The New Deal and the Origins of the Modern American Real Estate Loan Contract in the Building and Loan Industry

Jonathan Rose
Kenneth Snowden [*]

February 9, 2012

Abstract

We treat the direct reduction loan contract as an instance of financial innovation and describe its adoption within the building and loan (B&L) industry beginning in the 1880s and culminating in the 1930s. A long chain of complementary innovations at B&Ls gradually reduced the costs of adoption, leading to moderate use by the 1920s and potential for far greater use. In the 1930s, extreme dissatisfaction with other contracts radically altered the adoption calculus, as did new competition from FHA-insured lenders. Federal savings and loan charters built upon the accumulated innovations at B&Ls by emulating the small segment of the industry that had adopted direct reduction lending by the 1920s. Other policies helped restructure the liabilities of B&Ls to accommodate the loss of credit risk sharing and mutuality inherent to older contracts. New Deal policies therefore built upon and facilitated the ongoing process of financial innovation that brought the familiar modern loan contract to the conventional loan market.

[*] Rose: Federal Reserve Board, jonathan.d.rose@frb.gov; Snowden: University of North Carolina Greensboro, snowden@uncg.edu. The views presented in this paper are solely those of the authors and do not necessarily represent those of the Federal Reserve Board or its staff.

1. Introduction

During the 1930s, the increased use of direct reduction loan contracts (i.e., fully amortized loans with equal monthly payments) reshaped the U.S. residential mortgage market. This transition is often described as a rapid move away from short-term, interest-only, balloon loans prior to the Great Depression, resulting from the success of two New Deal programs that used the direct reduction contract: loan insurance through the Federal Housing Administration (FHA), and loan modifications through the Home Owners Loan Corporation (HOLC).[1] This popular account captures important parts of the truth, but it misses much more. Neither the FHA nor the HOLC were the first in the U.S. to use the direct reduction contract for residential real estate loans. That honor belongs to a segment of the building and loan (B&L) industry, historically the largest institutional source of residential real estate loans. B&Ls introduced the direct reduction contract in the 1880s and used it continually thereafter.[2] As is the case with many innovations, the widespread adoption of this contract did not follow immediately after its inception, nor did it necessarily appear inevitable *ex ante*. In this paper, we identify the forces that drove the adoption of the direct reduction contract by B&Ls after 1930 and explain why the same or other forces did not lead to more widespread adoption during the previous fifty years.[3]

The bulk of the B&L industry long used neither the direct reduction contract nor the short-term balloon contract. Instead, most B&Ls relied heavily on the traditional B&L share accumulation loan that dates back to the 1830s in the U.S. and the 1780s in England. In a share accumulation loan, a borrower committed to purchasing equity shares in his B&L each month until the shares, plus retained dividends, equaled the value of the loan. The repayment period usually lasted around twelve years, with the exact duration and interest cost depending on the dividend rate that the borrower earned on the accumulated shares. In comparison, a direct reduction loan delivers more certainty to borrowers. Since the non-interest portion of each payment directly reduces the amount of outstanding principal debt, the maturity date is known from the outset as well as the ultimate interest cost.

Despite the apparent superiority to borrowers of direct reduction loans relative to share

[1] See, for example, Green and Wachter (2005), Emmons (2008), Gruenberg (2007), Center for American Progress (2011), or Zandi and deRitis (2011), among many others. Jaffee (1975) is a notable exception. We build on Jaffee's work by considering the mortgage loan contract from a financial innovation point of view.
[2] See Snowden (2010) for an overview of direct reduction contracts in farm lending.
[3] Throughout the paper we describe these institutions as building and loan associations. During the 1930s and 1940s, the industry transitioned to the "savings and loan" nomenclature.

accumulation loans, the latter remained in wide use until the 1930s. An 1893 federal census of B&L activities show the share accumulation contract dominated the B&L industry at that time. The next period for which data are available is the 1920s. An NBER survey, though flawed, indicates direct reduction contracts were adopted a bit more widely by that time, but the share accumulation contract was still much more common. The share accumulation contract was then rapidly and broadly abandoned in favor of the direct reduction contract starting in the mid-1930s, particularly around 1935. These data, gathered from reports of B&L regulators for a number of states, establish for the first time the rapid and widespread adoption of direct reduction loans within the market for non-insured (conventional) real estate loans.

Though it is tempting to consider the 1930s transition to direct reduction loans as an isolated instance of financial innovation, we suggest the transition is best understood as part of a long chain of innovations within the conventional residential loan market, centered in the B&L industry, which gained considerable momentum in that decade. In other words, we suggest the correct unit of innovation is the entire suite of organizational and financial policies that complemented the direct reduction contract and enabled its use, along with the contract itself. The outline of our argument is as follows.

To a B&L, the benefit of adopting the direct reduction contract came from its attractiveness to borrowers, but offsetting costs came from three sources: the loss of risk-sharing with borrowers, the costs of overcoming organizational and accounting changes needed to administer direct reduction loans, and, after 1894, the potential loss of mutuality which allowed B&Ls to avoid federal taxation. Incremental innovation at B&Ls over several decades gradually lowered these costs to the point at which they were broadly balanced with the benefits of adoption by the 1920s. Borrowers' demands changed rapidly during the 1930s, however. Share accumulation contracts became deeply unpopular as their underlying risks became quite apparent to borrowers.

In this context, New Deal policy to encourage direct reduction loans did not act in isolation. Rather, it built on a century's worth of incremental innovation that had brought the B&L industry to a point at which the direct reduction contract could be adopted as easily as it was. Federal savings and loan charters required direct reduction lending, directly emulating a small segment of the industry that federal officials admired, and a suite of other New Deal programs helped restructure the liability side of B&L balance sheets to accommodate the loss of

credit risk sharing and mutuality inherent to the new loan format. FHA insurance of direct reduction loans likely changed the competitive environment for B&Ls, though it is revealing that B&Ls made the transition to such loans while largely avoiding the new FHA program and focusing their lending activities within the much larger uninsured (conventional) market.

This discussion focuses on the use of amortization, as does the paper in general. Of course, the risks in a loan contact are influenced by all of its features, including the term, leverage, interest rate and method of repayment. Lenders compete for borrowers by adjusting any or all of the four. However, we identify amortization as the key development in the 1930s that drove the other changes in loan contracts during that decade. Full amortization was required to reduce the risk associated with higher leverage and longer maturities, and its absence had become the key constraint on loan contract design in the early twentieth century.[4] The short term balloon loan, in wide use among non-B&L lenders, was emblematic of older ways of assessing risk that emphasized borrowers' equity rather than capacity to pay.[5]

Many readers will also identify the modern American loan contract with the use of fixed rates over long periods of time. Concern over interest rate volatility is largely a development confined to the postwar period. In the historical period considered in this paper, loan rates had long been high but stable. Steps to deal with interest rate risk and other developments during the postwar period represent a continuation of the long tradition of incremental innovation in the US residential loan market.

2. Loan contracts at B&Ls before 1930

In this section, we have two goals. First, we begin with the early history of the B&L industry in order to understand how the share accumulation contract came to be the default contract in that industry. This history shows that, at first, the share accumulation contract for borrowers was not a choice of an association but rather the foundation of B&L financial structure and inseparable from it without innovations in that structure. Our second goal is to then sketch the long chain of innovations that ensued. While some of these early innovations were put in place without the direct reduction contract in mind, we describe how these innovations

[4] See for example, Colean (1944). Colean was the designer of the FHA's mortgage program, and argues that amortization was the most important change of the period and led to a restructuring of credit standards with more focus on consumers' ability to pay, similar to practices common for other consumer installment loans.

[5] A similar transition had occurred earlier in the farm mortgage sector, starting in the 1890s and that ended with the adoption of direct reduction loans through the Federal Farm Loan bank system in 1916.

eventually enabled the industry to jettison the share accumulation loan in favor of the direct reduction loan. The history of the B&L industry is one of incremental innovation; the latter innovations that made direct reduction loans less costly to adopt built on the entire chain of innovation up to that point.

Share accumulation as the foundation of early B&Ls

The share accumulation plan was the contractual foundation of the building and loan movement in the U.S.[6] In the earliest B&Ls, all members joined in order to eventually become borrowers. From the outset each member would commit to accumulate shares of the size he needed to pay for a home, through the payment of compulsory monthly dues. For example, if a member desired to accumulate $1000 for a house, he would subscribe for five shares with maturity value of $200 each. Members would then take turns in borrowing from the pot of money created by these dues.[7] By the time it was a member's turn to borrow, he would have already accumulated part of his shares (and retained dividends) that would eventually be used to pay off the loan in full.

Share accumulation loans were straight, balloon loans that also required the creation of a sinking fund in the form of shares to repay the loan at maturity. Thus, they were quite different than balloon loans offered by other lenders that did little to require borrowers plan for repayment. Of course, the B&L loan required not just monthly dues but also interest payments, on the full amount of the loan since that amount remained outstanding until the shares matured and the loan was cancelled. However, as a borrower's sinking fund grew, it would accumulate retained dividends that in some sense offset the interest payments. The pace of these retained dividends would determine the maturity of the loan, which was indefinite.[8]

Borrowers liked the B&L contract because it offered longer maturities and higher loan-to-value ratios than other lenders were willing to provide on standalone, balloon loans. The

[6] This section gathers information contained in Bodfish and Theobald, pp. 30-49; Ewalt, pp. 370-395; Clark and Chase, pp. 32-62; and Bodfish chapters 4-7.

[7] The order of borrowing members was determined by a bidding process. Members that wished to borrow earlier would pay for the privilege by paying a higher premium for the loan than other members were willing to pay. The premium was added to the cost of the loan either as a monthly charge or as a lump sum discount from face value withheld at origination.

[8] Until the maturity value was reached, the rules regarding payment of dues and dividends were strict. Members were fined if they missed or were late paying dues. Members were also required to reinvest dividends in their share accounts, and stood to lose some accumulated dividends, and perhaps even some paid-in dues, if they withdrew before the shares matured.

B&L contract exposed borrowers to additional risks, however, because of the requirement that the sinking fund remain invested in the association's loan portfolio.[9] For example, at a typical dividend rate of 6 percent, monthly dues with retained dividends would mature shares with par value of $200 and monthly payments of $1 in about 11½ years. A lower dividend of, say, 3 percent would lengthen the process to 15 years, while a higher dividend of 8 percent would speed it up to 11 years. The borrowing member was also vulnerable to net losses on the association's loan portfolio. If this occurred, the value of a borrower's existing share accumulation could decrease and the effective principal on the outstanding loan increase.

These original associations terminated once the shares reached their maturity value and, by design, each member had accumulated enough savings to have paid for a house. Consequently, they are known today as terminating associations. The design was borrowed from the structure of early English building societies and can be traced back to the 1780s in England and the 1830s in the United States.

The chain of innovation begins, 1830s-1880s

Under the terminating plan the B&L industry was limited to serving small groups of prospective homeowners who were ready and willing to commit to a strict, compulsory savings plan over the same horizon, roughly twelve years. This organizational structure was not designed to attract non-borrowing savers. The subsequent innovations on that structure were largely ones that attracted such savers.

The first change did away with termination by grouping members into multiple series of share subscriptions spaced over time, typically quarterly. These "serial" associations mitigated the problem of matching the pace of borrowing with the pace of savings that had troubled terminating societies. This naturally led to the elimination of the requirement that all members borrow. Such a requirement had been important to terminating associations to ensure that available funds would be used as they became available. In serial associations, however, borrowers from new series could use the available funds, relaxing the need for members in older series to borrow, particularly if they were not yet ready to purchase homes. Each series within a

[9] Until the maturity value was reached, the rules regarding payment of dues and dividends were strict. Members were fined if they missed or were late paying dues. Members were also required to reinvest dividends in their share accounts, and stood to lose some accumulated dividends, and perhaps even some paid-in dues, if they withdrew before the shares matured.

serial association was, in effect, a separate terminating association but each group could serve as either net lenders or net borrowers to other series in the association.

