Credit Risk, Credit Scoring, and the Performance of Home Mortgages

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Institutions involved in lending, including mortgage lending, carefully assess credit risk, which is the possibility that borrowers will fail to pay their loan obligations as scheduled. The judgments of these institutions affect the incidence of delinquency and default, two important factors influencing profitability. To assess credit risk, lenders gather information on a range of factors, including the current and past financial circumstances of the prospective borrower and the nature and value of the property serving as loan collateral. The precision with which credit risk can be evaluated affects not only the profitability of loans that are originated but also the extent to which applications for mortgages that would have been profitable are rejected. For these reasons, lenders continually search for better ways to assess credit risk.

This article examines the ways institutions involved in mortgage lending assess credit risk and how credit risk relates to loan performance.[1] The discussion focuses mainly on the role of credit risk assessment in the approval process rather than on its effects on pricing. Although the market for home purchase loans is characterized by some pricing of credit risk (acceptance of below-standard risk quality in exchange for a higher interest rate or higher fees), mortgage applicants in general are either accepted or rejected on the basis of whether they meet a lender's underwriting standards. The article draws on the extensive literature that examines the performance of home mortgages and the way that performance relates to borrower, loan, and property characteristics.

An increasingly prominent tool used to facilitate the assessment of credit risk in mortgage lending is credit scoring based on credit history and other pertinent data, and the article presents new information about the distribution of credit scores across population groups and the way credit scores relate to the performance of loans. In addition, the article takes a special look at the performance of loans that were made through nontraditional underwriting practices and through ''affordable'' home lending programs.

Delinquency and Default

Delinquency occurs when a borrower fails to make a scheduled payment on a loan. Since loan payments are typically due monthly, the lending industry customarily categorizes delinquent loans as either 30, 60, 90, or 120 or more days late depending on the length of time the oldest unpaid loan payment has been overdue.

Default occurs, technically, at the same time as delinquency; that is, a loan is in default as soon as the borrower misses a scheduled payment. In this article, however, we reserve the term ''default'' for any of the following four situations:

- A lender has been forced to foreclose on a mortgage to gain title to the property securing the loan.
- The borrower chooses to give the lender title to the property ''in lieu of foreclosure.''
- The borrower sells the home and makes less than full payment on the mortgage obligation.
- The lender agrees to renegotiate or modify the terms of the loan and forgives some or all of the delinquent principal and interest payments. Loan modifications may take many forms including a change in the interest rate on the loan, an extension of the length of the loan, and an adjustment of the principal balance due.

Because practices differ in the lending industry, not all of the above situations are consistently recorded as defaults by lenders. Moreover, the length of the foreclosure process may vary considerably, affecting

1. Institutions that originate mortgages do not necessarily bear the credit risk of the loans; the risk is often borne, at least in part, by a mortgage insurer or by an institution that purchases mortgages. A previous article in the *Federal Reserve Bulletin* assessed which institutions bear the risks of mortgage lending by examining the distribution of home loans originated in 1994 across the various institutions participating in the mortgage market. See Glenn B. Canner and Wayne Passmore, ''Credit Risk and the Provision of Mortgages to Lower-Income and Minority Homebuyers,'' *Federal Reserve Bulletin*, vol. 81 (November 1995), pp. 989–1016.

the measured default rate. For these reasons, analyses of default experiences can be difficult and are often based on only a subset of actual defaults. Delinquencies, on the other hand, are recorded contemporaneously and generally on a more consistent basis. Therefore, delinquency data may provide a good source of information for analysis, particularly for evaluating the performance of newly originated loans. and for identifying underperforming loans that require greater attention.

The number of borrowers who become delinquent on their loans is much greater than the number of actual defaults. In some cases, delinquency results from a temporary disruption in income or an unexpected expense, such as might arise from a medical emergency. Many of these borrowers are able to catch up on missed payments (and any associated late payment fees) once their financial circumstances improve. In other cases, lenders work with borrowers to establish a repayment plan to bring payments back on schedule.

Delinquencies, particularly serious ones, are often resolved when the borrower sells the property and uses the proceeds to pay off the loan. Even when the proceeds of the sale are insufficient to fully repay the mortgage obligation, the lender may accept a partial payment to avoid foreclosure. Foreclosure is usually a costly process. Lenders face a variety of expenses, including interest accrued from the time of delinquency through foreclosure; legal expenses; costs to maintain the property; expenses associated with the sale of the property; and the loss that arises if the foreclosed property sells for less than the outstanding balance on the loan. Because foreclosure is so costly to lenders, they may encourage delinquent borrowers to sell their homes and avoid foreclosure even if the proceeds of the sale would not cover the entire amount owed on the loan.[2] This alternative is attractive to many borrowers because having a foreclosure recorded on their credit histories is particularly derogatory and will usually be a significant hindrance in their future efforts to obtain credit.

Because default is costly, the interest rates lenders charge incorporate a risk premium. To the extent that the causes of default are not well understood, lenders may charge a higher average price for mortgage credit to reflect this uncertainty. Alternatively, lenders may respond to this uncertainty by restricting credit to only the most creditworthy borrowers. By better distinguishing between applicants that are likely to perform well on their loans from those that are less likely to do so, lenders can ensure wider availability of mortgages to borrowers at prices that better reflect underlying risks.

Default also imposes great costs both on the borrowers involved in the process and on society in general. For borrowers, default ordinarily results in a lower credit rating and reduced access to credit in the future, a loss of assets, and the costs of finding and moving to a new home. When geographically concentrated, defaults can also have a pronounced social effect because they lower local property values, reduce the incentives to invest in and maintain the homes in the affected neighborhoods, increase the risk of lending in those neighborhoods, and thus reduce the availability of credit there.

Theoretical and Empirical Determinants of Credit Risk

Gaining a greater understanding of the factors that determine mortgage loan delinquency and default has been an objective of mortgage lenders, policy makers, and academics for decades. A better understanding of these relationships holds the promise that lenders can more accurately gauge the credit risk posed by different applicants and increase the safety and profitability of mortgage lending.

An extensive literature regarding the theoretical and empirical determinants of mortgage credit risk has developed over the past three decades.[3] This literature emphasizes the important roles of equity in the home and vulnerability to so-called triggering events in determining the incidence of delinquency and default. These studies have enhanced our understanding of the determinants of credit risk and have established a better foundation for consistent and effective mortgage lending.

Theoretical Determinants of Mortgage Loan Performance

Most models of mortgage loan performance emphasize the role of the borrower's equity in the home in the decision to default. So long as the market value of

2. For an assessment of the factors that influence the length of time lenders are willing to allow mortgage loans to remain delinquent before foreclosing, see Thomas M. Springer and Neil G. Waller, "A New Look at Forbearance," *Mortgage Banking,* December 1995, pp. 81–84. For a discussion of the reduced losses to lenders associated with alternatives to foreclosure, see John Bancroft, "Freddie Mac Pushes Alternatives to Foreclosures," *Real Estate Finance Today,* November 6, 1995, pp. 12 and 18.

3. See Roberto G. Quercia and Michael A. Stegman, "Residential Mortgage Default: A Review of the Literature," *Journal of Housing Research,* vol. 3, no. 1 (1993), pp. 341–79.

the home (after accounting for sales expenses and related costs) exceeds the market value of the mortgage, the borrower has a financial incentive to sell the property to extract the equity rather than default.[4] ''Option-based'' theories provide a framework for understanding the relationship between equity and loan performance; these theories view the amount of equity accumulated in the property as the key determinant of whether a borrower will default. Within this framework, mortgage default is viewed as a *put option*, in which the borrower has the right (option) to transfer ownership of (put) the home to the lender (through foreclosure or voluntarily) to retire the outstanding balance on the loan. Borrowers will be increasingly likely to exercise this option the further the market value of the house falls below the value of the mortgage. However, because of high transaction and other costs (for example, moving expenses and damage to the borrower's credit rating resulting from default), few borrowers would be expected to exercise this option ''ruthlessly'' (that is, default as soon as equity falls below zero).[5]

Option-based theories of loan performance identify a number of equity-related factors likely to influence default rates. Included among these are the initial loan-to-value ratio (the ratio of the loan amount to the value of the property), which determines the amount of equity at the time of loan origination; current and expected future rates of home price appreciation, which determine the direction, speed, and size of changes in equity levels; the age of the loan, because equity accumulates as payments on a mortgage reduce the amount owed; and the term of the mortgage, because loans of shorter duration are amortized more quickly. In addition, current mortgage interest rates (relative to the rate on an outstanding loan) influence the likelihood of default by affecting the value of the mortgage to a borrower. For example, a mortgage interest rate below current market levels is a disincentive for the borrower to default because a new mortgage would carry a higher rate.

While option-based theories emphasize the role of equity in the home in determining loan performance, other theories of loan performance additionally emphasize the financial footing of borrowers and their corresponding vulnerability to significant adverse changes in their financial or personal circumstances, referred to as ''triggering events.'' In this view, both negative equity and a triggering event would be associated with most defaults. A triggering event alone would not ordinarily cause a default when a borrower has equity in a home; rather, the borrower would sell the property and fully repay the loan to keep the equity (net of transactions costs) and avoid the adverse consequences of a default. On the other hand, in the absence of a triggering event, a borrower would not be expected to exercise the default option ruthlessly because of the large (transaction and reputation) costs the borrower would bear. A default, in this latter case, would occur only if, in the owner's view, the property's value had declined significantly and prospects for its near-term recovery were poor.

Analysts who emphasize the role of triggering events focus on adversities such as reductions in income brought about by a period of unemployment. Other events that may lead to repayment problems include bouts of illness, which may result in both large expenses and a disruption in income, and changes in family circumstances, particularly divorce. Measures of the borrower's vulnerability to such events include ratios of monthly debt payment to income; the level of financial reserves available to the borrower; measures of earnings stability, such as the borrower's employment history; and the borrower's credit history, which in part reflects the borrower's ability and willingness to manage debt payments in the face of changing circumstances.

Option-based and triggering-event theories suggest different relationships between delinquency and default. In the options-based view, delinquency occurs only as a precursor to default and would be evident only among borrowers with substantial negative equity. Triggering-event theories view delinquencies as related to an event and not necessarily to the borrower's level of equity. In this view, delinquencies are not explicitly linked to default but can lead to default if the triggering event is sufficiently severe and the borrower has substantial negative equity in the home.

Empirical Evidence on the Determinants of Mortgage Loan Performance

Empirical investigations have found that both equity and adverse changes in borrowers' circumstances are related to mortgage loan performance, as predicted by theory. Studies consistently find that the level of equity (whether proxied by the loan-to-value ratio at

4. The value of the mortgage is not determined solely by the principal balance owed. It also depends on the relationship between the rate of interest on the loan and the current market rate for mortgages of similar duration.

5. In some states, lenders have the statutory right to seek deficiency judgments against a borrower to try to recover losses incurred as a consequence of default. Such statutory provisions tend to reduce the ruthless exercise of the default option. In many instances, however, borrowers do not have other assets available to cure deficiencies.

the time of origination or by a contemporaneous measure of the ratio) is closely related to both the likelihood of default and the size of the loss in the event of default.

A recent analysis of the performance of nearly 425,000 loans originated over the 1975–83 period illustrates these relationships. The analysis found that conventional mortgages with loan-to-value ratios at origination in the range of 91 percent to 95 percent default more than twice as frequently as loans with loan-to-value ratios in the range of 81 percent to 90 percent and more than five times as often as loans with loan-to-value ratios in the range of 71 percent to 80 percent (table 1). Loss severity (that is, loss to the lender measured as a proportion of the original loan balance) is about 40 percent higher for loans with original loan-to-value ratios in the range of 91 percent to 95 percent than it is with loans with loan-to-value ratios in the range of 81 percent to 90 percent.[6]

Additional evidence regarding the relationship between loan-to-value ratios at time of origination and mortgage default is provided in an analysis conducted by Duff & Phelps Credit Rating Company. They found that among thirty-year fixed rate mortgages, those with a 90 percent loan-to-value ratio are 230 percent more likely to default than loans with an 80 percent loan-to-value ratio and that loans with a 95 percent loan-to-value ratio are 350 percent more likely to default than a loan with an 80 percent loan-to-value ratio.[7]

Research also finds that the likelihood of default is positively related to loan-to-value ratios among single-family loans insured by the Federal Housing Administration (FHA). The default rate among FHA-insured loans with down payments of 3 percent or less is approximately twice as high as the rate among those with down payments of 10 percent to 15 percent, and five times as high as the rate among loans with down payments of 25 percent or more.[8]

1. Proportion of selected mortgages that defaulted by year-end 1992 and resulting severity of loss, by selected loan-to-value ratio ranges

Percent

Performance measure	Loan-to-value ratio (percent)				All
	10–70	71–80	81–90	91–95	
Proportion defaulted	.24	1.11	2.74	6.20	2.16
Average loss severity	22.3	29.2	34.4	47.9	39.2

NOTE. Mortgages were originated during the 1975–83 period and purchased by Freddie Mac. Defaulted loans are those on which Freddie Mac acquired the property through foreclosure. Loan-to-value ratio is the original loan amount divided by the value of the property at origination. Loss severity is the total loss before mortgage insurance payouts (if any) resulting from foreclosure (including interest and transaction costs) divided by the mortgage balance.

SOURCE. Robert Van Order and Peter Zorn, "Income, Location and Default: Some Implications for Community Lending," paper presented at the Conference on Housing and Economics, Ohio State University, Columbus, July 1995.

While research suggests that negative equity is a necessary condition for default, it also suggests that negative equity is not a sufficient condition (most loans with negative equity do not default).[9] In line with the triggering-event explanations, measures of a borrower's ability to pay also explain default and delinquency, although delinquency relationships are less well documented. Default rates have been found to decrease generally with increases in levels of wealth and liquid assets. Further, default likelihoods are closely linked to measures of income stability. Default rates are generally higher for the self-employed and for those with higher percentages of nonsalary income and lower for those with longer employment tenures. Perhaps surprisingly, after controlling for other factors, the initial ratio of debt payment to income has been found to be, at best, only weakly related to the likelihood of default.[10]

Although a borrower's credit history may play an important role in determining mortgage loan performance, few published studies have been able to incorporate such information in their analyses. Relevant credit history data are often difficult to obtain and hard to quantify. The available evidence, however, indicates that loans made to borrowers with flawed credit histories (those who have had difficulties meeting scheduled payments on past loans) default or

6. See Robert Van Order and Peter Zorn, "Income, Location, and Default: Some Implications for Community Lending," paper presented at the Conference on Housing and Economics, Ohio State University, Columbus, July 1995. Further, a number of studies have found that neighborhood and property conditions, which ultimately affect property values and thus equity, are significant factors for mortgage performance. See, for example, James R. Barth, Joseph J. Cordes, and Anthony M.J. Yezer, "Financial Institution Regulations, Redlining, and Mortgage Markets," in *The Regulation of Financial Institutions*, Conference Series 21, Federal Reserve Bank of Boston (April 1980), pp. 101–43.

