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Securitization and Mortgage Renegotiation: Evidence from the Great Depression

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We use loan-level data from the New York City metropolitan area to examine the extent to which lenders attempted to prevent foreclosures with concessionary modifications during the Great Depression. We find no principal forgiveness in the sample and only a handful of concessionary mortgage modifications of other types. Far more mortgages terminated through foreclosure than received any sort of concessionary modification. The results indicate that there are significant impediments to renegotiation of residential mortgages beyond securitization. As such, less renegotiation seems unlikely to be a major cost of securitization of residential mortgages. (*JEL* G21, N22, R31)

Voluntary residential mortgage modifications have been rare in the foreclosure crisis that began in the late 2000s. For example, White (2009b) finds only forty principal reductions of more than 10% of the balance owing in his analysis of more than 100,000 securitized subprime loans. White (2009a) examines 1.5 million subprime and alt-A mortgages and finds only 1,100 modifications involving principal forgiveness. Adelino, Gerardi, and Willen (2010b) find that fewer than 3% of all seriously delinquent mortgages received payment-reducing modifications in the 2007–2008 period. White (2009b) finds that the most common form of concessionary modification was a rate freeze or a reduction in the interest rate. Agarwal, Amromin, Ben-David, Chomsisengphet, and Evanoff (forthcoming) find that more than 85% of all seriously delinquent mortgages do not enter into any modification or loss mitigation program within six months of becoming seriously delinquent.

Several commentators have argued that the main reason for the failure of voluntary residential mortgage modifications in the foreclosure crisis that began in the late 2000s is that most residential mortgages are securitized. The general impression the profession has is that prior to the current era of widespread securitization, it was common for lenders to make substantial

changes to the loan terms to make the mortgage more affordable. For example, Zingales (2008) asserts, "In the old days, when the mortgage was granted by your local bank, there was a simple solution to this tremendous inefficiency. The bank forgave part of your mortgage; let's say 30%." Similarly, Geanakoplos and Koniak (2008) write in the *New York Times,* "In the old days, a mortgage loan involved only two parties, a borrower and a bank. If the borrower ran into difficulty, it was in the bank's interest to ease the homeowner's burden and adjust the terms of the loan. When housing prices fell drastically, bankers renegotiated, helping to stabilize the market." This view has also been adopted by policymakers (see Congressional Oversight Panel 2009, pp. 1–2).

This article presents evidence that concessionary mortgage modifications were rare in "the old days." We test the hypothesis that securitization is the primary impediment to modifications of residential mortgages using a sample of residential mortgages originated in the New York City (NYC) metropolitan area between 1920 and 1939. Our data include detailed information on the original mortgage agreement and any subsequent modifications to it. In particular, the sample collection specifically included a box where lenders could indicate whether there was a reduction in principal "by compromise." We are also able to observe changes in amortization, interest rate changes, and, to a lesser extent, changes in maturity. It is important to note that very few mortgages were securitized during the Great Depression.

In no year between 1929 and 1935 did more than 2% of outstanding loans receive what may have been a concessionary modification. We find no instances of principal forgiveness in our main sample. We find some interest rate reductions possibly due to a concession on the part of the lender, but the average concession to the interest rate is less than 100 basis points. Changes in amortization that result in a reduction in the payment are similarly rare. We find a handful of loans where the lender may have exercised forbearance such that there is a small increase in the principal balance owing. Far more mortgages terminated through foreclosure than received what may have been a concessionary modification during the 1930s.

A caveat to our results is that lenders in our sample may have engaged in some forbearance that we are unable to observe. Indeed, we observe a significant delay between when home prices and employment in the NYC region fall and when the foreclosure rate in our sample reaches its peak. While we try to identify forbearance in our data, the short-term nature of most mortgages originated in the 1920s makes it impossible to identify forbearance if the lender did not amortize missed payments.

Our results provide evidence against the hypothesis that securitization is the main reason that lenders are reluctant to modify residential mortgages and, especially, to forgive principal. The advantage of using data from the Great Depression to test whether securitization is the reason for so few modifications is that there is little risk of endogeneity in which mortgages were securitized since securitization was exceptionally rare. Although the mortgage market of

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the 1920s and 1930s differs from the present market, the market was similar to the current situation in the most important respects for understanding lenders' reactions to distressed mortgagors. First, the 1930s saw a large decline in both nominal and real home prices as well as a significant increase in unemployment. Second, the foreclosure rate rose dramatically: Nationally, the non-farm foreclosure rate in metropolitan communities nearly quadrupled between 1926 and 1933, rising from 3.6 foreclosures per 1,000 dwellings to 13.3 foreclosures per 1,000 dwellings (Federal Home Loan Bank Board 1937a). Third, if the lender foreclosed on a property, the lender stood to recover substantially less on the property than its fair market value and would incur significant foreclosure costs. Finally, some lenders held mortgages they originated themselves, while others held mortgages originated by third parties who had no intention of holding the mortgages themselves.

We also find that, rather than help troubled borrowers avoid foreclosure, lenders may have forced some mortgagors into foreclosure by refusing to refinance short-term loans with a balloon payment coming due. This finding is present only in the years the Home Owners' Loan Corporation (HOLC) was accepting applications. The HOLC was a program that the federal government established in 1933 to try to reduce the number of foreclosures; the HOLC stopped accepting applications in 1935. Home owners at serious risk of foreclosure, particularly because a lender would not roll over an expiring balloon mortgage, applied directly to the HOLC for a mortgage refinancing. If the mortgagor's application to the HOLC was successful, the HOLC acquired the troubled original mortgage from the lender; the lender in exchange received HOLC bonds. The finding that term expiries only increased the risk of foreclosure during the HOLC years suggests that lenders may have refused to refinance balloon loans in anticipation that the HOLC would refinance the loans and the lender would be repaid more than the expected market value of the loan.

Currently, the literature has not reached a consensus as to whether securitization impedes renegotiation at all and, if so, to what extent. Although Piskorski, Seru, and Vig (2010) find that securitization increases the likelihood that a seriously delinquent loan will terminate through foreclosure, Adelino, Gerardi, and Willen (2010b) use the same dataset and find no difference in the modification rate of portfolio loans and securitized loans. See Adelino, Gerardi, and Willen (2010a) for a discussion of the reasons for the different findings. While Cordell, Dynan, Lehnert, Liang, and Mauskopf (2009) present evidence that servicers do not have the right incentives to modify loans, the results here suggest that simply better aligning the servicer's and lender's incentives is unlikely to substantially increase the number of troubled mortgages that receive a modification.

Insofar as the findings show that less renegotiation is not a major cost of securitization, the article contributes to the emerging literature on the costs and benefits of securitization. On the benefits side, Loutskina and Strahan (2009)

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show that securitization reduces the effect of bank financial conditions on the supply of residential mortgage credit. One of the drawbacks of securitization may, however, be that lenders screen loans that are likely to be securitized less carefully. Elul (2009), Krainer and Laderman (2009), Agarwal, Chang, and Yavas (2010), and Jiang, Nelson, and Vytlacil (2010) explore this issue in the residential mortgage market, and Benmelech, Dlugosz, and Ivashina (2010) study the issue in the corporate loan market.

The results of this study and those of White (2009a,b) and Adelino, Gerardi, and Willen (2010b) regarding the renegotiation of residential mortgages contrast with the frequency of concessionary renegotiation of other sorts of financial contracts. Benmelech and Bergman (2008) find that airlines are frequently able to renegotiate their leases downward when they are financially distressed. James (1996) examines a sample of financially distressed public firms not in bankruptcy and finds that, provided public debt holders agree to an exchange, banks frequently reduce principal on bank loans. James (1995) similarly finds many instances of banks forgiving principal on debt in exchange for an equity stake in a firm. The rarity of concessionary renegotiation for residential mortgages likely owes to informational asymmetries between borrowers and lenders, as Wang, Young, and Zhou (2002) suggest in their theoretical model. Lenders likely have difficulty distinguishing between financially troubled mortgagors and mortgagors unlikely to default but that still have negative equity. In contrast, information on the financial condition of publicly traded firms is readily available.

This article also contributes to a growing body of recent literature that aims to understand the real estate lending environment of the 1920s and the 1930s and the impact of the HOLC. Courtemanche and Snowden (2010), Fishback, Flores-Lagunes, Horrace, Kantor, and Treber (forthcoming), and Rose (forthcoming) examine the impact of the HOLC, a federal program wherein the federal government directly refinanced troubled loans. In exchange for their troubled loans, lenders were given HOLC bonds. We find some evidence that lenders may have refused to refinance distressed mortgages with balloon payments coming due in hopes that the mortgagor would apply to the HOLC consistent with Rose's (forthcoming) finding that the HOLC was primarily a program that benefitted lenders. Wheelock (2008) provides an overview of the government response to the foreclosure crisis of the 1930s. Goetzmann and Newman (2010) examine securitization in the 1920s. Eugene White (2009) provides an overview of the causes of the real estate boom of the 1920s and its subsequent collapse.