The serial plan appeared in the 1850s and then continued to dominate older, northeastern B&L loan markets until the 1930s. Serial associations were eventually supplemented (but not supplanted) by "non serial" associations in the mid 1800s. Non serial associations gave each member his own series instead of grouping members into series that would mature all at once and create a cash flow problem for the association.[10]

The industry grew rapidly for the remainder of the 19th century after the introduction of the serial and non-serial plans and by 1890 B&Ls were operating in every state and in cities of all sizes. Given this success, and the flexibility in organizational design that the industry used to achieve it, it will be useful for later purposes to consider the costs and benefits that the serial and non-serial associations of the nineteenth century would have faced if they had jettisoned the share accumulation loan in favor of the direct reduction loan.

At serial and non serial associations, with changes in saving contracts for non borrowers, share accumulation for borrowers was no longer strictly necessary. In a terminating society, borrowers had taken on the same contracts as savers because all savers were eventually borrowers. Changes in that structure to allow for different types of pure savers gradually lowered the costs of adopting direct reduction contracts relating to organizational and accounting changes.

Compared to a terminating society, direct reduction loans could be incorporated into a serial society somewhat more easily, but the change would still be consequential. Serial associations retained a single accounting and contractual structure. Borrowers were granted share accumulation loans financed by savers who also used share accumulation contracts. To adopt direct reduction contracts, new accounting techniques would have to be adopted so that borrowers' accounts could have been separated from the accounts of others. Such accounting techniques were not necessary with share accumulation loans because borrowers were part of a series, and so their sinking funds matured at the same time as those of non-borrowing savers who invested in the same series. Therefore the entire series could be treated as the same account. In

[10] B&L literature typically refers to these associations as "permanent" associations but we prefer the less-used "non serial" terminology as "permanent" conveys no information about the distinguishing features of the organizational plan used by these associations. Non serial was the term used in New Jersey and elsewhere here and there in the industry.

this respect, direct reduction loans were somewhat easier for non serial associations to adopt, as accounting innovations in these associations allowed each member to have his own set of books. In a non-serial association, an existing borrower could have his loan converted to a direct reduction loan, for example, without affecting the accounting books of all the other members in that borrower's series, since each member already had his own series.

Mutuality was retained by serial and non serial associations because borrowers were members and retained risk through their accumulated shares, even though savers and borrowers became different classes of members. With direct reduction loans, borrowers would no longer have equity stakes, since they would have no sinking funds. This would be a consequential change. Risk-sharing with borrowers was central to keeping loss reserves low and creating such reserves would be costly. In addition, mutuality allowed B&Ls to avoid federal taxation. B&L officials feared that borrowers would not be considered members if they did not purchase shares and therefore the tax exemption would be compromised.

The introduction of direct reduction loans in the late 19th century

The compulsory savings contract was the next target of innovation. Such contracts were eliminated for savers first and that elimination was a key precursor to their elimination for borrowers. Serial and non serial associations eventually relaxed the requirement that all savers agree to invest in the association through compulsory savings contracts. Without the constraint of termination, B&Ls initially allowed members to keep matured shares with the association rather than withdraw from it, especially in non-serial associations where these maturations did not occur in bulk (Bodfish and Theobald, p. 47). This led to the development of new types of shares that required only one large initial payment, without further compulsory savings. Such savings vehicles were similar to certificates of deposit but remained in the form of equity shares and therefore did not have a guaranteed rate of interest, as B&Ls were still defined by mutuality. These vehicles attracted new types of savers to B&Ls.

In Dayton, Ohio, B&Ls built on these developments in the 1880s by offering installment shares but without the requirement for compulsory savings. These optional payments gave flexibility which attracted additional types of savers. Such "optional" associations can be traced to a second infusion of ideas from English building societies, which came to Dayton after one of the city's residents learned of these practices while visiting England. In addition, building and

loans in Ohio were authorized in the late 1800s to accept deposits as well, further attracting new types of savers.

The elimination of compulsory installments for some savers is important as it underscores how the share accumulation contract was no longer a necessary feature of a B&L, and could have been eliminated for borrowers as well. B&Ls developed accounting methods to handle accounts of those without share installment contracts, and those methods were an incremental step toward accounting methods for direct reduction contracts.

Therefore, it was not a coincidence, as we shall see next, that Dayton and Ohio in general became the key center of direct reduction lending in the American nonfarm residential real estate mortgage market. These loan contracts had, in fact, been in use in England and were another innovation carried over during the creation of optional associations. More fundamentally, though, the ability to use the contract was predicated on the series of steps that led up to the creation of optional associations. Optional societies, having done away with termination, series, compulsory savings contracts, and also mutuality in Ohio by virtue of accepting deposits, required little further changes to adopt direct reduction contracts. Indeed, in such an environment, insisting that borrowers use share accumulation contracts and participate in mutual risk would have been quite odd given that neither were required of savers.

The state of amortization in the 1890s

The first data that comprehensively record the use of amortization at B&Ls come from the extraordinary 1893 report of the Commissioner of Labor (Wright 1893). This was the first complete canvas of the nation's B&Ls, a process not repeated again until the 1935 Census of Business. Among other tabulations, the report gives the number of associations in each state that used different organizational plans, some of which included periodic reductions in principal debt. Though the data do not distinguish whether the periodic reductions are accomplished through direct reduction or cancel and endorse arrangements (defined below), the data nevertheless provide a quite valuable look at the state of amortization in the late 1800s.

Table 1: The spread of amortization by 1893

	Number of associations using amortization	Total number of associations
Ohio	254	718
Maryland	63	237
New Jersey	24	286
Pennsylvania	64	1076
District of Columbia	1	26
Indiana	1	429
Minnesota	2	82
Missouri	1	349
Wisconsin	1	39
Rest of the country	0	2596
Total	411	5838

In general, the share accumulation plan was the dominant loan form. Out of 5,838 B&Ls in the country, 5,427 (93 percent) did not use amortization. The report summarized practices this way: "Dues and interest are usually paid periodically... As a rule, the plans of the associations provide that loans on real estate shall run to the maturity of the shares pledged, the maturing value of the shares being equal to the loan and by maturity satisfying the loan. In some associations, however, the loans run for a fixed period (p. 387)."

Table 1 reports the number of associations in each state that reported the use of amortization for loans according to the 1893 report. Only in two states, Maryland and Ohio, did a large fraction of active B&Ls report amortization. In both Ohio and Maryland the 1893 report describes associations as using plans in which "principal is reduced periodically by the amount of dues paid in, and interest is charged on the balance only." In no other state was amortization as widespread: New Jersey, Pennsylvania reported moderate use of some amortization, and 6 associations scattered across the District of Columbia, Indiana, Minnesota, and Missouri reported amortization as well.

The exceptionalism of Ohio is consistent with the development of the optional plan in that state (transplanted from England, as noted above). Much of the early history of Maryland associations remains unknown, as the state lacked supervision for B&Ls until the 1940s. The

1868 Maryland laws of incorporation allowed for what was essentially a direct reduction plan, but for reasons that are not fully apparent this development never proved as influential as the developments in Ohio (Bodfish and Theobald 1931, p. 49). We simply interpret the parallel developments in Ohio and Maryland as part and parcel with the innovation process that characterized the industry during these years, in which new financial features were constantly developed and even developed more than once.

The gradual adoption of direct reduction loans up to the 1920s

Two key organizational changes occurred at B&Ls between the 1890s and the 1920s that supported the spread of direct reduction lending. These innovations largely focused on the way that credit risk was allocated within associations

The first change occurred in Ohio, where B&Ls increasingly used savings deposits as their primary funding source. In this respect, Ohio was quite unique. Though deposit-taking had been legal since 1868, it became more widespread during the 1900s, and by 1930 about half of Ohio B&Ls' funding came from deposits rather than equity shares. The taking of deposits fundamentally altered the mutuality of B&Ls and moved it toward a savings bank type model. We will see later that this model was more or less copied wholesale by New Deal officials in creating the structure of federally chartered associations. In Ohio, in the context of these developments, it would have been incongruous for associations in the state to insist that borrowers retain mutual risk on their loans while most liability holders were not exposed to such risk. The only area not to use direct reduction loans was Cincinnati, which—consistent with our story—retained both traditional installment stock liabilities and share accumulation loans.

By issuing low-return deposit liabilities, associations were able to divert earnings into contingent reserves that increased the liquidity and decreased the risk of investing in the association. Such reserves are quite important for an association granting direct reduction loans, since without the ability to share credit risk with borrowers, it would have been difficult to allocate any potential losses across all shareholders, not to mention attract investors willing to absorb all such risk. In the 1930s, for example, the building of reserves became a major issue, as some investors sought to leave their associations but their B&Ls would not let them because, among other reasons, losses needed to be allocated and allowing members to withdraw at par

would allow them to escape from incurring such losses (See Rose 2011). Of course, building loss reserves is costly, and therefore an adoption cost to direct reduction loans, unless liability expenses can be lowered in some other way, such as through low-cost deposits.

B&Ls using direct reduction contracts also found ways to address the potential loss of mutuality and associated tax consequences. The most common tactic involved requiring borrowers to purchase nominal amounts of membership shares, such as special shares with maturity value of $1 and no further payment requirements, or through simply requiring $1 of payment on optional shares. Cancel and endorse contracts, described below, were also a potential method to deliver amortization while still requiring purchase of shares. It is a wonder that tax authorities were fooled by these tactics, but it appears they were for many years. This is the sort of practical knowledge, however, that was critical to supporting the rapid pace of adoption during the 1930s. Associations that had doubts about mutuality were told about these tactics by others from Ohio or New York, who could speak from experience.[11]

A second change occurred most prominently in California, but also in several other states, and moved in the same direction as the changes in Ohio. Investment certificates—liabilities with guaranteed dividends and no compulsory installment obligations—accounted for 71 percent of California B&L liabilities by 1929. Outside observers often denounced investment certificates as being tantamount to deposits, and indeed the most similar financial instrument today would be a certificate of deposit. Certificates with a guaranteed rate of interest were made possible by the addition of non-withdrawable capital stock, generally held by the directors of an association, designed to create buffer against losses for other classes of liabilities, much like capital at commercial banks.

Both investment certificates and direct reduction loans gained favor around the same time in California, between 1895 and 1910.[12] The link once again lies in the elimination of mutuality and the handling of credit risk. Under guarantee stock arrangements, credit risk was allocated to the holders of the non-withdrawable capital stock, while borrowers repaid a loan by accumulating a sinking fund comprised of guaranteed installment shares. The term used in California for such loans was "definite contract" loans, as a guarantee of the maturity date was made possible by the elimination of credit risk for borrowers. It was a small step, quickly taken

[11] See Bodfish (1927) and the *Building and Loan Annals*, 1934, p. 296.
[12] See Bodfish (1931), History of California B&Ls.

in California, to direct reduction loans.

From a financial innovation point of view, it is revealing that B&Ls in this period also experimented with a third contract, the so-called "cancel and endorse" contract, which was something of a bridge between the old sinking fund loan and the direct reduction loan.[13] Its origins are a bit unclear; Clark and Chase, writing in 1924, assert it "came into vogue many years ago" but suggest "only a few associations still use" the contract (p. 143).