7. "The State of the Private Mortgage Insurance Industry," Special Report, Duff & Phelps Credit Rating Company, December 1995.

8. See "An Actuarial Review of the Federal Housing Administration's Mutual Mortgage Insurance Fund," prepared by Price Waterhouse for the U.S. Department of Housing and Urban Development, June 6, 1990, p. 12.

9. See Robert Van Order and Ann B. Schnare, "Finding Common Ground," *Secondary Mortgage Markets*, vol. 11 (Winter 1994), pp. 15–19.

10. See Quercia and Stegman, "Residential Mortgage Default"; and James A. Berkovec, Glenn B. Canner, Stuart A. Gabriel, and Timothy H. Hannan, "Race, Redlining, and Residential Mortgage Loan Performance," *Journal of Real Estate Finance and Economics*, vol. 9 (November 1993), pp. 263–94; and Van Order and Zorn, "Income, Location, and Default."

become delinquent more often than loans made to borrowers with good credit histories.[11] The relationship between credit history and loan performance is discussed further in the section on credit scoring.

On balance, defaults likely occur as a result of a combination of factors. Almost uniformly, studies indicate that the level of equity is a robust predictor of default. Studies also demonstrate a significant relationship between mortgage performance and measures of vulnerability to triggering events.

MORTGAGE UNDERWRITING AND RISK MITIGATION

Institutions that bear the credit risk of mortgage lending mitigate that risk by screening borrowers and by sharing risk with others. Screening of prospective borrowers is accomplished primarily through the underwriting process, whereby information needed to assess credit risk is collected, verified, and evaluated.

Risk-sharing may take a number of forms. First, and most important, lenders share the risk of default with the borrower by requiring a down payment and establishing a schedule of payments that will fully amortize the loan over a set period of time. Second, lenders often share the credit risk of a loan with either a private mortgage insurer or a government agency such as the FHA or the Department of Veterans Affairs (VA). Finally, lenders may sell a loan to another party under arrangements that partly or fully transfer the credit risk. The institutions that share or assume the risk of lending do not solely rely on the screening done by mortgage originators but also make independent assessments.

The Underwriting Practices of Mortgage Lenders

Lenders pursue different business strategies, and their underwriting practices and standards reflect those strategies. Some lenders choose to underwrite mortgages more strictly and thus limit their exposure to losses. Others accept more credit risk but also price for this risk, attempting to recoup higher expected losses by charging higher fees or interest rates on riskier mortgages. Still others may choose to specialize in financing certain types of properties or borrowers.

In assessing credit risk, lenders consider the size of the proposed down payment and the value of the collateral as determined by a property appraisal, which together determine the loan-to-value ratio. Lenders also evaluate the capacity of the prospective borrower to meet scheduled debt payments and to provide the initial funds required to close the loan. In so doing, lenders rely on many of the same factors that researchers have found to be important predictors of loan performance, including borrower sources of income; employment history (such as measures of employment stability and prospects for income growth); ratios of debt payment to income; and asset holdings, particularly the amount of liquid assets available to meet down-payment, closing cost, and cash reserve requirements.[12]

In addition, lenders evaluate the credit history of prospective borrowers as an indicator of their financial stability, ability to manage credit, and willingness to make timely payments. Credit histories are often complex and consist of many items, including the number and age of credit accounts of different types, the number of recent inquiries to the credit file, account activity patterns, the incidence and severity of payment problems, and the length of time since any payment problems occurred.

Some applicants fall well within the underwriting guidelines established by lenders, whereas others fall far below the standards. The decision to either approve or deny loan requests from such applicants is generally straightforward. Frequently, however, the decision is less clear-cut. For example, an applicant may fail to meet one of many established underwriting guidelines, such as a satisfactory record of payments on past debts.[13]

Lending policies generally allow for flexibility in implementation so that applicants may offset weakness in one factor with strength in others. For example, even if an applicant's ratio of debt payment to income exceeds a lender's established guidelines, the

11. See, for example, Wilson Thompson, "A Model of FHA's Origination Process and How it Relates to Default and Non-Default," Working Paper, Department of Housing and Urban Development (1980); and Gordon H. Steinbach, "Ready to Make the Grade," *Mortgage Banking* (June 1995), pp. 36–42.

12. Most lenders require borrowers to have cash reserves sufficient to cover two months of mortgage payments (including principal, interest, and tax and insurance escrows) at the time of closing. This reserve may provide a cushion should the borrower suffer a temporary financial setback, and it is a signal to the lender that the borrower has the discipline to accumulate savings.

13. For example, a study of mortgage lending in Boston found that more than 80 percent of the applicants for home purchase loans appeared either to have a weakness in their credit histories or to fail to meet some other underwriting standard. See Alicia H. Munnell, Lynn E. Browne, James McEneaney, and Geoffrey M.B. Tootell, "Mortgage Lending in Boston: Interpreting HMDA Data," *American Economic Review,* vol. 86 (March 1996), pp. 25–53.

lender may approve the loan if the applicant exhibits very stable income and an excellent credit history. Similarly, a lender might consider a large down payment to be a compensating factor offsetting weakness in some other area. Lenders will generally weigh all the factors and in some cases seek additional information in attempting to make a more precise evaluation of credit risk.

Risk Sharing

Originators of mortgage loans typically share or transfer risk by requiring borrowers to purchase mortgage insurance or by selling mortgages to secondary-market institutions. For most mortgages, all or a significant portion of the credit risk is borne by a party other than the originator of the loan. For instance, credit risk was either shared or transferred on nearly three-fourths of all the home purchase loans originated in 1994.[14]

Mortgage lenders generally require a down payment of at least 20 percent of the appraised value of a home, unless the mortgage is backed by a type of insurance, paid for by the borrower, known as mortgage guarantee insurance. Mortgage insurance for low-down-payment loans is available from the federal government, primarily through programs administered by the FHA and the VA and from private mortgage insurance (PMI) companies.

When a loan is backed by mortgage insurance, much of the credit risk is transferred to the insurer. Should the borrower default, the insurer will reimburse the lender for the losses resulting from default, up to certain limits. Mortgage insurers, like loan originators, establish underwriting standards that determine which loans they will insure and how much credit risk they will bear. Lenders may encourage applicants seeking mortgages with low down payments and those posing higher risks to apply for government-backed loans rather than conventional loans backed by PMI because the greater depth of insurance coverage provided by the government on such loans affords the lender greater protection in the event of default.

Secondary-market institutions buy and sell billions of dollars of mortgages and securities backed by mortgages each year. Secondary-market institutions promulgate the underwriting guidelines that loans must meet to be eligible for purchase or securitization. Three government-sponsored enterprises (GSEs) dominate secondary-market activity—the Federal National Mortgage Association (Fannie Mae), the Federal Home Loan Mortgage Corporation (Freddie Mac), and the Government National Mortgage Association (Ginnie Mae). Fannie Mae and Freddie Mac mainly buy conventional mortgages, holding some in portfolio and converting others into securities that are sold to investors. Ginnie Mae does not purchase loans but guarantees the timely payment of interest and principal for privately issued securities backed by mortgages insured by the FHA or VA. Various non-GSE institutions, including commercial banks, savings associations, insurance companies, and pension funds are also active purchasers of mortgages.

Mortgage insurers and secondary-market institutions generally consider the same set of factors originators review when assessing credit risk. The underwriting standards applied, however, will differ across institutions in accordance with their various business strategies and tolerance for risk. Private mortgage insurers, for example, while backing loans with high loan-to-value ratios, generally require borrowers to make larger down payments and pay a larger share of the closing costs than do the FHA and VA.[15]

Sometimes mortgage originators do not share credit risk with other institutions. Unlike mortgage insurers and secondary-market institutions, which are generally remote from borrowers, institutions that both originate and bear the credit risk of mortgages (known as portfolio lenders) are typically located in the communities where they extend credit and have numerous other financial relationships with their communities. For these reasons, portfolio lenders may have better information about local economic conditions and the risks posed by individual borrowers, which, in turn, may enable them to better measure and mitigate the risks associated with mortgage lending. With better information to gauge credit risk, portfolio lenders may be able to profitably originate some loans that do not meet the underwriting standards established by secondary-market institutions and PMI companies.

Credit Scoring and the Mortgage Lending Process

Mortgage lending institutions establish guidelines for underwriters to follow when evaluating applications

14. See Canner and Passmore, "Credit Risk and the Provision of Mortgages," p. 998.

15. See Glenn B. Canner, Wayne Passmore, and Monisha Mittal, "Private Mortgage Insurance," *Federal Reserve Bulletin*, vol. 80 (October 1994), pp. 883–99.

for credit, but they also rely heavily on the experience and judgment of underwriters when assessing credit risk. Relying on subjective analysis has some important limitations, however. Loan officers differ in their experience and in their views regarding the relationships between risk and specific credit characteristics of applicants. Consequently, an institution cannot be sure that its underwriters are approving all applications that have risk profiles consistent with the objectives of the institution. In addition, because of the numerous and often complex factors mortgage underwriters need to consider, subjective underwriting is time-consuming and costly.

To facilitate the mortgage underwriting process, reduce costs, and promote consistency, ''credit scoring'' models have been developed that numerically weigh or ''score'' some or all of the factors considered in the underwriting process and provide an indication of the relative risk posed by each application. In principle, a well-constructed credit scoring system holds the promise of increasing the speed, accuracy, and consistency of the credit evaluation process while reducing costs. Thus, credit scoring can reduce risk by helping lenders weed out applicants posing excessive risk and can also increase the volume of loans by better identifying creditworthy applicants.

Generically, scoring is a process that uses recorded information about individuals and their loan requests to predict, in a quantifiable and consistent manner, their future performance regarding debt repayment. Scores represent the estimated relationship between information obtained from credit bureau reports or loan applications and the likelihood of poor loan performance, most often measured as delinquency or default (see box ''Developing a Credit History Scoring System'').

Scoring has been used to assess applications for motor vehicle loans, credit cards, and other types of consumer credit for decades.[16] Technological advances in information processing and risk analysis combined with competitive pressures to process applications more quickly and efficiently are pushing the lending industry to incorporate scoring in the mortgage underwriting process.

Mortgage lenders ordinarily consider two kinds of scores: those that are based primarily on the credit histories of individuals and those that weigh credit history as well as the other factors considered in the underwriting process. The former will be referred to here as ''credit history'' scores and the latter as ''application'' scores. Because they reflect the wide range of factors considered in the evaluation of credit risk, application scores are more comprehensive than credit history scores. The credit history score is, then, a single element to be weighed along with the other factors in determining the total application score.

Credit History Scores

The difficulties in assessing the often complex information about individuals' past and current experience with credit has helped motivate the adoption of scoring methods for interpreting credit history. A credit history score represents the estimated relationship between information on the credit histories of individuals contained in credit bureau reports and the likelihood of poor loan performance. In credit history scoring systems, prospective applicants receive a numerical score based on their individual credit history information; the score reflects the historic performance of loans extended to individuals with similar characteristics. Individuals with identical credit scores may have received them for different reasons, but within the context of the credit scoring index, they are assessed to have equal likelihoods of the predicted behavior, that is, they are considered to pose the same credit risk.

Credit history scores can supplement or even replace the traditional subjective assessment of credit history with a quantitative measure summarizing the pertinent information in an applicant's credit report. Adding a statistically derived measure of the credit risk associated with a given credit history may allow underwriters to better and more quickly assess the strengths and weaknesses of applications.

Each of the three national credit bureaus, Equifax, TRW, and Trans Union, make available credit history scores—developed by Fair, Isaac and Company, Inc. (FICO)—based on information contained in each of the credit bureau's files. These generic credit history scores—the Equifax Beacon, the TRW-FICO, and the Trans Union Empirica scores—are made available to help lenders assess risk on a wide variety of loans. In addition, credit history scores tailored to the mortgage market (mortgage credit history scores) are now available; these scores are specifically designed to assess the credit history risk of mortgage loans.[17]

16. See Robert A. Eisenbeis, ''Problems in Applying Discriminant Analysis in Credit Scoring Models,'' Board of Governors of the Federal Reserve System, Staff Economic Studies (1977); and Edward M. Lewis, *An Introduction to Credit Scoring* (San Rafael, Calif.: Athena Press, 1990).

17. See ''Equifax, Inc. Develops Mortgage Credit Scoring System,'' *National Mortgage News*, June 13, 1994, p. 25. A number of ''custom'' credit history scoring models have been developed for specific lenders to assess credit risk for specific loan products.

Recent events have ensured that credit history scores will be used much more often in the mortgage lending process than they have been in the past. Most prominently, letters issued by Fannie Mae and Freddie Mac in 1995 strongly encourage the thousands of lenders from whom they purchase loans to consider the Beacon, TRW-FICO, and Empirica credit history scores in their loan underwriting.[18]

18. See Fannie Mae Letter LL09-95 to all Fannie Mae lenders from Robert J. Engelstad, "Measuring Credit Risk: Borrower Credit Scores and Lender Profiles," October 24, 1995; and Freddie Mac Industry Letter from Michael K. Stamper, "The Predictive Power of Selected Credit Scores," July 11, 1995. As an alternative, Freddie Mac and Fannie Mae recommend that, when underwriting loans, lenders consider credit history scores that are calculated to predict bankruptcy. The generic bankruptcy scores are the Equifax Delinquency Alert System, Trans Union's Delphi score, and the TRW-MDS score. Also see Marshall Taylor, "Secondary Markets Explain Credit Scores," *Real Estate Finance Today*, April 1, 1996, p. 16.

Application Scores

Based on all information relevant to a loan application, application scores are most often used to deter-

Developing a Credit History Scoring System

Developing a credit history scoring system requires information about the experiences of individuals with credit.[1] Information is ordinarily drawn from credit account files maintained by credit bureaus and sometimes from records maintained by lending institutions. The credit account files of individuals are segregated into groups based on measures of loan performance. Ordinarily, the credit account files are segregated into two distinct categories: those in which debts have not been paid as scheduled as of a specified date or during a specified time period (referred to here as "bad" accounts) and the rest ("good" accounts). Bad credit accounts can be defined in various ways depending on the severity of observed credit difficulties. For example, bad accounts might include any file with at least one thirty-day delinquency within the past year, or they may be limited to accounts that have had more serious delinquencies.

