

The Promise of Automated Underwriting: Freddie Mac's Loan Prospector

by Peter E. Mahoney and Peter M. Zorn

Automated underwriting is changing the way Americans finance their homes. More and more families are discovering that obtaining a mortgage does not have to be cumbersome or frustrating. A leader in the development of automated underwriting, Freddie Mac introduced Loan Prospector in 1995. This state-of-the-art automated underwriting service combines the accuracy of statistical risk assessment with the best modern technology for collecting information. Now automated underwriting is poised to strengthen America's housing-finance system by making the process faster and fairer, reducing costs and expanding opportunities for homeownership.

INNOVATION IN MORTGAGE LENDING

America's housing finance system has come a long way since the days when few families owned homes and fewer still had mortgages.

Peter E. Mahoney is Assistant General Counsel in Freddie Mac's Legal Division. Peter M. Zorn is Director of Financial Strategy and Policy Analysis in Freddie Mac's Housing Economics Department. This article is based on a Freddie Mac report entitled *Automated Underwriting: Making Mortgage Lending Simpler and Fairer for America's Families* (Freddie Mac Report 259, September 1996).

For decades, mortgage lending was hampered by the lack of uniform loan documents and underwriting guidelines. Instead, prospective investors had to assess each loan, borrower and property individually.

In creating Freddie Mac in 1970, Congress sought to establish a reliable and efficient secondary market for conventional loans, that is, mortgages not insured or guaranteed by the federal government. At that time, Senator John Sparkman, Chairman of the Senate Banking Committee, predicted that the development of standard mortgage documents would prove to be an "historic event in home finance in America."¹

In fulfilling Sparkman's prophecy, the industry concentrated in the early years on developing uniform documents and standardizing underwriting guidelines. Several years ago Freddie Mac undertook a more ambitious project: to redesign the mortgage underwriting process itself through the development of more fact-based tools to predict loan performance.

Although an early entrant in the automated underwriting field, Freddie Mac was not the first to create a system for providing computerized evaluations of loan applications.² Mortgage insurers, as well as lenders and others in the mortgage industry, had

developed their own automated systems, employing varying solutions to the underwriting challenge.

Some chose approaches that simply converted existing underwriting standards to an electronic format. While these "rules-based" systems speed up the underwriting process, they do not improve the accuracy of lending decisions.

To offer a better approach, Freddie Mac worked with industry partners to create an underwriting system based on the repayment experience of actual loans. This system is built on a sophisticated analysis of which loan, borrower and property characteristics, together and in combination, affect mortgage performance.

To produce the statistical basis for Loan Prospector, Freddie Mac began by combing its extensive database to develop a geographically, economically and demographically diverse sample of mortgages. The sample consisted of more than 200,000 loans, each with an established repayment record spanning several years.

Using this sample, augmented by other data, Freddie Mac was able to pinpoint key factors that cause loans to default, along with their relative importance. It also was able to

quantify complicated trade-offs so that strengths in a loan application could offset weaknesses. Freddie Mac then tested the statistical results against the actual performance of millions of other loans, verifying the accuracy of the system.

In 1994, Freddie Mac enlisted a small group of lenders to test the new automated underwriting service under real-world conditions. By conducting second-look manual reviews on virtually every loan application evaluated under the pilot program, it confirmed that the system was working as intended. In February 1995, Loan Prospector became commercially available to all Freddie Mac lenders.

USING LOAN PROSPECTOR

Consumers already are well acquainted with the blink-of-an-eye responses that technology makes possible. Most people do not think twice about swiping their credit cards through a machine on the gas pump or letting a supermarket check-out scanner tabulate their grocery bills. In a few years, homebuyers will feel the same way about automated underwriting: They will not be able to imagine buying a home any other way.

To use Loan Prospector, a lender enters a borrower's application information into its own computer system. The information then is communicated electronically to Loan Prospector, which, in turn, collects credit information from other sources. Loan Prospector weighs all of this information to determine the likelihood that the loan will be repaid, based on the way similar mortgages with comparable borrower, property and loan characteristics have performed in the past.

On the basis of this comprehensive evaluation, the loan application is assigned to one of three risk categories:

- **Accept.** An accept designation indicates the lowest level of risk. The majority of

applications reviewed by Freddie Mac through automated underwriting fall into this category. Assuming the information provided is accurate, Freddie Mac stands ready to purchase these loans.

- **Refer.** A refer designation signifies that the application needs further review. Loan Prospector provides feedback to help the lender focus on those aspects of the application requiring attention. Based on additional review, underwriters have determined that many of these loans, when supplemented by more information, are acceptable for sale to Freddie Mac.
- **Caution.** A small fraction of applications receives a caution designation, meaning that the application carries substantial risk and warrants significant reexamination by the lender. In these cases, Loan Prospector identifies which aspects of the application prompted the caution warning. If extenuating circumstances make the loan a better risk than the available statistical information indicates, a lender still may originate and sell a caution loan to Freddie Mac.

Once a risk classification has been made, Loan Prospector transmits the risk classification to the lender, along with any guidance about where potential problems lie. With this information, the lender can make a faster and more accurate loan decision.

BUILDING BLOCKS OF UNDERWRITING

Good underwriting is the foundation of a healthy mortgage finance system. An accurate assessment of risk is key to helping families buy homes they can afford and keep. Mistakes that lead to foreclosure can be devastating not only to borrowers, but also to the neighborhoods in which they live.³ Loan Prospector excels in analyzing a multitude of factors simultaneously. It balances the

layers of risks and compensating factors that make mortgage underwriting so complex.

All mortgage underwriting, whether traditional or automated, is based on a wide variety of factors, broadly categorized as the "three Cs": collateral, credit reputation and capacity, as illustrated in Figure 1.