The cancel and endorse contract still required borrowers to purchase shares, but allowed borrowers to cancel principal debt when a share matured. For example, suppose that a borrower wished to borrow $1000. Under a sinking fund plan with shares that mature at $200, this would require $1 to be paid on each share each month, for a total of $5 plus interest on the loan. Cancel and endorse contracts instead applied all $5 to one share, often with maturity of only $100. When each share reached maturity, the share would be endorsed over to the association and the principal debt cancelled by that amount, and the process repeated with the next share. This constituted a form of amortization.

In economic terms, since the cancel and endorse contract used a form of amortization it therefore left the borrower with little of the risk inherent to sinking fund contracts. On a credit risk basis, it was almost identical to the direct reduction contract. However, in accounting and organizational terms, the differences were large enough that some B&Ls opted for these contracts instead of direct reduction contracts, though this practice never gained the popularity of the other two contract types and faded by the 1940s. An article in the *Federal Home Loan Bank Review* explicitly described this loan contract as a compromise between direct reduction and share accumulation that avoided some of the organizational changes needed for direct reduction loans.[14] The existence of this contract can be interpreted as some evidence that B&Ls were reluctant to adopt direct reduction contracts not just because they eliminated the sharing of credit risk borrowers (as we emphasize in this paper) but also because of the costs of other accounting and organizational changes.

Altogether, by the 1920s, the B&L industry was comprised of widely varying organizational forms. Terminating societies were largely relics, but many older areas, such as Pennsylvania and New Jersey, retained strong attachments to the serial system. Non serial and

[13] *Building and Loan Guide and Bulletin*, 1935 p. 110; *Savings and Loan News* June 1935, p. 12; *Federal Home Loan Bank Review*, May 1935, p. 279.
[14] See the March, 1935 issue.

optional plans dominated other areas. California-style guaranteed share plans spread to a few more states, principally Colorado and Oregon, and Kansas developed similar plan as well.[15]

Data on the use of direct reduction contracts in the 1920s are limited. Virtually all studies that discuss loan contracts during the 1920s and 1930s cite the same data set, which was constructed by the NBER in 1947. In that year, the NBER surveyed savings and loan associations, as well as commercial banks and life insurance companies, with requests for samples of loans that had been originated between 1920 and 1947. The savings and loan sample consists of about 4700 loans made by 92 savings and loan associations.[16]

In the next section, we present higher quality data on the 1930s from a different source, but we have yet to find any better sources for the 1920s. Though the NBER data are unique and quite valuable, they are also subject to substantial bias. In particular, given the fact that failures among lenders were widespread between 1920 and 1947, the responses likely have a strong survivor bias. Imagine, for example, the problematic nature of conducting a survey in the year 2027 that asked then-existing lenders for a sample of their loans back to the year 2000. This is particularly troubling given the structure of the building and loan industry in the 1920s, which was unusually dominated by a large number of small associations, with roughly 13,000 associations at the end of the 1930s. Nonresponse bias would appear to be potentially quite problematic as well, since the NBER asked 500 associations to respond but received responses from only 92.

Table 2 reports the information given by the NBER data on loan plans. To the best of our knowledge, these data have not been summarized publicly in this fashion before; this tabulation was assembled for a preliminary version of an NBER volume on the loan experience of savings and loan associations, but the volume was never published. Table 2 indicates that, among the S&Ls surveyed, 35 percent of loans originated between 1920 and 1929 were direct reduction loans, while only 47 percent were share accumulation loans.

[15] See Clark & Chase p. 47-50; Bodfish (1931) p. 320. Ohio B&L officials justifiably viewed these developments in California and Kansas as a way of offering deposits with the appearance of equity shares.

[16] Scans of the original data are available at the NBER website: http://www.nber.org/nberhistory/historicalarchives/. Morton (1956) contains a description of the sampling process in Appendix A, as well as a discussion of the biases. The Morton volume discusses all of the financial surveys, while Behrens (1952) focuses on commercial banks, and Saulnier (1950) focuses on life insurances companies. The S&L sample was intended for publication in an analogous volume authored Edward Edwards, but the volume was never published.

Table 2: NBER Data on Loan Contracts

Contract Type	1920-1929	1930-1934	1935-1941	1942-1945	1946-1947
Share accumulation	46.7	54.1	13.9	5.0	5.4
Cancel and Endorse	12.2	5.6	2.7	1.2	1.1
Direct Reduction (non-FHA/VA)	35.3	34.2	76.8	85.5	61.7
Direct Reduction (FHA/VA)	0.0	0.2	4.9	7.1	31.3
Straight	5.6	5.9	0.2	0.1	0.3
Contract N/A	0.2	0.0	1.5	1.1	0.2

Notes: This tabulation is taken from Table 17 of a preliminary and ultimately unpublished NBER manuscript dated to December 1950, by Edward E. Edwards, titled *Urban Real Estate Financing by Savings and Loan Associations.* It is available from the authors.

We suspect the estimated use of direct reduction contracts is too high, biased upwards by perhaps about 10-15 percentage points. For example, suppose that 90 percent of Ohio associations used direct reduction loans in the 1920s, as did half of California and New York associations (as indicated by historical sources discussed more below), and perhaps most of Maryland. Given the geographic distribution of the B&L assets in 1930, (shown in a table given in the appendix), this would imply about 20 percent of loans in the 1920s were direct reduction loans. The number might be a bit higher given small penetration in other states, but it is difficult to reach a number such as 35 percent.

Indeed, the NBER sample was quite skewed geographically. Ohio and New Jersey should be equally represented in the sample; each accounted for about 14 percent of national B&L loans in 1930 according to the US Building and Loan League.[17] However, Ohio—the nation's bastion of direct reduction lending in the 1920s—accounts for 19 percent of the sample, while New Jersey—a state wholly devoted to traditional share accumulation lending—accounts for only 2 percent. Similarly, Pennsylvania is also dramatically underrepresented, and Philadelphia, the city that had the most B&Ls in the country in 1930, is entirely unrepresented. Of course, these biases are not surprising given the enormous number of lenders that liquidated in the mid-Atlantic area.

Therefore, we do not place much faith in the aggregate implications of the NBER sample. It is useful, however, as a general measure of the geographic extent of diffusion. Consistent with

[17] See *United States Building and Loan Annals*, 1930, Secretary's Report.

what we know about the structure of the industry, twelve of fifteen Ohio B&Ls in the sample reported use of direct reduction loans in the 1920s, the other three split between cancel and endorse and share accumulation. Seven of eight Californian B&Ls did as well, along with the only lender in Maryland, half of those sampled in New York, and a few others in Washington and Michigan. All the remaining associations used cancel and endorse or share accumulation contracts.

Looking forward from 1929

Rosenberg (1982) provides a useful conceptual framework for explaining the trajectory of innovations in the B&L industry. He emphasizes that the unit of innovation is rarely a single invention; instead, major productivity improvements are driven by the accumulation of incremental changes that follow a path shaped by compatibility with existing practices. Taken in this light, the transition from sinking fund to direct reduction contracts among B&Ls after 1880 cannot be explained simply by comparing the relative advantages and disadvantages of the two loan types. The choice between the two was also conditioned by previous innovation to liability structures so that by 1930 different types of B&Ls faced different costs and benefits when choosing whether to adopt the modern, direct reduction loan.

The transition to direct reduction involved restructuring the liabilities of a B&L, and by 1930 the costs of doing so varied substantially across the nation. These costs depended on an association's organizational form, its state's regulatory structure, and the characteristics of the savers that it served. These all evolved in different patterns across markets in the U.S. during the century-long process of innovation that we described earlier. Prior to the Depression, these costs were substantial enough in most areas to outweigh the perceived benefits of switching to the direct reduction loan. Indeed, during the 1920s building boom, those B&Ls that used sinking fund loans had little trouble attracting borrowers. This was especially true given that other lenders continued to offer short-term loans with balloon payments or, at best, partial amortization. Within this environment, the B&L industry expanded while continuing to rely most heavily, and in most markets, on the traditional sinking fund loan contract.

We have outlined two general costs of adoption direct reduction contracts. The first set of costs related to organizational and accounting changes. These costs were formidable at first under terminating societies, but an accumulation of small changes that spanned serial, non serial,

optional, and guarantee stock societies slowly and perhaps imperceptibly lowered such costs over time.

The second set of costs related to the allocation of credit risk and departures from mutuality. The transition to the direct reduction loan among B&Ls involved moving away from its traditional sinking fund loan contract under which borrowers shared the risk on the association's loan portfolio with the non-borrowing members that funded the loans. The direct reduction loan broke this risk sharing arrangement since under the contract borrowers accumulated equity in their own home by amortization rather than in a sinking fund that was invested in the B&L. To implement direct reduction, therefore, a B&L had find some other way to reduce the risks borne by non-borrowing members if it was going to successfully compete for the public's savings. One technique used to do so before 1930 was to create new classes of stock so that guarantors like those in California insured the investments of other non-borrowing members. Another approach was to issue low-return, deposit-like liabilities (or actual deposits in Ohio) that were supported by diversions of earnings into contingent reserves that increased the liquidity and decreased the risk of investing in the association. The building of reserves became a major issue in the 1930s and is reflective of this problem of allocating credit risk in the absence of share accumulation loan contracts.

3. The 1930s transition

We present three different data sources to measure the pace of the transition during the 1930s. We start with the example of a single state, Iowa, which has particularly detailed data for this period, and then move to a sample of all states with available data. We also compare the findings from these new data with the data from the NBER sample discussed above.

Transition in Iowa

The annual reports on Iowa B&Ls are especially valuable as they are the only reports that give year-by-year information on both loan plans and organizational types. These reports indicate which of three loan plans—direct reduction, share accumulation, or cancel and endorse—was in use for the purpose of new loan originations in each year starting in 1935. In addition, the reports indicate which organizational plan—serial or non serial—was in use in each year.

As background, there were 59 state-chartered B&Ls active in Iowa in 1935. In 1940, this

number remained 59, reflecting 10 new state-chartered associations that offset the loss of 10 existing associations (through 5 liquidations, 1 federalization, and 4 mergers).[18] At the federal level, 32 additional associations were active in 1940. Almost all of these federal associations had been organized in 1933 or 1934 as part of a federal effort to target geographic areas not served by any state-chartered association.

Table 3 reports the use of different contract forms in each year. At the beginning of the 1930s, all Iowa B&Ls were using the share accumulation loan plan. Indeed, at the end of 1935 the state regulator noted that "Until last year or so all of our associations have made loans on what is commonly known as the Share Accumulation Plan." During 1935, 4 state associations adopted direct reduction loan plans, and more adopted the loan plan each year until 1940, when 41 of 59 state associations reported its use. If we ignore the 10 newly formed associations which all adopted direct reduction loans from the outset, 31 of the 49 B&Ls that were active at the beginning of 1935 and extant in 1940 changed their loan plans to direct reduction during the intervening five years.

Table 3 : Adoption of direct reduction loans in Iowa

	State-chartered associations						
	All associations		Associations that existed in 1935				Federally chartered associations (all using direct reduction)
Year	Number active	Number using direct reduction	Number active	Number using direct reduction	Number adopting direct reduction	Number adopting cancel and endorse	
1935	59	4	59	4	4	9	32
1936	60	16	56	12	10	3	32
1937	60	24	54	18	8	1	32
1938	61	36	51	26	9	2	31
1939	60	38	50	28	3	2	32
1940	59	41	49	31	4	0	32

Adoption among the largest associations was a bit more complete but not dramatically so: those that adopted direct reduction loan plans by 1940 had held 77 percent of the industry's assets in 1935. A number of smaller associations held onto share accumulation loans into the 1940s, but these associations were increasingly marginalized into a fringe by the progression of

[18] One additional state chartered association was formed after 1935 but then federalized before 1940.

the rest of the industry.

