

# Home Mortgage Delinquency and Foreclosure

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## Home Mortgage Delinquency and Foreclosure

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## Foreword

This monograph is a part of the National Bureau's Quality of Credit Program, which in recent years has studied the changing characteristics and performance of credit in every major sector of the U.S. economy.<sup>1</sup> The enormous postwar growth of one- to four-family home mortgage debt, and the veritable revolution in terms, give special importance to this study.

The study was made possible by the generous assistance of the three leading associations of U.S. mortgage lenders: the U.S. Savings and Loan League, the Mortgage Bankers Association of America, and the National Association of Mutual Savings Banks. They supplied not only financial support but the even more vital sample data. Leon Kendall, Oliver Jones and Saul Klamman represented the three cooperating associations on the project and supervised the three surveys that secured the data.

Other funds for the project were provided by the Research Committee of the Graduate School of the University of Wisconsin and the general funds of the National Bureau. Additional computer time was supplied by Western Data Processing Center at UCLA. The University of Wisconsin's Social Systems Research Institute assisted in analytical design and performed most of the programming. Special thanks are due to

<sup>1</sup> Previously published studies are: Albert M. Wojnilower, *The Quality of Bank Loans: A Study of Bank Examination Records* (1962); Martin H. Seiden, *The Quality of Trade Credit* (1964); Thomas R. Atkinson, assisted by Elizabeth T. Simpson, *Trends in Corporate Bond Quality* (1967); Geoffrey H. Moore and Philip A. Klein, *The Quality of Consumer Instalment Credit* (1967). Several earlier investigations by the National Bureau, published in its *Studies in Urban Mortgage Financing*, dealt with characteristics of urban mortgages and factors affecting lending experience in the 1920's, 1930's and 1940's. For a summary report, see J. E. Morton, *Urban Mortgage Lending: Comparative Markets and Experience*, Princeton University Press for NBER, 1956.

Donald Steward and Edward Glaaser in this connection. On behalf of the National Bureau I am privileged to thank all of these organizations and persons for their assistance.

We are grateful also to Edgar R. Fiedler, Jack M. Guttentag, and F. Thomas Juster, who served as the staff reading committee of the Bureau; to Robert M. Fisher, Board of Governors of the Federal Reserve System, who supplied useful comments on the report; to Wallace J. Campbell, M. G. de Chazeau, and Walter E. Hoadley of the Director's reading committee; to James F. McRee, Jr., who edited the manuscript, and to H. Irving Forman, who drew the charts.

My colleague, John Herzog, performed the prodigious labor required to convert the raw sample data into material suitable for computer analysis, and drafted all but the first chapter of the monograph and the Introduction and Summary. I gathered the material for the first chapter in preparing my forthcoming volume, *The Quality of Postwar Credit in the United States*, which will summarize the major results of this and other special studies of postwar credit quality. Both Herzog and I are responsible for the design of the study and share responsibility for the interpretation of the results.

James S. Earley  
Director, Quality of Credit Program

## Introduction and Summary

The growing importance of home mortgage loans in the portfolios of American financial institutions, the radical shift that occurred in the characteristics of these loans over the postwar years, and the considerable rise (albeit from very low levels) in mortgage delinquency and foreclosure in the late 1950's and early 1960's, motivated this study. It examines the characteristics significantly associated with mortgage performance and attempts to measure changes in the quality of home mortgage loans that may have occurred over the postwar years as a result of the changed characteristics.

Chapter I examines changes in home mortgage characteristics and performance in the postwar period, and briefly summarizes other postwar studies of characteristics as related to performance. Chapter II, which is the heart of the investigation, applies multiple regression analyses to nationwide sample data covering nearly 13,000 home mortgage loans to ascertain how various characteristics were related to the performance status of the loans in the year 1963. Chapter III uses these relationships, combined with time series data on characteristics, to measure changes in home mortgage quality through time.

There have been marked changes in home mortgage loan and borrower characteristics over the postwar years. In the latter 1950's and early 1960's an increasing share of borrowing was for refinancing purposes, as distinct from the purchase of a new property. There is also evidence of a growth of junior financing accompanying home mortgage borrowing over these years. Typical maturities of Federal Housing Administration, Veterans' Administration, and conventional loans have all lengthened greatly. In addition, all types of loans showed substantial increases in typical loan-to-value ratios. The ratios of monthly loan payments and housing expense

to borrower incomes remained fairly constant for FHA's, but rose substantially for VA's. Although FHA borrowers as a group held about the same relative position in the income distribution over the postwar period, loans under the VA program were increasingly made to borrowers in the relatively lower-income groups. There are no comparable time series data for conventional loans. It is to be observed that the lengthening of maturities and the rise in loan-to-value ratios that carried through 1964 were arrested and reversed in 1965-67.