To my knowledge, this is the first study to examine the extent to which lenders tried to prevent foreclosures by granting concessionary modifications in the 1920s and 1930s. It is also the first article since the 1950s to examine the NBER mortgage experience cards for life insurers, commercial banks, and savings and loan associations (henceforth savings and loans). Rose (forthcoming) examines the loan experience cards from the HOLC and has generously

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provided digitized versions of these data to the National Bureau of Economics Research (NBER) to post on its Web site.

The next section of the article describes the dataset. Section 2 summarizes the renegotiations we observe in the data. Section 3 discusses the implications of our findings for loan renegotiation in the current foreclosure crisis, and Section 4 concludes.

1. The Data

The data in this sample are the NBER's mortgage experience cards for loans originated in the 1920–1939 period for the NYC metropolitan area. We use only data on non-farm, conventional mortgages for one to four family homes. The mortgage experience cards were collected by the NBER in the late 1940s and were designed to be a representative national sample of the loans of mortgage lenders extant as of 1944. These data are available on microfiche files at http://www.nber.org/nberhistory/historicalarchives/archives.html.

Figure 1 is an example of a mortgage experience card from our sample. This particular experience card represents a mortgage held by a commercial bank (rolls 1–3 on the NBER's Web site). Field A represents the lender's internal coding of the loan; the numbers immediately to the right of field A represent the NBER institution number (437 in this case) and the NBER loan number specific to each institution (37 in this case). There is little missing data in fields B through E, which are self-explanatory. Questions F and G are sometimes blank in the data or filled out and then subsequently scribbled out. It seems possible that many lenders did not fully understand these questions despite the detailed instructions they were given (see Morton 1956, appendix B); many savings and loans indicated that the purpose of the loan was "purchase" (the experience cards for savings and loans are slightly different than those for commercial banks and include an additional field where the institution indicates the purpose of the loan) and then went on to indicate that the loan was not a purchase mortgage, which seems puzzling. It is unclear exactly what is meant by real estate sales contract, but only 8% of the mortgages in our sample meet this definition according to the reporting institutions, and only 71% of our mortgage experience cards have a response to this question. Approximately 7% of our loans are missing appraisal at origination (Field H). Field J indicates the current status of the loan. In this case, the loan is outstanding. For foreclosed loans, an additional sheet records details of the foreclosure.

Field I is the field of most interest for this study. This particular loan has three modifications. However, it seems the lender did not record all maturity extensions (extensions of contract term) since there was not a maturity extension either in 1930 (when the original term expired) or in 1934, when the term set in 1931 expired. Such missing term extensions are especially prevalent in the commercial loan sample because they have the shortest loan maturities, in part due to regulations. Indeed, many of the commercial bank loans are demand

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Figure 1
Example of a mortgage experience card (roll 3, slide 419 on NBER Web site)

loans after an original one-year term. Commercial banks sometimes explicitly indicated that the maturity structure was demand after one year; it is likely that this was the standard contract for many lenders and that many lenders simply recorded the maturity as one year even if it was, in fact, demand after one year. In the event that the loan had more than three modifications, the institution sometimes filled out another card or two additional cards if there were more than six modifications.

For life insurers, the NBER data are a 1% random sample of the mortgage loans originated after 1920 of the thirty largest (by size of the non-farm mortgage portfolio) life insurance lenders. For life insurance companies, the coverage of current loans (i.e., loans active in the late 1940s) is similar to the coverage for historical loans. Furthermore, life insurers kept detailed records of their loans so that it was easy for them to link successor loans with earlier loans (i.e., to identify modifications). Finally, there is little survivorship bias for life insurance companies because few of them failed in the 1930s. For additional details on the sampling procedure, see Morton (1956).

For commercial banks and savings and loans, the NBER samples roughly correspond to a 1% random sample conditional on achieving a representative national sample; in areas of the country where a lender was the predominant local lender, the NBER requested that the institution sample more than 1% of its loans. Similarly, small lenders sampled less than 1% of their mortgages

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because they originated a smaller proportion of loans. The data for commercial banks are a somewhat less reliable sample of the loans extant in the 1920s and 1930s than those of life insurers. Sixty-eight percent of participating lenders were able to report on inactive as well as active loans. Several commercial banks collapsed in the early 1930s, so we expect to see some survivorship bias in this sample. Morton (1956) concludes that biases due to inadequate linking of successor loans with earlier loans are likely to have been negligible for large commercial banks, which make up the bulk of the NBER's data on commercial bank mortgages.

The data for savings and loans, which were usually known as building and loan associations before the early 1930s, are the least representative of the three NBER samples. Only 46% of the responding savings and loans were able to report their inactive loans. Furthermore, survivorship bias is likely the worst for the savings and loans sample. As a result, we have a smaller sample of loans made by savings and loans in the 1920s and 1930s than their share of lending in the 1920s and 1930s. The survivorship bias in the commercial bank and savings and loans implies that the institutions in our sample are likely to have been among the healthier institutions in existence during the 1920s and 1930s.

Nothing on the cards specifically indicates whether the loan was securitized. Commercial banks were specifically instructed to sample only loans held for their own accounts (Morton 1956, appendix B), however. For life insurers and savings and loans, only a handful of loans in our sample would have been securitized even if some institutions included their securitized loans in their sample. While residential securitization did exist throughout the 1920s, a very small fraction of institutionally held residential mortgage debt was securitized. White (2009, figure 14) reports that the volume of residential mortgage bonds reached a peak of just under $500 million in 1928; the total volume of institutionally held non-farm residential mortgages was nearly $11.5 billion in the same year (Morton 1956, tables C-1 and C-3).

However, many of the loans reported by life insurers would have been acquired in the secondary market. Throughout the 1920s, life insurers almost exclusively acquired loans through correspondents, also known as mortgage companies, rather than through branches (Saulnier 1950). Saulnier (1950, pp. 30–32) reports that the usual arrangement was for the life insurer to pay the correspondent a fixed fee at the time of loan origination in exchange for originating the loan and servicing the loan while it was outstanding. As the volume of new loans decreased in the early 1930s, many correspondents went out of business or life insurers proposed new arrangements for the compensation of correspondents. The compensation structure worked out was usually either a flat fee per mortgage being serviced each month or a fee set as a percentage of collections. In some cases, life insurers themselves took over the servicing of the loans. Snowden (1995) suggests that early on in the crisis, life insurers approved many bad loans to ensure that their correspondents had adequate revenue.

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Snowden (1995) reports that commercial banks and savings and loans were in general local lenders who would have had little need to use correspondents. In many cases, they were forbidden by statute from engaging in interstate lending. A handful of our commercial banks engage in interstate lending, almost always in neighboring states. Our savings and loans appear to be almost exclusively very local lenders.

1.1 Summary statistics

Table 1 illustrates summary statistics for our sample. About half the loans in our sample come from life insurers, with the remainder roughly split between commercial banks and savings and loans. This is not representative of the share of loans by each type of institution at the time. The share of life insurers in institutional residential mortgage holdings (by amount outstanding) was approximately 11% in 1925 and 16% in 1935 (Morton 1956, table C-2). Commercial banks held 18% of residential mortgage debt in 1925 and 19% in 1935. Savings and loans accounted for fully 51% of mortgage holdings in 1925 and 39% in 1935. Thus, life insurers are overrepresented in our sample, and savings and loans are underrepresented, due to the data collection procedure described above.

The loans in our sample have an average nominal interest rate of 5.82%. The average rate masks differences over time in the rate: The average rate for a new loan was close to 6% throughout nearly all of the 1920s and the early 1930s. Likely due to competition from Federal Housing Administration (FHA) loans, which had a fixed rate of interest set by the FHA rather than the lender, the average interest rate fell gradually from 1934 until 1939, when it stood at 5.1%. There do not appear to be major differences across lender types in the interest rates on mortgages.

The average original maturity on the loans is quite short, at just under six years. The average maturity differs significantly both across lenders and across time. Commercial banks have the shortest average maturity, in large part because of regulations preventing many of them from making long-term loans on non-farm mortgages. Prior to 1927, federally regulated commercial banks could not legally own residential mortgages with maturities any longer than one year; this restriction was lifted to five years in 1927 (Behrens 1952). Loans held by life insurers have an average maturity of just under six years. It is unclear exactly why life insurers had such short loan terms, particularly given the long-term nature of their liabilities. For all types of lenders, the average loan term rose substantially from around 1934 to 1939, perhaps in response to the introduction of fifteen-year FHA mortgages.