The link between loan contracts and organizational plans is quite clear in these data, as adoption of the direct reduction loan plan was in every case accompanied or preceded by conversion to non-serial organizational plans if the association was not already using the non-serial plan. In most cases these two changes were put in place during the same year.[19] There is no indication that state law required such parallel conversions. Those associations operating on non-serial plans in 1935 also adopted direct reduction loans earlier than their serial plan counterparts; three-quarters of those switching did so by the end of 1937, whereas most serial plan associations switched loan contracts in 1938 or after. Finally, the table indicates that 17 associations adopted cancel and endorse contracts at some point, though its popularity is not sustained and by 1940 no additional associations adopted it.

Transition in a panel of states

We have gathered new data on the use of direct reduction contracts in each year from 1935 to 1945 at the aggregate state level for B&Ls in 16 states. These data are only available for 16 states because those are the states that distinguished different contract types on loans when reporting balance sheet information in annual reports of B&L supervisors. (See the data appendix for a listing of these annual reports.)

These data, displayed in Table 4, indicate the share of outstanding loans (by value) held by state-chartered B&Ls that were direct reduction loans in each year. This is a somewhat different measure than the NBER data, which pertained to the flow of new originations rather than the stock.[20] Compared to the NBER data, our data have the considerable advantage of covering every B&L in operation at the time in these states. As far as we know, these data are the first attempt to comprehensively characterize the nature of contract changes at B&Ls during the 1930s. Generally speaking, these data represent a large improvement as they are available on an annual basis and suffer from no survivor or nonresponse biases, though they do not cover

[19] Of the 59 associations that existed in 1935, 38 adopted direct reduction contracts at some point between 1935 and 1940 (although not all of these were still active by 1940). 27 were already operating on the non-serial plan in 1935 and therefore did not change their organizational plan. The other 11 associations were operating on the serial plan in 1935, and every one of these 11 converted to non-serial associations. In 8 cases, the organizational change occurred in the same year as the loan plan change, and in the other 3 cases, the organizational change occurred one or two years earlier.

[20] B&Ls were portfolio lenders, and engaged in very little secondary market activity. Therefore, new originations should be expected to retained on books.

every state. Each cell in the table is reference to a different state-year annual report, and therefore the table is built from roughly 150 different volumes.

Table 4: Direct reduction loans as a percent of all loans, state-chartered B&Ls

State	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
CT		6.4	14.3	21.4	30.0	40.0	49.2	54.1			
MA	0.5	4.6	11.4	17.6	23.8	31.7	41.0	47.7	52.6	56.5	62.4
ME							56.6	63.2	66.8	74.9	76.4
NH	0.0	4.2	10.7	17.8	22.0	27.7	31.6	34.8	36.6	38.8	44.8
VT					40.7	49.2	33.1	40.3	43.7	51.2	48.1
NJ	6.5	10.2	13.3	18.1	40.7	51.5	59.8	65.6	70.1	75.5	80.1
NY		47.9	48.7	55.5	61.7	67.6	73.8	77.0		82.5	86.4
IL		15.8	21.8	33.4	44.0	57.8	68.2	73.7	78.2	83.1	87.5
IN		39.6	49.1	55.6	62.2	68.6	69.5	69.5	77.1	79.9	
WI	14.8	30.0	41.7	47.0		67.9	71.5	75.1	82.8	89.1	
IA	1.8	21.5	42.8	52.8	58.8	65.9	64.3	75.4	77.8	78.3	80.4
KS	25.7	40.6	47.1	59.0	58.1	64.7	65.5	69.7	71.4	76.2	81.7
NE	12.7	47.1	49.2		56.3	61.0	62.9	66.7	68.1	69.0	78.5
LA	4.2	24.8	56.4	69.7	79.5	84.8	88.3	90.3	92.5	94.4	94.7
TX		66.0	76.2	81.8			91.5	93.2	95.4	97.2	98.2
VA		26.5	30.2	35.0	42.7	45.0	54.8	60.9	66.2	70.6	77.9

Notes: See the appendix for the data sources. Empty cells indicate that the publications could not be located for those state-years (due either to non-publication or rarity) and data could not be estimated either. Data for a few cells are estimates based on items from the liability side of B&L balance sheets. Since share accumulation loans involve pledging shares, the amount of these shares can be used to estimate the amount of share accumulation loans if such shares are specified as separate liability items. Such estimation requires an assumption regarding the ratio of outstanding share accumulation loans (on the asset side) to pledged shares (on the liability side); such ratios are fairly constant within states over a few years. The estimated cells are Iowa in 1935, Illinois in 1936, Texas in 1944 and 1945, New York in 1936, Indiana after 1936, and Nebraska in 1935-1937, 1942, and 1945.

Though Tables 4 and 5 cover only 16 states, these 16 states accounted for a large portion of the nation's B&L loans. In 1930, B&Ls in these states held 48 percent of loans held by all B&Ls in the country (see the table in the Appendix).[21] In addition, B&Ls in Ohio accounted for another 14 percent, and as noted above, it is well established from contemporary sources that

[21] Source for this paragraph: p. 377 of the 1932 *Building and Loan Annals.*

direct reduction loans were widely used in Ohio prior to the Depression. Our own estimates suggest that over 90% of Ohio loans were direct reduction loans throughout the 1930s.[22] Therefore, we are able to characterize the adoption rate for states that held 62 percent of the nation's B&L loans in 1930.

It is important to note that the data in Table 4 apply only to state-regulated B&Ls. The following table, Table 5, combines state and federal B&Ls; since all federally chartered B&Ls were required to use direct reduction loans, the numbers in Table 5 are necessarily larger in each state-year than in Table 4.

Table 5: Direct reduction loans as a percent of all loans, federal- and state-chartered B&Ls

State	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
CT		24.0	37.1	45.7	54.7	64.7	74.0	77.9			
MA		6.0	26.5	33.6	40.0	48.0	56.1	61.1	65.1		
ME							59.2	65.5	69.1	77.0	78.8
NH		33.0	40.7	46.7	50.8	56.6	59.9	60.9	60.9	61.8	65.9
VT					62.9	75.3	75.0	77.1	79.5	82.8	81.7
NJ		10.2	13.3	18.1	41.3	52.5	61.3	67.0	70.1	75.5	80.6
NY		69.7	65.7	71.4	77.1	81.2	85.5	87.0		90.8	93.1
IL		32.1	44.4	55.9	65.5	75.8	82.1	84.8	87.7	91.9	93.5
IN		68.5	75.5	78.6	82.2	85.4	85.9	86.0	89.7	91.1	
WI		33.2	46.2	52.3		74.9	78.2	81.3	87.2	92.3	
IA		34.9	56.1	65.7	72.7	78.6	78.3	85.4	87.4	88.2	89.3
KS		46.6	55.9	70.0	74.8	79.8	79.2	82.2	84.4	89.4	90.6
NE		50.8	54.1		62.0	66.8	68.9	72.1	73.5	74.6	82.4
LA		35.6	63.0	74.6	82.9	87.3	90.1	91.8	93.6	95.2	95.5
TX		76.0	84.2	90.5			96.6	97.1	98.0	98.7	99.2
VA		43.1	53.1	58.6	67.3	70.3	76.2	79.9	83.4	86.6	90.5

Notes: See the notes to the previous table as well. Data from 1935 are not included because no federal S&L data were published that year.

[22] This estimate is based off of the amount of shares on the liability side of Ohio B&L balance sheets that are pledged toward mortgage loans. For example, in 1935 there are $10.7 million in pledged shares and $461.4 million in outstanding loan. Typically in data from other states, pledged shares support about 3-4 times their value in mortgage loans, implying about $42.8 million in share accumulation loans, leaving more than 90 percent of the $461.4 million loans as direct reduction loans.

Discussion: The Overall Pace of Adoption

Tables 4 and 5 make clear that, overall, the pace of adoption was quite rapid. In 1935, use of direct reduction loans was quite limited. The fact that data are missing for several states in 1935 in many cases reflects that use was so low that those states' regulators did not yet consider it important enough to report that information, though there are exceptions such as New York, where direct reduction loans were likely not uncommon in 1935. In Illinois, for example, direct reduction loans were only made legal in July, 1935, and the state regulator noted in the 1936 report that the number of such loans had been too few in 1935 to justify the trouble of tabulating and reporting them. [23]

The data allow an unprecedented look at the timing and the speed of the adoption process. By 1936, direct reduction loans appeared on the aggregate B&L balance sheets of all states, and by 1940, most of these balance sheets showed more than 40 percent of outstanding loans were of the direct reduction form. By 1945, adoption was nearly complete in many states. Therefore, over a ten year period, there was a near total abandonment of the 100-year old share accumulation contract. No existing data make the pace of the transition so clear.

These trends roughly match those in the Iowa association-level data above. Most of the Iowan associations that adopted direct reduction loans did so between 1936 and 1938, and these are the years with the most rapid changes in Table 5 as well.

We can also compare these data to the NBER data from Table 3. The NBER data give a general sense of the transition to direct reduction loans during the 1930s, as they are grouped in five year intervals. Direct reduction loans become much more common in the sample after 1935, accounting for over 80 percent of originations in the second half of the 1930s, and an even larger percentage in the 1940s. More refined year-to-year statistics are not readily available, as the complete NBER sample would have to be digitized, and would probably be of dubious statistical validity given the sample size and biases. The NBER data also indicate that new originations of share accumulation contracts declined considerably after 1935, to only about 5 percent of all originations by the 1940s.

Compared to the NBER data, the changes in this state-level panel after 1935 appear even more drastic, as there is little indication that these states had used direct reduction loans pre-1935

[23] 1936 Illinois annual report, p. IX.

to the extent suggested by the NBER data. This is partly a function of the omission of Ohio and California, two states with the most widespread use of direct reduction loans before the Depression.

As a benchmark in interpreting Tables 4 and 5, suppose that all associations had completely ceased originating share accumulation loans in 1935, those loans might be expected to run off by the late 1940s, given the typical 12 year duration (though admittedly the duration became longer during the 1930s for reasons we outlined above). Of course, not all associations did cease originating share accumulation loans quite so quickly. On the other hand, many existing share accumulation borrowers had their loans recast into direct reduction loans during the late 1930s, as they desired access to treatment equal to that being given to new borrowers. Recasting of existing loans sped up the transition process as measured in Tables 4 and 5.

The recasting of existing loans was widely noted at the time. For example, New York regulators reported "The advantages of this type of mortgage have also been extended to a considerable number of previous borrowers through conversion of their loans to the direct reduction plan." On a more national basis, the *Federal Home Loan Bank Review* stated that "it is common knowledge that these transfers were substantial."[24] In New Jersey, recasting of laons was linked to a comprehensive federally-led effort to salvage the state's B&Ls in the late 1930s. Though recasting of loans was not generally required for insurance through the Federal Savings and Loan Insurance Corporation, federal officials chose to require such recasting when offering the type of comprehensive salvaging operations that occurred in places like Newark, New Jersey (See Rose 2011).

Two more important features of these data should be noted, and will be built on further in the final section of this paper. First, there is a meaningful amount of variation across states in the adoption process. New England states tended to exhibit slower adoption processes, for example, while some states such as Louisiana show an early and near total commitment to direct reduction lending. This cross-state variability holds some potential for differentiating across hypotheses that could explain the transition to direct reduction loans. Second, it is important to note that the bulk of the activity documented here took place within the conventional (uninsured) loan market. In the next section we will show the extent of B&L involvement in the FHA, which was quite

[24] 1940 New York annual report, p. 7; *Building and Loan Guide and Bulletin*, Feb. 1938, p. 22; *FHLBR* April 1942, p. 231.

low in absolute terms and relative to other lenders.

