take advantage of regulatory variation. The estimates from that analysis do not differ significantly from a simpler difference-in-differences analysis. I also note that the usual concept of where forbearance should be applied—as a temporary measure to weather a downturn until an economy returns to 'normal'—would bias against finding a short-term positive relationship to output growth.

The first instrumental variable I use is an indicator for whether a state offers savings bank charters. I exploit the historical accident that this form of thrift (the savings bank) only reached certain states in the 1800s.[5] As they are are insured by the FDIC, states with savings banks had a lower share of thrift assets insured by the FSLIC (the "slow to fail" deposit insurance fund) during the S&L crisis, and hence receive less forbearance. The diffusion of savings bank charters appears to be unrelated to the economic characteristics of particular states (further discussion is provided in Section V). I control for general economic region by using Bureau of Economic Analysis (BEA) region fixed effects when using instrumental variables. The exclusion restriction is then: whether a state offers a savings bank charter within a BEA region is unrelated to changes in a state's economy during the S&L crisis, except through its effect on regulatory coverage.

In addition to not having a-priori reasons for a relationship between state savings banks charters and subsequent changes in economic trends during a crisis, I check ex-ante economic observables of states and find no differences. In addition I test to see if my instrumental variables select more pro-cyclical states by examining previous "placebo" business cycles and find that this is not the case.

For robustness I introduce a second instrumental variable: the average of forbearance in state *j*'s Federal Home Loan Bank (FHLB) district, excluding state *j* itself. This takes advantage of persistent differences in the speed of bank closure by different regulatory district. The twelve FHLB districts were drawn up in the Great Depression,

[5] The modern savings bank model first reaches the U.S. in Philadelphia from Scotland in 1816.

and each has different and persistent operational constraints. While the instruments are only weakly correlated with each other, results are of similar magnitude.

One arguable drawback of an identification strategy relying on institutional details is that the estimates necessarily come from a specific crisis and time period. However, I argue that in addition to providing causal estimates, the natural experiment in banking regulation the S&L Crisis provides is quite relevant today,[6] and broadly relevant for our understanding of the credit channel.

Viewing forbearance as a rightwards shift in the loan supply curve, I find further evidence for a supply-side interpretation of stylized facts from broader, correlative, studies of business cycles and financial crises (Jordà et al., 2014; 2013; Leamer, 2007). I find that forbearance leads to an expansion and accompanying boom in real estate, followed by a subsequent credit contraction and crash in real estate prices. Forbearance leads to significant estimated increases in construction activity, house price appreciation, and GDP growth from the real-estate sector, which, after forbearance is removed, are followed by larger declines in the same variables and also aggregate output growth.

At the same time as an expansion in real-estate activity, banks in high forbearance states experience higher earnings. This observation is consistent with a model in which liberal credit policies by banks, focusing on a particular asset class, exacerbate speculation and boost current reported earnings at the expense of future earnings and true economic value creation (Rajan, 1994). Consistent with contemporary reports of a thrift industry growing into new and unwise investment opportunities, I find the subsequent decline in real GDP to be greater in states that experienced greater growth in "High Risk" commercial real estate loans during the forbearance period.[7]

Unlike the lack of innovation associated with government-directed forbearance lending in Japan (Caballero et al., 2008), I find no evidence that the unfettered forbearance the U.S. pursued results in unhealthy product-market competition. Forbearance is positively associated with job-creation and new business starts, and has no observable relationship to patent filings growth. I also do not find evidence that would

[6] "Very few of us like to be confronted with unpleasant choices. […] European politicians faced unpleasant choices and had to respond. But rather than decisively addressing the problem, they essentially opted to kick the can down the road." *Mohamed El-Arian, "Europe Struggles with Bad Choices," Reuters, 2011*

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

support interpreting my measurement of forbearance as related to fraudulent activity by management or shareholders (Akerlof & Romer, 1993).

One alternative interpretation of the forbearance policy is that it led to a difference in bank failures, rather than a difference in the supply of loans. Perhaps bank assets or operations were liquidated (sold) less efficiently after the end to forbearance in 1989. I test for this, and similar alternatives, and find that the estimated relationships between forbearance and output growth do not quantitatively change when controlling for total liquidated assets and the costs of liquidations. I cannot address a related point that we are missing a counterfactual of "infinite forbearance." This paper's estimates are conditional on an end to capital forbearance.

Previous studies of policy responses to financial crises examine correlations between policy responses and GDP growth across numerous countries and crises (Boyd et al., 2005; Dell'Ariccia et al., 2008). A separate strand of literature measures the effects of specific banking crises on borrowers or sectors of the economy, employing novel identification strategies such as the timing of a foreign crisis or the uncertain timing of a large bank failure (Caballero, Hoshi and Kashyap, 2008; Ivashina and Scharfstein, 2010; Peek and Rosengren, 2000; Santos, 2010). My principal contribution is to bridge these literatures and measure the effect of a single regulatory policy on aggregate growth.

In an empirical study closely related to this paper, Bernanke and Lown (1991) ask if the 1990-1991 recession was caused by a failure in the credit channel, examining aggregate state-level average capital ratios. In contrast to their analysis, I take heterogeneity across financial institutions into account and find a strong relationship between financial distress and low economic activity. I find that the evidence agrees with a "credit-crunch" view of the 1990-1991 recession, a view held by observers at the time but one for which Bernanke and Lown find no evidence.

The rest of the paper is structured as follows: Section II reviews the theoretical and empirical evidence on potential effects of regulatory forbearance; Section III provides historical background on the Savings and Loan crisis; Section IV describes the historical dataset and defines the key treatment policy variable of forbearance; Section V presents the empirical methodology and identification strategy; Section VI follows with the results; Section VII explores the channel; and Section VIII concludes.

II. Regulatory Policy Responses and the Real Economy: Previous Evidence

Cross-country comparisons of historical banking crises paint a suggestive picture of the real effects of forbearance. During the early 1990s, Japanese regulators failed to recognize losses in a timely manner and encouraged lending to less financially sound borrowers and industries (Caballero, Hoshi and Kashyap, 2008). On the other hand, Scandinavian regulators moved swiftly to resolve undercapitalized institutions, to separate assets into bad banks, to arrange public takeovers and to force existing shareholders out of failed institutions. Scandinavia enjoyed a quick recovery (Jonung, 2009), while Japan is still recovering today.[8]

Japan provides a protracted period of forbearance for study. Gibson (1995) finds banks pass their problems onto borrowers, lowering their investment. Peek and Rosengren (2005) find inefficient lending practices hurt Japanese banks' own profits. Hoshi and Kashyap (2004) find that a delay in bank recapitalization, coupled with government-encouraged lending, is at least partly to blame for the lost decade. Caballero, Hoshi and Kashyap (2008) find that lending to "zombie borrowers" reduced healthy product market competition.

Forbearance leads to low levels of capital we would not normally observe, and these low bank capital levels are important to the extent that they introduce additional frictions to the credit channel and the traditional functions of financial intermediaries such as screening, contracting, monitoring of loans, and maturity transformation. Theoretically, low capital levels can exacerbate any of the classic frictions suggested by corporate finance models: moral hazard and asymmetric information between bank management, shareholders, depositors and regulators. The question is whether the costs of increasing these frictions outweigh the costs of bank closures. Allowing financially troubled banks to continue operating could encourage 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" to the next administration. It might

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

not be a coincidence that both Japan and the U.S. received new supervisory structures (and in the U.S., a new administration[9]) before bank losses were materially recognized (Hoshi and Kashyap, 2015; Kane, 1989a).

Models that predict negative effects from forbearance still allow unrelated *benefits* of forbearance. For example, avoiding the failure of a financial intermediary delays the costs of shutting down a credit factory. These costs are associated with long-lasting reductions in county-level income due to imperfect credit markets (Ashcraft, 2005). Kryzanowski and Roberts (1993) find that forbearance gave many insolvent Canadian banks time to regain their health from 1922 to 1940. Dell'Ariccia, Detragiache and Rajan (2008) look at correlations between policy responses and economic growth in a cross-country study and find a weakly positive result for forbearance as a policy. However, they only examine concurrent outcomes. The US Savings and Loan crisis is one of the few instances of a pure forbearance policy response available for their analysis, and if attention is restricted to concurrent rather than long-run outcomes, then this paper's results agree with their findings.

III. Background on Savings Banks, Savings & Loans, and the Crisis

Both savings banks and savings and loans are a form of financial intermediary known in the U.S. as "thrifts." Historically, savings banks gathered community deposits and promoted thrift in local communities. Savings and loans[10] were formed as cooperative organizations to rotate the financing of new home construction as well as provide savings opportunities for the depositing cooperative. In contrast, the original savings banks business model was to encourage deposits and re-deposit them at larger financial institutions, invest in government bonds, or lend to the lowest-risk credits.

While early balance sheets differed, by 1980 the two mandates were equivalent. Both national savings banks and savings and loans shared a federal regulator (the Federal Home Loan Bank Board or FHLBB, of which FSLIC was a subsidiary), but supervision—and hence forbearance—of state-chartered institutions varied at the

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

[10] "Savings and loans" were first known as "Building Societies" when they formed in the UK, then "Building and Loan" societies when they first formed in the US.

beginning of the crisis. States outsourced the supervision of state-chartered savings banks to the FDIC, whereas savings and loans were supervised by the local Federal Home Loan Bank (FHLB). The main business of each district's FHLB was to make super-senior advances to its owners (its local savings and loans). The head of each of the 12 FHLBs was the ultimate Principal Supervisory Agent (PSA) for savings and loans in its region. Both the FDIC/FSLIC distinction and FHLB districts will be used for identification strategies described in Section V.