The average realized maturity of the loan (the time from origination until termination) is around eight years. Furthermore, it is much more similar across lenders, with commercial banks having the longest realized maturity of the three types of lenders. The average loan to value (LTV) in our sample is just

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Table 1
Summary statistics

	Mean	Std. Dev.	Min.	Max
Original Interest Rate (%, Nominal)	5.83	0.41	4	7.2
Life Insurers Only	5.79	0.39	4	7
Commercial Banks Only	5.87	0.34	4.5	6
Savings & Loans Only	5.87	0.48	4	7.2
Original Term (Yrs, Ex. Demand Loans)	7.31	5.75	0.5	25
Life Insurers Only	5.95	5.53	0.5	25
Commercial Banks Only	3.48	3.42	1	20
Savings & Loans Only	12.71	3.14	1	20
Original Appraisal ($)	12,593	26,469	2,000	475,000
Original Amount ($)	6,819	12,921	480	250,000
Life Insurers Only	7,514	9,939	1,500	150,000
Commercial Banks Only	7,373	22,323	600	250,000
Savings & Loans Only	4,916	2,761	480	20,000
Original LTV (as recorded by NBER)	0.57	0.12	0.04	1
Origination Year	1929	5	1916	1939
Life Insurers Only	1929	5	1920	1939
Commercial Banks Only	1928	4	1916	1939
Savings & Loans Only	1930	6	1918	1939
Number of Years Active (excluding loans active at end of NBER sample)	8.1	5.2	0	24
Life Insurers Only	7.1	4.7	0	23
Commercial Banks Only	9.8	5.6	0	21
Savings & Loans Only	8.5	5.2	0	24
Number of Modifications (any type, to end of NBER sample)	0.91	1.36	0	8
Life Insurers Only	1.25	1.61	0	8
Commercial Banks Only	0.54	0.79	0	4
Savings & Loans Only	0.56	0.97	0	5

	%
Amortization Characteristics:	
Non-amortizing at Origination	50.1
Partially Amortizing at Origination	16.3
Property Characteristics:	
Single-Family	83.9
Lender Characteristics:	
Held by Life Insurer	51.8
Held by Commercial Bank	22.7
Held by Savings & Loan	25.5
Termination Characteristics (at end of NBER sample):	
Active	28.4
Paid Off	43.7
Transferred to HOLC	7.2
Other Transfer / Assignment	4.2
Foreclosed	16.5
Modification Characteristics:	
With Modification(s)	47.0
With More Than One Modification	22.1
Total Number of Loans	890

under 60%. Commercial banks and life insurers were often restricted by either state or federal regulations from holding loans with LTVs above 50% or 60%. Loans held by life insurers and commercial banks are somewhat larger than loans held by savings and loans.

About half of the loans in our sample are non-amortizing, and only a third are fully amortizing. The high share of non-amortizing loans reflects the disproportionate influence of life insurers in the sample: More than 80% of mortgages held by savings and loans are fully amortizing, either through a share accumulation plan, a direct reduction plan, or a "cancel and endorse" arrangement.[1]

Nearly half the loans in our sample have at least one modification, while 22% have two or more modifications. Despite having the shortest realized maturities, life insurers report the largest average number of modifications. Commercial banks and savings and loans report less than half the number of modifications per loan of life insurers. Because many of the modifications in our sample are term extensions, the low number of modifications by savings and loans may be due to higher initial terms. Conversely, many of the commercial bank mortgages have one-year terms at origination and are effectively demand loans after that point, which means they may simply not have many term extensions to record. Alternatively, life insurers may have kept better records than commercial banks and savings and loans. We investigate this possibility further later in the article.

1.2 Foreclosures

We focus on the NYC region during this period because of the availability of Nicholas and Scherbina (2010) transactions-based hedonic home price (see Figure 2). To our knowledge, neither repeat sales nor hedonic home price indices are available for other regions of the country during the 1920s or the 1930s.[2] During our sample period, lenders faced significant incentives to avoid foreclosures. At a minimum, the lender would recover about 26% less on the property than its fair market value (Nicholas and Scherbina 2010) and would incur foreclosure costs of approximately 5% of the value of the property (Russell 1937). If the first mortgage were made at a 60% loan to value and the property fell in nominal terms by 30% from the time of origination to the time of default, a far more modest drop than the drop of over 50% between 1929 and 1932 (Nicholas and Scherbina 2010), the lender would stand to lose 13% of the value of the loan.

The information from foreclosures in our sample also provides some information regarding how costly foreclosures were for lenders. For foreclosures and deeds-in-lieu initiated prior to 1940, it took the lender an average of 4.7 years to sell the property. In the interim, lenders sometimes rented the property out and the nominal home price sometimes increased. Nevertheless, after taking into account net income, foreclosure expenses, recoveries on deficiency judgments, delinquent interest, and the foreclosure sale price, the average loss,

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[1] See Ryan and Weese (1935) for a discussion of the different amortization structures of savings and loans' mortgages.

[2] Shiller (2005), however, provides a national index.

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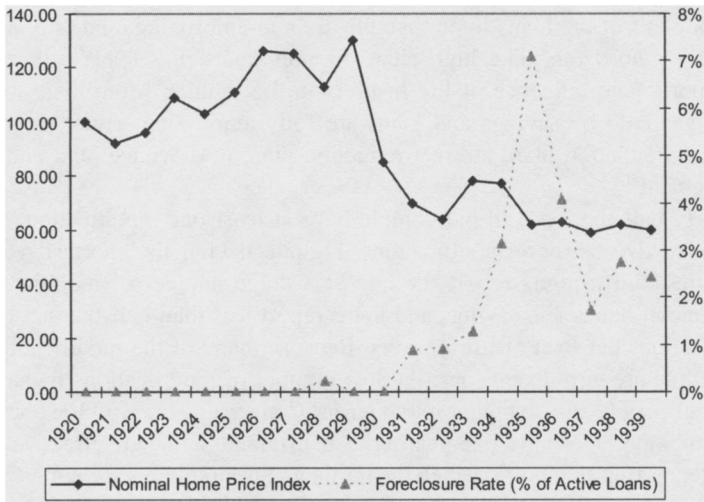
Figure 2
Nicholas and Scherbina nominal index and NYC metro area foreclosure rate
Deeds-in-lieu included as foreclosures in calculating the foreclosure rate.

as a percentage of the outstanding loan balance at the time of foreclosure, was 27%. Thus, on many loans in our sample, lenders may have fared better by engaging in a concessionary modification than by instituting a foreclosure if a concessionary modification would prevent a foreclosure and they could identify the mortgages that would enter foreclosure in the absence of concessionary modifications.

Prior to 1933, lenders in this region neither expected to be able to offload their distressed mortgages to the federal government nor were prevented from exercising their right to foreclose. The HOLC began accepting applications in July 1933. Legislation to establish the HOLC began in June 1933; the first formal request by President Franklin D. Roosevelt to create something similar to the HOLC occurred in April 1933 (Harriss 1951), so it is unlikely that there were significant anticipatory effects in 1932.[3]

After 1932, the presence of the HOLC may have deterred lenders from making modifications because they may have anticipated that the HOLC would take on their distressed loans; indeed, Rose (forthcoming) concludes that the HOLC was primarily a program that benefited lenders. The HOLC stopped accepting applications in 1935.

Many states began enacting long-term foreclosure moratoria in 1932 and 1933; see Wheelock (2008) for a discussion of the effects of the moratoria. Some of these moratoria were limited to farm foreclosures or to individuals

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[3] A search of the *New York Times* database from 1930 using the term "foreclosure" revealed that the first mention of the possibility of something similar to the HOLC is on April 14, 1933 ("The President's Message," *New York Times*, April 14, 1933, p. 2).

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that had not made timely payment of principal and interest; still others were voluntary. Connecticut never had a foreclosure moratorium. New York enacted a foreclosure moratorium from August 1933 that was limited to defaults on principal (Skilton 1943; "Text of Mortgage Moratorium," *New York Times,* August 18, 1933, p. 6). Originally scheduled to last only until July 1934 ("Text of Mortgage Moratorium," p. 6), the New York moratorium was not completely dismantled until after 1943 (Skilton 1943). New Jersey enacted a foreclosure moratorium at the end of March 1933 that was also limited to defaults on principal ("Jersey House Votes Foreclosure Holiday," *New York Times,* March 28, 1933); the first mention of the possibility of a foreclosure moratorium in New Jersey by the *New York Times* was on February 18 ("Eight States Join in Moore Parley," February 18, 1933).