States not included in Tables 4 and 5

The remaining states not listed in Table 4 or 5 accounted for 38 percent of B&L loans in 1930.[25] Among these states, a group of only eight accounted for the bulk, holding 30 percent of national B&L loans. These states either did not publish any publicly available reports on B&Ls (Maryland, Oklahoma, Pennsylvania, and South Carolina) or did not distinguish among loan contracts in their published balance sheets (California, Kentucky, Michigan, and Missouri). While we cannot fully characterize the adoption pattern during the 1930s in these states, we generally have strong evidence on whether direct reduction loans were used prior to the Depression in each.

Two of these states, California and Maryland, likely had substantial use of direct reduction loans prior to the Depression. Maryland's B&Ls, appear to have introduced the direct reduction loan in the 1860s independent of its transplantation to Dayton, Ohio from England a few years later, as was noted in the discussion of the 1893 data above. In 1937, a federal report on Baltimore's B&Ls noted that few had changed loan plans because the direct reduction contract had already been in widespread use prior to the Depression, the state's B&Ls. In California, direct reduction loans appear to have been used, but the extent of adoption is a bit unclear. In the NBER sample, seven of the eight Californian lenders reported direct reduction loans and no share accumulation loans in the 1920s, but the NBER sample should not be trusted to be representative.

California, like Ohio, had largely moved beyond the traditional B&L equity share funding mechanisms. In California's case, new funding came from instruments similar to certificates of deposit (known as "investment certificates") that constituted about 70 percent of funding by 1930. Haveman, Paruchuri and Rao (2007) note that loan plans changed around the same time as guarantee stock organizational structures were adopted in the early 1900s, as California state law allowed B&Ls to make direct reduction loans as early as 1901. Maryland's

[25] Of the other 32 states that are not listed in Table 5 (excluding the territories of Alaska and Hawaii), 21 did not distinguish between loan plans. We have not been able to locate annual reports for the other 11 in this period, likely because no reports were published. These states without reports are Arizona, Arkansas, Maryland, Minnesota, Mississippi, New Mexico, Oklahoma, Pennsylvania, South Carolina, and Wyoming. We have confirmed that Maryland and South Carolina did not publish any reports in this period as there was no state regulation over B&Ls. The other states likely did not publish reports either, but it is difficult to obtain confirmation of a negative.

liability structure is a mystery. The state had no regulation of B&Ls until the 1940s, so much of this history was unfortunately never recorded.

Four states, Kentucky, Missouri, Oklahoma, and Pennsylvania, appear to have relied more or less exclusively on share accumulation loans prior to the 1930s. In all except Oklahoma, B&Ls in these states were predominantly of the serial form. The NBER sample contains two lenders from Missouri, three from Oklahoma, and four from Pennsylvania, and all report only share accumulation loans before 1935. The sample contains no Kentucky loans from that period. The 1936 annual report of Missouri B&Ls states that the direct reduction plan "is gradually usurping the old sinking fund plan in vogue for so many years in the industry… and is rapidly being adopted by State chartered institutions" (p. 10). Pennsylvania annual reports are not available, but federal surveys in late 1936 of Pennsylvania B&L lending practices indicate little adoption of direct reduction loans had occurred up to that point. For example, the report for Philadelphia, perhaps the most important B&L city in the country, noted that "Only a few associations have adopted the direct reduction plan." The same lack of change up to 1936 was noted in Pittsburgh, Scranton, Reading, Allentown, Bethlehem and Harrisburg, though some adoption of direction reduction plans was noted in Erie.[26] Federal surveys of Covington, Lexington, and Louisville Kentucky note the same pattern. For example, the 1936 Covington survey notes that some federal associations have introduced direct reduction loans, but "building and loan associations and their members have so long operated on the share reduction basis that most of them still continue this plan."[27]

Finally, the historical record yields more limited information on the remaining two major states—Michigan and South Carolina. The NBER sample has no loans from South Carolina. A federal survey from the latter 1930s indicate that a small number of associations in Columbia, SC had offered direct reduction loans prior to the Depression, but "most" operated on the share accumulation plan. The NBER data record some use of direct reduction loans in Michigan in the 1920s. The federal surveys, however, give little indication that such practices were widespread. Since the NBER data do not cover any of the major Michigan cities, we suspect share

[26] The quote on Philadelphia is from p. 22 of the HOLC report.

[27] The federal surveys referenced here were conducted by the HOLC in most of the largest metropolitan areas in the second half of the 1930s. These can be found in the City Survey Files, Records of the Home Owners' Loan Corporation, Record Group 195.3, National Archives II, College Park, MD. Each of the reports cited here are available digitally from the authors. The Oklahoma reports are in box 41A, the Pennsylvania reports in boxes 30-32 and 93-96; the Kentucky reports in boxes 123-124; the South Carolina reports in box 97; and the Michigan reports in boxes 6-8, 17-19, and 23.

accumulation loans were still dominant in Michigan prior to the Depression.

4. Explaining the 1930s Transition to the Direct Reduction Loan

Two overlapping stories may explain the rise of the direct reduction loan during the 1930s. The first depicts New Deal policy as the catalyst driving the adoption of the modern mortgage loan. Central to this interpretation are the HOLC refinancing program and the FHA mortgage loan insurance program. The programs familiarized lenders with the long-term, direct reduction loan, and subsidized its use. In doing so the programs created a competitive environment in which all lenders, including B&Ls, felt pressure to adopt direct reduction loans. This view is in line with what we have referred to as the popular understanding. The second interpretation, which we have been building toward in this paper, emphasizes that B&Ls had been gradually moving away from the sinking fund loan before 1930 and had already laid the foundation for further change. The nature of the adoption calculus remained largely the same, but the benefits of adoption increased greatly as the crisis of the 1930s changed borrowers' assessment of older contracts. At this point New Deal policies facilitated and accelerated the transition.

We attempt to unravel these two interpretations in this section. Using aggregate and state level data, we first show that that the adoption of direct reduction lending among B&Ls responded to considerations that should have been weighed in a process of innovation. We then show that the a set of policies aimed directly at B&Ls (federal charters, FHLB discount lending, and FSLIC insurance), facilitated the diffusion of the direct reduction loans within the industry. Finally, we argue that the HOLC and the FHA programs are unlikely to explain either the timing or the permanence of the B&L industry's transition to the direct reduction loan. For this reason we conclude that New Deal policy built on and accelerated a stream of innovation that had begun much earlier.

None of the evidence presented in this section represents a definitive test of the relative importance of the various influences that were at work. But within the discussion we enumerate specific hypotheses that could be used to sort out the influences that drove the adoption of the direct reduction loan during the 1930s when data on the structure and lending activities of individual B&Ls become available.

The sinking fund loses popularity

The mortgage crisis that began in 1930 affected the B&L industry for the rest of that decade. Mortgage foreclosures accelerated to a peak in 1933, and during this period B&L failures were widespread. After a brief respite in mid-decade, failures increased again within the industry and remained high throughout the 1930s. The prolonged nature of B&L distress is important here because it helps to illustrate why industry attitude shifted so abruptly against the sinking fund contract.

Borrowers' dissatisfaction with share accumulation loans grew quickly in this environment. Industry leaders, though, clearly understood the risks that borrowers faced before the 1930s. Clark and Chase, writing in 1925 in a text that the U. S. Building and Loan League had commissioned to help promulgate best practices within the industry, noted these risks:

> The periodical reduction plan has this advantage for the borrower: In the event of a failure of the association at any time after he has started to repay the loan, the borrower's liability is constantly growing less. If the affairs are thrown into liquidation, the borrower can only be held for the amount of the principal that remains charged to him…It is possible in the event of a failure under the regular [sinking fund] plan that all shares might lose their value and the borrower would still be liable for the total amount of his loan. (Clark and Chase, p. 142-3)

After identifying the problems that could arise when a sinking fund association experienced distress, they dismissed them too easily:

> The practice of crediting on the loan each of the separate payments, thus reducing the principal each month, instead of applying the payments on shares, may make a difference to the borrower from a legal standpoint in case the association fails. It makes very little practical difference because of the small likelihood of failure. (Clark and Chase, p. 255).

The risks that faced borrowers, and their association, tuned out to be much worse than described by Clark and Chase. As losses on mortgage loans increased in the industry, B&Ls were forced to write down the value of the shares held by borrowers in their sinking funds. Each adjustment down increased the net loan balance for every borrower and, therefore, the costs and time left on their loan. Borrowing members responded to this situation rationally—they defaulted on their loans not only because of distress, but also to avoid throwing good money after bad into their sinking fund. By this point non-borrowing members also stopped making installment payments, and sought to withdraw from the association. When funds to pay withdrawals ran out, a building and loan remained open, but became what was referred to as "frozen" as it slowly liquidated its loan and real estate portfolio and settled its share accounts. The status of the borrowing member's sinking fund contributions in these proceedings varied dramatically by state and was

the subject of extensive litigation.[28]

Table 6: Growth and contraction in sinking funds

	B&L Mortgages (Gross Held) ($000,000)	Share of B&L Mortgages: (Percent of Gross Mortgages Held): Accumulated in Sinking Funds	Paid Off	Made New
1921-1928				
1929	$7,791	19.7%	16.8%	23.0%
1930	$7,760	21.2%	16.6%	16.2%
1931	$7,214	22.5%	19.2%	11.9%
1932	$6,407	24.5%	19.8%	8.0%
1933	$5,559	25.3%	21.1%	6.9%
1934	$4,593	23.8%	27.9%	8.9%
1935	$3,947	19.9%	28.3%	13.2%
1936	$3,810	15.9%	23.0%	19.5%
1937	$3,886	12.2%	21.3%	23.3%
1938	$3,967	9.8%	18.3%	20.3%
1939	$4,126	8.4%	20.4%	24.4%
1940	$4,415	7.0%	21.3%	28.1%
1941	$4,823	5.4%	21.0%	30.2%

Notes: Data taken from Russell (1962), *Savings and Loan Associations*, Tables 4 and 9, pages 649, 654.