Both delinquency and foreclosure experience reflected some weakening in mortgage quality in the later postwar years as compared with the remarkably strong records of the late 1940's and early 1950's. The rates of serious delinquency (i.e., loans ninety days or more in arrears) began to rise for all three classes of mortgages in 1957, although after 1961 this upward trend leveled off. Foreclosure rates remained at very low levels through about 1959, but then a steep upward trend set in which was arrested only in 1964. Our study can be viewed as an attempt to explain the trends in mortgage performance through 1963. To what extent were they attributable to the increase in refinancing and use of second mortgages, to rising loan-to-value ratios, and the other changes in loan and borrower characteristics that had taken place?

Earlier studies of these matters were deficient in several respects. The present study was formulated in the light of the earlier ones and attempted to remedy their major shortcomings. Unlike earlier studies this one used samples that were national in scope and covered conventional as well as FHA and VA mortgages. Most importantly, by using a multiple regression technique the separate effects of the various loan and borrower characteristics upon the risk of delinquency and foreclosure could be tested for statistical significance. A total of thirteen separate regressions were run to test various subsamples of loans, different clusters of independent variables, and the variables related separately to both delinquency and foreclosure. Separate samples of loans were obtained from the United States Savings and Loan League (USSLL), the Mortgage Bankers Association (MBA), and the National Association of Mutual Savings Banks (NAMSB).

The independent variables used in the analysis include: (1) loan purpose (e.g., new house purchase, refinancing); (2) the presence or absence of junior financing; (3) loan-to-value ratio; (4) loan type (i.e., FHA, VA, or conventional); (5) initial term to maturity; (6) monthly mortgage payment to borrower income ratio; (7) borrower occupation; (8) marital status; (9) number of dependents; and (10) geographic region.

The complete results of the regression analyses are presented in Chapter II. The most important ones can be summarized as follows.

### *Factors Related to Delinquency*

1. Borrowing for *refinancing* purposes and the presence of *junior financing* appear to be the most important variables affecting the incidence of serious loan delinquency (i.e., a loan being 90 days or more in arrears).<sup>1</sup>

2. The *loan-to-value ratio* was found to be positively and significantly related to the probability of a loan being in delinquency status in all the equations in which this variable was tested.

3. *Term to maturity*, on the other hand, appeared to have little or no influence once the effects of other variables were removed. While the coefficient carried a negative sign in all the equations (indicating an inverse relationship to risk), it was statistically significant in only four of the six. Furthermore, the cases in which it was significant all contained fewer than the full complement of variables, indicating that this one was acting as a proxy for those we omitted. In fact, it can be observed that the more variables that were dropped the stronger this inverse relationship appeared to be. Even in our most complete specification of the equation (where the sign was still negative) we were unable to include a wealth or liquid asset variable. This may have prevented us from sufficiently isolating the effects of such things as the financial burden of the mortgage indebtedness upon the borrower. In such cases shorter terms could, in part, reflect a borrower's greater financial weakness and for that reason show higher delinquency. This would be the case, for example, if lenders demanded faster repayments from weaker (though still acceptable) borrowers, but in such an event short maturities could be said to *reflect* rather than *cause* greater risk.

4. *Occupation* turned out to be a fairly important variable. Generally speaking, professional persons, executives and managers showed the least delinquency, and self-employed persons and salesmen the most. Only slight variations were noted among the remaining occupational classes.

5. *Number of dependents* bore a significant direct relationship to delinquency risk for the USSLL sample, although in the MBA and NAMSBS samples this variable was not clearly significant.

<sup>1</sup> The influence of these variables could be tested only for conventional loans, since very few FHA and VA loans are made for refinancing purposes and no secondary financing is permitted in connection with FHA and VA lending.

6. *Mortgage payment-to-borrower income ratios* were not significantly related to delinquency risk. This ostensibly surprising fact appears to be because both borrowers and lenders watch this ratio very carefully. They avoid loans in which some fairly modest critical limit is exceeded unless there is an unusual assurance that payments can be made from nonincome sources. Study showed that most loans in the samples had payment-to-income ratios below 25 per cent.

7. *Marital status* was not a statistically significant variable in any of the equations, even though the risk coefficients were uniformly lower for married than for single borrowers.

8. *Borrower age* yielded such mixed results that no generalization seems warranted, although in one sample (USSLL) borrowers under 40 appeared to be riskier than their older counterparts.

9. *Region* was included to isolate geographical influences. There were significant differences among the regions, indicating that failure to include this variable would have seriously biased the results.