Despite the sharp fall in both nominal and real home prices between 1929 and 1932, Figure 2 illustrates that the foreclosure rate in this sample does not reach its peak of over 7% of active loans until 1935, after home prices appear to have stabilized at a lower level. This does not seem likely to result from a lengthy legal delay in processing foreclosures. Russell (1937) examines a sample of foreclosures in 1936 and finds that the average length of time between the time at which the lender dispatches the loan to a foreclosure attorney and when the foreclosure is completed is 5.2 months. Similarly, the *New York Times* reports an average foreclosure time of just over five months ("Opposes Home Loans by Federal System," June 25, 1932).

Figures 3 and 4 illustrate that the peak in the foreclosure rate in this dataset does not coincide with the peak in the national unemployment rate (NBER historical macro database series m08292a) or New York state factory payroll employment (NBER historical macro database series m08078a). Both series suggest that the labor market had started to recover by 1935. It thus seems puzzling that the foreclosure rate is much higher in the period from 1934 to 1936 than from 1930 to 1932.

In light of the sharp fall in employment and home prices, it is perhaps surprising that foreclosures and deeds-in-lieu never exceed 7% of loans outstanding. Although to my knowledge there are no other estimates of foreclosures as a share of mortgages outstanding for NYC in this period, the Federal Home Loan Bank Board (FHLBB) published foreclosure rates as a share of dwellings outstanding. For the year ending September 30, 1937, the FHLBB (1937b) reports 11.9, 13.4, and 13.7 foreclosures per 1,000 dwellings in the states of Connecticut, New Jersey, and New York, respectively. By comparison, our foreclosure rate in 1937 for all three states (not just the NYC metro area) equates to 18.8 per 1,000 residential mortgages outstanding. For the entire New York district (New Jersey and New York), the FHLBB (1942) reports that the foreclosure rates per 1,000 dwellings from 1935 to 1939 were 16.9, 12.9, 12.0, 9.4, and 8.9 in each respective year. Our foreclosure rate shows a much sharper peak in 1935 and a slight increase in 1938 and 1939, suggesting that our sample is too small to get precise estimates of the foreclosure rate in each year.

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Figure 3
Employment and NYC metro area foreclosure rate
Deeds-in-lieu included as foreclosures in calculating the foreclosure rate.

Figure 4
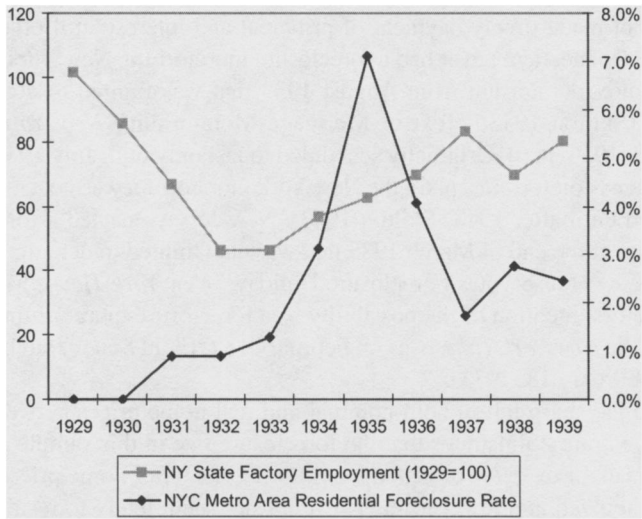**Unemployment rate and NYC metro area foreclosure rate**
Deeds-in-lieu included as foreclosures in calculating the foreclosure rate.

Overall, our average foreclosure rate per 1,000 mortgages from 1935 to 1939 for all loans in Connecticut, New Jersey, and New York is 33.1, while the average foreclosure rate per 1,000 non-farm dwellings during the same period

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reported by the FHLBB (1942) for New Jersey and New York is 12.0. Fisher (1951, table 8) reports that approximately half of the homes in this region were mortgaged, suggesting that the average FHLBB rate per mortgage is approximately 24 per 1,000. Thus, our average rate seems to be fairly representative but may be higher than that in the general population. Our higher foreclosure rate is likely because life insurers, who held more non-amortizing and partially amortizing loans than savings and loans, are overrepresented in our sample. A caveat, however, is that our sample is small; caution should be used regarding inferences from our data regarding the time-series pattern in the foreclosure rate in our sample.

Thus, we can summarize by saying that a substantial portion of mortgages were at risk of foreclosure, that most foreclosures resulted in significant losses, and that there was usually a long delay between when the lender could take possession of a foreclosed property and when it could dispose of it. As a result, if a mortgagee could save any particular loan by modifying it, the mortgagee would have been better off than foreclosing.

2. Modifications

Table 2 summarizes the frequency of modifications by year and type. As noted earlier, life insurers have a proportionately higher number of modifications. However, some of the difference in the number of modifications per loan between life insurers and other types of lenders is due to their recording of maturity changes alone. Commercial banks and savings and loans almost never report a modification that is just a change in the maturity. Excluding modifications that involved only a change in maturity, life insurers report an average of 0.56 modifications per loan, commercial banks an average of 0.28 modifications per loan, and savings and loans an average of 0.36 modifications per loan.

Turning to the types of modifications we observe by each lender type, life insurers report proportionately more of all types of modifications except partial prepays and principal increases. Commercial banks report the largest share of loans with partial prepayments, and savings and loans report a much larger share of loans with principal increases. The disproportionate number of loans with principal increases for savings and loans can largely be explained by their involvement in construction lending; regulations required life insurers and commercial banks to lend only on improved property. Of the fifty-four principal increases by savings and loans, thirty-two of them were on construction loans.

The loan cards identify principal forgiveness with the field principal reduction "by compromise" (see Figure 1). There is no principal forgiveness in our sample. In examining residential and commercial mortgages for the entire three states of Connecticut, New Jersey, and New York over the period from 1920 to 1947, we see only a handful of cases where the lender forgave principal.

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Table 2
Modifications (1920–1939) by institution type and by year

	All	Maturity Change	Rate Reduction	Rate Increase	Change in Loan Type	Principal Write Down	Partial Prepay	Principal Increase	Maturity Change Only	# of Loans
All	583									
By Institution Type:										
Life Insurers	437	404	122	26	142	0	32	5	180	461
Commercial Banks	56	39	48	0	33	0	28	3	2	202
Savings & Loans	90	58	7	3	19	0	11	54	9	227
By Year:										
1920	1	1	0	0	0	0	0	0	1	9
1921	0	0	0	0	0	0	0	0	0	22
1922	0	0	0	0	0	0	0	0	0	43
1923	2	1	0	0	0	0	0	1	1	75
1924	4	2	1	0	1	0	0	2	1	125
1925	13	9	1	0	4	0	0	5	3	189
1926	15	14	1	0	1	0	0	4	9	285
1927	25	22	0	1	3	0	1	7	14	367
1928	36	34	1	3	5	0	2	10	19	423
1929	52	45	3	5	7	0	3	5	28	483
1930	40	36	4	2	5	0	1	8	20	536
1931	34	33	7	0	5	0	7	5	14	567
1932	63	61	4	4	31	0	11	3	21	554
1933	36	34	1	5	20	0	5	0	11	545
1934	26	21	4	4	7	0	2	0	13	544
1935	44	39	23	4	16	0	6	1	9	493
1936	45	35	28	0	15	0	3	6	9	493
1937	47	42	32	1	24	0	14	1	6	463
1938	46	39	35	0	24	0	7	1	7	472
1939	39	28	26	0	21	0	6	1	2	491
Year Unknown	15	5	7	0	5	0	3	2	3	

For data by year, # *of loans* is the number of loans active in that year (including loans terminated in that year). Many modifications included changes to multiple loan elements such that the modification types are not mutually exclusive. Modifications that involve a rate change and a change to an FHA loan are not included as rate changes.

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We turn now to the possibility that some of the interest rate decreases, changes in loan type, or principal increases are due to concessions by the lender to make the mortgage more affordable to the borrower and thus reduce the risk of foreclosure.

2.1 Potentially concessionary modifications

Table 3 shows the number of modifications that may be concessionary. We use the term "potentially concessionary" to refer to a modification that results in either a lower payment for the borrower that is not due to a reduction in the principal outstanding from prepayment or a principal increase potentially due to forbearance. Our definition of a concessionary modification is quite generous, so our estimates should be viewed as upper bounds on the number of concessionary modifications; many of the modifications we identify as potentially concessionary may in fact be idiosyncratic changes to contract terms that do not reflect attempts by the lender to prevent foreclosures.