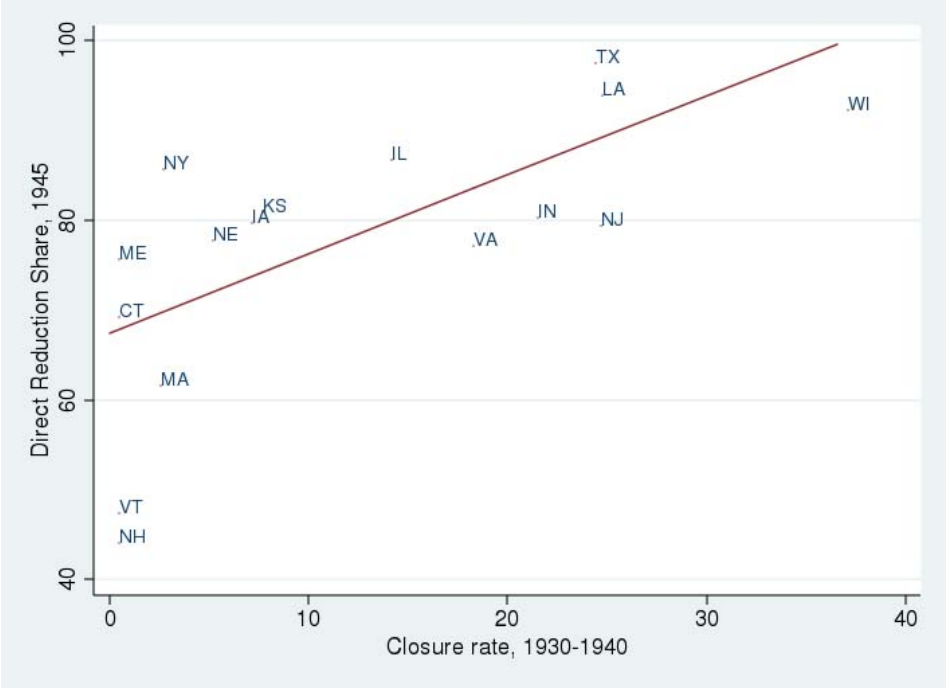
By 1934 an article in the official publication of the industry's national trade group reflects how quickly and dramatically these experiences changed attitudes about the traditional B&L sinking fund loan:

> …[A]n almost universally adopted principle in building and loan has in the short period of a few years become discredited to the extent that it is now rapidly becoming obsolete. I refer to the to the share plan loan. (*Building and Loan Annals*, 1934, 197)

Table 6 reflects just how this process unfolded. As the mortgage crisis gained force between 1930 and 1933, B&Ls cut back dramatically on mortgage originations relative to retirements and the industry's portfolio shrank by about 30 percent. During this period, the accumulations in borrowers' sinking funds actually increased from 21.2 to 25.3 percent as a share of outstanding mortgage balances, but hundreds of associations were actually frozen and waiting to liquidate. More than a thousand did so after 1935, and by 1939 the B&L industry still held 12 percent of its

[28] Rights of Depositors and Borrowers upon Insolvency of Building and Loan Associations Source: The Yale Law Journal, Vol. 42, No. 6 (Apr., 1933), pp. 931-94.1

Chart 1: Transition to Direct Reduction related to Closure Rates



Notes: Closure rates include liquidations and state seizures but not reorganizations. Closure rates are compiled from the state-level annual reports.

assets in foreclosed real estate.[29] During this process the accumulations held in borrowers' sinking funds decreased rapidly and the risks that sinking fund loans placed on borrowers and their associations became clear not only to members and industry leaders, but to potential loan customers as well:

> Again, as this [the sinking fund loan] plan becomes understood, it is more difficult for associations to obtain the best mortgage loans…The difficulty of obtaining good loans is especially pronounced in areas where there are major reductions in dividend rates or where there have been failures or reorganizations of associations. It also becomes a greater problem where competitors citing unusual examples use them to discourage borrowers or prospective borrowers in even the best managed institutions using this plan. (Bodfish and Theobald, 1938, 183)

Bodfish and Theobald suggest that the sudden increase in concern about the fragility of the sinking fund contract created market pressures for B&Ls to adopt the direct reduction loan. To examine the possibility Chart 1 presents a scatterplot of the share of direct reduction loans held in the aggregate B&L mortgage portfolio for sixteen states in 1945 against B&L closure rates in those states between 1930 and 1940. The positive association between closures and adoption is consistent with the claim that market participants reweighed the relative advantages

[29] Snowden (2003), Table 3.

and drawbacks of the sinking fund contract as a result of the mortgage crisis. Given these trends, it is likely that direct reduction contracts would have been adopted more widely during the 1930s even in the absence of New Deal programs.

The differential cost of adopting direction reduction across association types is also reflected in the scatterplot in Chart 1. Serial associations dominated the B&L industry in all of the New England states, for example, and the direct reduction loan was adopted more slowly there.[30] For this region, of course, very low closure rates could also have played a determinative role. The interaction seems to also to have been at work in serial-dominated states that experienced more severe distress—such as Illinois and New Jersey—where the benefits of moving away from sinking fund loans, as measured by closure rates, apparently outweighed the relatively high costs of restructuring liabilities. Wisconsin represents the situation in which a rapid transition to the direct reduction loan could be attributable either to the high rate of closures or to the relative ease of transitioning to direct reduction loans in a state where non-serial plan associations dominated. The fact that non-serial B&Ls also dominated in Texas and Louisiana could also explain why the transition to direct reduction was more rapid in these states than in equally distressed, but serial-plan dominated, New Jersey.

The patterns in the scatterplot for these ten states suggest that the transition to the direct reduction loan in the 1930s reflected both costs and benefits. In this way this evidence is consistent with the view that the rapid transition to direct reduction in the 1930s was driven by the same forces that had pushed the innovation before 1930, albeit at a much more gradual pace. We learn much less from Chart 1, however, about the process for states like New York and Kansas in which a mixture of serial and non-serial associations operated and direct reduction lending had made inroads during the 1920s. Variation in the rate of adoption across states would also have been influenced, of course, by the pace of the recovery in the local housing market during the late 1930s or the presence of regulatory impediments to the direct reduction loan.

These observations suggest the features that need to be incorporated in an empirical model of the individual B&L's transition to direct reduction lending and how those decisions were affected by the 1930s mortgage crisis. Such a model needs to take account of the organizational and balance sheet characteristics of the association as it entered the 1930s, the

[30] This discussion refers to the 1924 enumeration of plans across states that is presented in Table XXXI of Clark and Chase, 1925, 502-3.

shocks that it and its neighboring associations experienced during the 1930s crisis, the pace of recovery in the local market after the transition had begun, and important regulatory constraints. Within this framework it will be most important to test:

1. Whether the abandonment of the sinking fund contract, and the embrace of the direct reduction loan, was accelerated by the distress that an association or its neighbors experienced from using the traditional loan contract during the mortgage crisis.
2. Whether the transition to the direct reduction loan was slower for associations that faced high costs in changing liability structures to accommodate direct reduction loans.
3. Whether the speed of recovery in local housing markets, and/or state-specific regulatory impediments, influenced the speed of a B&Ls adoption of the modern, direct reduction mortgage loan.

Federal charters

The new system of Federal charters was most influential in the transition to direct reaction lending. By 1936, in fact, federally-chartered S&Ls were required to write only direct-reduction mortgage loans and to fund them with liabilities similar to the optional payment shares used in Ohio (called "share savings accounts") which had deposit-like qualities and were federally-insured. A federal charter, in other words, provided an entire framework for changing a B&L's assets and liabilities so that it could make and fund direct reduction loans.

Federal chartering requirements were responsive to and built on the transition already taking place in the industry. After federal charters were authorized in June 1933, the general counsel of the FHLB Board met with a group of B&L industry leaders to get feedback and enlist their cooperation before drafting the actual language of the charter. He initially proposed that federal associations be limited to holding only direct reduction loans and funding them with share accounts with no compulsory savings requirements. He left, however, with a compromise that retained traditional installment shares and loans:

> Another great debate arose over the terms and conditions of loans…[t]here was much objection to the abandonment of the Share Account Sinking Fund Loan which, of course, does give the corporation added strength because under the plan the borrowers absorb a part of the losses. We finally compromised…so that the Share Account Sinking Fund loans could be carried. (Russell, 1960, 64.)

This initial framework was referred to as Charter E.[31] The dating of this event to 1933 is

[31] By 1935 Charter E was interpreted to mean that share account loans could only be carried in a federal association

important: it occurred just after Congress authorized the HOLC to make direct reduction loans (in fact federal charters were authorized in the same act but the loan plan was not specified), and before the creation of the FHA in 1934. This window into the decision making framework of the New Deal is quite unique and valuable, and very much consistent with our framework which has emphasized that credit risk allocation was a major reason that B&Ls retained share accumulation contracts into the 1920s.

The transformation to direct reduction contract within the B&L industry was so rapid that, just three years later, the FHLB Board approved a new Charter K that required both direct reduction loans and share savings accounts without objection. In this area New Deal followed and built on but did not lead innovation within the B&L industry. Importantly, these new federal charters adopted optional payment shares as liabilities, thereby solidifying the transition to the model developed in Ohio, similar to savings bank and far removed from the structure of the original B&L terminating associations.

By 1941 more than 20 percent of B&Ls/S&Ls operated under federal charters and together they held 35 percent of the industry's assets. More than 800 of these institutions entered the federal system by converting from state charters, while the remaining 639 were originally organized as federal S&Ls.[32] The grants of federal charters might have encouraged or sped up the transition to direct reduction for some lenders. Given the selection involved in the chartering program, however, the more important channel of influence was probably the competitive effect of federal savings and loans on the remaining state-chartered B&Ls, as noted for example by the NY Superintendent of Banks:

> Although plans differing from the original instalment [sic] share method have developed during the past decade, this systematic, long-term method of saving, which provides so suitable a counterpart to the long-term mortgage lending policy, has continued to be the principal source of funds. However, since the inception in 1934 of a system of federally incorporated savings and loan associations, there has been evidence of a departure from this long established principle. The practices of Federal associations have tended to obscure the share ownership characteristic by the use of the ambiguous term "account" and have subordinated the systematic saving feature by an appeal directed primarily to the optional and investment accounts. Active solicitation based on share insurance and dividend rate has been substituted in large measure for the education of the public in systematic habits of thrift…
>
> (NY Superintendent of Banks, 1937, pp. 5-6)

---

only if state law required it.

[32] The Home Owners' Loan Corporation was charged with investing some $250 million in the 1930s in the stock of new federal associations in areas not served by home mortgage lenders. The data on federal charters come from Snowden (2003) Table 3.

Restructuring liabilities during the 1930s

Two other federal programs that operated under the direction of the Federal Home Loan Bank Board were created over a three year period specifically to serve B&Ls and complemented the federal charters. At the urging of President Hoover, the FHLB regional bank system was created in 1932 to provide mortgage loan discounting to B&L members. The New Deal added a system of federal charters in 1933 and the share insurance through the Federal Savings and Loan Insurance Corporation (FSLIC) in 1934. Although these acts passed at different times and for different reasons, together the programs transformed the B&L industry into the modern S&L industry that than dominated the conventional residential mortgage for forty years.[33]

A modern savings and loan association by 1940 relied on discount lending by its FHLB regional bank as a dependable source of funding that also provided asset liquidity, and relied on FSLIC insurance to market its more traditional funding through share savings accounts. Both programs were required for federal associations and open to state-chartered associations, and could have also assisted these state B&Ls in particular in the transition to direct reduction lending. Both programs also simplified the allocation of credit risk, which would no longer be partially borne by borrowers through share accumulation contracts. Share insurance in particular meant that fundamentally some credit risk could be borne by the government and its taxpayers. By 1941, in fact, about 40 percent of state-chartered associations were FHLB members and one-third of those also participated in the FSLIC program.

Empirical models of the adoption of direct mortgage lending by B&Ls need to account for all of these influences. These programs, after all, provided yet another mechanism by which New Deal policy built upon and facilitated a century-long process of innovation through which the Building & Loans developed the modern long-term, fully-amortized conventional mortgage loan.

Lastly, with regard to liability developments, we have emphasized through the paper that B&Ls had to restructure their liabilities by creating loss reserves in order to adopt the direct reduction contract. The New York Superintendent of Banking (and savings and loans) described one of the adjustments that were most common during the 1930s:

> A continued tendency has been shown toward the adoption of the direct reduction mortgage. This plan eliminates the issuance of shares to be pledged to secure mortgage loans and as a result the ratio of surplus and guaranty fund to shares may reflect an increase even in the absence of actual

[33] Snowden, 2003.

> transfers from earnings. In view of the trend toward this method of operation, it is recommended that transfers from earnings to guaranty fund be continued until such fund equals 10% of share liability or 50% of real estate owned, whichever is greater, and that the maximum surplus accumulation to be permitted, be raised from 15% of share liability to 25%. (New York, 1936, p. 5)

These loss reserves ("guaranty funds" in New York or "contingent reserves" elsewhere) on the liability side of balance sheets set aside earnings that could have been awarded to shareholders as dividends. The purpose was to smooth the returns paid to shareholders and to offset losses suffered by the association. The costs of undertaking this change depended on the organizational structure of an association, and it turned out that serial associations were particularly ill-prepared:[34]

> In the serial and terminating associations, these [contingent] reserve funds are seldom found. In both of these types of associations, profits are allotted to shares in a group or series, and are at once reinvested by the association…" (Clark and Chase, 1925, 344)

Serial plan associations in particular had avoided reserve funds because it was difficult to allocate them across different groups of members who had contributed different amounts of foregone earnings over different time horizons.