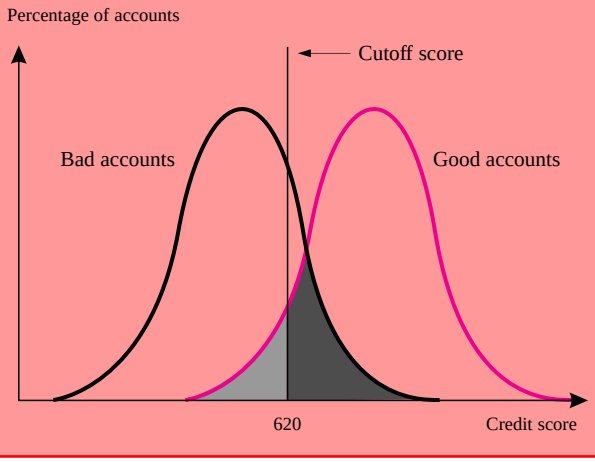
Having sorted the files according to performance as of a specified date or during a specified period, the analyst then focuses on information in the credit files from a preceding time period that might have predicted the performance outcome. Detailed information drawn from each credit file is then recorded for statistical analysis. The selection of specific items is often based on discussions with loan underwriters plus a preliminary (bivariate) statistical analysis of the relationship between individual credit factors and loan performance. The information recorded pertains primarily to the individual's experience with credit.

The analyst then uses multivariate statistical analysis of the recorded information to identify which *set* of characteristics is most useful in identifying borrowers who are likely to meet their scheduled payments and those who are not. The statistical analysis provides weights (or scores) for each factor, ranking its relative importance in predicting into which group an individual will fall. Applying these weights to the characteristics of individual accounts yields a total score for each individual. Most credit scoring systems that are widely used have adopted a scale with a range of scores between 300 and 900, with higher scores corresponding to lower credit risk.

Both the good accounts and the bad accounts will have files with a wide range of scores. However, if the credit scoring system is predictive of performance, good accounts will have the highest percentage of high scores and bad accounts likewise will have the highest percentage of low scores. The predictive power or performance of a scoring model is measurable, and the developer of the model looks for the combination of attributes of the borrower's credit history that will maximize the score's predictive power.

The distribution of total scores for individuals falling into the good or bad categories can be described graphically (see diagram). As shown, the good accounts tend to cluster around a higher average score than do the bad accounts. To operate a scoring system for credit underwriting, a lender must select a cutoff score (such as 620) that can be used to distinguish acceptable from unacceptable risks. Regardless of the cutoff score selected, some customers with bad scores will be offered credit because of offsetting factors, and some customers with good scores will be denied credit, also because of offsetting factors.

Distribution of credit scores of good and bad accounts



1. Federal law prohibits lenders from considering certain factors such as gender, race, or ethnicity in making credit decisions. Consequently, these factors are not used in constructing credit scoring models, and age and marital status can be considered only under certain circumstances.

mine which credit requests are clearly acceptable under established underwriting guidelines and which need further review. The use of application scores differs among the participants in the mortgage market: Loan originators generally use application scores to identify applications eligible for streamlined underwriting; secondary-market institutions use them to facilitate loan purchases; and PMI companies use them to help screen applications for mortgage insurance.

As a screen for streamlined underwriting, a threshold score corresponding to low credit risk is established by the lender. Applicants with scores within the low-risk range generally would be eligible for a streamlined review that focuses primarily on verification of reported information and evaluation of the collateral. Streamlined underwriting allows those making credit decisions to reduce costs by enabling underwriters to spend less time on the low-risk applications and more time on those applications that involve more complexity and potential risk.[19] Importantly, streamlined underwriting also benefits many customers by shortening the amount of time between the date of application and the credit decision.

Secondary-market institutions also use application scores. Freddie Mac and Fannie Mae, for instance, have developed application scoring systems that indicate to the lender whether a prospective loan is clearly eligible for sale to these institutions or whether the lender will need to show that compensating factors exist that make the loan an acceptable credit risk.[20]

Private mortgage insurance companies use application scoring systems to quickly identify those prospective loans that clearly meet the underwriting standards of the insurer. Loan applications that fail the automated screen are reviewed by an underwriter to determine whether compensating factors are present that would make the loan insurable. Mortgage Guarantee Insurance Corporation (MGIC), for example, reports that about 30 percent of the applications they receive for mortgage insurance are approved through their automated application system; the remaining applications are referred to underwriters for closer review.[21]

Most credit history and application scoring systems are proprietary, and the specific factors used and the risk weights assigned to these factors in establishing scores are not generally available to the public. As a consequence, scoring systems have a ''black box'' aspect to them. Nonetheless, most scoring systems share a number of elements. For example, most credit history scoring systems consider records of bankruptcy, current and historic ninety-day delinquencies, and the number of credit lines. Most mortgage application scoring systems additionally consider factors such as the loan-to-value ratio, the ratio of debt payment to income, and measures of employment stability. However, the risk weights assigned to these factors vary from system to system.

Other Uses of Credit Scoring

Credit history scores and application scores have uses other than in the loan underwriting process. To monitor the quality of their portfolio and to determine the appropriate level of reserves to set aside for losses, lenders may periodically obtain credit scores for borrowers with outstanding loans. Similarly, institutions can use credit scores to evaluate the quality and value of mortgages they are considering for sale. For example, credit scores can help identify the credit risk of seasoned loans and help determine the appropriate grade (risk) pool into which individual loans should be placed for sale to the secondary market.

Lenders may use credit scores to differentiate risk categories of loans for pricing decisions. Rather than reject higher-risk loans for origination or purchase, the lender may decide to price the risk by requiring an interest rate premium on those loans with higher predicted probabilities of default. The use of credit scores can also help with the collection and loss mitigation process by, for example, allowing lenders to concentrate staff resources on borrowers whose credit scores indicate greater risk of delinquency.

Finally, lenders can use credit scores to facilitate strategic planning decisions. For instance, lenders concerned about possible attrition in their loan portfolio due to competition for refinancings may offer a new loan to those current borrowers whose credit scores indicate that they would be most attractive to potential competitors.

Limitations of Scoring

Although credit scoring can reduce costs and bring more consistency to the underwriting process, its reliability depends upon the accuracy, completeness, and timeliness of the information used to generate the

19. See, for example, Janet Sonntag, ''The Debate Over Credit Scoring,'' *Mortgage Banking* (November 1995), pp. 46–52.

20. The automated underwriting systems developed by Freddie Mac and Fannie Mae are known respectively as ''Loan Prospector'' and ''Desktop Underwriter.''

21. See Jim Kunkel, ''The Risks of Mortgage Automation,'' *Mortgage Banking* (December 1995), pp. 45–57.

scores. For example, credit scores based on erroneous or seriously incomplete credit report information are not likely to accurately measure the risk posed by an individual applicant and may lead to unwarranted actions on an application (see box ''How To Obtain Your Credit Report and What To Do To Correct Errors in the Report'').

Also, concerns have been expressed that credit scores may not accurately gauge the creditworthiness of individuals whose experiences differ substantially from those on whom the index is based. If the baseline population used to generate the scoring index is not sufficiently diverse, then scores may lack predictive power for the underrepresented segments of the overall population. For example, rent, utility, and other nonstandard payment histories, which are often considered important for low-income populations, are frequently left out of scoring models. Thus, scores for these populations may not reliably assess individual risk.

Another set of concerns surrounds the use of credit scores more generally in the underwriting process. Lenders relying too heavily on scores might not give adequate consideration to special circumstances, such as a recent illness, that might mitigate a low score. Further, scores may lack predictive power if the underlying model used to generate the scores does not reflect current relationships between risk characteristics and measures of loan performance. Builders of credit scoring models report that model performance deteriorates over time. Thus, periodic validation may be necessary to ensure that scoring models retain their accuracy.

Credit scoring and its application to mortgage markets are evolving. Credit history scores, for example, traditionally have been based on the payment performance of a cross-section of consumers who have used credit, not all of whom have incurred mortgage debt. But consumer behavior with respect to mortgage debt may differ from behavior with respect to consumer debt. Consumers facing financial difficulties may, for instance, choose to pay their mortgage obligations first and postpone payments on other debts. For this reason, one might expect that a credit scoring model developed specifically for the mortgage market would provide more accurate predictions of future mortgage payment performance than a generic credit history score, even before the borrower has obtained a mortgage.

The development of models for credit history scores and application scores based on the payment performance of mortgage holders has historically been hampered by incomplete information about which consumers have mortgages and about other characteristics of these consumers. Also, many individual lenders have made too few mortgages to develop a sound mortgage credit scoring model. Recently, however, developers of scoring models have integrated information from several sources to develop both mortgage credit history scores and mortgage application scores.

How To Obtain Your Credit Report and What To Do To Correct Errors in the Report

In 1970 the Congress enacted the Fair Credit Reporting Act (FCRA) to give consumers specific rights in dealing with credit bureaus. The FCRA requires credit bureaus to furnish a correct and complete consumer credit report to businesses or persons to use in evaluating consumer applications for credit, insurance, a job, or other legitimate business need in connection with a transaction involving the consumer.

Consumers can obtain a copy of their credit file from a credit bureau. A reasonable fee may be charged for the report. If a consumer has been denied credit, insurance, or employment because of information that was supplied by a credit bureau, the FCRA requires that the recipient of the report give the consumer the name and address of the credit bureau that supplied the information. The consumer then has the right to obtain the report free of charge if requested within thirty days of receiving a notice of denial. Reports can be requested by phone at the following numbers: Equifax—1-800-685-1111; Trans Union—1-800-916-8800; and TRW—1-800-682-7654.

Consumers have the right to dispute the information in their credit files if they believe that their credit reports contain errors or are incomplete. When a credit bureau receives a complaint of this nature, it must investigate and record the current status of the disputed items within a reasonable period of time. If the credit bureau cannot verify a disputed item, it must delete it from the file. The credit bureau is required to correct any information confirmed to be erroneous and to add any information that has been omitted.

If the credit bureau's investigation does not resolve a dispute, the consumer may file a brief statement explaining the nature of the dispute. The credit bureau must include this statement in the report each time it is sent out.

The Federal Trade Commission is the federal agency that enforces the FCRA. Questions or complaints related to a credit report may be directed to the Correspondence Branch of the Federal Trade Commission, Washington, DC 20580. Free copies of publications discussing credit issues are available from Public Reference at the same address.

Credit History Scores and Mortgage Performance

Relatively little information about the relationship between credit history scores and mortgage loan performance is publicly available. However, recently obtained proprietary information (courtesy of Equifax Credit Information Services, Inc., one of the three large national repositories of credit information) relates credit scores to loan performance for a large sample of mortgage loans. The sample contains virtually all of the mortgages that were outstanding and whose payments were current as of September 1994 at three of the largest lenders in the country. The sample is not, however, necessarily representative of the pool of borrowers nationwide; these lenders do not, for example, participate in all markets, nor do they offer all types of mortgages. To ensure confidentiality, no information was included in the data that could be used to identify individuals or financial institutions.

The data for each loan include a mortgage credit history score, ''The Mortgage Score'' (TMS), developed by Equifax Mortgage Services and generated as of September 1994.[22] TMS was developed by Equifax on the basis of the credit records of mortgagors and the payment performance on their mortgage accounts. The data also include measures of the performance of each loan over the subsequent twelve months (to September 1995); the date the loan was originated; the loan type (conventional or government-insured and whether the interest rate on the loan was fixed or variable); the ZIP code of the property securing the loan; and characteristics of the loan such as loan size and loan-to-value ratio at the time of origination. All loans in the sample were current in their mortgage payments as of September 1994, the date the TMS was determined. For our analysis, loans with payments at least thirty days late at any point during the performance period (September 1994 through September 1995) are defined as delinquent.

For loans originated within the year preceding September 1994, the TMS reasonably approximates the credit history score that could have been used in underwriting the loan. These loans, then, allow an examination of the relationship between credit history scores at the time of origination and near-term loan performance. For more seasoned (older) loans, the TMS as of September 1994 does not necessarily reflect the borrower's credit record at the time the loan was originated. Therefore, the sample relationship between the TMS and loan performance does not necessarily reflect the predictive value of credit history scores at the time of loan origination. However, the older loans in the sample can be used to demonstrate how lenders can use credit scores to help monitor or evaluate the credit risk of seasoned loan portfolios.

To analyze these relationships, we separated loans into three types (conventional fixed rate, conventional adjustable rate, and government-backed) and two ''seasoning'' categories (newly originated and seasoned) and then sorted them into three credit score ranges—low, medium, and high—based on their TMS scores (which, again, are mortgage credit history scores). Newly originated loans are those issued after September 1993; seasoned loans are those that were originated between January 1990 and September 1993. The three ranges of TMS scores correspond to the specific ranges identified in the Fannie Mae and Freddie Mac letters to mortgage lenders on the use of the generic credit history scores (the Beacon, TRW-FICO, and Empirica scores) in underwriting loans.[23]

TMS scores in the low range correspond to generic credit history scores that Freddie Mac has identified as showing ''a strong indication that the borrower does not show sufficient willingness to repay as agreed'' (generic credit history scores below 621). TMS scores in the medium range correspond to generic scores about which Freddie Mac has sufficient concern to require a more detailed evaluation of the credit history file (generic credit history scores in the 621–660 range). TMS scores in the high range correspond to generic scores in a range at which, unless additional credit history risks are identified, ''the borrower's willingness to pay as agreed is confirmed'' (generic credit history scores above 660).

The distributions of mortgage loans by credit score range for the three types of loans sorted by seasoning status, and the delinquency rate within each range, are shown in table 2. The vast majority of both newly originated and seasoned loans have credit scores in the high range. For example, more than 90 percent of conventional fixed rate mortgages have credit scores

22. The Mortgage Score and TMS are service marks of Equifax Mortgage Services.

23. See note 18. The scales of the generic credit history scores and of the TMS differ. Using the Equifax data on individuals scored with both a generic credit history score and the TMS score, we set cutoffs for the TMS score at a level designed to capture the same percentages of borrowers in the low, medium, and high ranges as were implied by the cutoffs of the generic credit history scores identified in the Freddie Mac and Fannie Mae letters.