We identify concessionary interest rate reductions as situations in which the lender reduces the interest rate to a level more than twenty-five basis points below both the original rate and at least one standard deviation below the rate prevailing on new loans in the year of the modification. Lenders at that time did not engage in risk-based pricing based on the individual's default risk (see Morton 1956); therefore, a reduction in the interest rate to significantly below the rate for new loans is highly unlikely to be due to improvements in credit risk. Table 3 illustrates that only a small fraction of loans received what might be concessionary rate modifications. With our most generous definition of a concessionary rate reduction, a reduction in the rate to a rate more than one standard deviation below the rate on newly originated loans in the year of the modification, less than 7% of all loans received one. The average rate on a rate reduction is a mere sixty-five basis points below the rate on new originations, however, suggesting that our definition may be too lenient. With a more stringent definition of a rate reduction, a reduction in the rate to a rate more than two standard deviations below the rate on newly originated loans, we find that only 2% of all loans ever received one. Even with this more stringent definition, the average rate reduction is to a rate only seventy-eight basis points below the rate on new originations. The most significant rate reduction we observe is to only 202 basis points below the rate on new originations in the year of the modification. Furthermore, our definition of rate reductions likely indicates concessions where there were in fact none in 1931 and 1932. Because there were very few originations in these years, the standard deviation of the rate on new loans is exactly zero; therefore, the rate reductions we observe in these years are not likely to be true concessions on the part of the lender.

We identify changes in amortization from "Fully Amortizing" to "Partially Amortizing" or "Non-Amortizing" and from "Partially Amortizing" to "Non-Amortizing" as potentially concessionary because such a change would have

1829

Table 3
Potentially concessionary modifications (1920–1939) by institution type and by year

	Rate Reduction 1 (One Std. Dev.)	Rate Reduction 2 (Two Std. Dev.)	Reduction in Amortization	Principal Increase <15%	# of Loans	All Concessions (rate reduction 2 definition) as % of Loans	Foreclosures as % of Loans
By Institution Type:							
Life Insurers	38	12	16	1	461		
Commercial Banks	20	6	1	1	202		
Savings & Loans	1	0	2	9	227		
By Year:							
1920	0	0	0	0	9		
1921	0	0	0	0	22		
1922	0	0	0	0	43		
1923	0	0	0	0	75		
1924	0	0	0	1	125		
1925	1	1	1	0	189		
1926	1	0	0	0	285		
1927	0	0	2	0	367		
1928	0	0	1	0	423		
1929	2	1	5	0	483		
1930	4	0	1	2	536		
1931	7	7	0	1	567		
1932	4	4	0	1	554		
1933	2	1	0	0	545		
1934	4	0	1	0	544		
1935	10	1	3	1	493		
1936	15	1	1	3	493		
1937	1	0	3	1	463		
1938	1	0	1	0	472		
1939	7	1	0	0	491		
Year Unknown				1			
Average basis points below average rate on new originations	65	78					
Max basis points below average rate on new originations	202	202					

For data by year, *# of loans* is the number of loans active in that year (including loans terminated in that year). Many modifications included changes to multiple loan elements such that the modification types are not mutually exclusive. Modifications that involve a rate change and a change to an FHA loan are not included as rate changes. A rate reduction 1 (one std. dev.) is defined as a reduction in the rate to a rate more than one standard deviation below the average rate on new originations (excluding FHA loans) in that year. A rate reduction 2 (two std. dev.) is defined as a reduction in the rate to a rate more than two standard deviations between the average rate on new originations in that year (excluding FHA loans).

resulted in a decrease in the periodic payment. As Table 3 illustrates, just 2% of all mortgages received a reduction in the amortization. While there is a spike in the number of concessionary changes in amortization in 1929, there is no such increase in the years when they would have been the most needed, 1930–1932, the years with the sharpest drops in home prices and employment and when there was not yet any significant government intervention in the mortgage market.

We identify principal increases of less than 15% as possibly concessionary because these may indicate situations where the lender engaged in forbearance such that the principal owing on the mortgage increased due to capitalization of unpaid interest and principal. It is highly unlikely that a large principal increase indicates forbearance, however. We view any principal increase of 15% or more of the balance at origination as not due to the lender exercising forbearance. To put this into perspective, for a mortgage with monthly payments and a 6% annual interest rate, a year of neither principal nor interest payments would result in an increase in principal of 6.2%; two years of neither principal nor interest payments would result in an increase in principal of 12.7%. We view it as unlikely that a lender would exercise forbearance for more than two years. Most mortgages in our sample have interest rates of less than 6% with payments due no more frequently than monthly, which is why we choose a threshold of 15%. Finally, we exclude all principal increases on construction loans as concessionary because the nature of construction loans is such that lenders likely used something somewhat similar to the now standard monthly draw method, wherein the lender disburses the funds for the loan on a gradual basis as construction proceeds.

Some of the balance increases we identify are quite possibly something entirely different from forbearance. However, even assuming that all of the principal increases we identify are due to forbearance, we find that less than 2% of all loans received a concessionary modification of this sort. It must be kept in mind that at least 10% of the population was unemployed from 1931 onward, meaning that many more borrowers would have benefited from forbearance. Furthermore, we do not see any rise in the proportion of loans that received forbearance in the years 1932–1935, making it unlikely that these modifications truly represent forbearance.

To summarize, combining all three forms of modification (using the more stringent definition of a rate reduction), we find that a mere 5% of all loans received any sort of modification that might be a concession on the part of the lender. By comparison, almost 14% of loans originated prior to 1939 were terminated by either a foreclosure or a deed-in-lieu by the end of 1939. To the extent that the modifications we identify are concessions at all, we still arrive at the conclusion that lenders and borrowers did not renegotiate nearly as many loans as went into foreclosure.

There is little difference in the propensity to grant concessionary mortgage modifications across lender types: Life insurers, commercial banks, and savings and loans all appear to have been reluctant to modify loan terms in response to an increased risk of foreclosure. Life insurers appear to have recorded changes in their loan terms somewhat more faithfully and thus have a slightly higher concessionary modification rate than commercial banks and savings and loans. However, life insurers held riskier loans than savings and loans. Furthermore, the proportion of life insurers' recorded modifications that may be concessionary is lower than that of commercial banks and savings and loans: About 11%

1831

of the modifications of life insurers are potentially concessionary, while the shares for commercial banks and savings and loans are around 15% and 14%. The sample size is too small to conclude that these are meaningful differences, however.

2.2 Concessionary modifications and mortgage distress

This section investigates the extent to which we observe loans that are in distress receiving a modification. In this section, we work with a panel version of our dataset that we create from the mortgage records. Each observation corresponds to one loan-year. Thus, a loan originated in 1936 and terminated in 1939 would have a total of four observations. We update the amortization status if there was a change in amortization through a modification. If the loan is modified to become an FHA loan, we drop any loan-years after the modification.

To identify what sort of mortgages were in distress, we first identify the factors that are associated with the probability that a mortgage terminates through a foreclosure, through a deed-in-lieu, or by being transferred to the HOLC. Table 4, column 1, reports the results of a probit regression in which the dependent variable is an indicator variable that takes on a value of one if the loan terminates through a foreclosure or a deed-in-lieu in that year.[4]

The sample is all loan-year observations prior to 1940. The independent variables are the LTV at origination, the amount of the loan, indicator variables for the lender type, an indicator variable that takes on a value of one if the mortgage is for a single-family home, and the percent change in the Nicholas-Scherbina (NS) home price index since origination.

While we could in principle compute the expected LTV on the property using the NS index, we do not follow this approach because we cannot compute the balance owing at any given time. For partially amortizing mortgages, our data do not tell us the size of the balloon payment due at maturity. For fully amortizing loans, our loan cards from insurance companies and commercial banks unfortunately do not tell us exactly what the amortization structure was. Many fully amortizing loans would have been constant amortization mortgages (CAMs) rather than the now-standard constant payment mortgages (CPMs). Furthermore, many of the loans in our sample would have had second mortgages attached to them. The prevalence of second mortgages in the 1930s is indicated by the data the NBER collected from the HOLC; more than 35% of the HOLC loans had second mortgages. Studying the Chicago market of the 1920s, Bodfish and Bayless (1928) report that nearly 50% of homes were financed using both first and second mortgages.

Consistent with negative equity being the main determinant of mortgage distress, the LTV at origination and the percent change in the NS index since

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[4] Appendix Table A1 presents the results from estimating all the specifications in Table 4 using a Cox proportional hazard model rather than a probit model.