The HOLC and FHA Programs

Between 1933 and 1936 the Home Owners' Loan Corporation wrote and held loans on one out of every ten owner-occupied nonfarm homes in the U.S. All of these were long-term (15-year) direct reduction loans. The program was designed to repair a distressed mortgage market by purchasing defaulted mortgage loans from private lenders and refinancing those loans on terms that distressed borrowers could fulfill.

Although the HOLC had a significant impact on the mortgage market and its recovery from crisis, its impact on the transition from sinking fund to direct reduction within the B&L industry was indirect. The HOLC, to begin with, was a temporary program that made loans only during the three-year window that was specified in the original legislation. The corporation, moreover, could not engage in general lending operations. Rather, it could only refinance existing loans. So while the HOLC was an enormously successful demonstration project for direct reduction lending, it could not influence mortgage lending terms by competing with private lenders. Clearly the HOLC did not invent the direct reduction loan, though perhaps it

[34] There were very few terminating associations in operation in the 1930s, but these would also have faced problems adapting to the direct reduction loan. Recall that serial associations accounted for all members in groups, while direct reduction loans required individual accounts.

was the first to introduce the loan to many markets. The HOLC's use of the direct reduction loan also reflects admiration for direct reduction loans that had already been in use, primarily in the farm mortgage sector, but also in segments of the B&L industry as we have seen.

The B&L industry sold more distressed loans to the HOLC than any lender group, but this is not surprising given that it was the nation's largest institutional source of residential real estate loans. As a share of its total mortgage loan portfolio, on the other hand, the HOLC bought fewer loans from B&Ls than most other lenders and, as we have just seen, did not save the industry from a long, painful process of liquidation that lasted well past 1936. Because of its influence on local mortgage market conditions and its potential influence as a demonstration program, an empirical model of the adoption of direct reduction at the individual association level should control for the amount of HOLC refinancing activity within its local market.

The FHA program, in contrast to the HOLC, had a more direct competitive impact on B&L lending practice. The program was created in 1934 with an explicit mission to provide "a thorough reform in the home financing structure" by insuring long-term, high LTV loans designed to result in "a complete retirement of the mortgage by the means of small amortization payments at frequent intervals."[35] Participating lenders paid a premium into a mutual fund to insure against the loss of principal on an approved loan. The idea was not new since private mortgage companies in the greater New York metropolitan area insured loans that they originated and sold to investors throughout the 1920s.[36] What was new about FHA insurance is that it was only available for long-term, amortized loans. In this way the FHA had an immediate and dramatic impact on commercial banks that had relied almost exclusively before 1930 on short-term balloon loans.

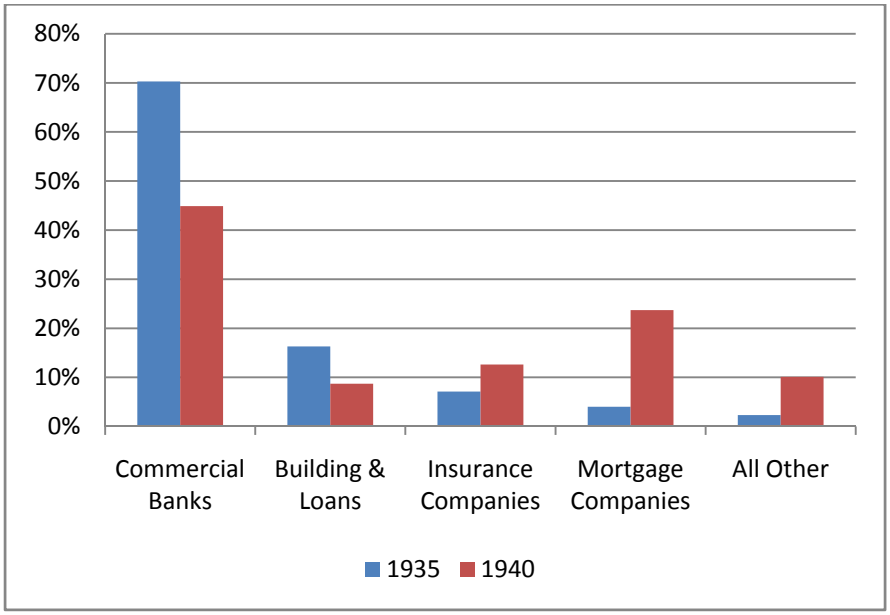
Commercial banks were by far the biggest users of FHA insurance. Figure 2 shows that in 1935 they accounted for 70 percent of all FHA-insured loans originated that year, and about 45 percent of those originated in 1940. By 1940, 37 percent of the residential real estate loans held by national and state-chartered banks were FHA loans.[37]

The B&L industry did not embrace the FHA nearly to the same extent. B&Ls were in the early stages of their own transition from sinking fund to direct reduction loans when the FHA program was proposed in the National Housing Act of 1934. The industry did not, however, see

[35] *First Annual Report of the Federal Housing Administration*, 1935, 4.
[36] Snowden, 2010.
[37] *Sixth Annual Report of the Federal Housing Administration*, 1940, 41-3.

federal mortgage insurance as a means of facilitating its transition. The program, instead, was seen as a mechanism through which other mortgage lenders, especially commercial banks, could enter the market for long-term real estate loans that B&Ls had dominated for a century with its share accumulation plan. For this reason the industry's trade group, the US Building and Loan League, fought hard to defeat the program, but lost.[38]

Figure 2: Share of all FHA loans originated by different lender classes



Notes: Each column is that lender's share of all FHA loans originated in each year. Therefore, the blue columns sum to one, as do the red columns. Source: Seventh Annual Report of the Federal housing Administration, p. 49.

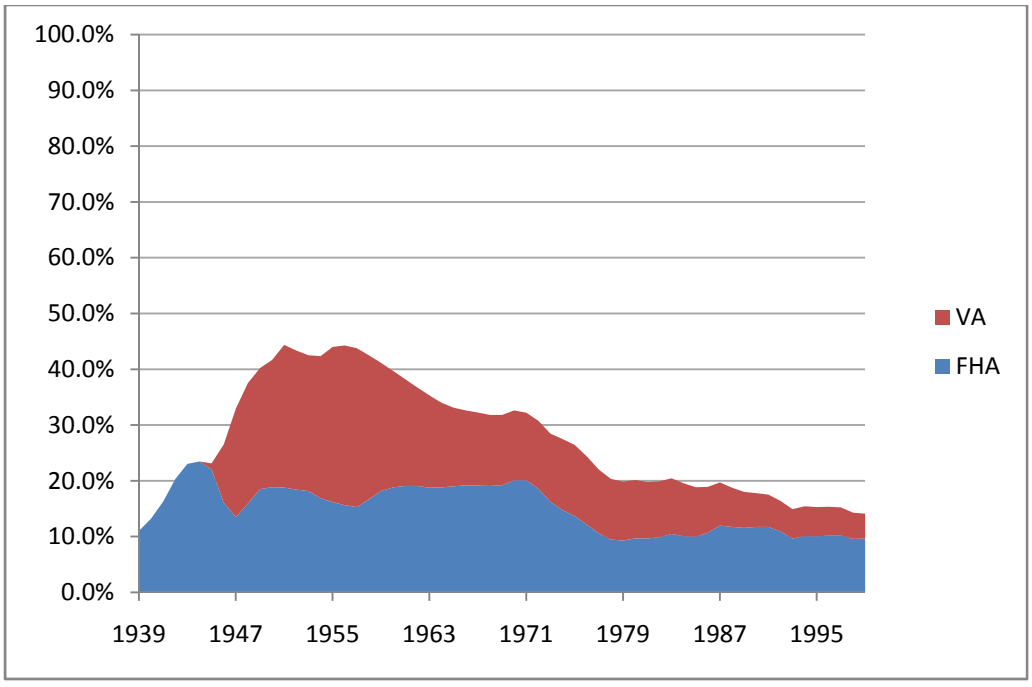
After losing the battle, some within the industry experimented with FHA lending, but resistance against participation eventually won out.[39] By the end of 1940, 1,700 out of nearly 7,000 B&Ls had made at least one federally-insured loan, but by 1940 only 789 participated in the program.[40] At that date, moreover, FHA loans represented only about 5 percent of the total B&L mortgage portfolio. The top panel of Figure 2 shows another measure of the B&Ls low and declining profile in the FHA program; by 1940 the industry originated less than 10 percent of all FHA mortgage loans although it remained the nation's largest residential home mortgage lender.

[38] Ewalt, 1962, 137-142.
[39] Ewalt, 1962, 140-4 argues that ideological opposition among B&Ls to FHA's public-private model accounts for B&Ls resistance to the program. The close connection between B&Ls and local home builders who did not want to conform to FHA strict building codes represents an interesting, but as yet untested, alternative explanation.
[40] FHA Annual report, 1940, p. 52.

The limited participation of B&Ls in the FHA program suggests that the empirical investigation of the adoption of direct reduction lending needs to treat the competition from FHA loans in local markets as seriously as the B&Ls themselves did. In particular, the amount and timing of FHA lending within the county in which a B&L was located needs to be incorporated and controlled for in the analysis.

The lack of B&L participation in FHA also has important implications for our broader understanding of the diffusion of the modern residential mortgage contract in the United Sates. A glaring deficiency in popular explanations of this process is a failure to recognize that the long-term, amortized mortgage was integrated during the 1930s into both the federally-insured and what soon would be called the conventional mortgage market. The B&L transition to the direct reduction loan is an integral component of the conventional market which, as can be seen in the lower panel of Figure 3, accounted for more than 80 percent of residential mortgages before 1940, and the large majority of it thereafter.

Figure 3: Share of all residential real estate loans that were insured by the FHA or VA



Source: Historical Statistics of the United States, Millennial Edition, Series DC292 – DC948

The state-level evidence suggests that market forces and adjustment costs help to explain

the speed and extent of the transition to the direct reduction loan within the B&L industry. The process was undoubtedly also influenced, however, by New Deal policies that fundamentally reshaped the residential mortgage market at the same time. To assess how, we must be specific about the channels of influence through which each policy affected the choice of loan contract by B&Ls. We do so in this section by first discussing programs through which the federal government directly wrote or subsidized direct reduction loans and then by examining the set of federal policies that were specifically targeted on the B&L industry.

Dealing with the organizational costs of adoption

The organizational and accounting costs of adopting direct reduction contracts were impediments overcome during the 1930s by the coordinated efforts of industry and government officials. B&L officers learned the mechanics of the direct reduction loans through an extensive educational campaign conducted by B&L trade associations and the federal government. Beginning around 1934, the major trade magazines and government journals all published amortization tables that B&L officers could use as references, invaluable in a world before digital computers. Also published were simple guides such as the size of a monthly payment necessary to retire a loan over a given number of months.[41]

Trade groups also developed courses of instruction on new accounting techniques.[42] Such courses disseminated new legal language for mortgage forms and association by-laws, examples of passbooks that could be issued to borrowers and would track payments on principal and interest, and reveal the balance due at any given time. Through these efforts, B&L officers learned what entries were required in their associations' ledgers and cash books, how to recast old share accumulation mortgages into direct reduction mortgages, and how to handle delinquencies with these new contracts. Naturally, business supply companies began to advertise new products, such as standardized passbooks for borrowers and accounting forms and accounting machines for associations.[43]

Though the transition to direct reduction loans took time and energy, ultimately there was

[41] See *American Building Association News*, August 1934, p. 364 and September 1938 p. 409; *Building and Loan Guide and Bulletin*, 1935 p. 7 and p. 108; *Federal Home Loan Bank Review*, March 1935, p. 189

[42] Ewalt (1962), p. 152.