I briefly note that the analysis in this paper tests a joint hypothesis, not only that forbearance is relevant, but also that banks were important locally (and less immediately substitutable by other, nonbank, sources). At the time of this crisis, many branching restrictions were still in place—they were subsequently lifted nationwide in 1994—and most bank lending, either residential or small businesses, was done locally.

Background on the Savings and Loan Crisis

Before the crisis, thrift charters were far more restrictive than commercial bank charters in terms of the activities they could pursue: for example, they could not lend to businesses, and until 1980, thrift deposits were non-demand in nature, i.e. checking accounts were not offered. In 1981-1982, the thrift industry experienced its worst financial operating results since the Great Depression, when the federal deposit insurance funds (FDIC and FSLIC) were created. As a result of their exposure to long-term fixed rate residential mortgages, thrifts' net worth declined by about one-quarter as short-term deposit rates rose. Estimated costs to resolve underwater institutions were $25-$100 billion; the FSLIC had only $6 billion in reserves (Kane, 1989b); and the federal government faced the choice of letting FSLIC fail and making up the difference with tax revenue, or engaging in forbearance.

In response to rising interest rates, regulators lifted interest rate caps in 1980, allowed on-demand deposits, and raised deposit insurance limits to $100,000 (from $40,000). The policy of regulatory forbearance started in 1982 with the passing of the Garn-St. Germain (or "Net Worth Certificate") Act in "an attempt to address [thrifts'] interest rate mismatch." This act allowed regulators to ignore banks' undercapitalization, issue "net worth certificates" (fictional capital), and broadened the business lines thrifts

could pursue (FDIC, 1997). Regulators encouraged 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, regulatory headcount decreased in the early years of the crisis owing to funding freezes or cuts.[11]

Capital requirements were also reduced in 1982 from 5% to 3%. Garn-St. Germain also relaxed reserve requirements. The FHLBB took advantage of the flexibility afforded to it by the act to move to a new accounting method using "appraised equity value." Thrifts were also allowed to use an average of assets over the previous four years and the current year's (much larger) assets, benefiting capital measurements for rapidly growing institutions. The FHLBB's implementation of net-worth certificates led to the least-healthy banks gaining more assistance (at the cost of the more healthy) than they did under the FDIC's implementation (GAO, 1984). New thrifts were given 20 years to reach the required capital levels, so an entrant into the industry needed to have initial net worth of only 0.15 percent of assets. Thrift owners at this time who were also land developers could deed difficult-to-value land or other assets as a contribution to capital (Akerlof and Romer, 1993).

Market participants reacted to the changes in regulatory policy. New S&L charters grew 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 more blatant 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 were.

Typically the researcher's challenge is to disentangle the effects of a financial crisis from the effects of aggregate demand changes, since 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

[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 & Romer, 1993)

institutional failures contemporaneous with positive output growth (Claessens and Kose, 2013). A nationwide drop in output growth did eventually occur in the U.S., but almost a decade after the en-masse forbearance of troubled financial institutions began. The final phase of the crisis started with the passage of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA).

By 1989, FIRREA brought with it a change in supervisory oversight and removed the variation in regulatory polices: the FSLIC was closed down and the FDIC assumed responsibility for the insurance activities of the FSLIC, while supervisory oversight of Savings and Loans was removed from the FHLB system to the new Office of Thrift Supervision (OTS). FIRREA ensured adequate capital for closing financial institutions, abrogated existing forbearance agreements, re-constricted bank mandates to pre-forbearance levels (e.g. no junk bond investments), and introduced the Resolution Trust Company (RTC) for faster resolution of ostensibly dead but not-yet-failed institutions.

IV. Measuring Forbearance and Dataset Description

In this section, I describe the dataset and construction of the key treatment policy variable. The historical dataset, obtained from the FDIC at the author's request, combines quarterly Thrift Financial Reports (for FSLIC-insured institutions) and Call Reports (for FDIC-insured banks) filed from the first quarter of 1984 onwards. These are institution (bank company) level financial reports providing balance-sheet information. Therefore forbearance is measurable from the first date thrift report data are available (Q1 1984), to the introduction of the Resolution Trust Corporation (RTC) and the end of the FSLIC in the middle of 1989.[12] This dataset starts two years into the seven years of the official policy of forbearance (1982-1989) owing to the start date of regular thrift financial reporting.[13] Discarding any observations of institutions that are uninsured or located outside of the 50 states, I estimate a failure model for each year using ex-ante observables.

[12] Results are similar whether including or not including failure surprises from 1989.
[13] The start date of the institutional data (1984) happens to coincide with the Reinhart-Rogoff timing of the start-date of this crisis.

Definition of Treatment Policy Variable (Forbearance)

I estimate a linear probability model of the failure of financial institution *i* at the end of year *t* using nationwide observations as specified in [1]. The residuals from yearly estimations provide an approximation of the extent to which a particular bank's failure, or lack of failure, is a surprise given the treatment of other banks in similar observable distress. The institution-level variables I use are standard in the bank failure literature. The intent is to arrive at a simple state-level measure of forbearance that does not simply count the number of failures (as then we would simply identify areas that were more or less financially distressed), but depends on the degree to which the absence of failure is unexpected given the banks' financial position and economic conditions for that state. I use a sum of the asset-weighted residuals (so larger surprises for larger banks count more) from this estimation to generate an aggregate measure of forbearance as shown in [2] and [3]:

$$failure_{i,s,t+1} = \alpha + \beta_1 \left(\frac{Equity}{Assets}\right)_{i,t} + \beta_2 ROA_{i,t} + \beta_3 NIM_{i,t} + \beta_4 \left(\frac{NPLs}{Assets}\right)_{i,t} + \beta_5 \left(Residential\frac{Mortgages}{Assets}\right)_{i,t} + \beta_6 \mathbf{1}_{\left\{\left(\frac{Equity}{Assets}\right)_{i,t} < 0.05\right\}} + \sum_{j=1}^{5} \delta_j \,\%\Delta RealGDP_{s,t-j} + \gamma' Industry_s + \varepsilon_{i,s,t} \quad [1]$$

$$Annual\ forbearance\ (f_{st}) = \frac{-\sum_{i \in I_{s,t}} \hat{\varepsilon}_{i,s,t} \cdot Assets_{i,t}}{\sum_{i \in I_{s,t}} Assets_{i,t}} \quad [2]$$

$$Forbearance\ (F_s) = \sum_{t=1984}^{1988} f_{s,t} \quad [3]$$

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 residuals $\hat{\varepsilon}$ from the annual hazard rate prediction in [1], and *F* is a cumulative sum of forbearance over the period for which data is available for. All variables are as of the beginning of each period.

The institutional covariates used in the hazard model are capital (Equity/Assets), Return on Assets (ROA), Net Interest Margin (NIM), non-performing loans (NPLs), residential mortgages, and a binary indicator variable for whether the bank is

undercapitalized (compared to regulatory thrift limits of 5% prior to the crisis) to allow for a nonlinear relationship between capital and failure. Regional (state-level) covariates include: a history of real state GDP growth and a set of controls for the industry exposure of a state as measured by the employment share of population in each one digit SIC code, following Strahan (2003). A geographic heat-map of F_S, the resulting forbearance measure, is presented in Figure 3.A and Figure 3.B illustrate the distribution of the measure of forbearance with a histogram of f_{st} and F_s.

Definition of failure

I define an institution as failed if it is closed by the relevant regulatory authority, or if management is removed through "Open Bank Assistance" (OBA). OBA occurs when a regulator replaces former management and enters into an agreement to let the legal entity of the bank survive.

Definition of a capital forbearance measure (CF)

In addition to measuring forbearance as a "surprising lack of failures", I also use a simple capital-based measure of forbearance. I define capital forbearance (CF) as occurring if an institution is under 5% equity capital at the beginning of a year and not closed by the end of that year. I then asset-weight these occurrences across a state, sum over the observation period, and divide by the 1984 level of assets for the state.

This measure is potentially troubling for a difference-in-differences analysis, as financial institutions would naturally have low capital levels in areas with previously worse economic outcomes, leading to an expected deviation from the parallel trends assumption. It also fails to distinguish between different levels of bank distress or other observables. Therefore, I use this purely capital-based measure only as a robustness test.

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) converted into per-capita growth using population levels from the U.S. Census Bureau; House Price Appreciation (HPA) from the Federal Housing Finance Agency (from 1976 onwards); loan growth (state-wide changes in nominal loan balances available from 1984 onwards); business bankruptcy filings from

the American Bankruptcy Institute (available from 1980 onwards) converted into per-capita rates; and job destruction and job creation rates[14] from the Census Bureau Business Dynamics Statistics (BDS). Figure 4 charts median levels of these outcome variables over time.

In additional tests to identify a channel for any relationship between forbearance and the real economy, I obtain patent filings from the USPTO, building permits from the U.S. Census, and total resolution costs associated with criminal cases from Akerlof and Romer (1993).

Table 1 presents a summary of all 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. Any independent variables used in prediction of failure in the first stage model are winsorised 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.

V. Empirical Methodology and Identification Strategy

My primary empirical strategy is to examine the relationship between the state-level measure of forbearance, F_s, and state economic outcomes. I do this first in a descriptive time-flexible manner. I then choose two time periods for a difference-in-differences analysis, before my main specification that instruments for forbearance. I pursue the flexible analysis first, because of a lack of a strong prior on the timing of any relationship between forbearance and economic outcomes. I allow for the relationship between forbearance and outcomes to vary over time by estimating the following regression:

[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.

1. Time-Flexible Specification

$$y_{st} = \alpha_s + \alpha_t + \delta_t F_s + X_{st}\beta + \varepsilon_{st} \quad t= 1978,\ldots,1997 \qquad [4]$$

Here, y is the economic variable of interest (e.g. real GDP growth), F is the continuous 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 state and regional covariates at the beginning of period t, and ε_{st} is an error term.