2. Mortgage loans, grouped by seasoning status, type, and payment status and distributed by credit score

Percent

Loan	Credit score range				Memo: Number of sample loans	
	Low	Medium	High	All	Total	Delinquent
Newly originated						
Conventional fixed rate	1.5	4.9	93.6	100	109,433	417
Delinquencies in score range						
As percentage of all delinquent loans of this type and seasoning	17.3	21.8	60.9	100	. . .	. . .
Memo: As percentage of all loans of this type and seasoning in score range	4.4	1.7	.2	.4	. . .	. . .
Conventional adjustable rate	3.8	8.3	87.8	100	24,075	119
Delinquencies in score range						
As percentage of all delinquent loans of this type and seasoning	18.5	24.4	57.1	100	. . .	. . .
Memo: As percentage of all loans of this type and seasoning in score range	2.4	1.4	.3	.5	. . .	. . .
Government-backed fixed rate	12.8	16.7	70.5	100	36,596	985
Delinquencies in score range						
As percentage of all delinquent loans of this type and seasoning	52.0	25.2	22.8	100	. . .	. . .
Memo: As percentage of all loans of this type and seasoning in score range	10.9	4.0	.9	2.7	. . .	. . .
Seasoned						
Conventional fixed rate	2.1	4.9	93.0	100	257,741	1,909
Delinquencies in score range						
As percentage of all delinquent loans of this type and seasoning	32.4	19.6	48.0	100	. . .	. . .
Memo: As percentage of all loans of this type and seasoning in score range	11.4	2.9	.4	.7	. . .	. . .
Conventional adjustable rate	7.6	10.7	81.8	100	125,384	2,423
Delinquencies in score range						
As percentage of all delinquent loans of this type and seasoning	42.5	21.7	35.8	100	. . .	. . .
Memo: As percentage of all loans of this type and seasoning in score range	10.9	3.9	.8	1.9	. . .	. . .
Government-backed fixed rate	13.7	15.5	70.9	100	67,913	2,786
Delinquencies in score range						
As percentage of all delinquent loans of this type and seasoning	59.9	19.4	20.7	100	. . .	. . .
Memo: As percentage of all loans of this type and seasoning in score range	18.0	5.1	1.2	4.1	. . .	. . .

Note. Newly originated loans were originated during the October 1993–June 1994 period. Seasoned loans were originated during the January 1990–September 1993 period.

The credit score is The Mortgage Score (TMS; service mark of Equifax Mortgage Services), a mortgage credit history score derived from a model based exclusively on the credit records of households with mortgages and their payment performance on mortgage loans. The credit score for each loan was calculated at the end of the third quarter of 1994.

Score ranges have been structured to roughly approximate the generic credit bureau score ranges used by Freddie Mac for evaluating whether an application for a mortgage meets its underwriting guidelines. The ranges for The Mortgage Score correspond to generic credit bureau scores (Beacon, TRW-FICO, Empirica) as follows: low = less than 621, medium = 621–660, and high = more than 660.

Delinquent accounts are those on which a payment was at least thirty days past due at any time during the period from September 30, 1994, through September 30, 1995.

. . . Not applicable.

Source. Equifax Credit Information Services, Inc.

in the high range. Relative to conventional fixed rate mortgages, a larger proportion of conventional adjustable rate mortgages and an even larger proportion of government-backed loans have low credit scores. For each type of loan, the proportion of seasoned loans with low scores is larger than that of newly originated loans.

Delinquency rates are low for each loan type regardless of seasoning status. The highest overall rate of delinquency, that for government-backed seasoned loans, is only 4.0 percent (table 2). These delinquency rates should be viewed in the context of several considerations that bias the results in opposite directions. On one hand, the rate is for delinquencies arising at any time over a twelve-month period and thus overstates the likelihood of a loan being delinquent at any point in time. On the other hand, economic conditions over this particular twelve-month period were relatively favorable, and all loans had to have been current in their payments at the beginning of the performance period. These latter factors tend to reduce measured delinquency rates.

The data indicate that TMS scores are a predictor of loan performance. For each loan type, regardless of seasoning status, borrowers with low scores have substantially higher delinquency rates than those with medium or high scores. For example, the delinquency rate for newly originated government-backed loans

with low TMS scores is 10.9 percent, compared with 4.0 percent for those with medium scores and 0.9 percent for those with high scores.

The relationship between credit scores and delinquency rates is further evidenced by the distribution of delinquent borrowers across credit score ranges for each type of loan. These distributions show that delinquent borrowers disproportionately have scores in the low range. Borrowers with low credit scores accounted for only 1.5 percent of all newly originated conventional fixed rate loans but for 17 percent of those that became delinquent (table 2, memo item). This relationship holds for other product types and seasoned loans as well. For example, borrowers with low credit scores accounted for 2.1 percent of all seasoned conventional fixed rate mortgages, but they accounted for 32 percent of those that became delinquent.

The data, however, also consistently show that most borrowers with credit scores in the low range are not delinquent. For example, in the case of newly originated conventional fixed rate loans, only 4.4 percent of borrowers with low credit scores became delinquent over the performance period. Thus, while delinquent borrowers disproportionately have low scores, most borrowers with low scores are not delinquent.

Distinct differences exist in delinquency rates across loan types and seasoning status. Within each credit score range and loan type, seasoned loans have higher delinquency rates than newly originated loans have.[24] For example, the delinquency rate for newly originated conventional adjustable rate mortgages with low credit scores is 2.4 percent, but the rate for seasoned conventional adjustable rate loans with low scores is 10.9 percent. Controlling for score and seasoning, government-backed loans have the highest rates of delinquency, a result consistent with data on relative delinquency rates from other sources.[25]

Detailed information on the distribution of TMS scores by loan performance, type of loan, and mortgage and location characteristics for newly originated loans is presented in tables 3, 4, and 5. In general, loans with lower loan-to-value ratios and loans on properties located in areas with higher relative incomes and higher relative home values have higher mean and median TMS scores and a lower percentage of borrowers with low and medium scores than other loans. These relationships hold for delinquent loans as well as for loans that were paid on schedule. For example, for newly originated conventional fixed rate mortgage loans (table 3 and chart 1), the mean TMS score for paid-as-scheduled loans with loan-to-value ratios less than 81 percent is 50 points higher than the mean score for those with loan-to-value ratios of more than 90 percent. Similarly, 94.5 percent of the loans with loan-to-value ratios of less than 81 percent are in the high credit score range, compared with 84.6 percent for those with loan-to-value ratios of more than 90 percent.

For each loan type, the mean and median TMS scores for delinquent loans are 100 to 150 points lower than the mean and median scores for those that were paid on schedule, and these differences are statistically significant. Similarly, the percentage of borrowers in the low credit score range is at least four to five times higher for delinquent loans than for loans that were paid as scheduled. These relationships hold across all subcategories of loans.

Additional information relating credit history scores to mortgage loan performance was provided by Freddie Mac (table 6). These data pertain to loans for single-family owner-occupied properties purchased by Freddie Mac in the first six months of 1994. Performance is measured by whether the loan had entered into foreclosure by the end of 1995. Foreclosure rates for different categories of loans are expressed relative to the rate for borrowers with loan-to-value ratios of 80 percent or less and high credit history scores, which was set to 1.[26]

Foreclosure rates are substantially higher for borrowers with low credit scores as well as for those with high loan-to-value ratios (table 6). Moreover, borrowers with low credit scores perform worse within each loan-to-value ratio category. The foreclosure rate is particularly high for borrowers with both low credit scores and high loan-to-value ratios—almost 50 times higher than that for borrowers with both high credit scores and low loan-to-value ratios. This finding, that loan performance deteriorates significantly when risks are high for multiple factors (''layering of risk''), is discussed at length later in this article.

The relationship between borrower income and loan performance appears to be slight. Within each credit score and loan-to-value ratio category, borrowers with income below 80 percent of area median

24. This result is consistent with other research, which indicates that delinquency rates increase as loans age, at least for the first few years after origination. See, for example, chart 1 in *The Market Pulse*, Mortgage Information Corporation (vol. 1, January 1996), p. 1.

25. See Mortgage Bankers Association National Delinquency Survey.

26. The credit score ranges are comparable to those used in tables 2 through 5.

3. Newly originated conventional fixed rate mortgage loans, grouped by payment performance and characteristic and distributed by credit score

Percent except as noted

Performance of mortgage and characteristic	Credit score								Total	
			Low		Medium		High			
	Mean[4]	Median[4]	Percent of characteristic	Memo: Percent of score range	Percent of characteristic	Memo: Percent of score range	Percent of characteristic	Memo: Percent of score range	Percent of characteristic	Memo: Percent of all loans
Paid as Scheduled										
Mortgage characteristic										
Loan-to-value ratio (percent)										
Less than 81	845	865	1.2	72.9	4.3	77.6	94.5	87.1	100	86.5
81 to 90	818	840	2.6	19.8	7.1	16.2	90.3	10.5	100	10.9
More than 90	794	811	4.0	7.3	11.4	6.2	84.6	2.4	100	2.6
All[1]	841	861	1.4	100	4.8	100	93.8	100	100	100
Loan size (dollars)										
Less than 100,000	836	859	1.9	47.5	5.7	41.9	92.4	35.0	100	35.5
100,000–200,000	839	859	1.4	33.8	5.0	35.0	93.6	33.8	100	33.9
More than 200,000	847	866	.9	18.7	3.6	23.1	95.5	31.2	100	30.6
All	841	861	1.4	100	4.8	100	93.7	100	100	100
Location characteristic										
ZIP code median income (percentage of area median income)[2]										
Less than 80	823	846	2.3	9.0	7.7	9.0	90.1	5.5	100	5.7
80 to 120	837	857	1.6	52.2	5.2	50.6	93.2	46.7	100	47.0
More than 120	847	867	1.2	38.8	4.1	40.4	94.7	47.8	100	47.3
All	841	861	1.4	100	4.8	100	93.7	100	100	100
Home values (percentage of area median home value)[3]										
Less than 80	826	847	2.2	20.7	6.6	18.8	91.3	13.4	100	13.8
80 to 120	836	856	1.6	27.9	5.2	26.5	93.1	24.2	100	24.4
More than 120	846	866	1.2	51.4	4.3	54.7	94.5	62.3	100	61.8
All	841	861	1.4	100	4.8	100	93.7	100	100	100
Delinquent										
Mortgage characteristic										
Loan-to-value ratio (percent)										
Less than 81	734	740	11.9	63.8	22.9	78.0	65.2	79.8	100	77.1
81 to 90	697	707	21.3	27.6	22.7	18.7	56.0	16.6	100	18.7
More than 90	699	744	29.4	8.6	17.6	3.3	52.9	3.6	100	4.2
All[1]	720	730	14.4	100	22.6	100	62.9	100	100	100
Loan size (dollars)										
Less than 100,000	692	686	25.1	59.7	24.6	46.2	50.3	33.9	100	41.0
100,000–200,000	720	730	14.7	29.2	23.8	37.4	61.5	34.6	100	34.3
More than 200,000	766	781	7.8	11.1	14.6	16.5	77.7	31.5	100	24.7
All	720	730	17.3	100	21.8	100	60.9	100	100	100
Location characteristic										
ZIP code median income (percentage of area median income)[2]										
Less than 80	724	738	17.4	11.1	19.6	9.9	63.0	11.4	100	11.0
80 to 120	707	712	22.0	69.4	21.6	53.8	56.4	50.4	100	54.4
More than 120	739	753	9.7	19.4	22.9	36.3	67.4	38.2	100	34.5
All	720	730	17.3	100	21.8	100	60.9	100	100	100
Home value (percentage of area median home value)[3]										
Less than 80	687	677	28.9	38.9	22.7	24.2	48.5	18.5	100	23.3
80 to 120	721	730	14.9	25.0	24.8	33.0	60.3	28.7	100	29.0
More than 120	735	743	13.1	36.1	19.6	42.9	67.3	52.8	100	47.7
All	720	730	17.3	100	21.8	100	60.9	100	100	100

Note. Loans were originated during the October 1993–June 1994 period. For definitions of credit score, score range, and delinquency, see note to table 2.

1. Excluding loans with no reported ratio.

2. Median family income of ZIP code in which the property is located relative to median family income of the property's metropolitan statistical area (MSA) or, if location is not in an MSA, relative to median family income of all non-MSA portions of the state.

3. Value of the property relative to the median value of owner-occupied homes in the property's MSA or, if location is not in an MSA, relative to the median value of owner-occupied homes in all non-MSA portions of the state.

4. Values of The Mortgage Score. The sample Mortgage Score range is 325 to 991.

Source. Equifax Credit Information Services, Inc.

income have somewhat higher foreclosure rates than average, and those with incomes above 120 percent of area median income have somewhat lower foreclosure rates than average. Credit score and, to a lesser extent, loan-to-value ratio appear to be much stronger predictors of foreclosure rates than income.

4. Newly originated conventional adjustable rate mortgage loans, grouped by payment performance and characteristic and distributed by credit score

Percent except as noted

Performance of mortgage and characteristic	Credit score								Total	
	Mean	Median	Low		Medium		High			
			Percent of characteristic	Memo: Percent of score range	Percent of characteristic	Memo: Percent of score range	Percent of characteristic	Memo: Percent of score range	Percent of characteristic	Memo: Percent of all loans
PAID AS SCHEDULED										
Mortgage characteristic										
Loan-to-value ratio (percent)										
Less than 81	817	842	3.8	86.8	8.2	85.5	88.1	86.8	100	86.7
81 to 90	801	821	3.7	12.6	8.8	13.6	87.5	12.6	100	12.7
More than 90	770	782	3.4	.6	12.8	1.0	83.9	.6	100	.6
All	815	839	3.8	100	8.3	100	88.0	100	100	100
Loan size (dollars)										
Less than 100,000	814	840	4.4	44.2	8.3	37.7	87.3	37.5	100	37.8
100,000–200,000	812	836	3.9	39.1	8.7	39.9	87.5	37.8	100	38.0
More than 200,000	819	840	2.6	16.8	7.6	22.4	89.8	24.7	100	24.2
All	815	839	3.8	100	8.3	100	88.0	100	100	100
Location characteristic										
ZIP code median income (percentage of area median income)										
Less than 80	788	811	5.5	13.4	12.6	13.9	81.9	8.5	100	9.1
80 to 120	811	836	4.2	52.9	8.6	50.1	87.2	47.5	100	47.9
More than 120	824	847	2.9	33.6	6.9	36.0	90.1	44.1	100	43.0
All	815	839	3.8	100	8.3	100	88.0	100	100	100
Home values (percentage of area median home value)										
Less than 80	802	828	5.1	38.1	9.9	33.6	84.9	26.9	100	27.9
80 to 120	812	835	3.7	24.3	8.4	25.1	87.9	24.7	100	24.7
More than 120	824	848	3.0	37.6	7.2	41.3	89.8	48.4	100	47.4
All	815	839	3.8	100	8.3	100	88.0	100	100	100
DELINQUENT										
Mortgage characteristic										
Loan-to-value ratio (percent)										
Less than 81	713	723	14.9	63.6	22.3	72.4	62.8	90.8	100	81.0
81 to 90	678	638	30.0	27.3	40.0	27.6	30.0	9.2	100	17.2
More than 90	576	576	100	9.1	0	0	0	0	100	1.7
All	710	718	19.0	100	25.0	100	56.0	100	100	100
Loan size (dollars)										
Less than 100,000	683	661	24.1	31.8	27.6	27.6	48.3	20.6	100	24.4
100,000–200,000	700	694	14.6	31.8	33.3	55.2	52.1	36.8	100	40.3
More than 200,000	739	764	19.0	36.4	11.9	17.2	69.0	42.6	100	35.3
All	710	718	18.5	100	24.4	100	57.1	100	100	100
Location characteristic										
ZIP code median income (percentage of area median income)										
Less than 80	631	653	43.8	31.8	6.3	3.4	50.0	11.8	100	13.4
80 to 120	720	729	15.4	45.4	27.7	62.1	56.9	54.4	100	54.6
More than 120	725	718	13.2	22.7	26.3	34.5	60.5	33.8	100	31.9
All	710	718	18.5	100	24.4	100	57.1	100	100	100
Home value (percentage of area median home value)										
Less than 80	706	707	17.6	27.3	23.5	27.6	58.8	29.4	100	28.6
80 to 120	688	678	12.8	22.7	38.5	51.7	48.7	27.9	100	32.8
More than 120	731	764	23.9	50.0	13.0	20.7	63.0	42.6	100	38.7
All	710	718	18.5	100	24.4	100	57.1	100	100	100

NOTE. See notes to table 3.
SOURCE. Equifax Credit Information Services, Inc.

