

NBER WORKING PAPER SERIES

DEPOSIT INSURANCE:
THEORIES AND FACTS

Charles W. Calomiris
Matthew Jaremski

Working Paper 22223
<http://www.nber.org/papers/w22223>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
May 2016

The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2016 by Charles W. Calomiris and Matthew Jaremski. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Deposit Insurance: Theories and Facts
Charles W. Calomiris and Matthew Jaremski
NBER Working Paper No. 22223
May 2016
JEL No. E44,G21,G28

ABSTRACT

Economic theories posit that bank liability insurance is designed as serving the public interest by mitigating systemic risk in the banking system through liquidity risk reduction. Political theories see liability insurance as serving the private interests of banks, bank borrowers, and depositors, potentially at the expense of the public interest. Empirical evidence – both historical and contemporary – supports the private-interest approach as liability insurance generally has been associated with increases, rather than decreases, in systemic risk. Exceptions to this rule are rare, and reflect design features that prevent moral hazard and adverse selection. Prudential regulation of insured banks has generally not been a very effective tool in limiting the systemic risk increases associated with liability insurance. This likely reflects purposeful failures in regulation; if liability insurance is motivated by private interests, then there would be little point to removing the subsidies it creates through strict regulation. That same logic explains why more effective policies for addressing systemic risk are not employed in place of liability insurance. The politics of liability insurance also should not be construed narrowly to encompass only the vested interests of bankers. Indeed, in many countries, it has been installed as a pass-through subsidy targeted to particular classes of bank borrowers.

Charles W. Calomiris
Graduate School of Business
Columbia University
3022 Broadway Street, Uris Hall
New York, NY 10027
and NBER
cc374@columbia.edu

Matthew Jaremski
Colgate University
Department of Economics
13 Oak Drive
Hamilton, NY 13346
and NBER
mjaremski@colgate.edu

I. Introduction

The insurance of bank liabilities began as an American experiment in six U.S. states in the early-to-mid 19th century. All six of those state liability insurance experiments had disappeared by the 1860s. A second wave of eight U.S. state experiments with deposit insurance occurred in the early 20th century, and again, all of those had disappeared by around 1930.¹ In 1933, after fifty years of failed attempts by advocates of deposit insurance to pass federal legislation and in the wake of the collapses of the eight state deposit insurance systems, U.S. federal deposit insurance was enacted. Although it was initially established as a temporary measure covering only small deposits, it soon became a permanent feature of the U.S. banking regulation that covers (either explicitly or implicitly) virtually all deposits today. Bank liability insurance remained an exceptional and controversial policy experience of the United States until the latter half of the 20th century. However, today it stands as a nearly ubiquitous feature of banking regulation that is endorsed by influential cross-border institutions such as the International Monetary Fund, the World Bank, and the European Union. As it spread to new nations, the extent of deposit insurance coverage within countries has also expanded.

This paper reviews the worldwide experience with bank liability insurance – including an analysis of the factors that led to its passage and expansion, as well as analyses of its performance, and connects the history of liability insurance to competing theoretical arguments that seek to explain it. Broadly speaking, there are two theoretical approaches to explaining the creation and expansion of deposit insurance: an economic approach grounded in potential

¹ After 1863, only national banks issued bank notes, owing to the prohibitive federal taxation of state bank issuance of notes. National bank notes suffered no risk of default because they were fully backed by government bonds deposited at the U.S. Treasury (Calomiris 1988). This explains why pre-1863 state insurance systems included the insurance of notes, while 20th century state insurance systems insured only deposits.

efficiency gains (i.e., public interest motivation), and a political approach grounded in the rising power of special interest groups that favored it (i.e., private interest motivation).

The economic approach posits that liability insurance may improve the efficient management of the banking system by reducing systemic liquidity risk. Despite that potential advantage, economic theories recognize the costs of enacting liability insurance. These include moral-hazard and adverse-selection costs, which increase fundamental insolvency risk, either as a consequence of greater conscious risk taking by bankers (moral hazard) or through an increase in the proportion of bankers who are incompetent managers. Whether bank liability insurance, on balance, reduces or increases risk in the banking system is an empirical question.

Alternatively, political theory provides a separate theoretical basis for explaining the presence of bank liability insurance. Political models identify circumstances under which the interests of particular groups within society (beneficiaries of passing liability insurance) may succeed in securing its passage, even though liability insurance is inefficient. Political models seek to explain why liability insurance may occur to favor certain groups in society at the expense of other groups and at the cost of higher systemic risk of banks.

After reviewing the economic and political theories of liability insurance in Section II, Section III reviews empirical evidence about factors that have been instrumental in creating or expanding deposit insurance, and the economic consequences of doing so. We conclude Section III by considering what these two types of evidence tell us about which of the two theoretical paradigms reviewed in Section II – the economic theory or the political theory– is more consistent with the facts. We show that the empirical literature on bank liability insurance

strongly favors the political approach over the economic approach as the potential economic efficiency gains of deposit insurance have been outweighed by its costs.

We argue that, consistent with political theories of deposit insurance, a major political advantage of deposit insurance is that it provides an effective means for government to supply hard-to-trace subsidies to particular classes of bank borrowers. Deposit insurance has not only protected banks and depositors, but the expansion of deposit insurance around the world has also offered a means of permitting banks to expand lending, which is often targeted to politically favored groups. In autocracies, insurance has been used to favor influential borrowers, which typically include industrial firms that participate in “crony” networks. Especially in democracies, insurance has been used to favor mortgage borrowers with political clout.

Section IV considers alternative government policies that protect bank liabilities under some circumstances (which we label “limited and conditional protection”). We contrast this limited and conditional protection with either unconditional liability insurance or with unconditional laissez faire policy. We show that, as a matter of theory, limited and conditional protection can be superior to either of the alternatives. We also show that, as a matter of history, limited and conditional protection is closer to the actual policies pursued prior to the spread of deposit insurance.

Section V concludes by summarizing our results and outlining remaining questions that should be addressed by political theories of the spread of deposit insurance.

II. Theories of Liability Insurance

The Economic Approach

The economic theory explaining the potential value of liability insurance begins with Diamond and Dybvig (1983). In their model, “banks” raise funds, which they invest in productive activities. Those productive activities have high payoffs if investment lasts for the full two periods, but investments yield lower payoffs if terminated prematurely. Some bank “depositors” unpredictably will need to consume early, which motivates banks to fund themselves with demandable debts (debts that can be redeemed early, at the option of the depositor). If too many depositors request early withdrawal, banks will have to liquidate their investments prematurely and inefficiently. The reduction in returns to investments that are liquidated prematurely is the source of liquidity risk in the banking system. Depositors’ payoffs in this setting depend on what other depositors do. If I expect all other depositors to run on the bank but I do not run, then my expected payoffs are lower than if I also run. For that reason, the Diamond-Dybvig contract generates a bad Nash equilibrium in which everyone runs on the bank because everyone expects others to run on the bank.

Government-provided deposit insurance eliminates liquidity risk in this model. Depositors’ payoffs from early withdrawal are now independent of what other depositors do, and this removes the incentive for depositors to run on the bank in anticipation of one another’s doing so. In the Diamond-Dybvig model, not only does deposit insurance remove all liquidity risk, it does so costlessly. The reason is that protected bankers’ choices (such as loan selection or leverage choice) are not modeled.

Since Diamond and Dybvig (1983), this approach to motivating deposit insurance has been criticized as incomplete in several important respects. First, the demandable debt contract that generates liquidity risk in the Diamond and Dybvig (1983) model is assumed, but it was not derived as an optimal contract. In fact, Jacklin (1987) and Jacklin and Bhattacharya (1988) show that the optimal contract in the Diamond and Dybvig setting would not be demandable debt, and therefore, liquidity risk is entirely avoidable without resorting to deposit insurance. Banks could issue long-term or equity claims to fund their investments without any cost so long as depositors who need to consume early are able to sell their claims on the bank in a secondary market to fund their early consumption.

The Jacklin and Bhattacharya critique of Diamond and Dybvig not only removes the argument for deposit insurance in their model, but in doing so, it also raises a deeper question. If demandable debt contracts create liquidity risk, then why do banks issue demandable debt contracts (or more generally, short-term debt contracts that mature more quickly than banks' assets)? This is an important question to answer because this "maturity mismatch" has been a key feature of banking throughout its history.

As the theoretical literature has evolved, two core functions of banks have been identified as contributing to banks' maturity mismatch: (1) the creation and use of information about borrowers (the so-called "delegated monitoring" function of banks), and (2) the structuring of banks' claims to facilitate their use as transacting media by people who lack information about the underlying value of the bank. These two aspects are inter-related because, without the asymmetric information that arises from the delegated monitoring function of banks, bank claims of all types would be liquid in secondary markets. For that reason, the delegated monitoring function of banks is central to any explanation of bank's maturity mismatch.

An early contribution to the literature on delegated monitoring is Diamond (1984). In that setting, observing the outcome of borrowers' projects is costly. The financing structure that optimally minimizes the costs of verification is one in which banks raise funds in the form of debts, the riskiness of which is declining in the scale of the bank (through the diversification that results from the law of large numbers).² As banks become very large, they are able to offer near riskless debt claims to depositors, and this means that only bankers (not depositors) invest much in information about the outcomes of bank-funded projects.

Calomiris and Kahn (1991) extended that delegated monitoring framework by modeling the incentive problem of banker fraud (absconding), which explains not only why banks would offer demandable debt, but also why they would offer demandable debt with a first-come, first-served rule.³ Demandable debt with a first-come, first-served rule serves to incentivize some depositors to monitor the bank so that they can preemptively withdraw and force a suspension of convertibility before a banker can abscond. Calomiris, Heider and Hoerova (2015) show that the optimality of demandable debt with a first-come, first-served rule can also be shown in a model where the principal-agent conflict between depositors and the banker takes the form of an unobservable provision of effort by the banker to manage risk (which builds on the incentive problem modeled by Holmstrom and Tirole 1997). In bad states of the world, the threat of a run prompts bankers to invest in risk management effort, which they would not do in the absence of that threat.