With an identifying assumption of parallel trends, having chosen two appropriate time periods, I collapse the data, taking an average of the outcome variable in each of the two periods. A difference-in-differences formulation with first differences taken between the two periods is:

2. Difference-in-Differences Specification

$$\Delta y_{st} = \alpha + \delta F_s + X_{st}\beta + \varepsilon_{st} \qquad [5]$$

In the difference-in-differences regression, I use Eicker-Huber-White standard errors to allow for heteroskedasticity. In the time-flexible specification, I cluster by state to allow for serial correlation in state-level errors. I estimate regressions with both ordinary and weighted least squares. The weights used for weighted least squares are the size of a state's economy–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.[15]

3. Instrumental Variables Specification

My main identification strategy to address potential endogeneity of forbearance is to use instruments for forbearance. The first and second stage regressions are:

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

$$\hat{F}_s = \alpha + \beta_1 StateBankCharter_s + \beta_2 \bar{F}_{d-s} + BEARegion_s + X_{st}\beta + \varepsilon_s \qquad [6]$$

$$\Delta y_{st} = \alpha + \delta \hat{F}_s + BEARegion_s + X_{st}\beta + \varepsilon_s \qquad [7]$$

My first instrumental variable is a binary indicator equaling 1 if a state offers savings banks charters (*StateBankCharter)*. The second instrumental variable $\bar{F}_{d-s}$ is the average of forbearance (excluding state *s*) in the FHLB district (*d)* the state lies in. *BEARegion* are fixed effects for the region of the U.S. a state lies in. As before, *X* is a vector of control variables that could affect changes in economic trends.

My first instrumental variable depends on the diffusion of savings banks. The first savings bank is in Philadelphia in 1816. Savings bank charters are more predominant in New England but also occur elsewhere, such as Florida and Washington for example. Nineteen states in total offer savings banks charters.[16] Between 1820 and the 1870s savings banks were the fastest growing financial intermediary in the United States. In the 1870s, when they peaked in their share of the American banking market, savings banks controlled approximately a quarter of the banking assets in the United States.[17]

The fact that savings banks only reach some states historically means that by 1980 two similar types of financial institution were covered by two different regulatory authorities. State savings banks were insured and regulated by the FDIC, Savings and Loans by the FSLIC. During the Savings and Loan crisis, the FSLIC was forced to engage in forbearance as a result of its underfunded position and the "too many to fail" nature of its Savings and Loan problem.[18] As a result, a state offering this additional thrift charter had reduced demand for FSLIC deposit insurance and consequently experienced less forbearance.

[16] 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.

[17] While their high water mark in assets is in the 1870s, I have as yet been unable to identify precise dates in which each state introduces its charter. I can arrive at an upper bound by taking the earliest date of *surviving* savings banks by state. This provides 1925 as the latest date savings banks reach a state (in this case, Oregon).

[18] "The FSLIC's extensive use of forbearance was a result of an inadequate insurance fund in an industry in which many institutions were insolvent." FDIC. 1997. *History of the Eighties: Lessons for the Future*. Federal Deposit Insurance Corporation.

The exclusion restriction is that controlling for other observables such as BEA region, whether savings banks reach a state is unrelated to changes in economic outcomes that arise specifically during the S&L crisis, except through an effect on forbearance. The only reasons I have found offered by historical accounts for why savings banks did not reach every state are i) the timing of urban growth in a state combined with the later arrival of community banks and savings and loans with broader product offerings, and ii) potential cultural differences at the time between regions in their preferences for paternalistic, European, institutions (Wadhwani, 2011).

The second instrumental variable I use exploits the difference between regulatory districts and general BEA economic regions. Each state lies in one of twelve Federal Home Loan Bank (FHLB) districts. FHLB districts were 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 had a large degree of heterogeneity in staffing levels, speed of recruiting new staff, and organizational approaches, all of which resulted in variation in their ability to fail troubled institutions promptly. This instrumental variable approach is informed by discussion with professionals involved in resolution management who highlighted regional style differences and non-capital reasons for slow resolution speeds. The concern with this instrument is that a bank's FHLB district might be more relevant to changes in economic outcomes during the crisis than its BEA grouping in ways that do not operate through its influence on different regional supervisors.

Checking both instruments' relationships with economic characteristics of states by estimating regressions of ex-ante observables delivers no statistically significant point estimates. I test the instruments separately and find null results for 1977 GDP level, the ratio of the size of the banking sector (assets) to GDP, 1977 population, and a simple measure of market concentration: the Herfindahl index of Financial Institution assets in a state.

VI. Results

I first present an estimate of the time-flexible specification, examining forbearance's relationship to the following economic outcomes: real per-capita GDP growth, house price appreciation (HPA), business bankruptcy filing, and job creation/destruction rates. Figure 5 plots the size of the coefficient from equation [4] when forbearance (F_S) is interacted with year fixed effects, normalized to show the difference associated with a state in the 75th percentile of forbearance to one in the 25th percentile. The figure also shows 95% confidence intervals. While the official policy of capital forbearance was implemented in 1982 and suspended in 1989, the benefit of first examining the data in this manner is to avoid privileging specific time periods over others.

Visual inspection of Figure 5 indicates that clear differences in outcomes appear only after forbearance begins in 1982. There are no clear systematic trends prior to forbearance. In the short run, HPA and bankruptcy filing rates have a clearly positive estimated relationship with forbearance. The relationship of HPA to forbearance is economically large. At its largest, moving from the 25th percentile of forbearance to the 75th percentile shows an associated annual HPA over 5% higher (compared to a mean of 5.1% and standard deviation of 7.5% in the dataset). The economic magnitude of the bankruptcy relationship is, at its largest, 1 less corporate bankruptcy filing per 10,000 people annually. This seems more economically significant when compared to a mean of 3 filings per 10,000 people per year (and standard deviation of 1). Job creation rates also appear to be higher in higher forbearance states during the forbearance period. Although point estimates are positive, there is no statistically clear initial relationship between forbearance and real per-capita GDP growth. However, from 1987 onwards, a negative trend appears in the estimates, with 1% annual differences in output growth at the time of the 1990-1991 recession. All findings are statistically similar when using an indicator variable for "High Forbearance" to compare states in the top quartile of forbearance to the rest of the US.

To explore whether the differences associated with forbearance should be interpreted causally, I first examine whether forbearance is related to economic trends prior to the start of the official policy of forbearance in 1982. Table 2 shows that there are no statistically significant differences in trends prior to the "treatment" of forbearance

across a range of economic outcomes (house prices, bankruptcies, job creation and destruction). Table 2 simply splits the data available for each time series prior to 1982 into two halves to be consistent across time series of different lengths, and finds that all slopes are statistically insignificant.

Under the identifying assumption of parallel trends, and before proceeding to an instrumented analysis that explicitly takes advantage of variation in regulators, Table 3 presents difference-in-differences estimates of the effects of forbearance on real per-capita output (GDP) growth. Table 3 compares averages over two periods: the first analysis in columns 1 and 2 compares the forbearance period (1982-1989) to the years preceding forbearance and finds no statistically significant difference. The second analysis in columns 3 and 4 compares the seven years after the legal end of forbearance (1989-1996) to the seven years during forbearance (1982-1989) and finds a significant drop in GDP growth. The estimated economic magnitude (of the smaller estimate in column 3) is that a one standard deviation increase in observed forbearance is associated with an average 0.9% lower annual growth rate in real per-capita GDP in the years following forbearance. That point estimate compares with a mean annual growth of 2.2% over the 20 years of the dataset. Given the previously mentioned reasons for expecting smaller measurement errors with larger states, and my interest in forbearance's relationship to national (weighted, aggregate) outcomes, I concentrate on weighted least squares estimates in the remainder of this paper.

Given that forbearance is measured over the period of 1982-1989, although orthogonalized to ex-ante observables each period, it could be endogenous to economic outcomes. Any choice regulators may have exercised of where to allocate forbearance would cause concern if it were in response to local economic conditions. If regulators respond to current and future economic outcomes, reverse causality concerns could bias the results of Table 3. This bias could go in either direction. On the one hand, regulators should pick more distressed areas for forbearance in order to avoid recognition of artificial/temporary/transient losses, waiting until asset valuations and the economy have reverted to "normal" levels in order to avoid losses. This would attenuate the endogenous point estimates previously presented to zero. On the other hand, if predictive regulators perversely pick states in such a way as to increase losses, they would pick

exactly those regions for forbearance where growth increases in the near future, and then subsequently liquidate assets after growth and prices fall, in such a way as to increase losses. This latter bias could replicate the findings of analysis without exogenous instruments.

To address these concerns, I pursue my main instrumented analysis in Table 4 and find estimates that are similar to those in the non-instrumented analysis. Each individual instrument's relevance is corroborated in the data: first stage F-statistics are greater than 10 individually. Statistical significance varies, but examining average growth over shorter time periods reveals estimates with either instrument that are statistically significant at 5% levels or lower—for example comparing the 5 years for which forbearance data is available (1984-1988) to the 5 years immediately after the formal end to forbearance (1989-1993).[19] I find that there are long-run costs and no significant short-run benefits estimated from forbearance. The magnitude of the long-run relationship (from the smaller point estimate) is 0.8% lower annual growth comparing the 75th to the 25th percentile of forbearance. That the instrumented analysis arrives at similar results to the non-instrumented analysis is consistent with a description of regulators as overwhelmed, and that forbearance occurred irrespective of local economic conditions.