The performance patterns by credit score and loan-to-value ratio are very similar for borrowers at all income levels. For example, among borrowers with high incomes, those with low credit scores and high loan-to-value ratios still have a foreclosure rate almost 50 times higher than those with high credit scores and low loan-to-value ratios.

These performance data reflect foreclosures during only the first eighteen to twenty-four months after origination. Typically, most foreclosures occur more than two years after origination. Analysts at Freddie Mac, however, believe that the pattern of *relative* foreclosure rates presented in table 6 will hold as these loans season.

5. Newly originated government-backed fixed rate mortgage loans, grouped by payment performance and characteristic and distributed by credit score

Percent except as noted

Performance of mortgage and characteristic	Credit score								Total	
			Low		Medium		High			
	Mean	Median	Percent of characteristic	Memo: Percent of score range	Percent of characteristic	Memo: Percent of score range	Percent of characteristic	Memo: Percent of score range	Percent of characteristic	Memo: Percent of all loans
PAID AS SCHEDULED										
Mortgage characteristic										
Loan size (dollars)										
Less than 100,000	752	767	12.6	71.4	17.1	68.9	70.2	64.9	100	66.4
More than 100,000	762	780	9.9	28.6	15.2	31.1	74.8	35.1	100	33.6
All	756	772	11.7	100	16.5	100	71.8	100	100	100
Location characteristic										
ZIP code median income (percentage of area median income)										
Less than 80	728	733	14.9	12.9	22.6	13.9	62.5	8.8	100	10.2
80 to 120	754	770	11.9	65.6	16.5	64.6	71.6	64.5	100	64.6
More than 120	770	792	10.0	21.5	14.1	21.5	76.0	26.7	100	25.2
All	756	772	11.7	100	16.5	100	71.8	100	100	100
Home values (percentage of area median home value)										
Less than 80	751	766	12.2	37.6	18.0	39.2	69.8	35.0	100	36.0
80 to 120	756	772	12.0	39.7	15.7	36.8	72.3	39.0	100	38.7
More than 120	763	780	10.5	22.8	15.6	24.0	73.8	26.1	100	25.4
All	756	772	11.7	100	16.5	100	71.8	100	100	100
DELINQUENT										
Mortgage characteristic										
Loan size (dollars)										
Less than 100,000	604	592	54.5	68.9	25.0	65.3	20.5	59.1	100	65.8
More than 100,000	622	610	47.2	31.1	25.5	34.7	27.3	40.9	100	34.2
All	610	598	52.0	100	25.2	100	22.8	100	100	100
Location characteristic										
ZIP code median income (percentage of area median income)										
Less than 80	596	593	54.5	16.6	29.5	18.5	16.0	11.1	100	15.8
80 to 120	606	592	54.5	68.4	22.9	59.3	22.6	64.4	100	65.2
More than 120	635	626	41.2	15.0	29.4	22.2	29.4	24.4	100	19.0
All	610	598	52.0	100	25.2	100	22.8	100	100	100
Home value (percentage of area median home value)										
Less than 80	604	591	54.0	45.3	25.6	44.4	20.5	39.1	100	43.7
80 to 120	614	606	48.9	34.2	27.1	39.1	24.0	38.2	100	36.3
More than 120	616	597	53.3	20.5	20.8	16.5	25.9	22.7	100	20.0
All	610	598	52.0	100	25.2	100	22.8	100	100	100

NOTE. See notes to table 3.
SOURCE. Equifax Credit Information Services, Inc.

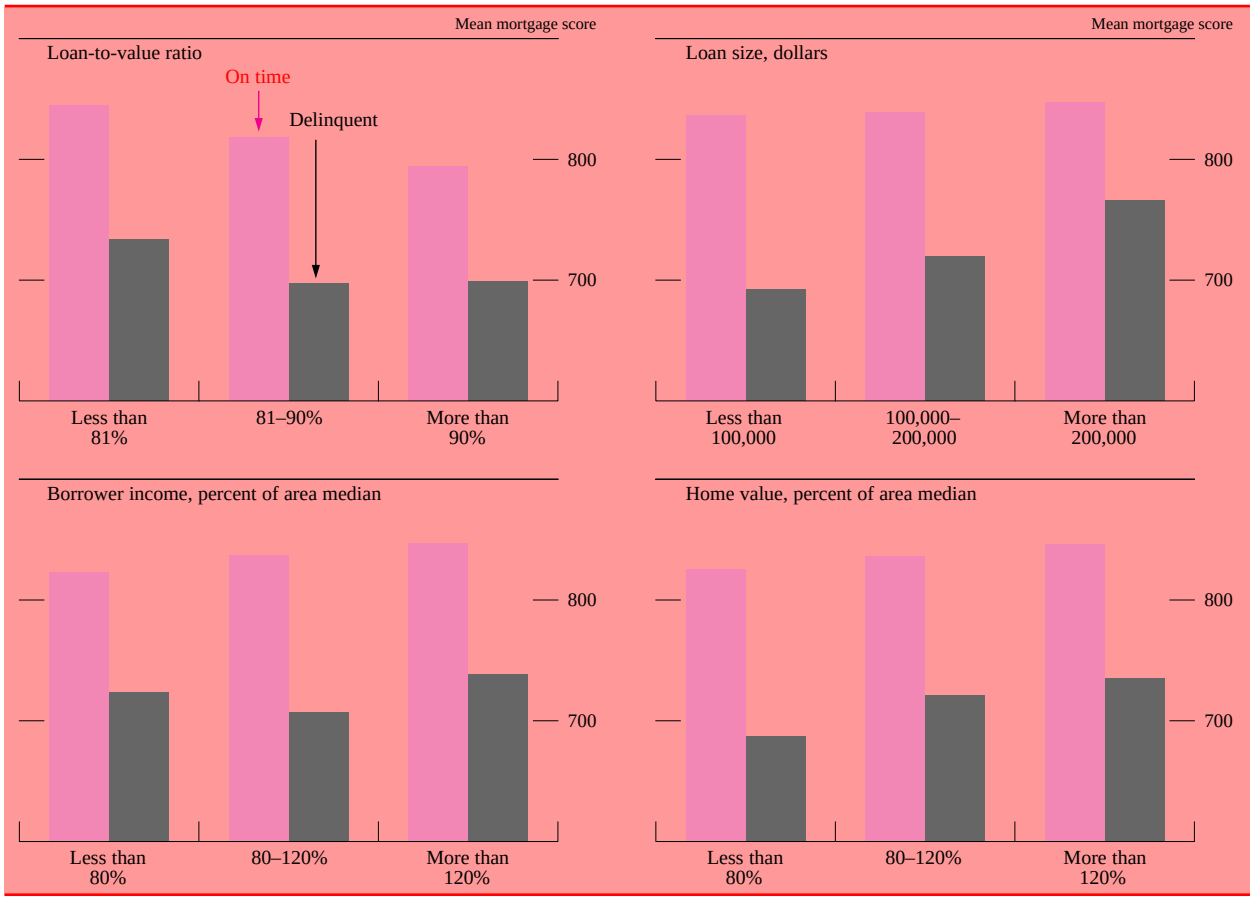
THE DISTRIBUTION OF SCORES ACROSS THE POPULATION

Little information is publicly available about how credit histories vary across population groups. As a summary measure of the credit histories of individuals, credit history scores provide a convenient way to compare different segments of the population with respect to their credit history profiles. Such comparisons offer a rough and partial guide to the willingness of lenders to extend credit to different categories of households, since credit history is only one element lenders consider in the evaluation of a mortgage application. Even applicants with low scores may qualify for a mortgage if they have compensating factors such as a low loan-to-value ratio.

Proprietary information on the credit history scores, mortgage status, and ZIP code location of individuals and households was obtained from Equifax. The information is based on a nationally representative sample and includes the Equifax TMS scores for 3.4 million individuals and the 2.5 million households they comprise.[27] Households were classi-

27. The sample was drawn by sorting the country's roughly 29,000 residential ZIP codes into strata defined by Census region, center-city/suburban/rural location, and median household income. A stratified nationally representative sample of 994 ZIP codes was drawn from these strata. TMS scores (computed in the same way as those dis-

1. Mean mortgage scores of selected, newly originated, conventional fixed rate loans, by payment status and characteristics of loan and locality



NOTE. For definitions and source, see notes to tables 2 and 3.

fied according to whether or not they appeared to have an outstanding mortgage loan. Other than the TMS score and mortgage status, no information was provided about the characteristics of the individuals. However, because the ZIP code of the individual's residence is known, it is possible to classify individuals by the characteristics of these locations.

We have calculated the distributions of three different population groups—individuals, households, and households identified as having mortgages—across the same TMS score ranges used in the previous section for various classifications of ZIP code. For all three population groups, the distributions of TMS scores are similar across different categories of ZIP code, although some absolute differences exist (table 7). For example, households with mortgages tend to have fewer low scores and tend to live in areas with higher relative median family incomes and median home values. For all categories, more than half, and in most cases more than two-thirds, of sample households or individuals have TMS scores in the high range. For these households, TMS scores fall within the acceptable range for mortgage qualification.

About 20 percent of individuals, 23 percent of households, and 15 percent of households with mortgages have low TMS scores and thus may have problems qualifying for a mortgage on the basis of their credit histories (table 7). These proportions do not vary much across urban/suburban/rural classifications but do vary substantially by median income and

cussed in the previous section) were obtained for all individuals with credit files in Equifax's off-line credit marketing database showing addresses in the sample ZIP codes.

Credit reports showing the same address were considered to be from the same household, and the low-score report (if two reports were involved) or the middle-score report (if three or more reports were involved) was chosen to represent the household. These figures understate the number of households with more than one adult. A possible explanation is that many couples obtain credit in only one person's name.

6. Relative foreclosure rates for selected categories of mortgage loans, by credit score range

Index

Loan-to-value ratio and borrower income	Low	Medium	High
All loans			
Borrower income (percentage of area median income)			
Less than 80	36.8	13.9	2.2
80 to 120	35.3	10.2	1.7
120 or more	31.1	8.9	1.1
All	33.9	10.3	1.5
Loan-to-value ratio less than 81 percent			
Borrower income (percentage of area median income)			
Less than 80	32.0	11.0	1.8
80 to 120	29.0	7.4	1.1
120 or more	22.0	6.7	.7
All	26.9	7.9	1.0
Loan-to-value ratio 81 percent or more			
Borrower income (percentage of area median income)			
Less than 80	51.4	23.0	4.4
80 to 120	47.4	15.8	3.6
120 or more	46.7	12.9	2.8
All	47.6	15.3	3.3

NOTE. The loans are for single-family owner-occupied properties and were purchased by Freddie Mac in the first six months of 1994. Index of foreclosure rate covers loans foreclosed by December 31, 1995; the index sets the average foreclosure rate equal to 1 for loans with borrower generic credit bureau scores of more than 660 and loan-to-value ratios of less than 81 percent.

The credit score ranges correspond to generic credit bureau scores as follows: low = less than 621, medium = 621–660, and high = more than 660.

Area median income is the median family income of the property's MSA or, if location is not in an MSA, the median family income of the property's county. Borrower income is as of the time of loan origination.

SOURCE. Freddie Mac.

home value of ZIP codes and by Census region. For example, about 33 percent of the households living in ZIP codes with median family incomes in the lowest range have low scores, compared with only 17 percent of households living in ZIP codes with median family incomes in the highest income range.

The extent of the variation in TMS scores by Census region is somewhat surprising. Although some of the variation by region is explained by differences in economic factors such as income and unemployment rates (additional analysis not shown), much of the variation is unexplained.

Information on the distribution, across score ranges, of households identified as having mortgages is potentially useful for forecasting the ability of mortgage holders to refinance their outstanding mortgage loans. As noted, 15 percent of all the households with mortgages have low TMS scores and thus may have difficulty refinancing.[28] Again, the proportion with low scores varies substantially by area income and home value and region. Almost one-fourth of households with mortgages in ZIP codes with lower incomes or lower home values fall in the low-score range and may have difficulty refinancing.

THE PERFORMANCE OF LOANS IN AFFORDABLE HOME LOAN PROGRAMS

In recent years mortgage originators, secondary mortgage market institutions (Fannie Mae and Freddie Mac in particular), and PMI companies have initiated a wide variety of affordable home loan programs intended to benefit low- and moderate-income and minority households and neighborhoods (see box "The Elements of an Affordable Home Loan Program").[29] These initiatives supplement a variety of long-standing government-sponsored programs, particularly those of the FHA and state and local housing authorities. In many cases, the reach of private-sector programs has been extended through public–private partnerships.

Analysis of data gathered under the Home Mortgage Disclosure Act (HMDA) for the period 1992–94 suggests that affordable home loan programs may be having an effect in metropolitan statistical areas (MSAs), as conventional mortgage lending to low- and moderate-income borrowers has increased at a substantially faster rate than lending to other groups (table 8). From 1992 to 1993 and from 1993 to 1994, the number of conventional home purchase loans extended to low- and moderate-income borrowers (incomes below 80 percent of the MSA median) increased 38 percent and 27 percent respectively. Over these same two years, lending to upper-income borrowers (incomes above 120 percent of the MSA median) rose more slowly, increasing only 8 percent and then 13 percent.

A combination of factors may have given rise to this pattern of lending. In some cases, lenders may be responding to newly perceived profit opportunities in underserved market niches. Some depository institutions may also be seeking to build an outstanding record of community reinvestment in order to enhance their compliance with the Community

28. This finding should be viewed with some caution. The percentage of sample households identified as having mortgages is lower than the proportion estimated from other data sources. If the sample households identified as having mortgages have a different credit score distribution than mortgage holders overall, then the sample statistics may be biased.

29. See "Affordable Mortgage Program Study," Consumer Bankers Association, annual reports 1993–95. For a review of the affordable lending initiatives sponsored by Fannie Mae and Freddie Mac, see the brochures "Opening Doors with Fannie Mae's Community Lending Products," Fannie Mae, 1995, and "Expanding the Dream," Freddie Mac, 1995.