² Krasa and Villamil (1992) show that banks' investments in firms should also take the form of debts in this environment.

³ This refers to the fact that in a bank run, depositors at the front of the line may receive all their funds, while those at the end of the line may receive no funds, if their bank runs out of reserves and is forced to suspend convertibility. The ultimate payout for depositors that were not at the front of the line may be much less than the face value of their deposits. Unlike in corporate bankruptcy, banks with a first-come, first-served rule do not require depositors of suspended banks who happened to be at the front of the line to re-deposit their funds into a common pool that is shared by all depositors.

These models are capable of explaining the maturity transformation of banks without appealing to the transactability of bank claims, but the benefits of maturity transformation are magnified if depositors value the ability to exchange their claims on the bank with others (e.g., to fund a consumption purchase). In an environment where people lack information about the underlying value of the bank's assets, they generally will be unwilling to trade in risky claims on the bank. In order for them to transact in claims on the bank, it is beneficial that the claims be senior claims on the bank's assets, implying that the value of those claims is relatively insensitive to the value of the banks' underlying assets (Gorton and Pennacchi 1990; Dang, Gorton, Holmstrom and Ordóñez 2014). Short-term debt instruments – which are de facto the most senior claims on a bank's assets – are constructed as a financing tranche that is particularly insensitive to the changes in the value of a bank's assets or cash flows, and therefore, particularly useful as a transacting medium.

In summary, the theoretical literature in banking has shown that models of principal-agent conflicts – in which bankers play an active role in selecting loans and managing loan risk but where bankers' actions and the consequences of those actions are not costlessly observable to everyone – are capable of explaining the desirability of creating a maturity mismatch in banks as a means of creating senior deposits subject to “market discipline” that rewards good behavior by bankers. If depositors value the flexibility of using their claims on banks as a transacting medium, the value of creating a maturity mismatch is even greater. In these models, banks' ability to efficiently direct funds to their highest and best uses and to facilitate consumers' needs to transfer financial claims easily require banks to create a large amount of low-risk, short-term claims to fund their risky assets.

Of course, despite the social benefits from creating such claims, in the event of sufficiently severe bad news about the economy that is relevant for the underlying value of banks' assets (a sufficiently severe "recession shock"), the riskiness of low-risk, short-term or demandable deposits may increase. Depositors may react to this increase in risk by withdrawing some of their deposits, forcing banks to de-leverage and shed some of their asset risk to restore depositor confidence in the low risk of default on deposits. The disciplinary process in reaction to an adverse shock to bank loans does not necessarily imply a "run" on deposits, but if the increase in risk is sufficiently great and sufficiently sudden, a run on the bank by most or all of its depositors may result. It is important to emphasize that, in theory, depositors should not wait for the bank to become insolvent to run on it. Thus, it is a fallacy to argue that runs on solvent banks is evidence, per se, of irrational, uninformed, or panicked behavior.

Even if banks' reliance on risk-intolerant short-term debt is socially optimal, it may make the process of adjusting to an adverse shock to the value of bank loans socially costly (Diamond and Rajan 2009). Even when market discipline takes the form of a gradual and orderly reduction in bank lending and leverage, which restores the low risk of deposits, the contraction in the supply of lending magnifies the contraction in economic activity. If the shock that produces a contraction in lending and the de-leveraging of banks is severe enough, then a sudden run on deposits throughout the banking system may result (Calomiris and Gorton 1991, Calomiris and Mason 2003a). The risk intolerance of depositors implies that withdrawals by depositors may occur long before a bank becomes insolvent. Banks that do not enjoy liability insurance protection experienced precisely this sort of market discipline by risk-intolerant depositors (Martinez Peria and Schmukler 2001, Calomiris and Powell 2001, Calomiris and Wilson 2004, Calomiris and Carlson 2016a). A systemic suspension of convertibility may result from a sudden

run on deposits and may also disrupt the ability of banks to provide liquidity to consumers and businesses. A sudden contraction in deposits and lending (a “funding liquidity” problem) can further deepen the recession by creating “market liquidity” problems, as banks and consumers seek to sell risky assets to shore up their financial positions (Calomiris and Gorton 1991, Adrian and Shin 2009, Mitchener and Richardson 2015, Calomiris and Carlson 2016b).

For all these reasons, the benefits that result from banks’ maturity transformation are not a free lunch; liquidity risk in the banking system will tend to aggravate the social costs of shocks to banks’ portfolios. The economic argument for deposit insurance begins with the recognition of those costs. Because government insurance of deposits removes the motivation for depositors to withdraw funds from banks that are experiencing increases in default risk, it can eliminate liquidity risk in the banking system, and avoid the magnification of recessionary shocks that is produced by market discipline. In doing so, however, deposit insurance eliminates the benefits associated with market discipline (Acharya and Thakor 2016). If market discipline was encouraging good risk management and preventing abuses by bankers, then removing market discipline will also have social costs. Undisciplined bankers may be less competent than disciplined ones. Because insured depositors no longer need to be discriminating in choosing where to deposit their funds, insurance will enable the operation of incompetent bankers who otherwise would have been excluded from the market by deposit discipline. Undisciplined bankers will also not be incentivized to manage risks as well as disciplined bankers, and may even face strong incentives to increase risk purposely in the wake of losses, so that they can maximize the value of deposit insurance protection (Merton 1977).

Is it possible for government deposit insurance to avoid these adverse-selection and moral-hazard costs? Prudential regulation is motivated in large part by the desire to limit banks’

abuse of protection. Regulatory discipline – in the form of minimum equity capital ratio requirements, minimum cash holding requirements, limits on lending practices, and other prudential measures – are intended as a substitute for market discipline. Of course, regulators (who set the rules), supervisors (who discipline banks that fail to comply with the rules), and examiners (who identify such failures) are all government employees. Unlike the discipline of uninsured depositors, who stand to lose their own wealth if bankers misbehave, the discipline provided by regulators, supervisors and examiners depends on the incentives that the political process is willing and able to create. For that reason, it is not obvious the extent to which prudential regulation, supervision and examination by the government is able to substitute for market discipline. Moreover, if deposit insurance is the result of a political bargain that serves a private interest purpose – either to provide a subsidy to banks or some class of borrowers – lax regulation may be an essential and purposeful feature of that same political bargain because without lax regulation, deposit insurance cannot convey its intended subsidy.⁴

In summary, for deposit insurance to be desirable on efficiency grounds, its net benefits – the gross benefits from mitigating the costs of liquidity risk less the gross costs of adverse selection and moral hazard – must be positive. That condition depends upon the ability of the prudential regulatory system to effectively limit abuses of deposit insurance by protected banks.

The Political Approach

Political theories of bank liability insurance begin by recognizing that outcomes determined by political processes – both in autocracies and in democracies – need not be

⁴ Indeed, as we discuss below, there is substantial evidence that prudential regulation and supervision are subject to politicization that can undermine their ability to rein in risk taking by protected banks.

efficient. Modern political economy (e.g., Coase's 1960 Theorem) posits that if the formation of coalitions is costly, coalitions involved in bargaining will not generally arrive at efficient outcomes. In democracies, vested interests may have incentives to mobilize political support and money to encourage politicians to support their causes, even if the outcomes are inefficient and disadvantageous to the majority of voters (Stigler 1971, Peltzman 1976, Becker 1983). In autocracies, inefficient outcomes that benefit the powerful elite often occur as the result of the elite's control, which is enforced by military power.

Calomiris and Haber (2014, Chapter 2) construct a typology of regulatory regimes of banking that arise in different sorts of states (i.e., various types of democracies and autocracies), and consider the role of deposit insurance in various types of political regimes. They emphasize that deposit insurance needs to be understood as part of an equilibrium political bargain achieved by a winning political coalition, and consequently, its function may vary across countries as the result of the differing political functions that it plays in different regimes and contexts.

For example, in the context of an autocracy that brings together a network of industrialist-bankers to determine the structure of the banking system (e.g., Mexico circa 1990), government insurance of all deposits could be a crucial ingredient for constructing a banking system because of business leaders' understandable reluctance to commit capital to banks that suffer a high potential for expropriation risk. Deposit insurance allows thinly capitalized banks to attract deposits, which fund bank loans. In many such autocracies, where elite families own industrial conglomerates as well as the banks on which their businesses depend for funding, it can be misleading to think of deposit insurance as a means of boosting bank profits, or of protecting politically influential depositors; deposit insurance's role may be to provide loans to

crony capitalists, which would be hard to fund otherwise (Haber 2008; Calomiris and Haber 2014, Chapters 10-11).

Similarly, in democracies, it can be misleading to conceive of deposit insurance as a benefit sought only by bankers and depositors. Although deposit insurance may benefit certain types of banks or certain types of depositors, it may be used as part of a broader political bargain to benefit a winning coalition of bankers, depositors and *borrowers*. For example, in the 20th and 21st centuries, in many democracies, real estate lending has become the most politically favored constituency of borrowers.⁵ This is clearly seen in the United States. While real estate lending was initially prohibited for national banks, real estate lending constituted the majority of bank loans by the end of the 20th century and is encouraged by Federal Home Loan Bank funding subsidies, by regulatory practices that encouraged mortgage lending (e.g., Community Reinvestment Act enforcement as a condition for granting permission for mergers), and by GSE mandates that required Fannie Mae and Freddie Mac to purchase some of the mortgage loans originated by banks in meeting their Community Reinvestment Act contracts.⁶ Deposit insurance may also have played a role here, if it enabled and encouraged banks to expand their risk taking as the *quid pro quo* in a deal to secure their willingness to meet politicians' goals for expanded real estate lending.⁷ The political theory of deposit insurance must take into account the interests of all of the parties that participate in determining the winning regulatory bargain of which it is a part – bankers, depositors, politicians and politically favored borrowers.