1832

Table 4
Characteristics of bad loans

	(1)	(2)	(3)	(4)	(5)	(6)
	Termination					
	Foreclosure or Deed-in-Lieu	Foreclosure or Deed-in-Lieu	Foreclosure, Deed-in-Lieu, or HOLC	Foreclosure or Deed-in-Lieu	Foreclosure or Deed-in-Lieu	Foreclosure or Deed-in-Lieu
Original LTV	2.15***	2.05***	1.50***	1.36*	1.62**	1.56**
	(3.84)	(3.57)	(3.31)	(1.84)	(2.08)	(2.01)
Original Amount ($100)	−0.00013	−0.00016	−0.00037			
	(−0.39)	(−0.49)	(−0.94)			
Single Family	−0.11	−0.09	−0.017			
	(−0.94)	(−0.94)	(−0.2)			
Held by Life Insurer	0.50***	0.021	−0.22			
	(3.47)	(0.08)	(−0.98)			
Held by Commercial Bank	0.23	−0.30	−0.46*			
	(1.43)	(−1.05)	(−1.91)			
Fully Amortizing		−0.58**	−0.52**	−0.52*	−0.44	−0.46*
		(−2.37)	(−2.50)	(−1.91)	(−1.63)	(1.67)
Partially Amortizing		−0.13	−0.041			
		(−1.26)	(−0.47)			
Original Maturity (Years)	0.0069	0.0049	0.0006	0.0630**	0.0523**	0.0508**
	(1.42)	(1.01)	(0.14)	(2.58)	(2.05)	(1.98)
% Change in NS Index Since Origination	−1.99***	−1.95***	−1.64***	−1.41***	−1.59***	−1.56***
	(−8.50)	(−8.31)	(−8.98)	(−4.13)	(−4.35)	(−4.22)
Term_expiry				0.493***	0.004	0.027
				(2.62)	(0.01)	(0.11)
Term_expiry * HOLC Year					1.227***	0.949***
					(4.98)	(2.74)
HOLC Year						0.276
						(1.14)
Constant	−4.22***	−3.61***	−2.86***	−3.92***	−4.05***	−4.03***
	(−10.34)	(−7.16)	(−7.22)	(−8.48)	(−8.34)	(−8.33)
Pseudo R^2	10.3%	10.9%	8.1%	11.2%	18.1%	18.4%
# of Observations	6,665	6,665	6,665	4,025	4,025	4,025

Each column presents the coefficients from a probit regression where the dependent variable takes on a variable of one if the loan terminates in that year through the termination type indicated. *** denotes significant at 1%; ** denotes significant at 5%; * denotes significant at 10%. *HOLC* means lender transferred loan to HOLC. *t*-statistics in parentheses. *NS Index* is the nominal Nicholas-Scherbina (2010) New York home price index. *Term_expiry* takes on a value of one for non-amortizing and partially amortizing loans in the year during and the year immediately following the expiry of the original loan maturity. *HOLC Year* takes a value of one if the year corresponds to 1933, 1934, or 1935.

origination are important determinants of whether a loan goes into foreclosure. Loans held by life insurers perform worse than loans held by savings and loans. Because our sample contains proportionately more loans from life insurers than life insurers' share of residential lending in the 1920s and 1930s, our sample has a higher foreclosure rate than the FHLBB records indicate for the New York region.

As Table 4, column 2, shows, however, the higher foreclosure rate of loans held by life insurers is entirely due to life insurers holding a higher proportion

1833

of non-amortizing loans than savings and loans; after controlling for the loan's amortization structure, loans held by life insurers perform no worse than those held by savings and loans. Loans that are fully amortizing perform best, while partially amortizing loans perform similarly to non-amortizing loans. Larger loans are no more likely to go into foreclosure than smaller loans, and mortgages on single-family homes are no more likely to go into foreclosure than loans for two- to four-unit properties. Loans with longer terms are no more likely to go into foreclosure than short-term loans.

Another option for the lender to dispose of their bad loans from mid-1933 through the end of 1935 was to transfer them to the HOLC, although it was the mortgagor that had to apply to the HOLC. Table 4, column 3, reports the results of a probit regression in which the dependent variable is an indicator variable that takes on a value of one if the loan terminated in that year by being transferred to the HOLC, through a foreclosure, or through a deed-in-lieu. The results are similar to the results for foreclosures and deeds-in-lieu alone; the LTV at origination, the loan's amortization structure, and the percent change in the NS index are the only statistically significant determinants of a loan being a bad loan.

We now turn to the relationship between the modifications we identify as potentially being concessionary and mortgage distress. Table 5 reports the results of probit regressions in which the dependent variable is an indicator variable that takes a value of one if the mortgage received a concessionary modification of any kind in that year. In this specification, we include as concessionary only rate reductions where the rate is at least two standard deviations below the rate on new originations in that year; the results using the one-standard-deviation definition of a rate reduction suggest that there is even less of a relationship between rate concessions and our measures of mortgage distress. For this specification, we include as a control variable the amortization status in the previous year, rather than the current year, since one of the concessions may be a reduction in amortization. The other independent variables are the LTV at origination and the percent change in the NS index since origination.

We first look only at modifications prior to 1933, since this is the period where there was little government intervention in the foreclosure market. Loans with high LTVs at origination were more likely to receive what may have been a concessionary modification. However, there is not a significant relationship between whether a loan received a concessionary modification and whether it was amortizing using or with the change in the price index. The relationship between loan distress and loan modifications is even weaker when we look at the entire sample or the sample excluding the HOLC years. In these samples, not even the LTV at origination makes it significantly more likely that the loan receives a concessionary modification. Over the full 1920–1939 sample, only whether the loan was fully amortizing in the previous period is a significant predictor of whether the loan receives a concessionary modification.

Table 5
Concessionary modifications and loans in distress

	1920–1932	1920–1939	1920–1932 and 1936–1939
Original LTV	2.67**	0.90	0.67
	(2.45)	(1.35)	(0.98)
	2.68**		0.94
	(2.22)		(1.33)–
Fully Amortizing (Lagged)	-0.20	-0.28*	-0.38
	(-0.91)	(-1.69)	(-1.22)
	0.17		-0.25
	(0.30)		(-1.46)
% Change in NS Index Since Origination	-0.17	-0.08	-0.13
	(-0.54)	(-0.33)	(-0.56)
	-0.21		-0.08
	(-0.66)		(-0.30)
Held by Life Insurer	0.51	-0.05	
	(0.86)	(-0.15)	
Held by Commercial Bank	-0.22	-0.33	
	(-0.34)	(-0.96)	
Constant	-4.00***	-2.99***	-2.75***
	(-6.23)	(-7.64)	(-5.00)
	-4.39***		-2.99***
	(-4.23)		(-7.18)
Pseudo R^2-Squared	2.5%	1.0%	1.8%
	5.8%		0.9%
# of Observations	3,432	6,665	6,665
	3,432		5,200

Each column presents the coefficients from a probit regression where the dependent variable takes on a variable of one if the loan receives a concessionary modification of one of the kinds shown in Table 3 (two-standard-deviation definition of rate concession). *** denotes significant at 1%; ** denotes significant at 5%; * denotes significant at 10%. t-statistics in parentheses. *NS Index* is the nominal Nicholas-Scherbina (2010) New York home price index.

1835

Thus, it appears that our concessionary modifications are at best weakly related to measures of loan distress. Concessionary modifications are not closely correlated to measures of mortgage distress, suggesting that many of the concessionary modifications we identify are not the result of the lender trying to help a distressed borrower avoid foreclosure. The true number of modifications that were actually concessions on the part of the lender is likely much lower than what is listed in Table 3.

2.3 Refusals to refinance

It has been suggested (e.g., Harriss 1951, ch. 1) that part of the reason for the increase in the foreclosure rate during the 1930s was the refusal of lenders to refinance short-term mortgages. In some sense, this can be viewed as the opposite of a concessionary modification since the lender is taking action that it knows increases the risk of foreclosure. We turn now to the question of the effect of an expiring loan maturity on the probability that a loan went into foreclosure.

If lenders had faithfully recorded all maturity extensions, the ideal approach to answer this question would be to compare the foreclosure rate among loans that were due for a term extension to those that were not due for a term extension, as well as to examine whether lenders were less likely to renew a loan that was likely to be in distress than a loan that was likely to be healthy. Unfortunately, many of our loans have missing term extensions in the sense of the loan being terminated long after the term expired or not having a modification within one year of when the term expired. This is true even for loans originated by life insurers, who recorded a proportionally greater number of maturity changes only. Furthermore, we have no way of knowing why lenders faithfully recorded maturity extensions for some loans and were more lax about recording term extensions for others. As discussed above, as a general rule, commercial banks and savings and loans appear not to have recorded modifications that involved only a maturity extension. There may also be systematic biases in the loans for which life insurers omitted customary term extensions. Thus, we are wary of looking at the effect of a term expiry using the loan term stated on the most recent modification or at origination.