The Elements of an Affordable Home Loan Program

The details vary widely, but affordable home loan programs generally involve four distinct elements: targeted groups, special marketing, the application of flexible underwriting standards, and the use of risk mitigation activities. Targeted groups are usually defined with eligibility criteria tied to borrower or neighborhood income, loan-to-value ratios, location, homebuyer status (for example, first-time homebuyers), and other factors.

Most important among these criteria are the income eligibility restrictions, which normally require a prospective borrower to have a low or moderate income or to purchase a home in a low- or moderate-income neighborhood. Special marketing activities commonly include homebuyer education seminars and outreach to religious and community organizations active in targeted neighborhoods. Flexible underwriting policies usually have the following characteristics: low-down-payment requirements; higher acceptable ratios of debt payment to income; the use of alternative credit history information such as records of payments for rent and utilities; flexible employment standards; and reduced cash reserve requirements. In addition, many lenders offer reduced interest rates, waive private mortgage insurance requirements, or reduce or waive points or fees associated with originating the loan.

To reduce the potential for higher losses on these flexibly underwritten loans, lenders customarily require the borrower to complete a homebuyer education program and to undergo credit counseling when needed. Lenders also use enhanced servicing techniques on these loans, contacting borrowers by phone, for example, as soon as they are thirty-days delinquent to determine the cause of the delinquency and to establish a plan to rectify the situation.

Reinvestment Act (CRA).[30] More generally, financial institutions may have determined that increased lending to a targeted area would serve their long-run interest in community stability. Finally, relatively larger numbers of low- and moderate-income households may have been seeking to purchase homes during this period because the affordability of housing improved to levels not seen since the 1960s.

Since affordable home lending initiatives typically involve the application of flexible underwriting standards, questions have been raised about whether the payment performance, and ultimately the profitability, of these loans is substantially different from that of traditionally underwritten loans. Analyses of these issues have tended to focus on measures of payment performance such as delinquency rates or, more rarely, the incidence of default. Little information is available about the cost of other aspects of affordable lending programs, such as enhanced servicing, homebuyer education, and various forms of direct subsidies (for example, waivers of some or all closing costs), that also affect the profitability of these programs. Similarly, little is known about possible increases in revenue that may result from a high-volume affordable lending program. For example, providing mortgages to lower-income households may lead to other credit- or deposit-related relationships that may be profitable for the lender.

Evidence from Roundtable Discussions

Until recently, most of the available information on the performance of affordable home lending programs had been anecdotal. For example, in roundtable discussions held with lenders in preparing the Federal Reserve's 1993 "Report to the Congress on Community Development Lending by Depository Institutions," the participants generally held the view that the costs of originating and servicing loans made under affordable home loan programs were greater than those incurred on other housing loans but that delinquency and default experience to that time had not been worse. Statistical analysis undertaken for that report did not find any notable relationship between bank profitability and the level of lower income mortgage lending activity.[31]

The roundtable participants suggested that the increased risks associated with allowing more flexible underwriting can be mitigated in various ways. Some lenders, by drawing on their specialized knowledge of local market conditions, familiarity with borrowers, and greater experience with affordable home lending, may be able to reduce the risks of applying flexible underwriting guidelines. By integrating care-

30. The Community Reinvestment Act of 1977 is intended to encourage commercial banks and savings associations to help meet the credit needs of the local communities in which they are chartered, including low- and moderate-income neighborhoods, in a manner consistent with safe and sound operations. For a review of different perspectives on the CRA, see Glenn B. Canner and Wayne Passmore, "Home Purchase Lending in Low-Income Neighborhoods and to Low-Income Borrowers," *Federal Reserve Bulletin*, vol. 81 (February 1995), pp. 71–103.

31. Statistical analysis of bank profitability and affordable home lending was based on data from the 1992 HMDA reports and from Call Reports of commercial banks and thrift institutions. See Board of Governors of the Federal Reserve System, "Report to the Congress on Community Development Lending by Depository Institutions" (Board of Governors, 1993).

7. Individuals and households, grouped by ZIP code characteristic and distributed by credit score range

Percent

Characteristic of ZIP code	Low		Medium		High		Total	
	Percent of characteristic	MEMO: Percent of score range	Percent of characteristic	MEMO: Percent of score range	Percent of characteristic	MEMO: Percent of score range	Percent of characteristic	MEMO: Percent of score range
	Individuals							
Median income of ZIP code (percentage of area median income)[1]								
Less than 80	29.5	21.0	14.2	17.4	56.3	11.9	100	14.4
80 to 120	19.8	65.2	11.8	66.6	68.4	67.2	100	66.7
More than 120	14.9	13.8	10.0	16.0	75.1	20.8	100	18.8
All	20.3	100	11.8	100	67.9	100	100	100
Median home value of ZIP code (percentage of area median home value)[2]								
Less than 80	27.4	34.3	13.9	29.7	58.7	21.9	100	25.3
80 to 120	19.6	51.7	11.5	52.2	68.9	54.1	100	53.4
More than 120	13.4	14.1	10.0	18.0	76.6	24.0	100	21.3
All	20.3	100	11.8	100	67.9	100	100	100
Urbanization of ZIP code								
Urban	22.0	37.5	12.0	35.0	66.0	33.5	100	34.5
Suburban	18.9	44.0	11.4	45.4	69.7	48.4	100	47.2
Rural	20.4	18.5	12.6	19.6	67.0	18.1	100	18.4
All	20.3	100	11.8	100	67.9	100	100	100
Census region of ZIP code[3]								
Northeast								
New England	17.8	5.4	11.2	5.8	71.0	6.5	100	6.2
Middle Atlantic	17.9	14.6	11.0	15.4	71.1	17.3	100	16.5
Midwest								
East North Central	15.5	9.4	10.8	11.2	73.6	13.2	100	12.2
West North Central	16.5	5.3	10.4	5.8	73.1	7.0	100	6.5
South								
South Atlantic	21.7	23.7	11.5	21.5	66.8	21.7	100	22.1
East South Central	25.5	5.1	13.8	4.8	60.7	3.6	100	4.1
West South Central	27.8	13.9	13.6	11.7	58.6	8.8	100	10.1
West								
Mountain	20.4	6.3	12.5	6.7	67.1	6.2	100	6.3
Pacific	20.6	16.2	12.7	17.1	66.7	15.7	100	15.9
All	20.3	100	11.8	100	67.9	100	100	100
	All households							
Median income of ZIP code (percentage of area median income)[1]								
Less than 80	32.8	21.4	14.9	17.6	52.3	12.2	100	15.0
80 to 120	22.4	65.0	12.7	66.6	64.9	67.2	100	66.6
More than 120	17.0	13.6	11.0	15.9	72.1	20.6	100	18.4
All	22.9	100	12.7	100	64.4	100	100	100
Median home value of ZIP code (percentage of area median home value)[2]								
Less than 80	30.7	34.3	14.7	29.6	54.6	21.8	100	25.6
80 to 120	22.3	51.3	12.5	51.6	65.2	53.3	100	52.7
More than 120	15.2	14.4	11.0	18.7	73.8	24.9	100	21.7
All	22.9	100	12.7	100	64.4	100	100	100
Urbanization of ZIP code								
Urban	24.7	38.4	12.8	35.9	62.5	34.6	100	35.7
Suburban	21.5	43.0	12.3	44.5	66.2	47.2	100	45.9
Rural	23.1	18.6	13.5	19.6	63.4	18.1	100	18.4
All	22.9	100	12.7	100	64.4	100	100	100
Census region of ZIP code[3]								
Northeast								
New England	20.3	5.3	12.3	5.8	67.3	6.3	100	6.0
Middle Atlantic	20.2	14.4	11.9	15.4	67.9	17.3	100	16.4
Midwest								
East North Central	17.9	9.3	11.8	11.1	70.2	13.0	100	11.9
West North Central	18.9	5.3	11.4	5.8	69.8	7.0	100	6.5
South								
South Atlantic	24.5	23.9	12.4	21.8	63.1	22.0	100	22.4
East South Central	28.6	5.1	14.7	4.8	56.7	3.6	100	4.1
West South Central	31.1	13.8	14.2	11.4	54.7	8.6	100	10.2
West								
Mountain	23.1	6.4	13.5	6.7	63.4	6.3	100	6.4
Pacific	23.2	16.3	13.6	17.3	63.2	15.9	100	16.1
All	22.9	100	12.7	100	64.4	100	100	100

7. Continued

Percent

Characteristic of ZIP code	Low		Medium		High		Total	
	Percent of characteristic	MEMO: Percent of score range	Percent of characteristic	MEMO: Percent of score range	Percent of characteristic	MEMO: Percent of score range	Percent of characteristic	MEMO: Percent of score range
	Households with mortgages							
Median income of ZIP code (percentage of area median income)[1]								
Less than 80	22.6	14.5	14.5	12.8	62.9	8.2	100	9.6
80 to 120	15.1	64.2	11.0	64.3	73.9	63.3	100	63.6
More than 120	11.9	21.3	9.3	22.9	78.8	28.5	100	26.8
All	15.0	100	10.9	100	74.1	100	100	100
Median home value of ZIP code (percentage of area median home value)[2]								
Less than 80	22.2	29.6	14.2	25.9	63.6	17.1	100	19.9
80 to 120	14.9	55.5	10.8	55.2	74.3	55.9	100	55.8
More than 120	9.2	14.9	8.5	18.9	82.4	27.0	100	24.3
All	15.0	100	10.9	100	74.1	100	100	100
Urbanization of ZIP code								
Urban	15.0	32.2	11.1	32.7	73.9	32.0	100	32.1
Suburban	15.1	57.4	10.7	56.0	74.2	57.1	100	57.0
Rural	14.4	10.4	11.3	11.3	74.3	10.9	100	10.9
All	15.0	100	10.9	100	74.1	100	100	100
Census region of ZIP code[3]								
Northeast								
New England	13.6	6.2	10.7	6.7	75.7	7.0	100	6.9
Middle Atlantic	14.1	13.7	10.1	13.5	75.8	14.9	100	14.6
Midwest								
East North Central	11.4	8.7	10.1	10.5	78.5	12.0	100	11.3
West North Central	12.1	4.1	9.2	4.3	78.6	5.4	100	5.1
South								
South Atlantic	15.6	26.5	10.4	24.3	73.9	25.3	100	25.4
East South Central	17.9	2.8	12.0	2.6	70.2	2.2	100	2.4
West South Central	19.8	11.3	11.9	9.3	68.3	7.8	100	8.5
West								
Mountain	15.3	7.5	11.7	7.9	73.0	7.3	100	7.4
Pacific	15.5	19.2	12.2	20.8	72.3	18.1	100	18.5
All	15.0	100	10.9	100	74.1	100	100	100

NOTE. The credit score is The Mortgage Score (TMS), of Equifax Mortgage Services. For definition of TMS and of the credit score ranges, see note to table 2; see also text note 27.

1. Median family income in ZIP code in which the property is located relative to median family income in the property's MSA or, if location is not in an MSA, relative to median family income in the non-MSA portion of the state.

2. Median value of owner-occupied homes in ZIP code in which the property is located relative to median value of owner-occupied homes in the property's MSA or, if location is not in an MSA, relative to median value of owner-occupied homes in non-MSA portion of state.

3. See map of Census Bureau regions and divisions, inside front cover, U.S. Department of Commerce, *Statistical Abstract of the United States: 1994*, Bureau of the Census (Government Printing Office, 1994).

SOURCE. Equifax Credit Information Services, Inc.

fully designed homebuyer education efforts and credit counseling services into their affordable lending programs, lenders may be able to screen out relatively high-risk applicants and better prepare first-time homebuyers for the responsibilities of homeownership. In addition, by adopting an enhanced servicing program for affordable home loan products that includes postpurchase contact and counseling and, if necessary, early delinquency intervention, lenders may be able to help avoid some potential defaults.

Experiences of Secondary-Market Institutions and Private Mortgage Insurers

Additional evidence has begun to accumulate about the performance of loans extended under affordable home loan programs and purchased by secondary-market institutions or insured by private mortgage insurance companies. For the most part, the evidence pertains to delinquency rates, because the loans examined are too recent in origin to permit a comprehensive evaluation of default and loss experience. In what follows, it should be emphasized that the vast majority of borrowers relying on affordable home loan products are current on their mortgage payments. However, even relatively small delinquency and default rates may make a program unprofitable. Analyzing delinquencies and defaults can highlight specific variables in the program that might be modified to screen out particularly bad risks and enhance program profitability.

Freddie Mac has been following the performance of the affordable home loans it purchases under its

8. Increase in number of conventional home purchase loans for lenders reporting under HMDA, by selected characteristics of borrowers, 1992–94

Percent

Borrower characteristic	1992–93	1993–94	Memo: Number of loans in 1994
All	16.5	17.9	2,795,162
Race or ethnic group			
American Indian/Alaskan Native	7.3	23.8	10,691
Asian/Pacific Islander	6.5	18.6	93,319
Black	35.8	54.7	125,796
Hispanic	25.4	42.0	129,695
White	17.5	15.7	2,281,450
Other	64.1	61.3	18,984
Joint (white/minority)	17.8	37.0	60,763
Income (percentage of MSA median)[1]			
Less than 80	38.4	27.0	516,824
80–99	21.4	19.1	295,734
100–120	16.2	15.7	285,044
More than 120	8.2	12.5	1,069,305
Income less than 80 percent of MSA median			
American Indian/Alaskan Native	22.1	32.0	2,125
Asian/Pacific Islander	28.6	29.3	16,865
Black	67.7	62.8	39,666
Hispanic	49.5	67.9	38,213
White	36.4	19.8	391,535
Total[2]	38.4	27.0	516,824

Note. As of 1993, a large number of additional independent mortgage companies became covered by the Home Mortgage Disclosure Act (HMDA). To provide the most appropriate year-over-year comparisons, the lending activity of these newly covered firms was excluded from 1993 volume estimates.

1. MSA median is the median family income of the metropolitan statistical area in which the property related to the loan is located (table includes only properties in MSAs).

2. Includes loans for which race is unknown or categorized as "other" or "joint."

Source. Federal Financial Institutions Examination Council.

"Affordable Gold" program, which was established to promote lending to low- and moderate-income households.[32] Freddie Mac reports that the sixty-day delinquency rate on these loans has been higher than on a "peer group" of traditionally underwritten mortgages, controlling for the loan-to-value ratio, the date of loan origination, region of the country, and type of property.[33] Among those Affordable Gold loans originated in 1994 for which borrowers were allowed to meet part of the minimum down-payment requirements with funds provided by a third party, the delinquency rate through February 1996 has been about 4 times higher than that for the peer group of traditionally underwritten loans. Other Affordable Gold loans originated in 1994 show a delinquency rate about 50 percent higher than that for the peer group.