⁵ Jorda, Schularick and Taylor (2015a, 2015b) show that real estate lending has boomed as a proportion of lending worldwide, and that it has played a major role in producing the global pandemic of costly and frequent banking crisis since the 1980s. Cournede and Denk (2015) show that the negative growth consequences of “excess” finance in many developed economies reflects the growth of real estate lending, which has displaced commercial and industrial lending.

⁶ These contractual arrangements are described in detail in Calomiris and Haber (2014, Chapter 7).

⁷ The implied government backing of the debts of Fannie and Freddie, which became explicit when the two GSEs became insolvent, played a role analogous to deposit insurance by providing a subsidy that reduced the cost to the GSEs of having to satisfy their mandates.

Not only does the political theory of deposit insurance require us to conceive broadly of its potential beneficiaries, it also requires us to conceive of prudential regulation as part and parcel of the political equilibrium that produces deposit insurance. For example, if the purpose of the political coalition that creates deposit insurance is to promote lending to risky crony ventures in an autocracy or to subsidize risky mortgages in a democracy, then it would defy logic for that coalition to simultaneously create a prudential regulatory apparatus that would prevent excessive risk taking. The political theory of deposit insurance predicts that if deposit insurance systems are devised to benefit winning political coalitions by allowing banks and borrowers to increase their risk taking at public expense, then we should not expect those winning political coalitions to tolerate the creation of prudential regulatory regimes that would undermine their rent-sharing arrangement by limiting risk taking. Prudential regulatory failure, according to this theory, should not be conceived as a mistake or a consequence of the inability to devise better incentives for regulators, supervisors, and examiners, but rather as an equilibrium regulatory outcome, designed by those who created deposit insurance as a means of increasing risk.

III. Empirical Evidence

Our empirical review considers, first, the evidence about which factors have been instrumental in creating or expanding bank liability insurance, and second, whether insurance has improved or worsened the performance of banking systems. From the perspectives of these two sets of evidence, we then consider which of the two theoretical paradigms reviewed in Section II – the economic theory or the political theory of deposit insurance – is more consistent with the facts.

The Origins of Insurance: Historical Evidence

Bank liability insurance began in the United States as a remedy to the issues produced by the “unit” (single office) banking system that existed across most states (Calomiris and Haber 2014, Chapter 6). Unit banks are subject to increased risk due to their inability to diversify the location of their lending or to coordinate their responses to common shocks by pooling their resources. The supporters of unit banking advocated the installation of liability insurance to protect bank noteholders and depositors against loss precisely because liability insurance provided an alternative to branching as a means of stabilizing the banking system. The support for liability insurance went hand in hand with the support for unit banking.

The United States’ embracing of unit banking went against the norm of the established banking systems of the time. For example, Canada, which shared a British Colonial heritage and a vast North American geography with the United States, chartered nationwide branch banks beginning in 1817, and large nation-wide branch banks have dominated the Canadian banking system ever since. Bank chartering authority in the United States was divided between state and national governments. In the early national period, aside from the nationally chartered Bank of the United States⁸ which operated branches throughout the country, other banks were state-chartered, few in number, and confined to the states that chartered them. While the earliest banks chartered in the South typically operated numerous branches (Schweikart 1987), banks in the North initially were confined to the largest cities, such as Philadelphia and New York City (Schwartz 1947). Banking system growth in the North and South continued to follow these patterns for some time. (Bodenhorn 2000, 2003, 2006, 2007, Calomiris and Haber 2014, Chapter 6).

⁸ The United States established two different Banks of the United States but neither lasted long because of political opposition.

Why did unit banking hold sway in the North? The answer does not lie in economics as this was clearly a highly inefficient way to organize a banking system. In addition to the issues discussed above, unit banks incurred excessive overhead costs and were unable to relocate depositors' savings from regions with few lending opportunities to locations where credit was relatively scarce. Even large unit banks operating in cities were hampered in making industrial loans by the middle of the nineteenth century because of the mismatch that had developed between large industrial borrowers and small unit bank lenders (Calomiris and Haber 2014, Chapter 6).

This leaves political factors to explain unit banking's persistence. Most obviously, once established, unit bankers had an incentive to protect their local markets from entrants. Small banks in rural and agricultural regions, in particular, pushed to perpetuate branching restrictions as a protection against entry by competing banks. If large city banks had been allowed to branch into the rural areas, then their relatively low overhead costs and diversified portfolios would have placed small local banks at a significant competitive disadvantage. Although unit bankers in rural areas consistently labored to preserve unit banking, that would not have been enough in a democracy like the United States to make unit banking the winning choice that it was in most of the country from roughly 1800 until the 1990s. Indeed, even in cases where the question of unit banking was put to a referendum – as it was in Illinois in 1924 – it passed by more than two to one (White 1985). The popularity of unit banking was especially high in places with large numbers of middle-class landowners, like the Midwest and the West (Calomiris 2000, p. 65). Indeed, unit banking was important enough to be embraced by the platform of the Populist Party in the late 19th century.

Why would landowning farmers support unit banking, a system that raised their borrowing costs? Calomiris and Ramirez (2004) argue that unit banks provided a form of credit insurance for local borrowers. Although loans were more expensive, unit banks are tied to the local community and have to be more forgiving in their willingness to continue lending to local borrowers during adverse times. To farmers who faced significant agricultural price risks, that insurance was highly valuable.

When these political circumstances were removed, unit banking was not popular. In the antebellum South, large farmers owned slaves, a mobile form of capital that made them less dependent on local circumstances and, therefore, less interested in supporting unit banking. Furthermore, branch banking was extremely useful to Southern planters for promoting the use of bankers acceptances and bills of exchange, which were used to finance the sale and shipment of Southern crops. After the Civil War ended slavery and shifted production towards smaller farms, however, unit banking became much more popular in the South.

Large banks in urban areas of the North typically fought to permit branching and, therefore, opposed deposit insurance. Branching would have allowed them to diversify their loan portfolios, attract deposits from a larger base, and take advantage of economies of scale necessary to pursue industrial lending. The advantages of unit banking and deposit insurance were relatively low in cities because large banks and their borrowers focused on commercial and industrial lending more than agricultural lending. Furthermore, because deposit insurance premia to support insurance payments were paid by all banks, large city banks would be on the hook for bailing out the depositors of failed rural banks making risky agricultural loans.

Advocates of unit banking succeeded in passing bank liability insurance in six states during the antebellum period. There were two versions of liability insurance. First, Indiana

chartered a limited number of banks with unlimited mutual liability for each other's liabilities. The system also vested member banks with regulatory and supervisory authority over each other. The Indiana model spread to Ohio and Iowa, and survived through to the Civil War, when most members converted to a national bank charter.⁹ Second, New York required all banks to pay into a "Safety Fund" that would be used to fully repay the liabilities of failed banks. Instead of allowing monitoring by members, bank comptrollers that had little supervisory or disciplinary powers were given charge of the system. The New York model spread to Vermont and Michigan, and in all three cases, it ended in systemic insolvency. (Golembe and Warburton 1958, Calomiris 1989, 1990; Calomiris and Schweikart 1991)

The creation of federally chartered national banks by the National Banking Acts of 1863 and 1864 further fragmented the banking system and reinforced unit banking because national bank regulators interpreted the act as only permitting the establishment of unit banks. Intending to bring the system together, the Acts instead created a dual banking system whereby the low capital requirements of state banks (i.e., banks chartered by state legislatures) allowed them to dominate in rural areas and the high requirements and restrictions on mortgage loans of national banks (i.e., banks chartered by the Comptroller of the Currency) concentrated them mainly in urban areas. That dichotomy complicated the debate over unit banking and deposits insurance by adding a new chartering authority difference to the divergent interests of urban and rural banks. State and national bank regulators now competed for members. In particular, under the dual banking system, state banking officials sought to create regulatory advantages that would allow their state banks to flourish relative to the Comptroller's national banks (James 1978).

⁹ Legislation supporting the National Banking Act imposed a ten percent tax on state banks' note issues. The members of the Indiana, Ohio and Iowa systems funded themselves primarily with notes, and so the new tax placed a prohibitive burden on their continued operation.

State legislatures during the postbellum period lowered capital requirements to attract members. The Panic of 1907, however, pushed regulatory competition in a new direction, leading eight states to pass deposit insurance.¹⁰ Similar to the New York model, each law created a non-state guaranteed fund that would be used to reimburse any deposits in the event of a failed member bank.¹¹ Why did the eight postbellum systems copy the New York model, which had produced such poor results in the antebellum era, rather than the successful Indiana antebellum system? The simplest explanation is that the Indiana model was not feasible for a system with a large number of member banks. As the number of member banks rises, the incentive of any member to monitor and enforce other members' adherence to collective rules is weakened. Without strong incentives to monitor, self-regulatory powers would not have been an effective check on risk taking, and unlimited mutual liability would have exaggerated moral-hazard problems (Calomiris 1989).

The geographical pattern of insurance law passage reflected the relative power of small banks and farmers in each state. As described by White (1981, p. 539) deposit insurance states had "firmly established unit banking within their boundaries and were all in relatively undiversified regions where business propensity in general depended on one or two commodities." The laws were concentrated in the rural and agricultural states in the Midwest and South Central, and the one geographic outlier (Washington) installed its system as a hasty

¹⁰ The states are Oklahoma, Texas, Kansas, Nebraska, South Dakota, Mississippi, North Dakota, and Washington.

¹¹ The major differences across the deposit insurance systems revolved around whether insurance was mandatory. Kansas and Washington passed voluntary laws that gave state banks the choice of whether to opt into the system. When given a choice, many large banks chose not to join the system. When given a choice, many large banks chose not to join the system. Texas allowed banks to opt out of the state's deposit insurance system if they were willing to insure their deposits by posting a collateral bond. South Dakota also passed a voluntary deposit insurance law, but it did not give rise to an insurance system because the creation of the system depended on obtaining a required number of members before it could begin operation.

reaction to bank failures in their state (Robb 1921).¹² All eight state insurance funds became insolvent in the 1920s after the sharp commodity price decline after World War I (Warburton 1959, Calomiris 1990, 1992). Despite being subject to similar exogenous shocks, the insured banking system collapses exhibited much higher loan losses than national banks within the same states or state-chartered banks operating in adjacent states.