We consider another approach in which we look at the probability that a loan went into foreclosure as a function of whether the original maturity was set to expire. We create a dummy variable called *term_expiry* that takes on a value of one if the loan is due to be refinanced in a given year and the loan is not fully amortizing. *Term_expiry* does not take on a value of one if the loan's term is expiring but there is no balloon payment due; an expiring term should not be problematic for a fully amortizing mortgage. Since the foreclosure process took about five months to execute and lenders likely allowed some period of delinquency before they commenced foreclosure proceedings, we also set *term_expiry* to one in the year after the loan is due to be refinanced. We drop

loan-year observations more than one year after the original term is set to expire so as not to include observations for which we have no information about whether the maturity is set to expire. We drop all observations for which the original maturity is not listed.

The results in Table 4, column 4, illustrate that loans for which the maturity was set to expire, or for which the term expired in the previous year, are significantly more likely to go into foreclosure than loans not due to be refinanced. The coefficients on the other determinants of foreclosure are similar to what we found using our benchmark specification in the previous section, although some of them fall below the 5% significance level. The effect of *term_expiry* is not likely due to any sort of selection bias in which loans were originated with long terms and which were originated with short terms since we control for the length of the term in both specifications. Our results are very similar when we set *term_expiry* to zero for loans for which the lender specifically recorded a term extension prior to the loan's original term expiring.

Thus, it appears that rather than assisting troubled borrowers avoid foreclosure by modifying the loan terms to make the payment more affordable, lenders forced certain loans into foreclosure by refusing to refinance short-term mortgages with a balloon payment due. This finding is especially puzzling because lenders do not risk moral hazard by simply refinancing a loan. The risk of granting a concessionary modification to a troubled mortgagor is that all mortgagors will pretend to be willing to default to get the concession such that lenders may reduce the value of their overall pool by following a policy of granting concessionary modifications. However, it is impossible for a borrower to pretend that his loan's maturity is expiring. Furthermore, the lender almost certainly knew that a maturing loan with a balloon payment due would go into foreclosure if he did not refinance it in the years in which the HOLC was not operative.

Table 4, column 5, explores the possibility that lenders' refusal to refinance loans stemmed from expectations of being able to transfer loans to the HOLC by including an interaction term that takes a value of one if the observation comes from an HOLC year (1933, 1934, or 1935) and the term is set to expire. Given the benefits that lenders received from loans refinanced by the HOLC (see Rose forthcoming), it is possible that lenders refused to refinance distressed loans because they expected that the mortgagor would apply to the HOLC if they refused to refinance a troubled loan. Indeed, one of the criteria the HOLC used to determine eligibility was whether the borrower had attempted to refinance the loan. The results in column 5 suggest that the effect of expiring loan maturities is exclusively due to observations during 1933–1935; the coefficient on *term_expiry* is far from significant once we include the interaction between *term_expiry* and HOLC year. Table 4, column 6, shows the coefficient estimates when we also include the HOLC year indicator variable; the results indicate that the significant coefficient on the interaction between

term_expiry and HOLC year is not simply due to there being a large number of foreclosures the years the HOLC was operational.

The HOLC may have been aware of this problem. In November 1934, the HOLC announced that it would accept no new applications. The announcement was unexpected, and shortly thereafter the HOLC wrote applicants and lenders to ask them to try to refinance the mortgages between themselves (Harriss 1951, ch. 1). The suspension did not last, however; the HOLC resumed accepting applications in early 1935.

2.4 Potentially concessionary modifications outside the NYC metro area

We have thus far restricted our analysis to the NYC metro area because this is the region of the country for which we have good home price data such that we know lenders faced increased risks of foreclosures on these loans. A disadvantage of this approach is that restricting ourselves to only this region means we limit the total number of loans we have to analyze.

Table 6 reports the number of potentially concessionary modifications on all one- to four-family properties in the states of Connecticut, New Jersey, and New York. In Table 6 we use the algorithm described in Section 3.1 to define a potentially concessionary modification. The results are similar to those from our main sample: Far more loans went into foreclosure than received a potentially concessionary modification. When we use the two-standard-deviation definition of a concessionary interest rate reduction, we see a slightly larger average rate reduction than in our main sample. However, the increase in the size of the rate reduction is largely because, with a larger sample, we have more variance in the interest rate on new originations in 1931 and 1932. In our main sample, there was no variance in the rate on originations in 1931 or 1932 because there were very few originations. As a result, in our main sample, we included rate reductions for 1931 and 1932 that were unlikely to be truly concessionary; with the larger sample, we have only one rate reduction in 1931 and 1932 when we use the two-standard-deviation definition.

In the larger sample, we see two instances of principal forgiveness, one by a life insurer and one by a commercial bank. The principal forgiveness by the life insurer (roll 6, slide 1129) occurred in October 1935. The loan was transferred to the HOLC shortly thereafter, in late 1935. The life insurer reduced the balance owing by $407 on a principal outstanding of $3,900. The loan was originated in 1928 and was modified once before, in 1931, to make it a partially amortizing loan rather than a non-amortizing loan. The loan had an LTV of 57% at origination and is thus unlikely to be a second mortgage.

The principal forgiveness by the commercial bank (roll 3, slide 231) occurred in 1938 and was for $415 on an outstanding balance of $3,665.

1838

Table 6
Potentially concessionary modifications (1920–1939) for all residential mortgages in CT, NJ, and NY

	Principal Writedown	Rate Red. 1 (One Std. Dev.)	Rate Red. 2 (Two Std. Dev.)	Reduction in Amortization	Prin. Increase <15%	# of Loans	All Concessions (rate reduction 2 definition) as % of Loans	Foreclosures as % of Loans
All	2	69	10	24	13	1261	3.9	13.3
By Institution Type:								
Life Insurers	1	39	4	19	3	680	4.0	18.1
Commercial Banks	1	29	6	4	1	277	4.3	11.6
Savings & Loans	0	1	0	1	9	304	3.3	4.3
By Year:								
1920	0	0	0	0	0	16	0.0	0.0
1921	0	0	0	0	0	35	0.0	0.0
1922	0	0	0	0	0	71	0.0	0.0
1923	0	0	0	0	0	115	0.0	0.0
1924	0	0	0	0	1	188	0.5	0.0
1925	0	2	1	1	0	285	0.7	0.0
1926	0	0	0	0	0	425	0.0	0.0
1927	0	0	0	2	0	536	0.4	0.0
1928	0	0	0	1	0	618	0.2	0.2
1929	0	2	1	5	0	694	0.9	0.0

(Continued)

1839

Table 6
Continued

	Principal Writedown	Rate Red. 1 (One Std. Dev.)	Rate Red. 2 (Two Std. Dev.)	Reduction in Amortization	Prin. Increase <15%	# of Loans	All Concessions (rate reduction 2 definition) as % of Loans	Foreclosures as % of Loans
All	**2**	**69**	**10**	**24**	**13**	**1261**	**3.9**	**13.3**
1933	0	3	2	2	0	750	0.5	1.7
1934	0	4	0	1	0	743	0.1	2.0
1935	1	16	1	4	1	666	1.1	6.3
1936	0	21	2	2	4	666	1.2	3.9
1937	0	1	0	2	2	640	0.6	1.9
1938	1	2	1	1	0	654	0.5	2.3
1939	0	7	1	1	0	690	0.3	2.2
Year Unknown					1			
Average basis points below average rate on new originations		68	120					
Max basis points below average rate on new originations		201	201					

For data by year, *# of loans* is the number of loans active in that year (including loans terminated in that year). Many modifications included changes to multiple loan elements such that the modification types are not mutually exclusive. Modifications that involve a rate change and a change to an FHA loan are not included as rate changes. A rate reduction 1 (one std. dev.) is defined as a reduction in the rate to a rate more than one standard deviation below the average rate on new originations (excluding FHA loans) in that year. A rate reduction 2 (two std. dev.) is defined as a reduction in the rate to a rate more than two standard deviations between the average rate on new originations in that year (excluding FHA loans).