To help enhance the effectiveness of its Affordable Gold home loan program, Freddie Mac offers lenders a tool, titled the "Gold Measure Worksheet," that can assist loan underwriters in their efforts to accurately assess the risk associated with combining various flexibilities in underwriting affordable home loans (see box "Freddie Mac's Gold Measure Worksheet").

32. Most of the loans extended to low- and moderate-income households that are purchased by Freddie Mac (and Fannie Mae) qualify under standard underwriting guidelines. Loans in the Affordable Gold program are generally underwritten using nonstandard criteria. Fannie Mae has a similar program, the "Community Home Buyers Program."

The performance of loans made to low- and moderate-income households using standard underwriting guidelines may be different from that of Affordable Gold loans. As shown in table 6 for loans underwritten with standard guidelines, borrower income is not strongly related to foreclosure rates.

33. See comments by Leland Brendsel in Snigdha Prakash, "Freddie Sounds a Delinquency Alarm on Popular Lower-Income Mortgage," *American Banker,* July 21, 1995, pp. 1 and 8.

Freddie Mac's Gold Measure Worksheet

Freddie Mac says that its Gold Measure Worksheet is a tool "designed to assist management and underwriters in their efforts to accurately assess the risk associated with combining various underwriting flexibilities," and thereby it helps the lender determine whether a loan will be acceptable for sale to Freddie Mac under its Affordable Gold program.

The worksheet (facing page) identifies borrower and loan characteristics related to credit risk and assigns a specific number of points (referred to as risk units, or RUs) to each characteristic. The sum of the risk units provides a summary measure of the risk associated with a given loan. The applicant's credit history is one element considered and is evaluated by using a credit history score obtained from a credit bureau or by measuring the individual components of the credit history file.

According to Freddie Mac, the Gold Measure Worksheet is intended to complement, rather than replace, the judgment of underwriters. As indicated in the worksheet instructions, it should be used in conjunction with Freddie Mac's booklet *Discover Gold Through Expanding Markets* "to identify compensating factors and risk offsets." This booklet provides case studies illustrating the flexibility lenders have in applying Freddie Mac's underwriting guidelines.

Freddie Mac specifies the following guidelines for evaluating the summary score derived from the Gold Measure Worksheet:

- A score of 15 or less (or up to 18 with comprehensive borrower prepurchase and postpurchase homeownership education) is acceptable to Freddie Mac, provided no other risk is apparent from the review of borrower eligibility, property appraisal, potential fraud, or data integrity issues.
- A score between 16 and 25 is acceptable only with documented offsets not captured on the Gold Measure Worksheet.
- A score greater than 25 requires that the transaction be further evaluated. Generally, Freddie Mac has found that loans with RUs greater than 25 are not acceptable for purchase without sufficient compensating factors.

Freddie Mac

GOLD MEASURE WORKSHEET—Version 2.0

Borrower/Co-borrower Name(s) _____
_____
City, State _____
Lender Loan Number _____
Origination Date _____
Completion Date _____

Seller Name _____
Freddie Mac Seller Number _____
Freddie Mac Loan Number (if available) _____
Branch Office/Channel _____
Underwriting Center _____
TPO Name _____
Underwriter _____

Loan Decision Approved __ Denied __ Withdrawn __ File Closed __

Directions:
- Circle the appropriate "Risk Units" (RUs) for each category. Total the RUs in each section and enter on the Subtotal line. Then combine Subtotals for each section and enter the Grand Total on the Total RUs line. Note that negative numbers such as "–2" are risk offsets.
- It is important to read the accompanying *Gold Measure Worksheet and Instructions—Version 2.0* booklet and to refer to it for additional information on completing this worksheet.
- This worksheet is an aid, not a substitute for the underwriting decision.
- Complete **either** Credit File A **or** Credit File B, but not both. Use Credit File A if 3 credit scores are requested. Use Credit File B if fewer than 3 credit scores are requested. See the *Gold Measure Worksheet and Instructions—Version 2.0* booklet for easy instructions on how to order bureau and bankruptcy scores for use with Credit File A.

I. Credit File A

Directions: When using Credit File A, complete **either** the Bureau Score **or** the Bankruptcy Score, but not both.

Bureau Score Equifax Beacon Score, Trans Union Empirica Score and TRW-FICO Score (See instructions)	RUs	**Bankruptcy Score** Equifax DAS Score, Trans Union Delphi Score and TRW-MDS Score (See instructions)	RUs
Over 790	–16	150 or less	–12
771 – 790	–14	151 – 200	–10
761 – 770	–11	201 – 240	–4
731 – 760	–7	241 – 300	–3
721 – 730	–5	301 – 320	–1
701 – 720	0	321 – 360	0
681 – 700	6	361 – 420	4
661 – 680	8	421 – 480	8
641 – 660	12	481 – 540	11
621 – 640	17	541 – 620	15
601 – 620	20	621 – 700	18
581 – 600	23	701 – 740	21
541 – 580	25	741 – 840	23
540 or less	32	841 – 960	25
		Over 960	29
No reported Score available	20	No reported Score available	20

I. Credit File A.
Subtotal of circled **RUs**: _____

II. Income

	RUs
Self-employed and above area median income:	5
Majority of income from commissions:	5
Employed second earner on application:	–2
Borrower's time on job is 5 years or more:	–2
Co-borrower's time on job is 2 years or more:	–1

II. Income. **Subtotal** of circled **RUs**: _____

III. Loan, Collateral, Assets

LTV/TLTV (including secondary financing*) is:	RUs
60.5% or lower	–27
60.6 – 70.5%	–16
70.6 – 80.0%	–5
80.1 – 85.5%	–1
85.6 – 90.5%	0
90.6 – 93.5%	2
93.6 – 94.5%	5
94.6 – 95.5%	8
95.6 – 96.5%	10
96.6 – 98.5%	11
98.6 – 99.5%	13
99.6 – 99.9%	15

Property seller contributions exceed 3% of value:	RUs
	5

Reserves are:	RUs
Less than 1 month	8
At least 1, but less than 2 months	5
At least 2, but less than 4 months	0
At least 4, but less than 5 months	–3
5 or more months	–6

Less than 5% down from borrower funds with 95% LTV (e.g. Affordable Gold with 3/2 Option):	RUs
	8

III. Loan, Collateral, Assets.
Subtotal of circled **RUs**: _____

*When secondary financing is included, if the secondary financing provides for any amortization (payments) before maturity of the Freddie Mac loan, then add 1% to LTV for every rounded percentage point of secondary financing. Likewise, add 0.5% to LTV for every rounded percentage point of secondary financing, if there is no amortization (no payments due) before maturity of the Freddie Mac loan. Unsecured grants or gifts require no adjustments to LTV.

I. Credit File B

Directions: Use Credit File B if fewer than 3 credit scores are requested.

No delinquencies or other derogatory tradeline or derogatory public record information and number of tradelines (open or closed) is:	RUs
11 or more	–4
6 – 10	–3
1 – 5	0

One or more revolving tradelines and **total** revolving balances are under $500:	RUs
	–4

Fewer than 3 tradelines (open or closed):	RUs
	2

Percent of all tradelines (open or closed) ever delinquent or worse (30-90 days or more, collection, charge-off, etc.):	RUs
0 – 10%	–3
11 – 15%	0
16 – 40%	4
41 – 60%	8
Over 60%	11

Worst ever derogatory credit file entry is either:	RUs
■ 30–180 days delinquent:	6
or	
■ Public record (bankruptcy, foreclosure, judgment, lien, garnishment, suit, certain collections) or tradeline reported as over 180 days delinquent, charge-off, repossession or collection:	10

Number of derogatory Public records:	RUs
0 – 1	0
2 – 3	4
Over 3	9

Number of inquiries in the past 3 months:	RUs
0	–2
1	0
2 – 3	5
4	8
5	11
More than 5	14

Age of **oldest tradeline** (in months):	RUs
0 (no tradelines) – 6	18
7 – 12	13
13 – 24	7
25 – 48	3
49 – 72	2
73 – 120	0
121 – 168	–1
169 or more	–2

If age of oldest tradeline is 13–48 months and **any one or more** of the following: ■ More than 3 inquiries within the past 3 months ■ More than 3 tradelines opened in the past year ■ Total open balances exceed $10,000	RUs
	6

I. Credit File B.
Subtotal of circled **RUs**: _____

IV. Debt-Payment Burden

Debt-to-income ratio is:	RUs
Less than 32.6%	0
32.6 – 38.5%	2
38.6 – 40.5%	4
40.6 – 42.5%	7
42.6 – 44.5%	10
44.6 – 46.5%	13
46.6 – 48.5%	15
48.6 – 50.5%	18
Over 50.5%	30

Spread between total debt and housing ratios (i.e. nonhousing debt ratio) is:	RUs
10 to 15%	2
More than 15%	5

Proposed housing expense is less than 120% of previous housing expense:	RUs
	–1

IV. Debt-Payment Burden. **Subtotal** of circled **RUs**: _____

V. Loan/Property Type

Loan type is:		RUs
Fixed-Rate:	15-Year	–6
	20-Year	–4
	25-Year	–1
ARM:	Rate-Capped	6
	Payment-Capped	8

Property type is:	RUs
2 Unit	5
3–4 Unit	11
Condominium	5

V. Loan/Property Type.
Subtotal of circled **RUs**: _____

Total of sections I A or B, II, III, IV and V. **TOTAL RUs:** _____

Freddie Mac Risk Unit Guideline:	15 RUs
If pre-purchase counseling:	16 RUs
If post-purchase counseling:	17 RUs
If pre- and post-purchase counseling:	18 RUs

Refer to *Gold Measure Worksheet and Instructions—Version 2.0* booklet for more information. This worksheet is an aid, not a substitute for the underwriting decision. Call your Account Representative for additional information.

Freddie Mac finds that the ''Gold Measure score'' (the application score computed using the Gold Measure Worksheet) is a strong predictor of loan performance and that the Gold Measure Worksheet provides a useful guide to making sound affordable housing loans. For example, among the Affordable Gold loans originated in 1994, the delinquency rate for those with scores (at origination) in the ''high risk'' range was 5.6 times higher than the overall delinquency rate for the peer group.[34] Those with scores in the ''medium risk'' range had a delinquency rate 1.4 times higher than the peer group, while those with scores in the ''low risk'' range had a delinquency rate only 0.6 times as high as the peer group.

Private mortgage insurance companies play an important role in affordable home lending programs because lenders and secondary-market institutions often require borrowers under the programs to obtain such insurance. Like the secondary-market institutions, the PMI companies have been closely monitoring the performance of the loans they insure that were extended under affordable home lending programs. Mortgage Guarantee Insurance Corporation (MGIC) was the first PMI company to provide a detailed analysis of the performance of such loans. MGIC's analysis found that the delinquency rate on such loans has been higher than on the other loans it insures, controlling for loan-to-value ratios.[35]

To better understand the factors that may be contributing to the elevated delinquency rates, MGIC focused on the effect of underwriting flexibility provided in four areas: (1) funds for down payment provided by a third party, (2) credit history, (3) allowable ratios of debt payment to income, and (4) available cash reserves after closing. MGIC found that, among the affordable home program loans insured in 1992 and 1993, providing flexibility in these four areas was associated with the following results:

(1) Borrowers who covered a 3 percent down payment themselves and had a third party provide an additional 2 percent (so-called 3/2 option loans) had a delinquency rate twice as high as borrowers who provided the entire 5 percent down payment.

(2) Borrowers with ''adverse'' credit histories had delinquency rates four times higher than borrowers with excellent credit histories, and borrowers with no credit history had delinquency rates eight times higher.

(3) Borrowers with ratios of debt payment to income exceeding the traditional guideline levels had a delinquency rate 60 percent higher than those with ratios at or below the traditional guideline levels.

(4) Borrowers with less than two months of cash reserves at closing had a delinquency rate 40 percent higher than those with at least two months of cash reserves.

To learn more about the relationship between underwriting flexibility and payment performance, MGIC also reviewed its claim rate experience on *all* loans (including those not originated under affordable home lending programs) it had insured on properties in the Midwest region from 1985 through 1990. MGIC found that claim rates are substantially higher when several criteria that qualify borrowers are jointly eased in order to qualify an applicant for credit, a practice referred to as layering of underwriting flexibilities.[36]

GE Capital Mortgage Insurance Corporation (GEMICO) reports a delinquency experience with loans made under affordable home loan programs that it has insured that is similar to MGIC's experience. Like MGIC, GEMICO investigated the results of allowing borrowers to qualify for credit with layered flexibilities. The baseline for comparison was the delinquency rate for all GEMICO-insured loans written under affordable home lending programs that have a loan-to-value ratio of at least 95 percent and that were originated over the 1992–94 period (labeled 100 percent in chart 2). Loan performance was measured at the end of 1995. As illustrated, when underwriting flexibilities were layered to qualify an applicant for credit, payment performance deteriorated markedly. For example, for those loans in which borrowers' cash reserves covered less than one month of mortgage payments (the customary minimum is two months), the delinquency rate was 32 percent higher than the baseline rate. Among these low-cash-reserve loans, delinquency rates soared to nearly 2.5 times the baseline rate when the *seller* contributed some of the funds needed to meet down-payment or closing cost requirements.

The GEMICO analysis found that delinquency rates on loans extended to borrowers with ''good'' credit histories have been lower than the baseline. Conversely, delinquency rates have been particularly high among loans in which the borrowers had marginal credit histories, high ratios of debt payment to income, and no cash reserves.

34. For the analysis presented here, ''high risk'' loans are those that have Gold Measure application scores above 25, ''medium risk'' loans are those with scores between 16 and 25, and ''low risk'' are those with scores below 16 (see box ''Freddie Mac's Gold Measure Worksheet'').