The banking collapse that followed the sharp post-World War I agricultural price declines seemed to place the nation on the path towards branching and away from deposit insurance. First, failures were concentrated in small agricultural banks and branch banks thrived during the period. Branch banks' share of U.S. commercial loans grew from 12.2 percent of all U.S. commercial bank loans in 1915 to over 45 percent in 1930 (White 1985; Economides, Hubbard and Palia 1996). Second, the failures of the state deposit insurance systems made contemporaries keen observers of the incentive problems of deposit insurance. Commenting in 1932 to the *New York Sun*, candidate Roosevelt wrote that deposit insurance "would lead to laxity in bank management and carelessness on the part of both banker and depositor. I believe that it would be an impossible drain on the Federal Treasury" (Quoted in Prins 2009, p. 139).

Despite the failures of many unit banks (especially insured ones) and all the opposition to deposit insurance, the U.S. still passed nation-wide deposit insurance in 1933. Fifty proposals for federal deposit insurance had been rejected by Congress since the 1880s because they were recognized as socially undesirable, special interest legislation promoted by unit bankers and their supporters (Calomiris and White 1994).¹³ However, as in the Panic of 1907, the Great

¹² Many neighboring states (e.g., Colorado, Minnesota, and Missouri) only narrowly defeated deposit insurance legislation during the period (Cooke 1910; White 1981).

¹³ For instance, the McFadden Act which was seen as an anti-branching law was pushed for by small state banks in areas without branching and was opposed by large national banks (Economides, Hubbard and Palia 1996). Kroszner and Strahan (2001) find similar results for votes on the Wylie Amendment to the Federal Deposit Insurance Corporation Improvement Act of 1991 on limiting deposit insurance to a single account per bank.

Depression brought the debate over deposit insurance into the public arena, where advocates of federal deposit insurance managed to win widespread support. Many writers and politicians blamed the Depression on gambling “banksters” in money center cities who did not have the public’s interest in mind. Therefore, while Senator Glass and President Roosevelt pushed to separate deposit and investment banks, they were forced to include deposit insurance legislation in order to gain sufficient votes from unit banking supporters, such as Rep. Henry Steagall.¹⁴ Congress was not ignorant of the dangers of unit banking and deposit insurance – which was opposed by Fed and Treasury officials, as well as the American Bankers Association (a group controlled by large banks) – rather Congress and the President succumbed to the lobbying of small unit banks and public opposition to concentrating banker power in the wake of the Great Depression. (Calomiris and White 1994; Economides, Hubbard and Palia 1996; Kane and Wilson 2000; Calomiris 2010; Calomiris and Haber 2014)

The Origins of Insurance: Recent Evidence

Given the unique unit banking structure of the United States, it took some time before deposit insurance gained traction in other countries. As Figure 1 shows, no country installed deposit insurance until the 1960s, and less than 20 countries adopted insurance by 1980 (Demirgüç-Kunt, Kane and Laeven 2008a). However, the next three decades saw an ever increasing number of deposit insurance systems, and there are now over 100 countries with deposit insurance. The extent of the coverage of deposit insurance (the extent to which deposits are covered by each insurance system) has also grown over time (Calomiris and Chen 2016). What caused this expansion? We begin by describing the broad trends in the adoption of deposit

¹⁴ For instance, in *Business Week* (12 April 1933), Senator Glass stated “Washington does not remember any issue on which the sentiment of the country has been so undivided or so emphatically expressed as upon this.”

insurance across geography, income, and time before considering potential economic and political causal factors.

Deposit insurance has spread around the globe but it is not equally distributed. Nearly every country in Europe and the vast majority of those in North and South America have installed some form of explicit deposit insurance. While many Asian and Pacific countries also installed deposit insurance, important countries such as China and Pakistan still have not adopted it by 2014.¹⁵ Africa and the Middle East are the two geographic areas where the largest proportions of countries did not pass deposit insurance.

Some of the geographic distribution is correlated with income differences. Deposit insurance is most popular in developed and high-income countries. As of 2003, 75 percent of high-income countries offered explicit deposit insurance, compared to 59 percent of middle-income countries and 16 percent of low-income countries. Even after removing the effect of high income levels, the tendency of European and Latin American countries to install deposit insurance is still relatively strong. Over 74 percent of middle- and low-income countries in Europe and Central Asia, and over 66 percent of them in Latin America and the Caribbean, installed deposit insurance. Comparatively, middle- and low-income countries in Asia, Oceania, the Middle East, and Africa have adoption rates below 40 percent (Demirgüç-Kunt, Kane, and Laeven 2008a).

Demirgüç-Kunt, Kane, and Laeven (2008a) conclude that the recent global expansion of deposit insurance reflects, in part, the acceptance of it as appropriate regulatory policy by influential political actors during the 1990s. The International Monetary Fund recommended deposit insurance as a means of managing banking crises to prevent further withdrawals, or as a

¹⁵ Honohan (2008) discusses the distinctive features of the Chinese financial system and how it protects depositors in the absence of deposit insurance.

means of walking back blanket guarantees (Folkerts-Landau and Lindgren 1998; Garcia 1999). The World Bank, like the IMF, encouraged the passage of deposit insurance by applying pressures on its member countries, and also provided loans to constitute the initial capital for the funding of insurance. Finally, the European Union's Directive on Deposit Insurance in 1994 virtually forced countries that sought EU membership to pass insurance.¹⁶ For example, the push by the EU was associated with a sudden change in Europe: between 1994 and 1998, sixteen European countries installed deposit insurance, with many of the adopters being middle- or low-income countries. Another wave of European countries seeking to gain admittance (e.g., Cyprus, Serbia, Albania, Slovenia, Malta) also installed deposit insurance in the early 2000s.

Demirgüç-Kunt, Kane, and Laeven (2008a, 2008b) also consider domestic political influences on the passage and design of deposit insurance. Their model includes measures of external political pressures, private interest group pressures and political-institutional factors in for 170 countries between 1960 and 2003.¹⁷ They show that, controlling for country GDP and growth, countries with a more contestable political system (proxied, among other ways, by polity score)¹⁸ and with larger and more under-capitalized banks were more likely to pass deposit insurance (see also Laeven 2004).¹⁹ In addition, countries were more likely to pass deposit insurance in the face of external pressure, particularly by the EU.²⁰ Finally, countries were much more likely to pass deposit insurance after a financial crisis. The authors argue that the

¹⁶ More recently, the EU has pushed for a single European Deposit Insurance Scheme (EDIS) to replace the country-specific systems. A press release in November of 2015 even called the EDIS the "third pillar" of banking union.

¹⁷ These studies build on the framework of Laeven (2004).

¹⁸ See also Kroszner and Strahan (1999).

¹⁹ The findings of these papers have been corroborated by additional research which includes more recent data. See Calomiris and Chen (2016), which make use of Demirgüç-Kunt, Kane and Laeven (2014).

²⁰ The results for the IMF and World Bank measures lose their statistical significance when placed alongside measures of the country's bank risk measures. This suggests that risky banks might have been able to use the external pressure to effect the change they wanted, whereas safe banks might have been able to rebuff the pressure.

occurrence is because “representatives for sectoral interest find it easier to negotiate regulatory reform during distressed times” (2008a, p. 70).

Demirgüç-Kunt, Kane, and Laeven (2008a, 2008b) also find that many of the variables’ affect the amount and limits of coverage provided by deposit insurance as a proxy for the potential moral hazard encouraged by the deposit insurance law. Specifically, the higher and more generous the coverage, the more risk-behavior the laws are expected to allow. First, countries with more democratic political systems and risky banks were more likely to install systems with more generous coverage. Therefore, the potential for moral hazard was greater in those countries where private interests stood the most to gain and could affect the regulators. Second, once bank risk is controlled for, external political pressure by the World Bank and EU seem to have led to better designed deposit insurance with more limited coverage. The result is likely due to the EU assisting countries in designing their systems, which may mean that the design choices were somewhat removed from reach of interest groups. Third, countries seem to have installed more generous laws after a crisis, but the effect is only statistically significant when bank risk is not controlled for.

The Consequences of Insurance

Although the evidence provided thus far has shown that identifiable political influences have been central to the passage of deposit insurance and the nature of its design, that evidence does not rule out the public interest view that deposit insurance tends to reduce systemic risk, nor the possibility that risk reduction is an anticipated benefit of deposit insurance. In this section, we consider evidence about the consequences of deposit insurance.

Our discussion tracks our earlier presentation, and begins with a discussion of the early U.S. liability insurance systems. An advantage of studying the U.S. liability experiments is that they occur within the same nation, under a common legal framework and political structure. For the antebellum period, Goodspeed (2015) finds that the banks covered under either the New York model or the Indiana model of liability insurance increased their leverage and relied more on short-term funding relative to surrounding uninsured banks. This is what one would expect irrespective of whether the systems created moral hazard; so long as protection was deemed credible, it reduced liquidity risk of member banks and thus allowed even prudently managed banks to increase their leverage. However, only banks under the New York insurance fund model saw an increased probability of failure, greater exposure to macroeconomic factors, and larger contractions in lending during crises. That finding reflects the incentives to imprudently increase asset risk and leverage that banks faced under the New York model compared to Indiana's mutual system.²¹

For the early 20th century deposit insurance systems, Calomiris and Jaremski (2016) take advantage of the fact that only state-chartered banks (and not national banks) were included in the various state experiments with deposit insurance. They perform a microeconomic analysis of how the implementation of deposit insurance within a state resulted in changes in state banks' abilities to attract deposits, and in their risk management practices. The data show that insured banks were able to attract deposits away from national banks, and their ability to do so was not affected by the prudence of the insured bank. This removal of market discipline, which had been constraining uninsured state banks, produced severe moral hazard of the banking system.