10. *Loan type* was also a significant variable. While loans insured or guaranteed by the federal government have, on the whole, performed more poorly than conventionals, study showed that this differential was largely due to the variables included in the regression equations in Chapter II. Thus, *after* the influence of such variables as loan-to-value ratios, occupation, etc., had been removed, conventional loans carried *higher* risks than FHA's or VA's. Presumably, this finding reflects differences in appraisal practices and other underwriting policies for which we lacked data.

### *Conditional Foreclosure Risk*

The second risk tested was that loans already delinquent would be foreclosed. In many cases the relationship between the various independent variables and the risk was similar to that for delinquency. The important exceptions are noted below.

1. *Term to maturity*, which was negatively related to delinquency risk, bore a direct relationship to conditional foreclosure risk.

2. *Occupation* did not prove to be a significant variable in conditional foreclosure risk, although in the USSLL data executives or managers carried a significantly higher risk coefficient than the other groups. In the MBA and NAMSBS equations the salesman category carried a significantly lower one.

3. *Loan purpose* remained one of the most significant variables, but in this case new home construction as well as refinancing was a high-risk purpose.

### *Straight Foreclosure Risk*

Straight foreclosure risk, or the risk that any given loan not currently in difficulty will end up in foreclosure, was also analyzed by the regression techniques. This analysis yielded results which could generally be inferred from an examination of delinquency and conditional foreclosure risk. That is, if a variable was positively related to both delinquency and conditional foreclosure, it was also positively related to straight foreclosure risk. If the relationship to the two earlier measured risks differed, the stronger coefficient dominated the straight foreclosure risk.

The key risk variables were once again loan purpose and junior financing. Construction loans had the highest foreclosure risk coefficient, followed closely by refinancing. Loans for home repair were next in order of risk, and the safest of all were loans for home purchase. As in all the other equations, loans involving junior financing proved to be much riskier than those that did not. Longer term to maturity as well as loan-to-value ratio was significantly and directly related to the risk that current loans would go into foreclosure.

### *Changes in Risks Over Time*

The regression analyses just discussed provided coefficients measuring the influence on delinquency and foreclosure of several important characteristics whose incidence in the total volume of new mortgage loans was available year by year over the postwar years. By weighting these characteristics by the coefficients, indexes of risk of delinquency and foreclosure for the postwar period could be constructed. Both published and sample data were employed in developing these time series.

The variables included in one or more of the risk indexes were: (1) loan-to-value ratio, (2) term to maturity, (3) payment-to-income ratio, (4) loan purpose, and (5) junior financing. Series covering delinquency and conditional foreclosure risk were constructed for VA, FHA, and conventional loans, and a straight foreclosure risk series was constructed for conventional loans.

Although there are definite hazards in attempting to fit time series data to cross-sectional equations (see Chapter III), the time series resulting from this analysis appear to explain much of the weakening of home mortgage performance that occurred from 1957 to 1963. The study thus provides fairly convincing evidence that there was an appreciable deterioration of home mortgage quality over much of the postwar period.

There is no question that there was a substantial increase in foreclosure risk, most of it coming in the latter part of the period.

### *Suggestions for Future Research*

Because of the limitations of the data and methodological difficulties, we must emphasize that the conclusions arrived at in this study are tentative. While the specific limitations are dealt with at length in the text, some of the main points bear noting here.

First, there is the matter of how we have defined mortgage "quality." From some standpoints, the definition should be related to the actual losses occasioned by default or foreclosure rather than their sheer incidence. However, this approach would require data of a different sort than we had at our disposal. Our samples were drawn from "live" loans, that is, loans still on the lenders' books. What one should have in order to examine loss rates is data on terminated loans—loans whose entire history is known.

A second problem arises in conjunction with the definition of variables, both dependent and independent. The dependent variable we were seeking, namely, "quality," does not readily lend itself to quantitative measurement. Although it is possible to use, as we did, dummy classes (e.g., delinquent, or in foreclosure, for low-quality) and employ multiple regression, other techniques, such as multiple discriminant analysis, might be more appropriate to the problem. As of now, however, computational difficulties are simply too great to permit using this approach.

As to the independent variables, it seems obvious that some mixture of scalar and dummy classes is essential to meaningful analysis, but this poses serious methodological problems when using standard regression techniques. Although we followed typical practice in choosing to ignore many of these problems, the biases thus introduced may be serious.

Finally, there is the difficulty associated with applying cross-section regression coefficients to time series analysis. This application necessarily assumes that there were no material changes in variables excluded from the equations which could have caused the coefficients to behave differently. The only way to determine how stable the coefficients are, in fact, would be to make numerous cross-sectional studies. Moreover, time series data on the characteristics of outstanding as well as new loans need to be developed if adequate explanations and forecasts of the changing delinquency and foreclosure rates on outstanding loans are to be made.

Obviously, much further empirical work remains to be done on changing mortgage quality over time.