Table 5 condenses the analysis of Table 4 across other key outcomes in the real economy: bankruptcies, job creation and destruction, and house prices. Forbearance is estimated to have an initially large, positive, and statistically significant relationship to house price appreciation over the period 1982-1989; smaller and marginally statistically significant relationships to job creation and destruction; and a beneficial, but statistically insignificant, relationship to business bankruptcy filing rates. These point estimates then reverse signs in the post-forbearance period. Moving from the 25th percentile of forbearance to the 75th percentile is associated with approximately 4% higher house price appreciation, 1/10,000 fewer corporate bankruptcies, and 0.5% higher job creation when comparing post-forbearance to forbearance time periods. The average job creation rate in the dataset is approximately 1% with a standard deviation of 3%.

[19] I have tested using 4 and 5 year averages and both are statistically significant while the magnitudes are larger when examining post/intra-forbearance periods. I have not examined other periods.

At first glance, the combination of a decline in bankruptcy filings but a negative long-term association with output growth seems reminiscent of the Japan finding, where inefficient, government-encouraged, forbearance-lending props up inefficient competitors and leads to worse industry efficiency (Caballero, Hoshi and Kashyap, 2008). But here we observe that the job creation rate is higher, not lower, with forbearance. We shall see more evidence in the next section that does not support product market competition as a primary force behind long-run differences in growth.

We can see an economically significant cyclical relationship of forbearance to aggregate output growth. If we ignore general equilibrium interactions between states, treat national outcomes as the simple weighted average of 50 islands' outputs, and use the presence of state savings bank charters as the counterfactual for all states, this simple back-of-the-envelope calculation indicates that the recession would have been avoided under the lower forbearance (faster-to-fail) FDIC policy. GDP growth would not have been quite as high in the mid 1980s, but growth in 1990/1991 would not have turned negative.

VII. How Does 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."[20]

How can regulatory forbearance affect economic growth? Estimated relationships with forbearance (F_s) capture not just a lack of otherwise-expected bank failures, but also any endogenous changes such as changes in banks' lending activity. Many models are potentially relevant to predicting the outcomes of less-capitalized-than-usual banks lending and competing in an uninhibited fashion, and are not mutually exclusive. I consider 1) a supply-side induced leverage/collateral cycle; 2) moral hazard; 3) other agency reasons, such as earnings management, for troubled banks making bad loans; 4) inhibited creative destruction in product markets; 5) fraudulent activity by management/shareholders ("looting"); and 6) fire sales.

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

(1) A supply-induced leverage and collateral cycle

The concept of a leverage cycle is not new, predicted by many models (Geanakoplos, 2003; Kiyotaki and Moore, 1997), and empirically established in historical studies (Jordà, Schularick and Taylor, 2014; 2013; Leamer, 2007). If forbearance forestalls the recognition of some negative shock, it may simply extend an expansion in credit/leverage with a larger subsequent crash. A similar prediction is made in Gorton and Ordoñez (2012), where the longer that investors have not questioned the quality of collateral before a (small) exogenous shock arrives, the larger the boom as well as subsequent crash. A broader drop in aggregate output growth from a sharp decline in real estate values is consistent with real estate's frequent role as collateral, frictions in the credit channel, and associated negative externalities such as "debt deflation" (Fisher, 1933). A drop in collateral value can impair both borrowers' and banks' balance sheets, raising the cost of bank capital and credit in general.

Figure 6 shows that a credit cycle is empirically related to forbearance by examining changes in nominal loan balances ("loan growth").[21] To make the connection from credit to the real economy, I test for increases in real estate activity. Figure 6 shows that new building and permit applications significantly increase in states with greater forbearance. Table 6 formally tests whether banks stimulate demand activity in real estate by comparing GDP growth in construction/real-estate industries to non-construction/real-estate GDP growth. I find that real-estate output materially increases intra-forbearance and is associated with a larger, post-forbearance decline. When real-estate activity is stripped out of GDP, the negative post-forbearance difference averaged over this large time period is of smaller magnitude and lower statistical significance.

(2) Moral Hazard

When considering the choices a highly levered financial institution might make 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 highly

[21] While the differences in the time-flexible specification may not be statistically significant on a per-period basis, a formal IV specification test confirms that post-forbearance loan growth is significantly lower.

levered banks make "Tails I win, heads you lose" bets. Examples of unwise or socially undesirable loans in such a narrative include investing in junk bonds or constructing housing in the middle of the Arizona desert.

I do not find strong evidence that shifting incentives to equityholders leads to growth in more speculative loans. Table 7 tests if the riskiness of an institution's portfolio increases as its equity position decreases. I find economically small point estimates, examining the relationship of High Risk Loans as the share of a bank's portfolio to changes in its equity ratio. Moving from the 25th to 75th percentile of equity capital is associated with just over a 1% increase in the share of a bank's balance sheet dedicated to high risk loans (the mean share in the dataset is 19% with a standard deviation of 14%). This analysis, using a broad loan classification as the dependent variable, is imperfect but the best test available given the lack of granular loan-level detail provided in call reports.

Table 7's relationship could also hold mechanically if banks' assets are shrinking, as high risk loans may also be less liquid investments and unable to be sold in short time periods. However, this does not appear to be the case. In untabulated results I introduce a binary indicator for banks whose assets are shrinking and find that it is actually banks with growing balance sheets that increase their portfolio weights on high-risk loans the most.

(3) Other Agency Reasons (Earnings Management) for Bad Loans

Apart from a minimal equity interest in an enterprise, there are a number of reasons that forbearance lending might lead to a misallocation of capital. One potential reason for making negative-expected-value loans to maximize reported profits. Rather than gambling for redemption, by growing into more speculative real estate lending activities, such as commercial loans for the Acquisition, Development, and Construction (ADC) of residential properties, a bank can essentially make its own luck and influence accounting (non-economic) returns, at least in the short run (Rajan, 1994).

ADC loans are typically structured at high (100%) LTVs and incorporate "Paid-in-Kind" (PIK) interest, pre-paid interest, or no interest for the initial years (Akerlof and Romer, 1993). When instituting capital forbearance in 1982, the Bank Board created additional short-term capital incentives for influencing collateral values by moving to use

the better of appraised or book equity value. Without careful oversight, a thrift that made ADC loans can guarantee itself accounting income. By continuing to lend against collateral, banks could prop up the transaction and appraisal values used in the regulatory accounting of their capital.

If forbearance bolstered short-term earnings, we would expect to see higher accounting profits at banks in higher forbearance states. Figure 6 illustrates that banks in higher forbearance states did earn higher return on assets (ROAs) on average. At its peak the relationship is more than +0.2% when comparing the 75^{th} to 25^{th} percentiles of forbearance—a moderate magnitude compared to a standard deviation of 0.36% in the dataset. Banks did not earn a significantly different net interest margin (NIM), the classic "cash" measure of a banking system's profitability. The fact that NIMs are unaffected cuts against the view that forbearance leads to excessive competition in lending. If an excessive competition channel exists, it must not alter the typical interest yield, but rather spurs more speculative investments.

If the loans that thrifts grew into were unproductive, one essential corollary is that greater drops in growth should be associated with greater growth in unproductive loans. Table 8 examines the most speculative loan category ("High Risk Loans") and finds post-forbearance declines in output growth are larger precisely in those states where these loans grew the most during forbearance. The economic importance of this estimated relationship is that if a state was already in the top quartile of forbearance, one standard deviation difference in high risk loan growth is associated with a 1.3% greater drop in post-forbearance annual GDP growth. In untabulated results, I also find that the ratio of non-performing loans is greater (after an end to forbearance) in high forbearance states.

(4) Creative Destruction

I pursue additional tests for whether lending under the U.S. policy of capital forbearance mirrored Japan's lost decade by stifling innovation and healthy industry participant turnover. In addition to having already observed relatively higher job creation rates previously—rather than lower, as would occur with a lack of creative destruction—Figure 6 shows that states with high forbearance also experienced more new business starts and had no observable differences in patent filing growth rates.

(5) Looting

Another alternative interpretation of why banks make bad loans is that at some point, a lack of capitalization leads to a lack of care in lending and it is more efficient to engage directly in criminal/fraudulent activity such as tunneling for private benefit or "looting" (Akerlof and Romer, 1993). Figure 6 first shows no relationship between forbearance and dividend payouts over time. The size of an approximately constant difference is small (at its highest approximately 0.1% of assets) and there is no time-varying trend during the period for which data is available. A more direct test that avoids conflating shareholders with management—as a test of dividends does—is to examine whether forbearance is related to bank failures where criminal prosecution is cited by regulators. In Table 9, I perform this test and find no statistically significant relationship between forbearance and the dollar amount of bank assets involved in criminal prosecutions of bank management or owners, normalized either by pre-crisis GDP or total crisis resolution costs for a state.[22,23]

(6) Fire Sales

A final mechanism through which the credit channel can affect the real economy is a difference in failures themselves. A style difference in failures could lead to different outcomes through fire sale dynamics, e.g. if failures were more spread out prior to 1989, and post-1989 failures were more concentrated, we could pick up an effect of additional losses through fire sales (Shleifer and Vishny, 2010).

Table 10 repeats the same main (instrumented) analysis of Table 4 with simple linear controls for failures – both dollar volume and associated resolution costs (losses on principal balance of bank assets) – normalized by a state's 1977 GDP. I find that while

[22] We may be concerned about the lack of power in this test given the use of instruments. The results are similarly statistically insignificant if we simply treat forbearance as exogenous and estimate the regression without a first stage.

[23] 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.

the level of failures enters significantly, the point estimate of forbearance remains largely unchanged. A difference in outcomes simply owing to a difference in timing in the loss of banks' credit functions is consistent with a lending channel explanation such as in (1) of this Section. In untabulated results I pursue a multiperiod, instrumented, difference-in-differences with 3 lags of per-period failures. While I find the point estimates of failures are often economically and statistically significant, the estimated relationship with forbearance is not largely altered.