²¹ As noted above, the success of the Indiana model reflected the incentives that it created for limiting moral hazard. The combination of a small number of members, unlimited mutual liability, and strong supervisory authority meant that individual members had the ability and the incentive to monitor and discipline one another to prevent excessive risk-taking. The New York model gave no such ability and the large number of members limited each's exposure to loss (Calomiris 1989).

Depositors applied strict market discipline on uninsured banks, but seemingly ignored the financial soundness of insured banks even as their risks mounted. Insured banks raised their loan-to-asset ratios, reduced their cash reserves, and kept their capital ratios close to the regulatory minimum. Insured banks seemingly bet on the permanence of agricultural price increases that had occurred during World War I, and depositors seemingly believed in the insurance systems' ability to protect them. When prices reversed in the early 1920s, the insured banking systems quickly collapsed, leaving depositors with losses and banks in bankruptcy.²²

Similar conclusions about the moral-hazard consequences of deposit insurance emerge consistently in studies of the recent period regardless of whether authors study cross-country samples or within-country time series. First, deposit insurance tends to encourage greater risk-taking by banks. Carr, Mathewson and Quigley (1994) find that the creation of deposit insurance in Canada in 1967 was associated with a sharp increase in bank failure rates: no bank, trust, or mortgage-loan companies failed in Canada from 1949 to 1966, but from 1968 to 1985, 22 institutions failed. Nier and Baumann (2006) show that deposit insurance resulted in lower capital buffers in individual banks across a large number of countries. Gropp, Gruendl, and Guettler (2014) show that formerly-insured Germany savings bank cut off the riskiest borrowers from credit and shifted their liabilities away from risk-sensitive debt instruments when removed from deposit insurance coverage. Ioannidou and Penas (2010) show that insured Bolivian banks were more likely to give out loans that had worse internal rating at origination, carried higher interest rates, and were associated with higher default and delinquency rates.

Other studies have shown that, as predicted by theory, the risk-increasing consequences of deposit insurance vary depending on the existing condition of insured banks, the type of insurance and the timing of risk taking. Brewer (1995) shows that the extent of increased risk

²² Calomiris (1990, 1992) links deposit insurance to increased bank risk and greater severity of loan losses.

taking by insured U.S. Savings and Loans in response to deregulation of their investments in the 1980s depended on their preexisting health: institutions that had suffered fewer losses and had higher capital values did not engage in resurrection risk taking because they still had large amounts of their own capital at stake. Demirguc-Kunt and Detragiache (2002) find that deposit insurance increases the likelihood of banking crises, but the adverse effect is stronger in countries with more extensive insurance coverage and weaker in non-government run insurance. Anginer, Demirguc-Kunt, and Zhu (2014) find that generous deposit insurance systems increase bank risk and systemic fragility in years leading up to the recent global financial crisis, but decrease those same measures during the crisis. They further argue that effective bank supervision can alleviate the unintended consequences of deposit insurance during good times.

Second, the increased risk taken by banks after the installation of deposit insurance is enabled by a reduction of market discipline.²³ Chernykh and Cole (2011), Karas, Pyle, and Schoors (2013) and Yan, Skully, Avram and Vu (2014) find that deposit insurance had large effects on bank risk taking, and that the sensitivity of deposit withdrawals to declines in bank capitalization and increases in bank risk declined dramatically for newly insured deposits in Russia and Australia respectively. Wagster (2007) finds that the installation of deposit insurance across Canadian banks led to a redistribution of bank stock value from large-block investors that had received higher returns as compensation for monitoring the bank to investors that held few shares and stood to gain relatively little from monitoring. Demirguc-Kunt and Huizinga (2004) show that deposit insurance reduced required deposit interest rates and lowered market discipline

²³ Many of the studies cited in the previous paragraph also find evidence of decreased market discipline. Some countries did not show a decline in market discipline. For instance, Martinez-Peria and Schmukler (2001) and Calomiris and Powell (2001) find no decline in market discipline in Argentina, Chile, and Mexico during 1980s and 1990s. That finding reflects the limited coverage of deposit insurance in Argentina and Chile, and questions about the government's ability and willingness to fund deposit insurance liabilities. For example, in Mexico, insured liabilities of banks earned dramatically different interest rates, all of which were substantially higher than the risk-free rate.

on bank risk taking. The authors stress that the results are larger for insurance systems with high coverage, broader coverage, and public management of insurance.²⁴ Calomiris and Chen (2016) estimate the consequences of deposit insurance for bank risk management across a broad sample of countries since the 1960s. Using a three-stage model in which political influences (such as those identified by Demirgüç-Kunt, Kane, and Laeven 2008a, 2008b) serve as instruments to predict the creation of deposit insurance and the extent of deposit insurance coverage, they find that the greater the instrumented generosity of deposit insurance, the higher are banks' loan-to-asset ratios and debt-to-equity ratios. They conclude that deposit insurance permits banking systems to raise their default risk both by increasing asset risk and by increasing leverage.

Third, deposit insurance can have a negative impact on the growth of the financial system. Cull, Senbet, Sorge (2005) find that generous deposit insurance negatively affected financial development and growth across countries, particularly in countries where the rule of law was relatively weak and bank supervisors were not granted sufficient discretion and independence. Bergbrant, Campbell, Hunter, and Owers (2014) show that deposit insurance reduced the development of both the banking system and non-bank financial markets. This effect was less severe in the short run, and the reduction was at least partially offset in countries with strong rules and laws.

Fourth, there is substantial evidence that prudential regulation and supervision are subject to politicization that can undermine their ability to rein in risk taking by protected banks. Calomiris and Haber (2014) shows that regulatory failure is often a predictable consequence of the political bargains that give rise both to safety nets and prudential regulations. Barth, Caprio and Levine (2006) find that prudential requirements have no identifiable effects on systemic risk.

²⁴ Focusing on large banks, Dewenter, Hess, and Brogaard (2014) find that the effect of deposit insurance varies depending on the level of economic freedom, rule of law and corruption in the bank's home country.

Indeed, the only stabilizing influence identified is market discipline, which results from a combination of limits on deposit insurance and increased disclosure. They also find that the extent of ineffective prudential rules is greater in more corrupt countries, which suggests that complex regulation is motivated more by the desire to create opportunities for bribery than by its effectiveness in limiting excessive risk taking. As discussed above, this type of behavior is consistent with a political theory of deposit insurance; if the intent of creating deposit insurance is to channel subsidies to banks, or through banks to a targeted group of borrowers, then lax regulation and supervision will be necessary to ensure that the subsidy is realized.

Brown and Dinc (2005) identify another political consideration that influences bank regulation: the timing of elections. They find that the regulatory recognition of bank losses, and the interventions to close insolvent banks that this recognition would require, is very unlikely to occur in an election year. Insolvent banks are very unlikely to be shut down in an election year because the closure of banks tends to result in the contraction of bank credit, which may have adverse consequences at the polls.²⁵ Unfortunately, these types of delays tend to produce “resurrection risk taking” (an extreme form of risk shifting), which tends to magnify the size of losses when banks are finally intervened.²⁶

In summary, the empirical literature on the consequences of bank liability insurance is vast and unusually uniform in its conclusions. Bank liability insurance increases bank risk rather than reducing it. Although insurance is justified economically as a means of limiting liquidity

²⁵ Although Brown and Dinc (2005) studied developing countries, their finding has broader applicability. The resolution of U.S. Savings & Loans was delayed for years in the mid-to-late 1980s; only after the election of 1988, did the Administration and Congress pass FIRREA (in February 1989) and begin to recognize fully S&Ls’ losses.

²⁶ This likely helps to explain why the average loss experience of banks throughout the world has been exceptionally large in recent years. Laeven and Valencia (2012) report a median value of the negative net worth of banks relative to GDP of 16% in the crises they study. Historically, because market discipline ensured the prompt closure of insolvent banks, bank losses were smaller, even in response to severe shocks. For example, during the Great Depression, the comparable figure for the United States was roughly 2% of GDP (Calomiris 2010).

risk, its adverse effect on fundamental risk taking by banks dominates the reduction in liquidity risk, and results in greater overall banking instability. In combination with the evidence about the private interest origins of insurance, the evidence about the risk-increasing consequences of deposit insurance strongly favors the private-interest (political) rather than public-interest (economic) interpretation of its purpose. It is hard to overstate the importance of this conclusion. As Calomiris and Haber (2014, Chapter 1) show, relying on data from Laeven and Valencia (2012), the period since 1970 has witnessed a global pandemic of banking crises around the world, and the frequency and severity of banking crises has been unprecedented. The empirical literature on the consequences of deposit insurance shows that it has played a central role in this dramatic escalation of banking instability.

Deposit Insurance as a Borrower Subsidy

The adverse growth consequences of deposit insurance identified by Cull, Senbet and Sorge (2005) suggest at least two plausible interpretations. First, it may be that the banking system volatility and crisis-induced financial distress created by deposit insurance results in lower growth. Second, it may be that deposit insurance is employed as part of a government effort to redirect credit to favored borrowers rather than banks, thus crowding out high-productivity investments. This latter effect should operate differently depending on the political regime in which deposit insurance arises and the borrowers being targeted. For example, in the 19th- and early 20th-century U.S. deposit insurance systems, the ultimate purpose of deposit insurance (as discussed above) was to favor agricultural borrowers who benefited from relaxing constraints on the lending of unit banks in rural areas. The primary consequence of these systems was explosive agriculture lending growth in the insured banking systems during World War I.

In an autocracy with high sovereign expropriation risk, deposit insurance can be a useful mechanism for convincing depositors to place their funds in a risky banking system so that those funds can be lent to industrial firms that have favored access to credit. In the case of Mexico in the early 1990s, the weak existing condition of the banks being privatized and the high level of expropriation risk banks faced meant that banks lacked sufficient capital to attract unprotected deposits and also meant that bank buyers were reluctant to invest equity in the weak banks. Deposit insurance was a key element of the rent sharing device that mobilized savings and channeled it to favored purposes (Haber 2005, 2008, Calomiris and Haber 2014, Chapters 10-11).