[43] *American Building Association News*, September 1935 p. 433, October 1935 p. 466 and Nov 1935 p. 524; *Savings and Loan News*, February 1933, p. 7, May 1934, p. 14, and October 1935 p.3; *Building and Loan Guide and Bulletin* 1935 p. 7 and p. 111; *United States Building and Loan Annals*, 1934 p. 298.

widespread recognition that the accounting procedures for direct reduction loans were substantially simpler, as there was no need to track the accumulation of a sinking fund or to credit dividends to the sinking fund. B&L officers and borrowers all appreciated this. Borrowers in particular favored the definite maturity date and the ability to track the unpaid balance on their passbooks at any time. Indeed, during the 1930s, B&L officers began to admit that many borrowers likely had never fully understood the old sinking fund plan.[44]

Few of these techniques or ideas adopted in the 1930s were crafted at the time. In fact, their rapid dissemination was predicated on their prior use in places like Ohio and California during the 1920s, allowing B&L officials in those areas to speak from practice rather than require other B&Ls to learn by doing all over again. Adoption, given a new urgency during the 1930s, accelerated the knowledge gained by associations over the previous fifty years through slower learning by doing processes.

The importance of these types of implementation issues should not be overstated, yet these issues do relate to the core of financial innovation. The direct reduction contract innovation boils down to a set of organizational procedures and accounting forms and practices. Though the practices required to implement such loans may seem obvious in retrospect, the extensive educational campaign during the 1930s suggests otherwise.

5. Conclusion

This paper is the first serious attempt to characterize, in the conventional mortgage market, the historical use of the direct reduction contract, a key financial innovation in the field of real estate lending. Gathering data from the 1890s, 1920s, and 1930s, we have shown that direct reduction contracts were slowly adopted by the B&L industry in the fifty years prior to the Great Depression, and then rapidly and extensively taken up during the 1930s.

This paper alters the conventional wisdom regarding the origins of direct reduction loans in two important ways. First, prior to the Depression, loan plans were not limited to short term balloon loans as building and loan associations, the largest institutional source of residential real estate loans, offered contracts with long terms and detailed repayment provisions. Second, the direct reduction contract is not a creature of the 1930s, as it had been used to a moderate extent

[44] *Building and Loan Guide and Bulletin* 1935 p. 111 and 1937 p. 20 ; *Savings and Loan News* October 1935 p. 9; *United State Building and Loan Annals,* 1934 p. 296 and 1937 p. 324.

as far back as the 1880s in the residential real estate loan market.

To explain the rapid adoption during the 1930s, therefore, is a matter of the economics of adopting an existing piece of technology, and can be approached using ideas from the literature on the history of technology. The slow-then-fast adoption pattern is not dissimilar to those characterizing other inventions historically. To explain this, we take to heart the lesson of Rosenberg (1982) that the relevant unit of innovation is rarely a single invention, but rather a set of complementary innovations, often accumulated incrementally. In this case, we stress that direct reduction contracts were made possible by a host of other changes in the organizational and economic structure of B&L associations from 1830 to 1930.

Importantly, this approach clarifies the role of the New Deal. New Deal policy helped B&Ls restructure their liabilities in order to cope with the changes in credit risk allocation and loss of mutuality inherent to dropping the older share accumulation contracts. The transition to direct reduction contracts at building and loan associations took place largely outside the direct scope of insurance by the Federal Housing Administration, though its competitive effects surely mattered.

Appendix: Geographic Distribution of NBER Sample

Table A: Geographic distribution of the NBER sample

State	Share of national B&L assets in 1930	Share of loans in NBER sample	State	Share of national B&L assets in 1930	Share of loans in NBER sample
Pennsylvania	15.5	3.2	(continued)		
Ohio	14.1	18.6	Arkansas	0.5	1.3
New Jersey	13.7	1.8	Minnesota	0.5	0.8
Massachusetts	6.4	7.9	West Virginia	0.4	0.0
California	5.8	9.9	Rhode Island	0.4	0.0
Illinois	5.3	8.7	Oregon	0.3	0.0
New York	5.0	9.3	Alabama	0.3	0.0
Indiana	3.5	9.3	South Carolina	0.3	0.0
Wisconsin	3.3	0.0	Connecticut	0.3	0.0
Maryland	2.5	1.0	Maine	0.3	1.5
Missouri	2.4	2.1	Montana	0.2	0.0
Louisiana	2.1	0.0	Mississippi	0.2	0.0
Michigan	1.9	3.4	Tennessee	0.2	0.0
Nebraska	1.7	0.0	Florida	0.2	0.0
Oklahoma	1.6	6.1	Delaware	0.2	0.0
Texas	1.5	1.0	New Hampshire	0.2	0.6
Kansas	1.5	2.4	North Dakota	0.2	0.4
Kentucky	1.3	0.8	Wyoming	0.1	0.0
Washington	1.2	4.4	South Dakota	0.1	0.0
North Carolina	1.0	0.0	Georgia	0.1	0.0
District of Columbia	0.9	1.4	Idaho	0.1	0.0
Virginia	0.7	0.0	New Mexico	0.1	1.6
Colorado	0.7	0.0	Arizona	0.1	0.0
Utah	0.6	0.0	Vermont	0.1	0.0
Iowa	0.6	2.6	Nevada	0.0	0.0

Notes: Data on assets in 1930 are taken from Bodfish (1931).

Appendix: Data Sources

The data used in this paper come from the following annual reports issued by the various state regulators of building and loan associations.

Connecticut: Office of the Banking Commissioner, *Report of the Bank Commissioner*.

Iowa: Auditor of the State, *Report of the State Auditor* and *Report on the Condition of Building and Loan Associations.*

Illinois: Auditor of Public Accounts, *Annual report of Mutual Building, Loan and Homestead associations*.

Indiana: Department of Banking, *Annual Report of the Department of Banking.*

Kansas: State Building and Loan Department, *Annual Report of the Kansas Building and Loan Associations.*

Louisiana: State Bank Commissioner and Supervisor of Homestead and Building and Loan Associations, *Biennial Report Relative to State Banks, Savings Banks, Trust Companies, and Homestead and Building and Loan Associations, and Credit Unions*

Maine: Bank Commissioner, *Report of the Bank Commissioner of the Condition of Savings Banks, Trust and Banking Companies, Loan and Building Associations, and Loan Companies.*

Massachusetts: Department of Banking and Insurance, *Annual Report of the Commissioner of Banks, Part III, Relating to Co-operative Banks and Savings and Loan Associations.*

Missouri: Bureau of Building and Loan Supervision, *Annual Report.*

Nebraska: Department of Trade and Commerce, *Report of the Department of Trade and Commerce.*

New Hampshire: Board of Bank Commissioners, *Annual Report.*

New Jersey: Department of Banking and Insurance, *Annual Report of the Commissioner of Banking and Insurance Relative to Building and Loan Associations.*

New York: Banking Department, *Annual Report of the Superintendent of Banks Relative to Savings and Loan Associations.*

Ohio: Department of Commerce, *Annual Report of the Superintendent of Building and Loan Associations.*

Texas: Department of Banking, *Annual Report of Building and Loan Associations.*

Virginia: State Corporation Commission, *Annual Report Showing the Condition of Incorporated State Banks and Other Institutions.*

Vermont: Department of Finance, *Annual Report of the Bank Commission*

Wisconsin, State Banking Department, *Annual Report of the Wisconsin Building and Loan Associations, Credit Unions, and Investment Associations.*

References

American Building Association News, various issues.

Bodfish, Henry Morton (1931). *History of Building and Loan in the United States.* Chicago: United States Building and Loan League.

Bodfish, Henry Morton and Adrian Daniel Theobald (1938). *Savings and Loan Principles.* New York: Prentice-Hall.

Building and Loan Guide and Bulletin, various issues.

Carliner, Michael S. (1998). "Development of Federal Homeownership 'Policy,'" *Housing Policy Debate*, vol. 9, no. 2, pp. 299-321.

Center for American Progress (2011). "A Responsible Market for Housing Finance." http://www.americanprogress.org/issues/2011/01/pdf/responsiblemarketforhousingfinance.pdf

Clark, Horace Frisby and Frank A. Chase (1927). *Elements of the Modern Building and Loan Associations.* New York: Macmillan.

Colean, Miles (1944). *American Housing*. The Twentieth Century Fund: New York.

Emmons, William R (2008). "The Past, Present and Future of the U.S. Mortgage Market," *Central Banker,* Summer 2008.

Ewalt, Josephine Hedges (1962). *A Business Reborn: the Savings and Loan Story.* Chicago: American Savings and Loan Institute Press.

Federal Home Loan Bank Board, *Annual Report*, Washington, D.C., various years.

Federal Home Loan Bank Board, *Federal Home Loan Bank Review*, various issues.

Green, Richard K. and Susan M. Wachter (2005). "The American Mortgage Market in Historical and International Context," *Journal of Economic Perspectives*, vol. 19, no. 4, pp. 93-114.

Gruenberg, Martin J. (2007). Remarks at the 2007 Annual Meeting of the European Forum of Deposit Insurers. http://www.fdic.gov/news/news/speeches/archives/2007/chairman/spnov2707.html

Jaffee, Dwight M (1975). "Innovations in the Mortgage Market" in *Financial Innovation,* edited by William L. Silber. Lexington: Lexington Books.

Haveman, Heather A., Srikanth Paruchuri, and Hayagreeva Rao (2007). "The Winds of Change: The Progressive Movement and the Bureaucratization of Thrift," *American Sociological Review*, vol. 72, pp. 117-142.

Mason, David L (2004). *From Building and Loan to Bail-out.* Cambridge: Cambridge University Press.

Rose, Jonathan (2011). "The Prolonged Resolution of Troubled Real Estate Lenders During the 1930s." Unpublished working paper.

Rosenberg, Nathan (1982). *Inside the Black Box: Technology and Economics.* Cambridge: University Press.

Russell, Horace (1960). *Savings and Loan Associations*. Albany: Matthew Bender and Co.

Savings and Loan News, various issues.

Snowden, Kenneth (1997). "Building and Loan Associations in the U.S., 1880-1893: the Origins of Localization in the Residential Mortgage Market," *Research in Economics*, vol. 51 pp. 227-250.

Snowden, Kenneth (2003). "The Transition from Building and Loan to Savings and Loan," pp. 157-206 in *Finance, Intermediaries and Economic Development,* edited by S. Engerman, P. Hoffman, J. Rosenthal, and K. Sokoloff. Cambridge: Cambridge University Press.

Snowden, Kenneth (2010). "Covered Farm Mortgage Bonds in the Late Nineteenth Century U.S.," *Journal of Economic History*, vol. 70, no. 4. pp. 783-812.

United States Building & Loan League (various years). *Building and Loan Annals*. Chicago.

U.S. Federal Housing Administration (various years). *Annual Report of the Federal Housing Administration*. Government Printing Office: Washington, D.C.

Wright, Carol (1893). *Ninth Annual Report of the Commissioner of Labor: Building and Loan Associations*. Washington, DC: Government Printing Office.

Zandi, Mark and Cristian deRitis (2011). *The Future of the Mortgage Finance System,* Moody's Analytics Special Report. http://www.economy.com/mark-zandi/documents/Mortgage-Finance-Reform-020711.pdf?src=dismal