Summary of Channel Evidence

I find evidence that forbearance prolongs a credit and collateral cycle in real estate, where greater availability in leverage coincides with greater appreciation in asset prices, only to be followed by a crash in real estate prices, leverage, and also in aggregate output growth. Many of the facts I find are consistent with a model of credit-exacerbated speculation, such as where banks are incentivized to lend against specific projects in part to maintain or improve their capital positions. This asymmetry can occur through the impairment of either banks' or borrowers' balance sheets, exacerbating (and exacerbated by) further reductions in leverage. Of course, any of the relationships I find could be made worse in the presence of sentiment or extrapolative expectations which I do not consider here. I perform a series of additional robustness checks to address alternative explanations and measurement questions. The main result holds, and I summarize these results in Appendix I.

VIII. Conclusion

In this paper I have presented an empirical analysis of the time-varying relationship between regulatory forbearance and the real economy. I have delivered a series of estimates of the real effects of regulatory forbearance in the U.S. savings and loan crisis: some positive and immediate, others negative and larger in magnitude.

In the S&L crisis, it appears that the economic paths of states diverged after regulatory forbearance began in 1982. Forbearance, in addition to delaying failures, appears to have led to relative expansions in credit and real estate. High forbearance areas experienced greater house price increases, construction, and employment. Ultimately though, after regulatory oversight was consolidated and the policy of forbearance ended, it was high forbearance states with preceding credit/collateral expansions that suffered larger contractions not only in their loans outstanding, house prices, and construction, but also aggregate output growth. Large estimated negative differences in aggregate output growth coincide with a nationwide recession in 1991.

This paper contributes to the literature with a focus on the net aggregate effects associated with regulatory forbearance. Previous studies estimate forbearance increased direct costs to the taxpayer of bailing out the FSLIC insurance fund by upwards of $100 billion. I find that if a social planner's objective were to simply maximize long-term output growth, the returns on such an investment are low. Of course, such a crude objective function is not what policy makers are considering in the middle of a crisis. Future work could pursue a more nuanced analysis and take general equilibrium considerations into account.

This paper improves upon existing cross-country evaluations of financial crisis policy by exploiting within-country regulatory differences. My findings develop our understanding about the impact of shocks to the lending channel on the real economy. Furthermore, this paper contributes to a growing empirical literature finding that in times of crisis, the banking system often passes its problems onto borrowers. During the S&L crisis, we observe both sides to this relationship: problems when failures occur, preceded by a credit expansion when banks are given a deregulatory carte blanche.

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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.

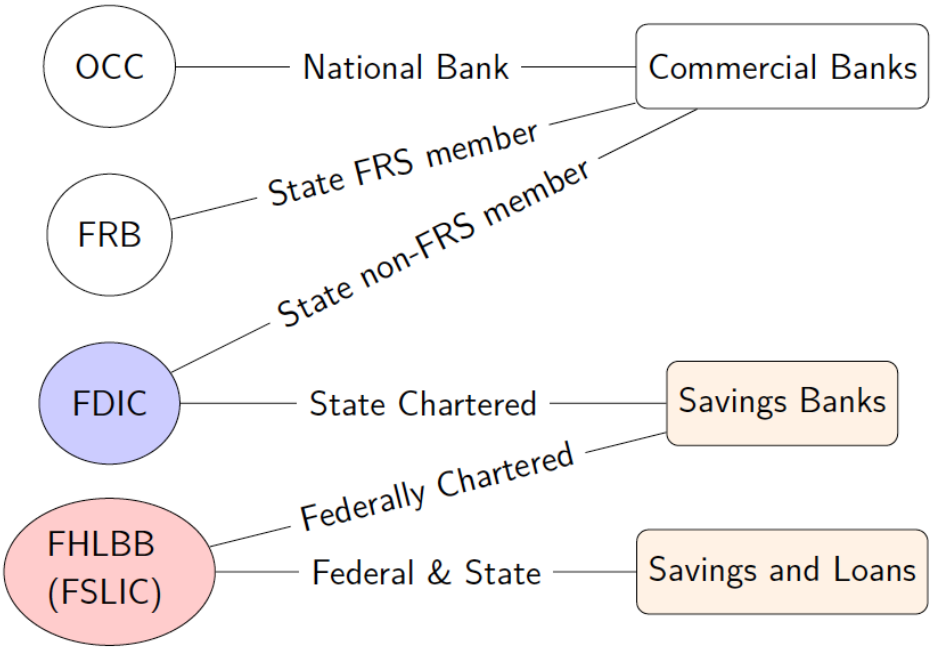

Figure 2. Real GDP Growth Associated with Forbearance

This figure demonstrates the mean per-capita Real GDP growth associated with "High Forbearance" states. "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.

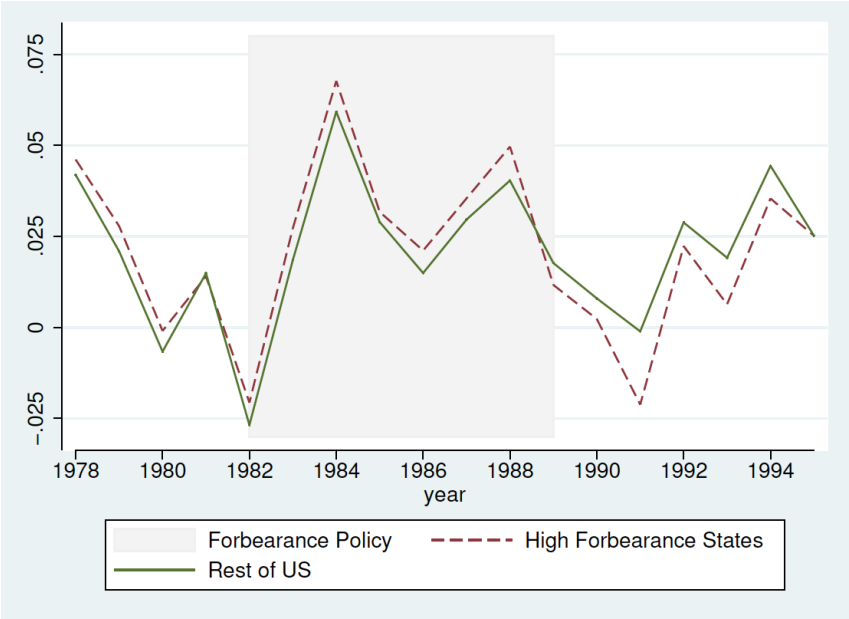

Figure 3. Distribution of Regulatory Forbearance

Figure 3.A illustrates geographic distribution of F_S (as defined in equation [3]) with a heat-map. The darkest blue states have the highest estimates of forbearance. Figure 3.B plots histograms of both F_S and the annual measurement of forbearance, f_{st}.

Figure 3.A Geographical Variation in Regulatory Forbearance (F_S)

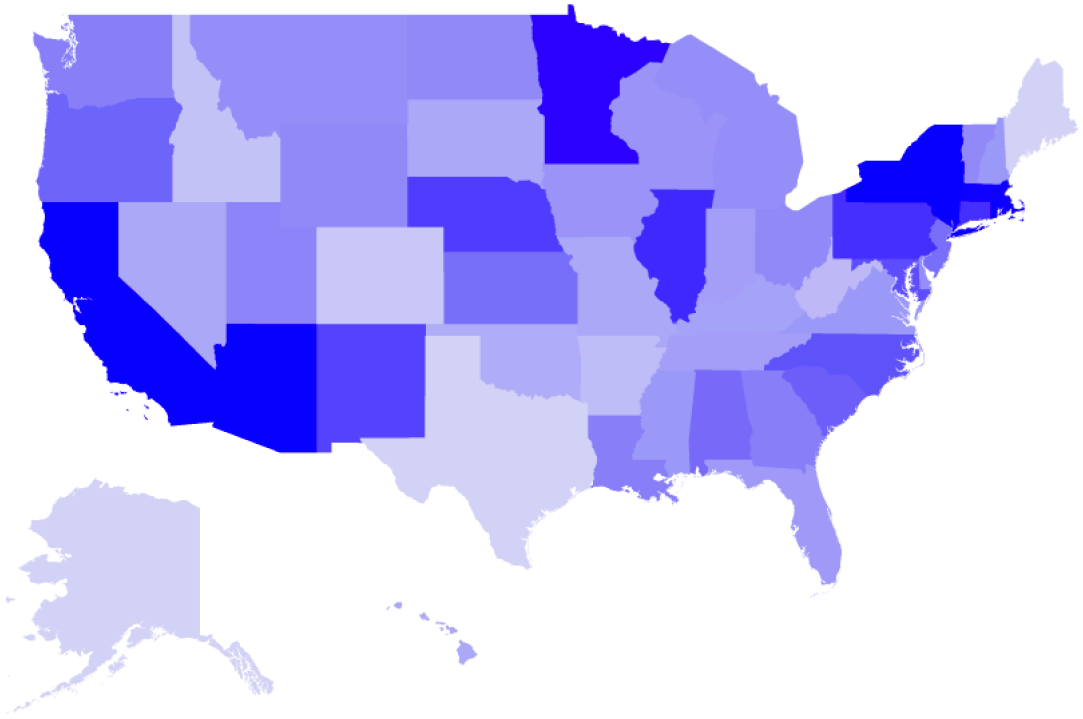

Figure 3.B Distribution of Regulatory Forbearance (F_s, f_s,)

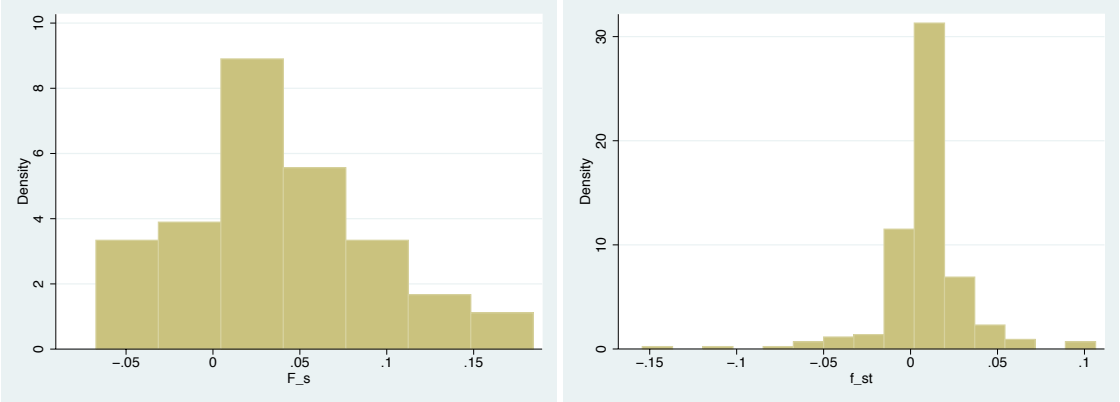

Figure 4. Median State-level Annual Changes in Economic Outcomes

This figure plots medians of outcome variables over time.