Table 7
Characteristics of bad loans, hazard ratios

	(1)	(2)	(3)	(4)	(5)	(6)
			Termination			
	Foreclosure or Deed-in-Lieu	Foreclosure or Deed-in-Lieu	Foreclosure, Deed-in-Lieu, or HOLC	Foreclosure or Deed-in-Lieu	Foreclosure or Deed-in-Lieu	Foreclosure or Deed-in-Lieu
Original LTV	1.059***	1.053***	1.036***	1.023	1.028	1.026
	(3.56)	(3.16)	(3.02)	(1.08)	(1.24)	(1.15)
Original Amount ($100)	1.000	1.000	0.999			
	(-0.30)	(-0.41)	(-0.84)			
Single Family	0.811	0.848	1.021			
	(-0.93)	(-0.72)	(0.11)			
Held by Life Insurer	4.586***	1.717	0.936			
	(3.82)	(0.84)	(-0.14)			
Held by Commercial Bank	2.507***	0.867	0.583			
	(2.09)	(-0.21)	(1.04)			
Fully Amortizing		0.315**	0.409***	0.193**	0.234**	0.250**
		(-2.04)	(-2.05)	(-2.49)	(-2.09)	(-2.00)
Partially Amortizing		0.814	0.971			
		(-0.89)	(-0.15)			
Original Maturity (Years)	1.022**	1.014	1.004	1.160**	1.153**	1.149**
	(2.11)	(1.36)	(0.46)	(2.16)	(2.05)	(1.99)

(Continued)

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Table 7
Continued

	(1)	(2)	(3)	(4)	(5)	(6)
	Termination					
	Foreclosure or Deed-in-Lieu	Foreclosure or Deed-in-Lieu	Foreclosure, Deed-in-Lieu, or HOLC	Foreclosure or Deed-in-Lieu	Foreclosure or Deed-in-Lieu	Foreclosure or Deed-in-Lieu
% Change in NS Index Since Origination	0.975***	0.976***	0.986***	0.978**	0.973**	0.972**
	(−3.51)	(−3.43)	(−2.68)	(−2.15)	(−2.35)	(−2.40)
Term_expiry				1.769	0.598	0.681
				(0.94)	(−0.70)	(−0.51)
Term_expiry * HOLC Year					11.961***	6.029**
					(3.93)	(2.09)
HOLC Year						2.09
						(1.16)
Log-likelihood	−683	−681	−1,020	−163	−154	−153
# of Observations	5,843	5,843	5,843	3,210	3,210	3,210

Each column presents the hazard ratios from estimating a Cox proportional hazard model where the failure variable is the termination type indicated. *** denotes significant at 1%; ** denotes significant at 5%; * denotes significant at 10%. *HOLC* means lender transferred loan to HOLC. *t*-statistics in parentheses. *NS Index* is the nominal Nicholas-Scherbina (2010) New York home price index. *Term_expiry* takes on a value of one for non-amortizing and partially amortizing loans in the year during and the year immediately following the expiry of the original loan maturity. *HOLC Year* takes a value of one if the year corresponds to 1933, 1934, or 1935.

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That modification also entailed a reduction in the rate to 4%, more than two standard deviations below the rate on new originations in 1938. The loan was originated in 1932 and was changed from a partially amortizing loan to a non-amortizing loan in 1933. The loan had an LTV of 97% at origination and is thus almost certainly a first mortgage. An LTV of 97% was very atypical during our sample period and especially unusual for a 1932 origination, however, suggesting that the origination may not have been an arm's-length transaction.

3. Discussion

Why were lenders reluctant to modify mortgages during the Great Depression? The first possibility is that lenders lacked information. Specifically, lenders may have had difficulties distinguishing which mortgages required modification to prevent foreclosure and loans that would not go into foreclosure. In our sample, less than 20% of loans terminated through foreclosure. Without the ability to distinguish which mortgages would go into foreclosure, lenders were very hesitant to grant concessionary mortgages on all their mortgages to prevent losses on less than 20% of them. While it seems clear that forgiving principal would have significantly reduced the probability of a foreclosure, with little ability to predict which mortgages would end in default, lenders generally not engaging in principal forgiveness was an economically sensible strategy. Wang, Young, and Zhou (2002) suggest that a solution to this informational problem may be to randomly reject applicants for a renegotiation; however, the evidence here indicates that lenders rejected the vast majority of applicants.

Another possibility is that lenders were reluctant to grant concessionary modifications of loans because of the accounting treatment of concessionary modifications. In what I have read in original sources, I have not found any mention of an accounting problem with modification. While it seems possible that accounting treatment may explain the lack of principal modification, given that loans were in general frequently modified in ways that were not concessionary, it does not seem likely that there would have been disparate accounting treatment of payment-reducing modifications of other kinds (e.g., concessionary rate reductions, reductions in amortization).

What do our results have to say about the reasons lenders are reluctant to modify mortgages in the current environment? Lenders in the 1920s and 1930s had far fewer tools with which to identify which of their mortgages were at serious risk of default than modern lenders. Credit scores for consumers were not yet in use, and lenders do not appear to have recorded such things as debt-to-income ratios. Underwriters used a credit-screening model rather than risk-based pricing. Unlike lenders today, lenders in the 1920s and 1930s were unlikely to have had access to carefully constructed price indices to ascertain the depth of the negative equity their mortgagors faced.

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Lenders in the foreclosure crisis that began around 2007 may be better able to identify which mortgages are likely to go into foreclosure, or at least which pools of mortgages have especially high foreclosure rates, using tools not available in the 1920s and 1930s. As a result, they may face less risk of granting unnecessary modifications on a large number of mortgages, modifications that would of course reduce the overall value of their pool of loans, such that they may have more of an incentive to modify at least some pools of mortgages. To the extent that our results suggest that giving unnecessary modifications is a serious concern on the part of lenders, we might expect to see the highest rate of concessionary modifications in pools of loans with high foreclosure rates, such as subprime and alt-A mortgages.

However, lenders during the 1920s and 1930s likely had much more soft information about the borrowers than lenders today and in many cases would have known the borrower personally. Furthermore, the incidence of strategic default was likely lower, as far fewer states had anti-deficiency statutes early in the Depression than do now; see Ghent and Kudlyak (2010) for evidence that recourse decreases the borrower's sensitivity to the default option.

We do not observe a difference in the share of loans that ended in foreclosure across different lender types once we control for other factors, suggesting that loans acquired in the secondary market were not of lower quality based on unobservable characteristics than loans originated directly by the lender. While more loans held by life insurers terminated through a foreclosure or deed-in-lieu, the difference in the foreclosure rate is entirely explained by the fact that loans originated by life insurers were more likely to be interest only or partially amortizing. However, the secondary market of the 1920s was different than it is today. First, as Snowden (1995) reports, mortgage companies generally bought back any mortgages that became delinquent within one year of origination, so mortgage companies may have had more of an incentive to adequately screen loans than independent mortgage brokers did in the buildup to the subprime crisis. Secondly, Snowden reports that life insurers felt an obligation to continue to accept loans originated by correspondents after the onset of the crisis. Snowden's finding suggests that life insurers tended to rely on a handful of correspondents, a system that may have provided further discipline on the quality of loans originated. It remains possible that the reason loans originated by life insurers were less likely to be fully amortizing than loans originated by savings and loans is due to life insurers' use of correspondents. Finally, it is possible that securitization itself, rather than simply originating with the intent to distribute, leads to lower-quality mortgages.

Our results also suggest a possible downside to government programs such as the HOLC. To the extent that lenders benefit from government programs that remove non-performing mortgages from their balance sheets, such programs may adversely affect lenders' incentives to preserve the values of their mortgages through private renegotiation.

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4. Conclusions

We have analyzed whether residential mortgage lenders engaged in concessionary loan modifications during the 1930s. While we observe a handful of modifications that may have been concessions on the part of the lender, we find that far more mortgages went into foreclosure than received what may have been concessionary modification. We find no principal forgiveness whatsoever in our main sample (the NYC metropolitan area) and only two cases of principal forgiveness when we examine all residential mortgages originated in Connecticut, New Jersey, and New York, only one of which seems likely to be an arm's-length transaction.

The results suggest that lenders during the Great Depression were seriously concerned about granting modifications unnecessary to prevent a foreclosure and thus reducing the overall value of their pool of loans. Although securitization may have played some role in the reluctance of lenders to renegotiate residential loans in the foreclosure crisis that began around 2007, our results indicate that securitization is not the main impediment to mortgage renegotiation. Our results instead suggest that lenders must be able to identify which loans are most likely to go into foreclosure before it is in their financial interest to modify loans.

We find some evidence that lenders' refusal to refinance short-term mortgages with balloon payments contributed to the elevated foreclosure rate during the 1930s. This result, however, is present only during the 1933–1935 period, suggesting that it is due to the presence of the HOLC.

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