In a democracy, insured institutions may also be given special incentives to lend to politically favored, risky purposes. Without protection, banks may be less willing to participate in favored lending programs, but with protection banks may be more willing to participate. For example, insured banks interested in pursuing mergers for which approval is required, may be more willing to make risky mortgage loans in order to receive merger approval than uninsured banks would be. Additionally, banks willing to target favored borrowers may also be granted subsidized access to funding that is conditioned on making targeted loans. As Calomiris and Haber (2014, Chapters 7-8) show, protected U.S. banks faced precisely this tradeoff in the 1990s and 2000s. A combination of deposit insurance, lenient prudential regulation, the conditioning of merger approvals on favorable Community Reinvestment Act outcomes, the ability to unload many of the risky mortgages on Fannie Mae and Freddie Mac (who were required by statute to purchase them in increasing amounts over time), and Federal Home Loan Bank borrowing subsidies targeted to real estate lending all worked together to encourage massive amounts of mortgage lending by banks.

There is reason to believe that the U.S. example is not an isolated case, as recent headlines in countries as different from one another as Brazil (with its Minha Casa, Minha Vida program) and the United Kingdom (with its Help-to-Buy program) show. Jorda, Schularick and Taylor (2015a, 2015b) document that the period since the 1970s – precisely the period in which deposit insurance spread throughout the world – was also a period of rising bank leverage and skyrocketing mortgage lending as a fraction of all loans. They also find that the vast majority of banking crises experienced by this group of countries was related to real estate booms and busts.

Banks are not natural providers of real estate finance, and their growing focus on real estate reflects policy distortions, including deposit insurance. Prior to deposit insurance, in the United States, mortgages were financed primarily by life insurance companies (funded by long-term debt) or by Building and Loans, which were funded by a complex funding contract that is more like equity than debt (White, Fishback and Snowden 2014; Fleitas, Fishback and Snowden 2015). Only when federal Savings & Loans began to be chartered in 1934, and were insured by the Federal Savings and Loan Insurance Corporation beginning in 1935, did short-term debt become an important source of mortgage finance.

The reliance on short-term bank-issued debt as a primary source for funding real estate lending is hard to rationalize in theory: real estate asset value growth is highly correlated with the business cycle and real estate assets are difficult to liquidate during a downturn, which makes short-term debt a poor choice for funding real estate loans.²⁷ Of course, if short-term debt is insured by the government, liquidity risk from this mismatch is avoided. Despite the lack of any

²⁷ Calomiris and Kahn (1991) and Calomiris, Heider and Hoerova (2015), banks are making commercial loans, not mortgages. Commercial loans depend for their value on uncertain cash flows. Payoffs are hard to observe and may be subject to manipulation. Furthermore, there are many opportunities for observable risk shifting through changes in risk management by the banker. This model would not be appropriate to apply to the funding of mortgages, where the value of the loan is insensitive to such behavior so long as the loan-to-value ratio of the mortgage is kept reasonably low. Similarly, models that focus on transactability (Gorton and Pennacchi 1990) imply less need for short-term debt finance because the value of the mortgage portfolio is relatively easy for outsiders to value.

economic logic connecting short-term debt and mortgages, there may be a strong political logic: governments may choose to use banks as the vehicle for passing through credit subsidies to favored mortgage borrowers because banks are heavily regulated and, therefore, subject to easy manipulation through a combination of deposit insurance, government incentives for mortgage lending, and lax prudential regulation.

Calomiris and Chen (2016) find that, for both developed and developing economies, external political influences that predict the enactment or expansion of deposit insurance coverage also predict an increase in the proportion of lending to households, which primarily consists of mortgage lending. In other words, as deposit insurance has subsidized risk in the banking sector, much of that subsidy has been passed on to consumers around the world in the form of risky mortgage lending.

Cournede and Denk (2015) show that the recent rise in lending to households (which largely consists of mortgage credit) is associated with a change in the relation between credit depth (bank credit relative to GDP) and economic growth. Contrary to the typical positive relationship between credit depth and GDP growth (King and Levine 1993, Levine 1997), the countries with the largest growth in government-subsidized mortgage lending actually saw a negative growth effect from incrementally more credit depth (which is driven by mortgage lending). This finding mirrors the negative relationship between deposit insurance and growth found by Cull, Senbet, Sorge (2005), suggesting that deposit insurance and mortgage credit subsidization may be two sides of the same political bargain. To our knowledge, with the exceptions of the historical work and the Mexican case study referenced here, there is little analysis of the role of deposit insurance as a subsidy passed through to favored borrowers. Most analyses of the political economy of deposit insurance focus on the influence of bankers as

lobbyists for deposit insurance subsidies. Future work on the political economy of deposit insurance should explore further the role of favored borrowers (especially mortgage borrowers in developed democracies) as a motivation for deposit insurance.

IV. Alternatives to Deposit Insurance

Bank liability insurance is only one of many ways to protect banks or to reduce their liquidity risk. Another approach is the “lender of last resort” (LOLR). Furthermore, the LOLR can be conceived narrowly (as a central bank acting as a collateralized lender, as in Bagehot 1873) or more broadly as any mechanism that provides assistance to banks. Potential mechanisms include ad hoc government guarantees of bank debts, tax or other policies targeted to raise bank earnings, guarantees of bank assets, redenominations of bank liabilities that raise their net worth, and injections of capital into banks (e.g., preferred stock or common stock).²⁸

A key feature that distinguishes all of these mechanisms from deposit insurance is the conditionality of assistance. Deposit insurance – especially when it covers a sufficiently large fraction of bank liabilities – constitutes an ex ante commitment by the government to protect depositors against all sources of loss. Other kinds of assistance reserve ex post discretion to the government over whether to protect bank claimants from loss and by how much.

Acharya and Thakor (2016) model the optimal design of the bank safety net. They show that, along with a minimum capital ratio requirement, efficiency is improved by making assistance to banks conditional on the nature of the shock that causes bank losses. Losses that result from systemic shocks should be protected, while losses that arise from idiosyncratic

²⁸ Examples of these various mechanisms and how they have been used are reviewed in Calomiris, Klingebiel and Laeven (2005), Calomiris and Khan (2015), and Calomiris, Flandreau, and Laeven (2016).

shocks should not be protected. The condition is useful because, in contrast to an unconditional commitment to protect all bank depositors irrespective of the nature of the shock that causes bank loan losses, it preserves some market discipline and thereby results in significant social savings.²⁹

Calomiris, Flandreau, and Laeven (2016) show that, prior to the spread of deposit insurance, assistance to banks tended to follow an approach similar to that described by Acharya and Thakor (2016). Sometimes assistance was provided privately, sometimes publicly. In Canada, the nationwide branch banks would orchestrate bailouts for a failing bank if they believed that its failure would threaten systemic stability, and they did this on at least two occasions prior to the formation of the Bank of Canada in 1935 (Calomiris and Haber 2014, Chapter 9). But most of the time, when a Canadian bank suffered distress, it was allowed to close without any assistance and with losses to depositors. Similarly, the Bank of England and the London Clearing Banks organized a guaranty fund to prevent Barings Brothers from failing in 1890 because of concerns about its systemic consequences, while individual British bank were allowed to fail at other times. The Mexican government also orchestrated assistance to its banks in the wake of the turmoil created by the Panic of 1907, but it did so only because of the systemic nature of the event, and it limited the assistance each bank received (Calomiris and Haber 2014, Chapter 10). The U.S. government's Reconstruction Finance Corporation made preferred stock investments in banks during the Great Depression, but only after the crisis had

²⁹ The protection of losses contingent on the realization of a particular state of the world will tend to make banks choose to load more of their risk on that state of the world, in order to capture the implied subsidy of insurance. That form of moral-hazard will mitigate the advantages from selective protection. A simple way to limit banks from loading more risk on to systemic risk states would be to limit the total proportion of lending in real estate. Real estate loans are highly correlated in returns with one another and with the business cycle, and are hard to liquidate in a recession, which makes them an important sources of systemic risk. Limiting U.S. banks real estate lending to, say, 25% of its total lending would go a long way to limit the ability of banks to load risk on the systemic risk factor. Real estate lending has constituted the majority of loans in the U.S. banking system recently, and for smaller banks on average it constitutes roughly three quarters of lending.

become quite severe, only after examining banks to ensure that deeply insolvent banks would not receive protection, and then also limited bank dividend payments and required banks to develop a plan for increasing their equity capital (Calomiris, Mason, Weidenmier and Bobroff 2013).

Calomiris, Flandreau and Laeven (2016) show that these assistance packages were quite successful. Their success reflected key features of the implicit rules that governed assistance: it was not guaranteed in advance, was state-dependent, was sometimes offered selectively to some institutions and not to others, and was given in a manner that limited the total risk exposure to the providers of assistance as much as possible under the circumstances.

If this historical approach to dealing with systemic risk was preferable to deposit insurance, then why did it end (in most countries) in the middle of the 20th century, as deposit insurance replaced it? If deposit insurance adoption were the result of a bona fide search for an optimal mechanism to deal with systemic risk (in the public interest), then that would be a puzzling fact indeed. But, as we have shown, deposit insurance is better understood as serving the private interests of banks, depositors, and favored bank borrowers. That perspective makes it easy to understand why the world has experienced inefficient technological regress in the design of bank safety nets.

V. Conclusion

Economic theories of deposit insurance posit that it is designed to reduce systemic risk in the banking system by mitigating or eliminating the liquidity risk associated with short-term debt finance of banks. Political theories of deposit insurance see it as serving the private interests of banks, bank borrowers, and depositors, potentially at the expense of the public interest. The

empirical evidence – both as it pertains to the original bank liability insurance schemes that were developed in the United States in the 19th and 20th centuries, and in the contemporary context – supports the private-interest approach. There is now a voluminous literatures showing that the adoption of liability insurance generally has reflected political influences, including private vested interests. The evidence regarding the consequences of liability insurance shows that it has been associated with increases, rather than decreases, in systemic risk as a result of the removal of market discipline in the market for bank liabilities (e.g., bank notes or deposits).