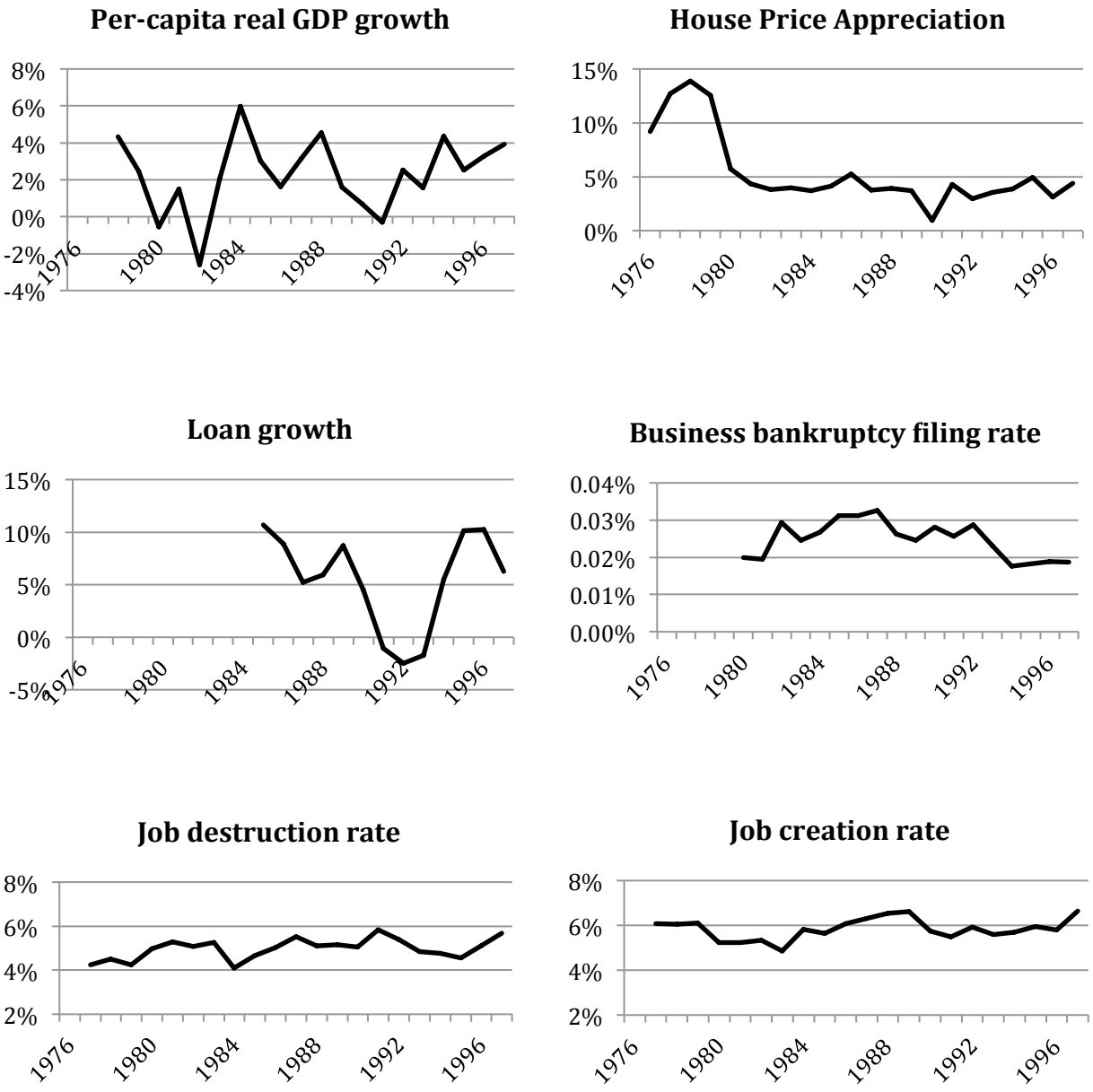

Figure 5. Time-varying Relationship of Forbearance to Economic Outcomes

This figure graphs the pattern of δ_t coefficients from equation [4], estimated using WLS for the outcome variables titled above each graph. Standard errors are clustered by state and 95% confidence intervals are indicated. The scales of graphs are normalized to represent the estimated average difference in the outcome variable between the 25th and 75th percentiles of forbearance. Detail on data sources is provided in Section III.

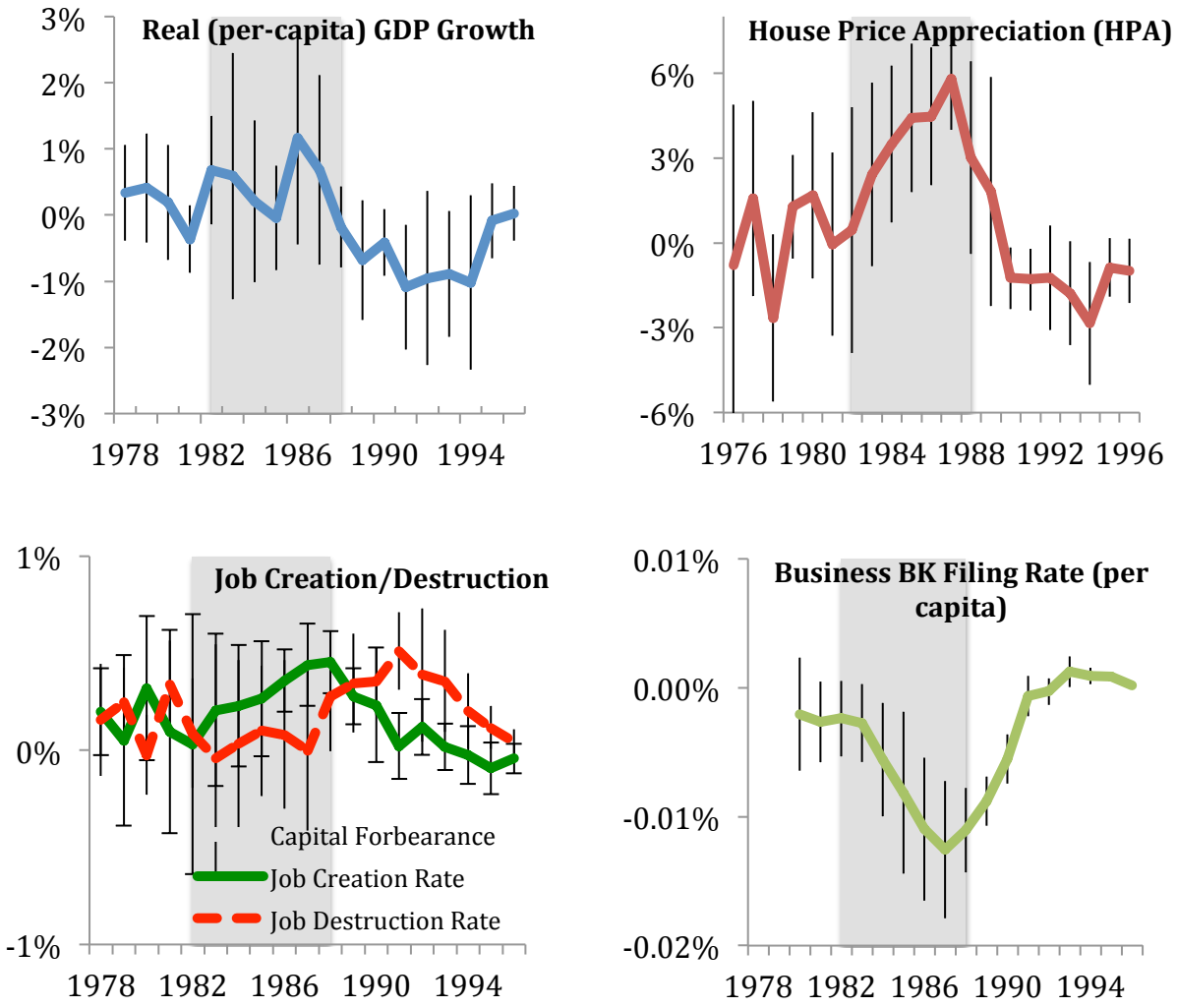

Figure 6 - Time-varying Relationship of Forbearance to Secondary Outcomes

This figure graphs the pattern of δ_t coefficients from equation [4], estimated using WLS for the outcome variable titled above each graph. Standard errors are clustered by state and 95% confidence intervals are indicated. The scales of graphs are normalized to represent the estimated average difference in the outcome variable between the 25th and 75th percentiles of forbearance. Detail on data sources is provided in Section III. NIM refers to the median "Net Interest Margin", and ROA to the median "Return On Assets" of financial institutions in a state. "New Business Starts" is an in-sample z-score of business starts in that state. Bank-level variables (NIM, ROA, Dividends) are presented as of year end, i.e. 1988 refers to the final filing of 1988.