35. Steinbach, ''Ready to Make the Grade.''

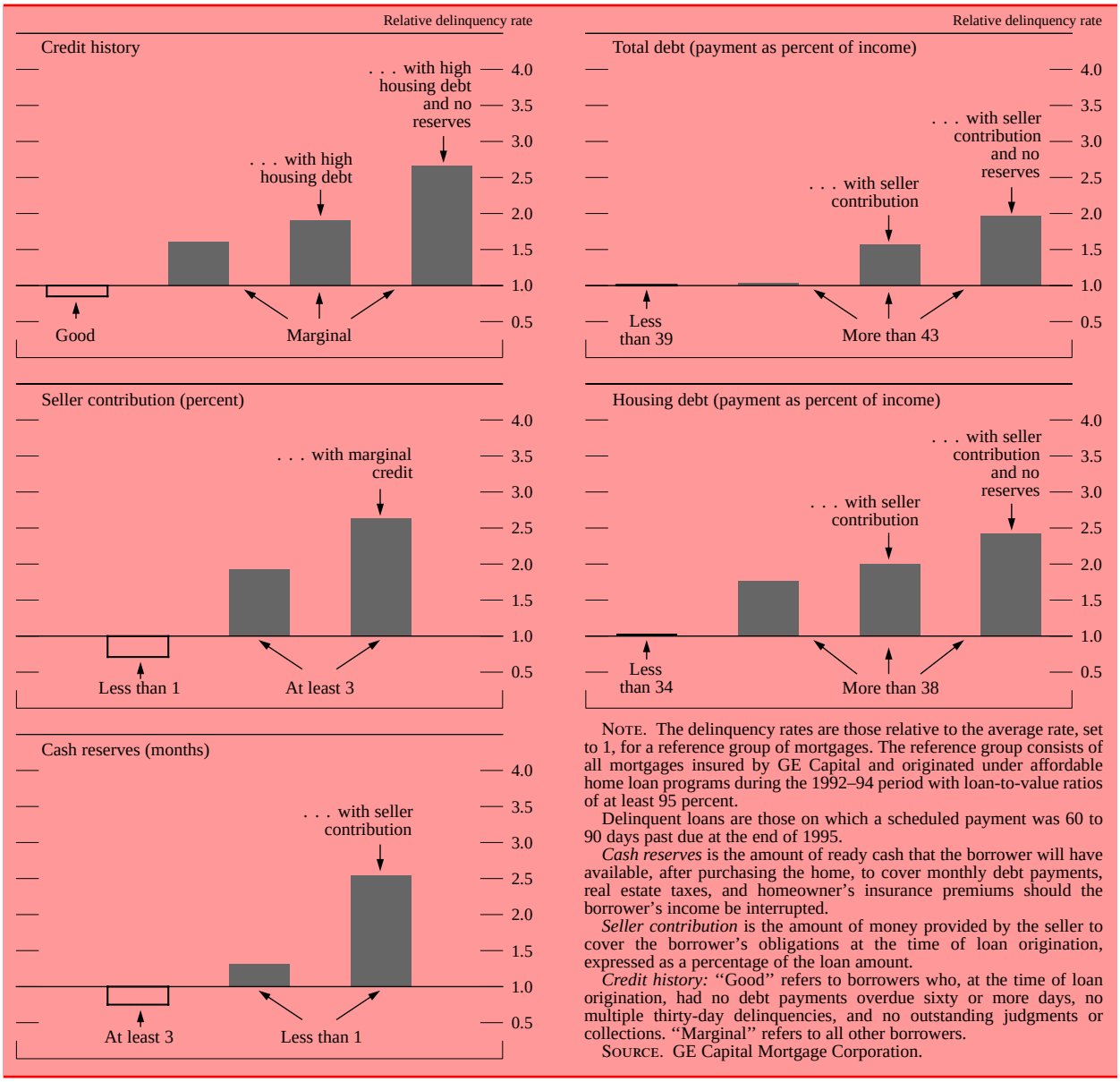
36. A subsequent study updated this analysis to cover loans originated from 1986 through 1991 (Larry Pierzchalski, ''Guarding Against Risk,'' *Mortgage Banking*, June 1996, pp. 38–45).

A third large mortgage insurance company, United Guaranty Corporation, reports that among the loans it insures, delinquency rates on loans from affordable home lending programs (of various types) exceed those on traditionally underwritten loans with the same loan-to-value ratio and year of origination (chart 3).[37] Among the affordable home loans that it has insured, those extended under the 3/2 option program have the highest delinquency rate. Like the other PMI companies, United Guaranty also indicates that it is too soon to determine whether the elevated delinquency rates on loans originated under affordable home lending programs will ultimately result in elevated claim rates and higher losses.

The PMI industry has generally not attempted to explicitly price the portion of the risk on loans made under affordable home lending programs that exceeds the risk on standard loans with the same loan-to-

37. Like the other PMI companies, United Guaranty also reports that loans underwritten using multiple flexibilities have substantially higher delinquency rates than other loans.

2. Effect on the performance of mortgages originated under affordable home loan programs when underwriting flexibilities are combined to qualify the borrower, by risk factor



NOTE. The delinquency rates are those relative to the average rate, set to 1, for a reference group of mortgages. The reference group consists of all mortgages insured by GE Capital and originated under affordable home loan programs during the 1992–94 period with loan-to-value ratios of at least 95 percent.

Delinquent loans are those on which a scheduled payment was 60 to 90 days past due at the end of 1995.

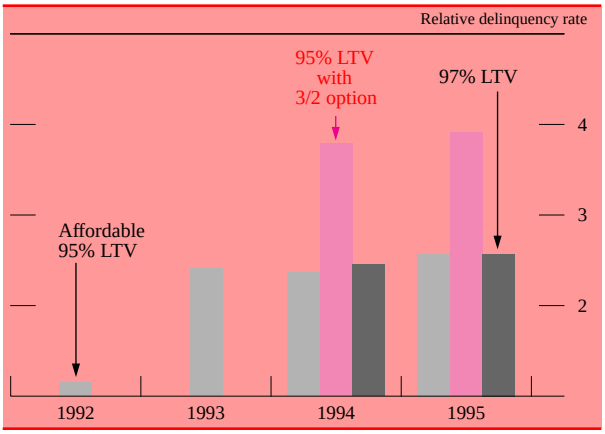
Cash reserves is the amount of ready cash that the borrower will have available, after purchasing the home, to cover monthly debt payments, real estate taxes, and homeowner's insurance premiums should the borrower's income be interrupted.

Seller contribution is the amount of money provided by the seller to cover the borrower's obligations at the time of loan origination, expressed as a percentage of the loan amount.

Credit history: "Good" refers to borrowers who, at the time of loan origination, had no debt payments overdue sixty or more days, no multiple thirty-day delinquencies, and no outstanding judgments or collections. "Marginal" refers to all other borrowers.

SOURCE. GE Capital Mortgage Corporation.

3. Relative delinquency rates of selected, privately insured, affordable home mortgages, by year of origination and type of loan



NOTE. The delinquency rates shown are those relative to the rate on standard 95 percent loan-to-value (LTV) ratio loans, for which the rate was set to 1.

Delinquencies are payments reported by lenders as being at least thirty days past due.

In this chart, the affordable loan category comprises loans designated by the lender as affordable home loans, loans sold to a state or local housing finance agency, and 97 percent loan-to-value ratio loans. In loans with the 3/2 option, the borrower made a 3 percent down payment and a third party supplied a 2 percent down payment.

SOURCE. United Guaranty Residential Insurance Co.

value ratio.[38] But anticipating that greater lender flexibility on such loans would entail some additional risk, insurers have employed various techniques to mitigate credit risk, such as requiring that borrowers receive some form of homebuyer education. Insurers are now instructing lenders to tighten their procedures, emphasizing that they should use the flexibilities in the underwriting guidelines judiciously and that layering risk factors to qualify applicants for credit is inappropriate unless the applicants have offsetting strengths. Insurers have further emphasized to underwriters that borrowers with marginal credit histories also are at greater risk of default;[39] insurers therefore have tried to clarify for lenders the circumstances under which applicants with marginal credit histories would be considered creditworthy. The PMI companies have expressed confidence that tightening procedures, along with improved homebuyer education programs and enhanced servicing, will reduce the risks of offering flexible underwriting standards to levels more in line with their current pricing structure.[40]

Experiences of Primary-Market Lending Institutions

While secondary-market institutions and the PMI companies have had quite similar experiences with affordable home lending, individual banks and savings institutions that originate mortgages report much more varied experiences with such loans. The programs of the depository institutions vary greatly in their target populations and details of operation. Institutions also differ in their loan servicing practices, which may affect the proportion of loans that move from initial delinquency into more serious delinquency and foreclosure. Consequently, generalizing about the experiences with loans made under affordable home loan programs by the large number of individual creditors that offer them is difficult.

Moreover, assessing the performance of affordable home loan portfolios is often complicated or precluded by a lack of adequate performance data on the loans. Most are relatively new and focused on relatively small geographic areas. Equally important, without information on the performance of traditionally underwritten loans that were originated, for example, during the same time period and within the same geographic area, the effect of individual underwriting flexibilities cannot be established.

Information from individual lenders reveals the varied nature of their experiences. NatWest, a large bank in the Middle Atlantic region, found that the delinquency rate was roughly 25 percent lower for the loans it made under affordable home lending programs than for its conventional loans made over the same period and in the same area; the bank attributes this record in part to enhanced counseling efforts. Bank of America also reports a 25 percent

38. Recently, however, United Guaranty announced that it will raise the insurance premium for its 95 percent loan-to-value ratio loans in which 2 percentage points of the funds are provided by a third party (that is, 3/2 option loans); the premium will rise to the level required of 97 percent loan-to-value ratio loans, which have exhibited elevated delinquency rates comparable to those on 3/2 option loans.

39. An analysis of delinquent loans made under affordable home loan programs insured by United Guaranty found, for example, that 53 percent have one or more major credit payment problems listed in their credit bureau reports.

40. Homebuyer education programs have varied considerably, ranging from the rudimentary to a series of in-depth classes. Industry representatives continue to believe that a well-designed program can significantly help borrowers prepare for the responsibilities of homeownership (“Affordable Housing—An Interview With MGIC’s Gordon H. Steinbach,” *Creative Interfaces,* Chevy Chase, Md., March–April 1996, p. 2).

In line with that objective, Fannie Mae has organized the American Homeowner Education and Counseling Institute, whose purpose is to help enlarge the pool of first-time homebuyers through the development of a high-quality, standardized education and counseling program. The institute is being financed initially by Fannie Mae, Freddie Mac, and several lenders and industry associations (Edward Kulkosky, “Fannie Institute’s Goal: Informing Both Lenders and Potential Borrowers,” *American Banker,* June 5, 1996, p. 8).

lower delinquency rate for its affordable home loans relative to its traditionally underwritten loans. They attribute this relatively favorable performance to the careful application of underwriting flexibilities based on their many years of experience with affordable home lending.

In contrast, other banks have found that delinquency rates on loans extended under affordable home programs have exceeded those on traditionally underwritten loans having comparable loan-to-value ratios. Moreover, like the secondary-market institutions, these banks have had higher delinquency rates on loans involving multiple flexibilities.

Participants in the NeighborWorks network—regional lending consortiums organized by the Neighborhood Reinvestment Corporation (NRC)—have also had a variety of experiences with the loans they have originated under affordable home lending programs. For some NeighborWorks programs, the rate for delinquencies lasting sixty days or longer is close to or below the industry average, while the rate is higher for other NeighborWorks programs. NRC views homebuyer education, both prepurchase and postpurchase, to be an essential element of successful affordable home lending programs.[41]

Geographic Concentration of Defaults

Not addressed in most analyses of affordable home lending programs is the question of whether delinquencies and defaults of loans in such programs tend to be geographically concentrated. Many affordable lending programs target specific neighborhoods or involve criteria that tend to focus the geographic reach of these programs. Consequently, the portfolio of affordable home program loans would tend to be less geographically diverse than the portfolio of traditionally underwritten loans. From a social perspective, this issue may be important because geographic concentrations of foreclosed properties can have adverse effects on neighborhood stability.[42]

Little is known about the degree of geographic concentration of defaults in affordable lending programs. One recent study, however, has investigated this issue using information from a single lender on the performance of loans underwritten under an affordable home loan program in Philadelphia.[43] The study found that more than two-thirds of the loans that were delinquent at least ninety days were located in Census tracts where only one-third of the bank's affordable home loans had been extended. The study's preliminary analysis suggests that geographic factors, such as area unemployment rates, are important in predicting these delinquencies. In addition, the borrower's credit history, as summarized by a credit history score, is also a strong predictor of loan delinquency. Two factors may have mitigated the adverse effects of concentration: Tracts with high delinquency rates are dispersed across the city, and the lender typically works with seriously delinquent borrowers, providing a period of forbearance to help them resume payments and avoid foreclosure.

SUMMARY

To measure credit risk, lenders gather information about prospective borrowers and the collateral they offer and then assess this information in light of experience gained from extending credit in the past. Historically, lenders have relied heavily on the subjective judgment of underwriters in assessing credit risk.

To facilitate the underwriting process, reduce costs, and promote consistency, lenders have brought credit scoring into the process. In some uses, credit scores are based exclusively on credit bureau records and, as such, provide a summary measure of the relative credit risk posed by individuals with differing credit histories. In other uses, credit scores are based on a wider range of information and are used to evaluate the overall credit risk posed by an applicant, providing a summary measure that lenders can use to gauge the acceptability of an application.

The data consistently show that credit scores are useful in gauging the relative levels of risk posed by both prospective mortgage borrowers and those with existing mortgages. Although the absolute levels of delinquency and default are low in all score

41. George Knight and Catherine A. Smith, ''Death Knell or False Alarm? Assessing the Risks in Lending,'' *Stone Soup,* Fall 1995, pp. 4–7.

42. Concern about the adverse neighborhood consequences of geographic concentrations of defaults in the FHA lending program are longstanding. Historically, the economic deterioration of many inner-city neighborhoods has been linked to the level of FHA lending in these communities and the relatively high rate of foreclosure and property abandonment associated with this lending program. See Calvin Bradford and Anne B. Schlay, ''Assessing a Can Opener: Economic Theory's Failure to Explain Discrimination in FHA Lending Markets,'' *CityScape,* U.S. Department of Housing and Urban Development, March 1996, pp. 77–88.

43. See Paul S. Calem and Susan M. Wachter, ''Performance of Mortgages in a Community Reinvestment Portfolio: Implications for Flexible Lending Initiatives,'' paper presented at the American Real Estate and Urban Economics Association meetings, San Francisco, January 1996.

categories, the proportion of problem loans increases as credit scores decrease. That relationship puts the focus of business concern on the prospective and existing borrowers with low scores because even small increases in the rate of default may mean the difference between profit and loss.

Analysis of the distribution of borrowers across credit history score ranges suggests that most households have relatively high scores, regardless of the income or home value characteristics of the areas in which they reside. However, relatively more of those who reside in lower-income locations or in locations with lower home values have lower scores.

For many institutions in the mortgage market, evaluating and managing the risks of lending to nontraditional borrowers and the risks of allowing greater flexibility in underwriting are relatively new experiences. Carefully evaluating the experiences to date provides important insights.

Available information suggests that most borrowers with loans made under affordable home loan programs have made their payments on time. Problems to date appear to have been concentrated among loans in which underwriting flexibilities have been layered and loans in which third-party down-payment assistance has been allowed.

Lenders and mortgage insurers have responded by tightening their procedures, emphasizing to underwriters that the flexibilities provided in underwriting guidelines need to be used judiciously and that appropriate compensating factors are needed to offset the risks associated with lending outside traditional guidelines. Market participants generally agree that, to be viable, affordable home lending programs must be accompanied by effective risk mitigation activities, including homebuyer education programs and enhanced loan servicing. Affordable lending programs are evolving and, as experience is gained, lenders are likely to find ways to expand homebuying opportunities without accepting undue risks. □