The exceptions to this rule are rare, and reflect design features that prevent moral hazard and adverse selection. An early U.S. example of a successful liability insurance system is that of antebellum Indiana. It combined unlimited mutual liability with collective enforcement powers that were administered by member banks. Because the number of members was sufficiently small, the combination of unlimited liability and far-reaching powers meant that member banks faced strong incentives to monitor one another, and the system proved to be quite successful in limiting systemic risk. Recent examples of successful deposit insurance systems are those that retain some market discipline by limiting insurance coverage. These, however, are the exceptions. For the most part, liability insurance has produced substantial increases in systemic risk.

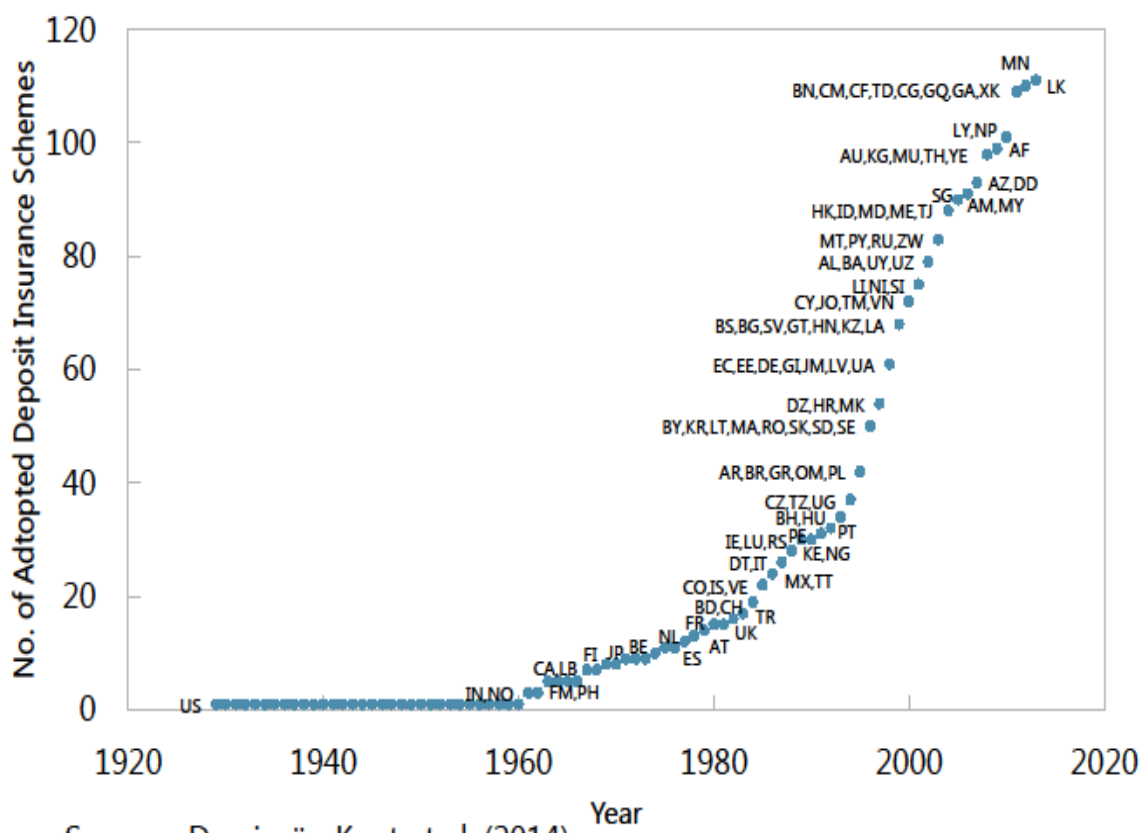
Prudential regulation of insured banks has generally not been a very effective tool in limiting the systemic risk increases associated with liability insurance. This likely reflects a combination of incentive problems in supervision (supervisors do not have skin in the game like depositors in unprotected banks), as well as purposeful failures in regulation. Purposeful failures of regulation reflect the fact that deposit insurance has the political purpose of delivering a

subsidy; it is therefore not surprising that the political equilibrium that gives rise to deposit insurance also gives rise to ineffective prudential regulation.

The politics of liability insurance should not be construed narrowly to encompass only the vested interests of bankers. In the United States historically, deposit insurance is better understood as a pass-through subsidy targeted to a particular class of bank borrowers. Early in U.S. history, these were agricultural borrowers, more recently, they have been mortgage borrowers. An important area for future research is to identify better the borrower groups who have stood to benefit from the expansion of deposit insurance around the world.

More effective alternatives to deposit insurance for limiting systemic risk were employed historically in many countries. Like the failure of effective prudential regulation, the failure to adopt these historically proven alternatives has a political explanation: deposit insurance is not designed to limit systemic risk. As Yogi Berra might have said, if contemporary bank safety nets had been designed to limit systemic risk, they wouldn't have been.

Figure 1. Adoption of Deposit Insurance



Sources: Demirgüç-Kunt et al. (2014)

References

- Acharya, Viral, and Anjan Thakor. 2016. "The Dark Side of Liquidity Creation: Leverage and Systemic Risk." *Journal of Financial Intermediation*, forthcoming.
- Adrian, Tobias, and Hyun Song Shin. 2009. "Money, liquidity, and monetary policy." *FRB of New York Staff Report* 360.
- Anginer, Deniz, Asli Demirguc-Kunt, and Min Zhu. 2014. "How does deposit insurance affect bank risk? Evidence from the recent crisis." *Journal of Banking and Finance* 48: 312-321.
- Bagehot, Walter. 1873. *Lombard Street: A Description of the Money Market*. London: Henry S. King. & Co.
- Barth, James R., Gerard Caprio, Jr., and Ross Levine. 2006. *Rethinking Bank Regulation: Till Angels Govern*. Cambridge: Cambridge University Press.
- Becker, Gary S. 1983. "A Theory of Competition among Pressure Groups for Political Influence." *Quarterly Journal of Economics* 98: 371-400.
- Bergbrant, Mikael, Kaysia Campbell, Delroy Hunter, and James Owers. 2014. "Does deposit insurance retard the development of financial markets?" Unpublished working paper.
- Brewer III, Elijah. 1995. "The impact of deposit insurance on S&L shareholders' risk/return trade-offs." *Journal of Financial Services Research* 9.1: 65-89.
- Brown, Craig O., and Serdar Dinc. 2005. "The Politics of Bank Failures: Evidence from Emerging Markets." *Quarterly Journal of Economics* 120: 1413-1444.
- Calomiris, Charles W. 1989. "Deposit insurance: lessons from the record." *Economic Perspectives* 13.3: 10-30.
- Calomiris, Charles W. 1990. "Is Deposit Insurance Necessary? A Historical Perspective." *Journal of Economic History* 50, 283-295.
- Calomiris, Charles W. 1992. "Do vulnerable economies need deposit insurance." *If Texas Were Chile, A Primer on Banking Reform*. San Francisco: Sequoia Institute: 237-314.
- Calomiris, Charles W. 2010. "The political lessons of Depression-era banking reform." *Oxford Review of Economic Policy* 26.3: 540-560.
- Calomiris, Charles W. and Mark A. Carlson. 2016a. "Corporate governance and risk management at unprotected banks: National banks in the 1890s." *Journal of Financial Economics* forthcoming.
- Calomiris, Charles W. and Mark A. Carlson. 2016b. "Interbank networks in the national banking era: their purpose and their role in the panic of 1893." Unpublished Working Paper.
- Calomiris, Charles W. and Sophia Chen. 2016. "The spread of deposit insurance and the global rise in bank leverage since the 1970s." Working paper.
- Calomiris, Charles W., Marc Flandreau, and Luc Laeven. 2016. "Political Foundations of the Lender of Last Resort: A Global Historical Narrative." *Journal of Financial Intermediation*, forthcoming.
- Calomiris, Charles W. and Gary Gorton. 1991. "The origins of banking panics: models, facts, and bank regulation." In *Financial markets and financial crises*, edited by R. Glenn Hubbard. Chicago: University of Chicago Press, pp. 109-174.
- Calomiris, Charles W. and Stephen H. Haber. 2014. *Fragile by design: The political origin of banking crises and scarce credit*. The Princeton Economic History of the Western World, Joel Mokyr, Series Editor.
- Calomiris, Charles W., Florian Heider, and Marie Hoerova. 2014. "A theory of bank liquidity requirements." *Columbia Business School Research Paper* 14-39.