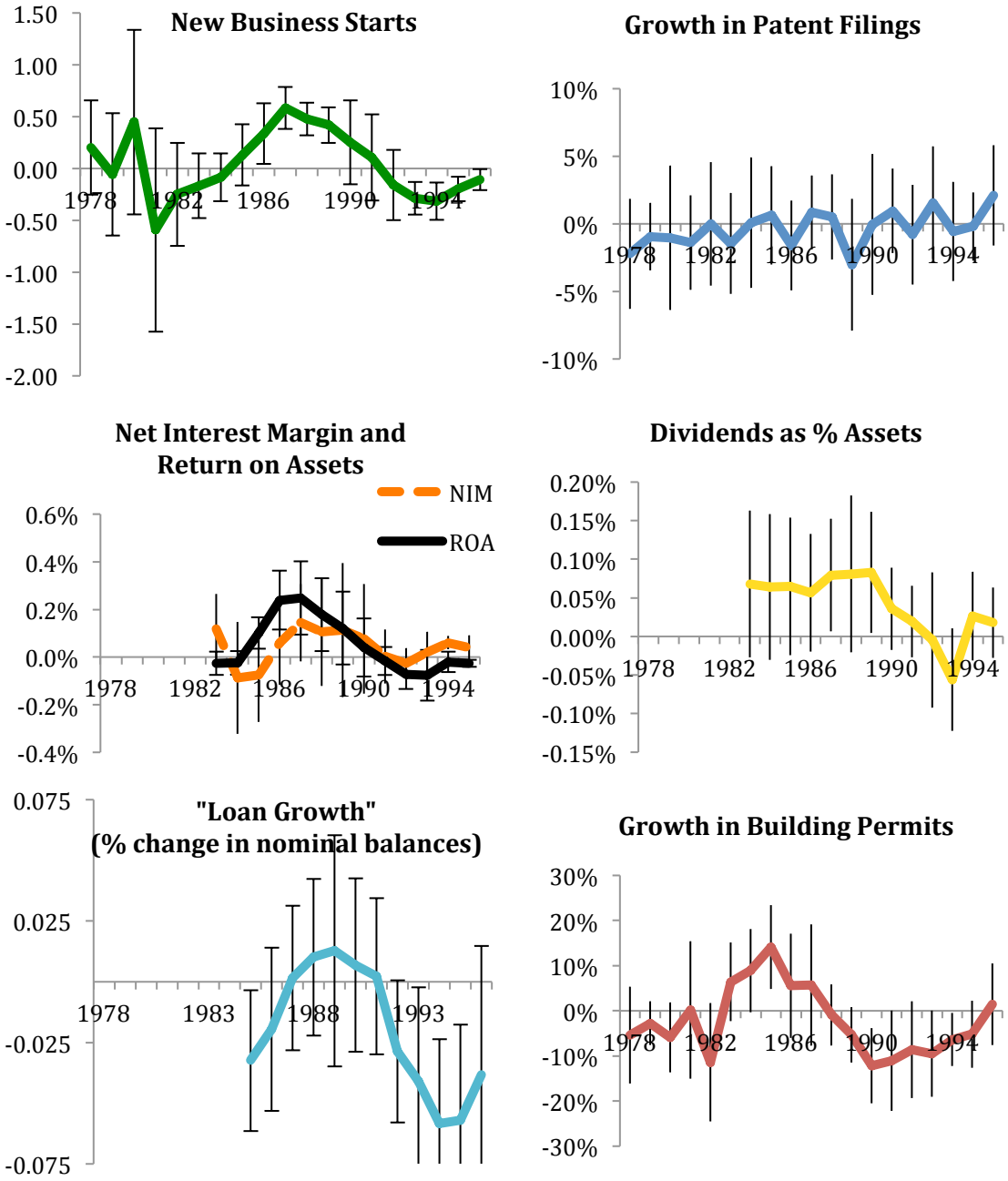

Table 1: Summary Statistics

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

Variable	# Obs.	Mean	Std. Dev.	Min	Max
Independent variables at the institution-level used in failure prediction					
Assets ($ millions)	88,864	222	1,944	0.342	154,000
Equity Capital	88,864	12	95	-1,287	8,009
Non-perf. Asset Ratio	87,959	0.017	0.028	0.00	0.88
1{Below 5% Equity Capital}	88,864	0.15	0.36	0	1
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 variables					
Growth in per-capita real GDP	1000	2.2%	3.2%	-18%	19%
S&L share of total state banking assets	700	12%	11%	0%	48%
Forbearance (F_s)	50	3.8%	5.5%	-6.7%	18%
Simple Capital Forbearance (CF_s)	50	1.67	0.89	0.23	3.98
HPA	1000	5.1%	7.5%	-54%	78%
Business Bankruptcy Filing Rate	900	0.03%	0.01%	0%	0.16%
Job Creation Rate	1050	6%	1.1%	3%	12%
Job Destruction Rate	1050	5%	1%	3%	10%

Table 2: Tests for Differing Trends Prior to Forbearance

This table provides a summary of multiple weighted least-squares estimates of regressions implementing a 2 period difference-in-differences with state-level observations. Data available for each time series prior to the start of forbearance (1982) is split into half, with averages taken over each time period. The difference in outcome variable is then taken as the dependent variable shown in the leftmost column. Point estimates are shown for δ (the coefficient on forbearance as defined in equation [5]). F_S is the state-level forbearance measure, as defined in equation [3]. States' 1977 GDP are used as weights.

Dependent Variable	δ (F_S)	t-stat	Null not rejected at 10% level?
Δ Per-capita real GDP growth	-0.064	-1.25	Yes
Δ House Price Appreciation	0.21	1.16	Yes
Δ Business Bankruptcy Per-Capita Filing Rate (%)	-0.004%	-0.43	Yes
Δ Job Creation Rate	0.011	1.04	Yes
Δ Job Destruction Rate	-0.006	-0.42	Yes

Table 3: Forbearance and Real Per-Capita GDP Growth

This table reports estimates of regressions implementing a 2 period difference-in-differences. Observations are at the state-level and averaged over two periods, with first differences taken as in equation [5]. The dependent variable is real per-capita GDP growth. F_S is the state-level measurement of regulatory forbearance, defined in equation [3]. Weighted least-squares estimates use 1977 GDP as state-level weights. Eicker-Huber-White standard errors shown in parentheses. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

	Δ Average Real GDP Growth			
Period 1 average:	Pre-Forbearance 1978-1981		Forbearance 1982-1988	
Period 2 average:	Forbearance 1982-1988		Post-Forbearance 1989-1995	
	OLS	WLS	OLS	WLS
	(1)	(2)	(3)	(4)
δ (F_S)	0.11	0.041	-0.13***	-0.16***
	(0.085)	(0.051)	(0.048)	(0.022)
State and Period Fixed Effects	Yes	Yes	Yes	Yes
N	100	100	100	100
Within R-squared	0.05	0.03	0.11	0.39

Table 4: Instrumented Test of Forbearance's Relationship to Output Growth

This table reports estimates of 2SLS regressions, defined in equations [6] and [7] of the text. The dependent variable (real-per GDP growth on a per-capita basis) is observed at the state level, averaged over the two periods shown and first-differences taken to implement a difference-in-differences analysis. F_S is the state-level Forbearance measure, defined in equation [3]. The instruments used in the first stage are i) a binary indicator variable for whether a state offers 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. WLS estimates use 1977 GDP as state-level weights. Constants are not reported. Eicker-Huber-White standard errors are shown in parentheses. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

	Δ Average Real GDP Growth			
Period 1 average:	Pre-Forbearance 1978-1981		Forbearance 1982-1988	
Period 2 average:	Forbearance 1982-1988		Post-Forbearance 1989-1995	
Instrumental Variables:	State Savings Bank charter	Charter + FHLB region	State Savings Bank charter	Charter+ FHLB region
	(1)	(2)	(3)	(4)
$\delta\ (\widehat{F_S})$	0.16	0.16	-0.13*	-0.19**
	(0.14)	(0.15)	(0.08)	(0.07)
BEA Region Fixed Effects	Yes	Yes	Yes	Yes
First-stage F-statistic	10.0	17.9	10.0	17.9
N	50	50	50	50
R^2	0.28	0.51	0.67	0.57

Table 5: Summary of Relationship Between Forbearance and Multiple Real Outcomes

This table reports summaries of 2SLS estimates, defined in equations [6] and [7] of the text. The dependent variables (shown in left-most column) are observed at the state level, averaged over two periods (shown in first row of table) and first-differences taken. F_S is the state-level Forbearance measure, defined in equation [3]. The instruments used in the first stage are i) a binary indicator variable for whether a state offers 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. Start dates for pre-forbearance time period are 1976 for HPA, 1980 for bankruptcy filings, and 1977 for job rates. Estimates are presented using 1977 State GDP as weights. Eicker-Huber-White standard errors are shown in parentheses. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

Period 1 average:	Pre-Forbearance			Forbearance 1982-1989		
Period 2 average:	Forbearance 1982-1989			Post-Forbearance 1989-1996		
Dependent Variable	$\delta\ (\widehat{F_S})$	Standard Error	R-squared	$\delta\ (\widehat{F_S})$	Standard Error	R-squared
Δ House Price Appreciation	0.27**	(0.14)	0.74	-0.80***	(0.21)	0.66
Δ Business Bankruptcy Per-Capita Filing Rate (%)	-0.029	(0.023)	0.69	0.053	(0.036)	0.68
Δ Job Creation Rate	0.045*	(0.024)	0.25	-0.066**	(0.027)	0.35
Δ Job Destruction Rate	0.036*	(0.019)	0.32	0.022	(0.020)	0.62

Table 6 – Forbearance and Real-Estate GDP Growth

This table reports estimates of the second-stage of 2SLS regressions, defined in equations [7] of the text. The dependent variables are per-capita nominal GDP growth as reported by SIC industry code, observed at the state level, averaged over two periods (shown in first row of table), and first-differences taken. Columns (1) and (3) examine "Real Estate" (Construction and Real Estate SIC industries), columns (2) and (4) examine the remainder of GDP growth. F_S is the state-level Forbearance measure, defined in equation [3]. The instruments used in the first stage are i) a binary indicator variable for whether a state offers 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. WLS estimates use 1977 GDP as state-level weights. Constants are not reported. Eicker-Huber-White standard errors are shown in parentheses. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

Period 1 average:	Pre-Forbearance 1978-1982		Forbearance 1982-1989	
Period 2 average:	Forbearance 1982-1989		Post-Forbearance 1989-1996	
Dependent Variable:	**Δ Real Estate per-capita GDP growth**	**Δ Non-Real Estate per-capita GDP growth**	**Δ Real Estate per-capita GDP growth**	**Δ Non-Real Estate per-capita GDP growth**
	(1)	(2)	(3)	(4)
δ ($\widehat{F_S}$)	0.34*	0.25	-0.74**	-0.23*
	(0.19)	(0.31)	(0.29)	(0.14)
Constant	-0.064***	-0.071*	0.042	-0.0050
	(0.020)	(0.041)	(0.031)	(0.015)
BEA Region FEs	Yes	Yes	Yes	Yes
N	50	50	50	50
R^2	0.29	0.41	0.17	0.54

Table 7: Changes in Equity Capital and Changes in High Risk Loans

This table reports estimates of OLS regressions using financial institution-level observations. The dependent variable for each specification is the change in "High Risk" loans as a percentage of assets, in the period following the change in the independent variable. "Equity ratio" is defined as the Equity/Assets for an institution. Constants are left unreported. Standard errors are clustered at two levels: the state/year pair and institution level, shown in parenthesis. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

	Changes in "High Risk" Loans as Share of Total Assets	
- Δ (Equity Ratio$_{it}$)	0.273***	0.261***
	(0.08)	(0.07)
State and Year Fixed Effects	No	Yes
N	85,487	85,487
R-squared	0.02	0.10

Table 8: Interaction between High Risk Loan Growth and Real GDP Growth

This table reports 2SLS estimates, defined in equation [7] of the text. The dependent variable (real-per GDP growth on a per-capita basis) is observed at a state-level, averaged over two periods (shown in first row of table), and first-differences taken. F_S is the state-level Forbearance measure, defined in equation [3]. "High Risk Loan Growth" is the cumulative growth in "High Risk" (commercial real-estate, non-farm) loans as defined by the FDIC over the years 1984-1989. Instruments used in the first stage and interacted with the same additional variable (High Risk Loan Growth) are i) a binary indicator variable for whether a state offers a savings bank charter and ii) the exclusive average forbearance in that state's FHLB district. "BEA Region" refers to Bureau of Economic Analysis region. WLS estimates are shown using 1977 GDP as state-level weights. Constants are not reported. Eicker-Huber-White standard errors are shown in parentheses. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

Period 1 average:	Forbearance 1982-1989
Period 2 average:	Post-Forbearance 1989-1996
	Δ Average Real GDP Growth
$\widehat{F_s}$	-0.14**
	(0.06)
$High\ Risk\ Loan\ Growth_s * \widehat{F_s}$	-0.23**
	(0.12)
BEA Region FEs	Yes
N	50
R-squared	0.43

Table 9: Forbearance and Fraud/Crime

This table reports estimates from the second stage of weighted 2SLS regressions. 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 & 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 variable for whether a state offers 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. Eicker-Huber-White standard errors are shown in parentheses. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

	Criminal Case Resolution Costs as % 1977 GDP	**Criminal Case Resolution Costs as % Total Crisis Resolution Costs**
δ $(\widehat{F_S})$	-0.30	-5.79
	(0.22)	(4.89)
S&L Share of Assets in State	0.063	2.22*
	(0.042)	(1.15)
Constant	0.035	0.30
	(0.037)	(0.65)
BEA region Fixed Effects	Y	Y
N	50	50
R-squared	0.21	0.15

Table 10: Forbearance and Real GDP Growth – Controlling for Differences in Failures

This table reports estimates of regressions using weighted 2SLS with state-level observations. The dependent variable (real per-capita GDP growth) is averaged over the time periods shown in the topmost rows of the table and first-differences taken. Total Failed Assets equals cumulative failures from 1984 to 1993. 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 variable for whether a state offers a savings bank charter and ii) the exclusive average forbearance in that state's FHLB district. Weights used are a state's 1977 GDP. Eicker-Huber-White standard errors are shown in parentheses. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

Period 1 average:	Pre-Forbearance 1978-1982	Forbearance 1982-1989
Period 2 average:	Forbearance 1982-1989	Post-Forbearance 1989-1996
	Δ Average Real GDP Growth	
δ $(\widehat{F_S})$	0.16	-0.20***
	(0.15)	(0.078)
Total Failed Assets	0.010	-0.035*
	(0.028)	(0.019)
Resolution Costs	-0.040	0.040
	(0.11)	(0.094)
Constant	-0.017	0.0080
	(0.021)	(0.011)
BEA Region Controls	Yes	Yes
N	50	50
R^2	0.282	0.601

APPENDIX I – ROBUSTNESS CHECKS

Table 1 of this Appendix performs a series of additional robustness checks. Overall, the main estimates remain unchanged: post-forbearance outcomes are worse while there is not a clear statistical difference in output growth during forbearance. The robustness tests applied, by row, are:

Row 1 confirms forbearance is not merely picking up a pre-existing state-wide exposure to residential real estate. As thrifts were known to have problematic fixed rate mortgage exposure, a control is introduced for the extent of residential real estate-collateralised lending in a state. It also confirms that the estimates of forbearance do not rely on house price trends by introducing a lag of the average of house prices in the preceding period.

Row 2 examines point estimates when Delaware and South Dakota are removed from the estimation. As pointed out by Jayaratne and Strahan (1996), over this time period these states attracted business from new incorporations and credit card banking respectively. Results are similar.

Row 3 ensures that previous results are not driven by the linear approximation of a relationship between forbearance and growth. I employ an indicator variable for states in the top quartile of forbearance and compare these "High Forbearance" states to the rest of the country.

Row 4 checks that the main finding is not an artifact of forbearance's definition as the surprising absence of failures based on observables. I use the simpler capital-based measure of forbearance, *CF* (as defined in Section III), counting forbearance if an institution is below 5% equity (the limit for thrifts prior to the crisis) at the beginning of a year and is not closed by the end of the year. CF_S has a 0.66 correlation with F_s. The economic magnitude of results are similar: a one standard deviation increase in capital forbearance is associated with a 0.89% lower subsequent annual growth rate.

The results of these robustness tests support the main hypothesis. In results not shown I also repeat the analysis for real GDP growth unadjusted for population, and remove California (as it is a large state with a high forbearance measure). I also pursue county level analysis, examining cumulative payroll growth and changes in the number of establishments. And lastly I pursue a multiperiod, panel Difference-in-Differences (with interactions for 7 years intra-forbearance, 7 years after forbearance, and three leads of the forbearance variable). I find similar results each way.

An additional concern is that forbearance may happen to correlate with pro-cyclical states that experience greater upturns and downturns. One argument against 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. An empirical argument is simply to test historical business cycles and see if the suggested pro-cyclicality holds. I test two preceding recessions in the 1970s and find no evidence that it does. Appendix Figure 1 illustrates that there are not systematically lower-than-normal growth rates associated with forbearance (or the instruments) at the same time as recessions (the grey shaded areas). I am required to examine nominal GDP growth owing to the lack of availability of BEA regional deflators prior to 1977.

Appendix - Table 1: Summary of Robustness Tests

Appendix Table 1 reports a summary of multiple weighted 2SLS estimates of [7]. 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) allows for changes in trend by state-level asset shares of residential mortgage and an average of the preceding period's HPA. Row (2) compares point estimates with two states removed, known to have unusual growth in financial and economic activity. Row (3) replaces the continuous treatment policy variable with an indicator for "High Forbearance" states: those in the top quartile. Row (4) replaces the treatment policy variable with a simple measure of capital forbearance as defined in Section III. Italicized point estimates are not directly comparable with other point estimates. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Time Periods compared:	*1. Pre-Forbearance 2. Forbearance*		*1. Forbearance 2. Post-Forbearance*	
Model	δ	R2	δ	R2
Baseline specification	0.16	0.28	-0.19**	0.57
1. Lagged HPA and residential lending covariates as additional treatment variables	0.0062	0.54	-0.11**	0.78
2. Remove Delaware and South Dakota	-0.007	0.51	-0.20***	0.56
3. "High Forbearance" indicator variable as treatment (>=80th percentile)	*-0.0018*	0.50	*-0.028**	0.40
4. Simple Capital Forbearance measure as treatment variable	*-0.001*	0.51	*-0.014****	0.70

Appendix Figure 1 - Test of Forbearance and IV's relationship to Output Growth During "Placebo" Business Cycles

This figure graphs the pattern of δ_t coefficients from equation [4] estimated using nominal GDP growth over the period 1965-1977. The main independent variables used are the primary instrument, a binary indicator variable of whether a state has savings banks charters, and the average measure of forbearance F_S. Estimates are presented using WLS with 1965 GDP as weights. I also present the estimated coefficients when controlling for BEA region. Standard errors are clustered by state and 95% confidence intervals are indicated for the most volatile time series, the coefficient on a state savings bank fixed effect.