- Calomiris, Charles W. and Matthew Jaremski. 2016. "Stealing Deposits: Deposit Insurance, Risk-Taking and the Removal of Market Discipline in Early 20th Century Banks." *Columbia Business School Research Paper No. 16-24*.
- Calomiris, Charles W. and Charles M. Kahn. 1991. "The role of demandable debt in structuring optimal banking arrangements." *American Economic Review*: 497-513.
- Calomiris, Charles W., and Urooj Khan. 2015. "An Assessment of TARP Assistance to Financial Institutions." *Journal of Economic Perspectives* 29: 53-80.
- Calomiris, Charles W., Daniela Klingebiel, and Luc Laeven. 2005. "Financial Crisis Policies and Resolution Mechanisms: A Taxonomy from Cross-Country Experiences." In *Systemic Financial Crises: Containment and Resolution*, edited by Patrick Honohan and Luc Laeven: 25-75. Cambridge: Cambridge University Press.
- Calomiris, Charles W. and Joseph Mason. 2003. "Fundamentals, Panics, and Bank Distress During the Great Depression." *American Economic Review* 93, 1615-1647.
- Calomiris, Charles W., Joseph Mason, Marc Weidenmier, and Katherine Bobroff. 2013. "The Effects of Reconstruction Finance Corporation Assistance on Michigan Banks' Survival in the 1930s." *Explorations in Economic History* 50: 526-547.
- Calomiris, Charles W. and Larry Schweikart. 1991. "The panic of 1857: origins, transmission, and containment." *Journal of Economic History* 51.04: 807-834.
- Calomiris, Charles W. and Berry Wilson. 2004. "Bank Capital and Portfolio Management: The 1930s "Capital Crunch" and the Scramble to Shed Risk," *Journal of Business* 77-3: 421-456.
- Calomiris, Charles W. and Eugene White. 1994. "The origins of federal deposit insurance." In *The Regulated Economy: A Historical Approach to Political Economy*. Chicago: University of Chicago Press.
- Carr, Jack, Frank Mathewson, and Neil Quigley. 1994. *Ensuring Failure: Financial System Stability and Deposit Insurance in Canada*. Toronto: C.D. Howe Institute.
- Chernykh, Lucy, and Rebel A. Cole. 2011. "Does Deposit Insurance Improve Financial Intermediation? Evidence from the Russian Experiment." *Journal of Banking and Finance* 35: 388-402.
- Coase, Ronald H. 1960. *The problem of social cost*. London: Palgrave Macmillan.
- Cournède, Boris, and Oliver Denk. 2015. "Finance and economic growth in OECD and G20 countries." OECD Economics Department Working Paper No. 1223.
- Cull, Robert, Lemma W. Senbet, and Marco Sorge. 2005. "Deposit insurance and financial development." *Journal of Money, Credit and Banking* 37-1: 43-82
- Dang, Tri Vi, Gary Gorton, Bengt Holmström, and Guillermo Ordonez. 2014. "Banks as secret keepers." NBER Working Paper w20255.
- Demirgüç-Kunt, Asli and Enrica Detragiache. 2002. "Does Deposit Insurance Increase Banking System Stability? An Empirical Investigation." *Journal of Monetary Economics* 49: 1373-1406.
- Demirgüç-Kunt, Asli, and Harry Huizinga. 2004. "Market discipline and deposit insurance." *Journal of Monetary Economics* 51.2: 375-399.
- Demirgüç-Kunt, Asli, Edward J. Kane, and Luc Laeven. 2008a. *Deposit Insurance Around the World: Issues of Design and Implementation*. Cambridge, Mass: MIT Press.
- Demirgüç-Kunt, Asli, Edward J. Kane, and Luc Laeven. 2008b. "Determinants of deposit-insurance adoption and design." *Journal of Financial Intermediation* 17.3: 407-438.

- Demirgüç-Kunt, Asli, Edward J. Kane, and Luc Laeven. 2014. "Deposit Insurance Database." IMF Working Paper WP/14/118, July.
- Dewenter, Kathryn L. and Alan Hess, and Jonathan Brogaard. 2014. "Institutions and Deposit Insurance: Empirical Evidence." Unpublished working paper.
- Diamond, Douglas W. 1984. "Financial intermediation and delegated monitoring." *The Review of Economic Studies* 51.3: 393-414.
- Diamond, Douglas W., and Philip H. Dybvig. 1983. "Bank runs, deposit insurance, and liquidity." *The Journal of Political Economy* 91-3: 401-419.
- Diamond, Douglas W., and Raghuram G. Rajan. 2009. "Fear of fire sales and the credit freeze." NBER Working Paper w14925.
- Diamond, Douglas W., and Raghuram G. Rajan. 2011. "Fear of fire sales, illiquidity seeking, and credit freezes." *The Quarterly Journal of Economics* 126.2: 557-591.
- Economides, Nicholas, R. Glenn Hubbard, and Darius Palia. 1996. "The Political Economy of Branching Restrictions and Deposit Insurance: A Model of Monopolistic Competition among Small and Large Banks." *Journal of Law and Economics* 39: 667-704.
- Fleitas, Sebastian, Price Fishback, and Kenneth Snowden. 2015. "Forbearance by Contract: How Building and Loans Mitigated the Mortgage Crisis of the 1930s." Working Paper, University of Arizona.
- Folkerts-Landau, David and Carl-Johan Lindgren. 1998. *Toward a framework for financial stability*. Washington: International Monetary Fund.
- Garcia, Gillian, 1999. "Deposit Insurance: A Survey of Actual and Best Practices". IMF Working Paper 99/54.
- Goodspeed, Tyler. 2015. "Skin in the Game: Liability Insurance, Extended Liability, and Financial Stability." Unpublished working paper.
- Gorton, Gary, and George Pennacchi. 1990. "Financial intermediaries and liquidity creation." *The Journal of Finance* 45.1: 49-71.
- Gropp, Reint, Christian Gruendl, and Andre Guettler. 2014. "The Impact of Public Guarantees on Bank Risk-Taking: Evidence from a Natural Experiment*." *Review of Finance* 18-2: 457-488
- Holmström, Bengt and Jean Tirole. 1997. Financial intermediation, loanable funds, and the real sector. *Quarterly Journal of Economics* 112-3, 663-691.
- Honohan, Patrick. 2008. "Protecting Depositors in China: Experience and Evolving Policy". In *Deposit Insurance Around the World: Issues of Design and Implementation*, 335-360. Cambridge, Mass: MIT Press.
- Ioannidou, Vasso P., and María Fabiana Penas. 2010. "Deposit insurance and bank risk-taking: Evidence from internal loan ratings." *Journal of Financial Intermediation* 19.1: 95-115.
- Jacklin, Charles J. 1987. "Demand deposits, trading restrictions, and risk sharing." In *Contractual arrangements for intertemporal trade*. Minneapolis: University of Minnesota Press.
- Jacklin, Charles J., and Sudipto Bhattacharya. 1988. "Distinguishing panics and information-based bank runs: Welfare and policy implications." *The Journal of Political Economy* 96-3: 568-592.
- Jordà, Òscar, Moritz Schularick, and Alan M. Taylor. 2015a. "Betting the house." *Journal of International Economics* 96: S2-S18.
- Jordà, Òscar, Moritz Schularick, and Alan M. Taylor. 2015b. "Leveraged bubbles". *Journal of Monetary Economics*, 76, S1-S20.

- Kane, Edward and Berry Wilson. 2000. "A Contracting-Theory Interpretation of the Origins of Federal Deposit Insurance." *Journal of Money, Credit and Banking* 30: 51-74
- Karas, Alexei, William Pyle, and Koen Schoors. 2013. "Deposit insurance, banking crises, and market discipline: Evidence from a natural experiment on deposit flows and rates." *Journal of Money, Credit and Banking* 45.1: 179-200.
- King, Robert G. and Ross Levine. 1997. "Finance, Entrepreneurship, and Growth: Theory and Evidence." *Journal of Monetary Economics* 32: 513-542.
- Krasa, Stefan, and Anne P. Villamil. 1992. "Monitoring the monitor: an incentive structure for a financial intermediary." *Journal of Economic Theory* 57.1: 197-221.
- Kroszner, Randall S., and Philip E. Strahan. 1999. "What Drives Deregulation? Economics and Politics of the Relaxation of Bank Branching Restrictions." *Quarterly Journal of Economics* 114: 1437-1467.
- Kroszner, Randall S., and Philip E. Strahan. 2001 "Obstacles to optimal policy: the interplay of politics and economics in shaping bank supervision and regulation reforms." *Prudential Supervision: What Works and What Doesn't*. 233-272. Chicago: University of Chicago Press.
- Laeven, Luc. 2002. "Bank risk and Deposit Insurance." *World Bank Economic Review* 16: 109-137.
- Laeven, Luc. 2004. "The political economy of deposit insurance." *Journal of Financial Services Research* 26.3: 201-224.
- Laeven, Luc, and Fabian Valencia. 2012. "Systemic Banking Crises Database: An Update." International Monetary Fund Working Paper 12/163.
- Levine, Ross. 1997. "Financial Development and Economic Growth." *Journal of Economic Literature* 35: 688-726.
- Martinez-Peria, Maria Soledad, and Sergio L. Schmukler. 2001. "Do depositors punish banks for bad behavior? Market discipline, deposit insurance, and banking crises." *Journal of Finance* 56.3: 1029-1051.
- Merton, Robert C. 1977. "An analytic derivation of the cost of deposit insurance and loan guarantees: an application of modern option pricing theory." *Journal of Banking & Finance* 1.1: 3-11.
- Nier, Erlend, and Ursel Baumann. 2006. "Market discipline, disclosure and moral hazard in banking." *Journal of Financial Intermediation* 15.3: 332-361.
- Peltzman, Samuel. 1976. "Toward a More General Theory of Regulation." *Journal of Law and Economics* 19: 109-148.
- Prins, Nomi. 2009. *It Take a Pillage: Behind the Bailouts, Bonuses, and Backroom Deals from Washington to Wall Street*. Hoboken, New Jersey: John Wiley and Sons.
- Robb, Thomas B. 1921. *The Guaranty of Bank Deposits*. Boston: Houghton Mifflin Co.
- Stigler, George J. 1971. "The Theory of Economic Regulation." *Bell Journal of Economics and Management Science* 2: 3-21.
- Wagster, John D. 2007. "Wealth and risk effects of adopting deposit insurance in Canada: Evidence of risk shifting by banks and trust companies." *Journal of Money, Credit and Banking* 39.7: 1651-1681.
- Warburton, Clark 1959. *Deposit Insurance in Eight States During the Period 1908-1930*. Federal Deposit Insurance Corporation.
- White, Eugene. 1981. "State-Sponsored Insurance of Bank Deposits in the United States, 1907-1929." *Journal of Economic History* 41: 537-557.

- White, Eugene. 1985. "Voting for costly regulation: Evidence from banking referenda in Illinois, 1924." *Southern Economic Journal*: 1084-1098.
- White, Eugene N., Kenneth Snowden, and Price Fishback (Eds.). 2014. *Housing and Mortgage Markets in Historical Perspective*. Chicago: University of Chicago Press.
- Yan, Xing, Michael Skully, Katherine Avram, and Tram Vu.. 2014. "Market discipline and deposit guarantee: Evidence from Australian banks." *International Review of Finance* 14.3: 431-457.