Collateral

Each mortgage is backed by real property, whether an owner-occupied home or an investor-owned dwelling. An accurate assessment of the value of the property is fundamental to determining whether, in the event of borrower default, the lender could recoup enough from the sale of the home to cover losses.

The amount of a borrower's own funds invested in the property, also referred to as borrower equity, likewise factors heavily into the lending decision. For years, mortgage research consistently has shown that a borrower with a significant financial stake in the property is less likely to default.

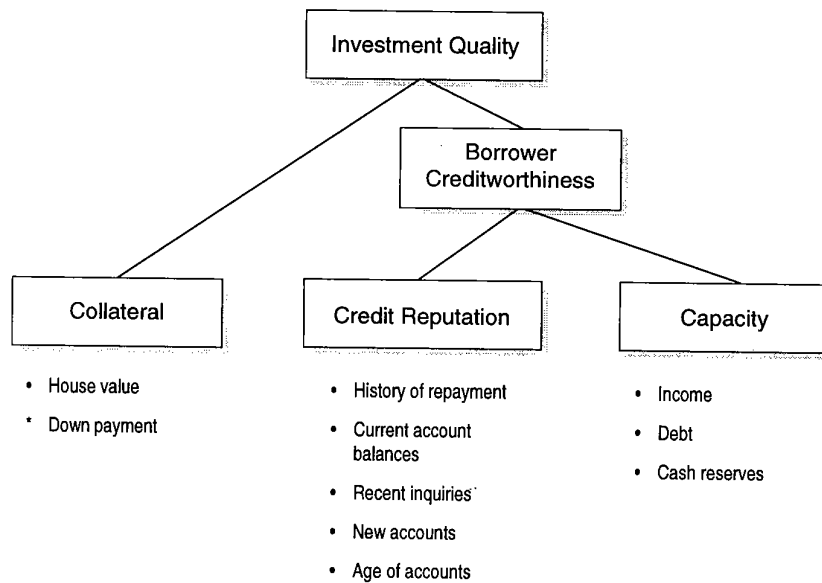
The relationship between borrower equity and loan default is shown in Figure 2, which examines the foreclosure experience of borrowers with differing downpayments. For loans purchased by Freddie Mac between 1985 and 1989, for example, borrowers who put down 5% to 9% were five times more likely to enter foreclosure than those who made down payments of 20% or more.⁴

Credit Reputation

Mortgage lenders also rely on credit information compiled by national credit repositories, commonly known as credit bureaus, to ascertain a borrower's track record of handling credit. Repositories can provide lenders with detailed credit files; they also can provide a credit-bureau score, which summarizes the information into one number reflecting an individual's expected credit performance.

AUTOMATED UNDERWRITING

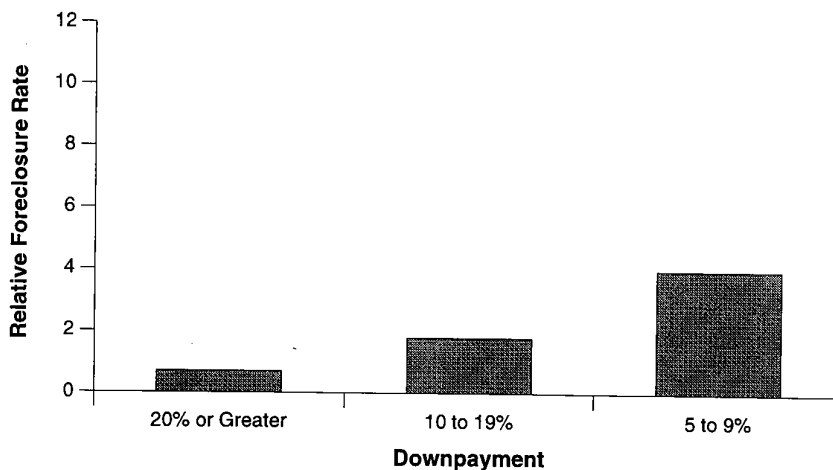
Figure 1. The Three Cs of Mortgage Underwriting



Credit files contain extensive information about open and closed credit accounts, called tradelines. For each tradeline, for example, the credit file tracks how much of the available credit limit has been used, the consumer's history of repaying the account and whether payment is up-to-date or delinquent. Credit files also document the number and nature of recent credit inquiries, which are requests by potential credit grantors to review a credit file. In addition, credit files contain information from public records, such as declarations of bankruptcy and unpaid judgments.

The need to consider so many varied pieces of information increases the difficulty of making an accurate assessment of an individual's credit profile. Credit-bureau scores, long used in consumer lending, address this problem. Based on the statistical relationship between the information contained in individual credit files and actual repayment experience, credit-bureau scores accurately summarize an individual's likelihood of repayment.

Figure 2. Foreclosure Rates Are Lower for Borrowers with Higher Downpayments



FICO scores are one example of a credit-bureau score.⁵ FICO scores range in value from about 400, denoting the highest risk, to about 900, indicating the lowest risk. Another example of a credit-bureau score is the MDS bankruptcy score, for which a lower score indicates lower risk.⁶

Freddie Mac research has shown that borrowers with strong credit profiles are significantly less likely to default on their mortgages. Based on its 1994 purchases, for example, Figure 3 shows that borrowers possessing weak credit profiles, defined as FICO scores under 620, were 18 times more likely to enter foreclosure than borrowers with FICO scores above 660.

Analyzing other data, researchers from the Federal Reserve Board reached a similar conclusion. In a comprehensive evaluation of the relationship between credit-bureau

Figure 3. Foreclosure Rates Are Lower for Borrowers with Lower-Risk Credit-Bureau Scores

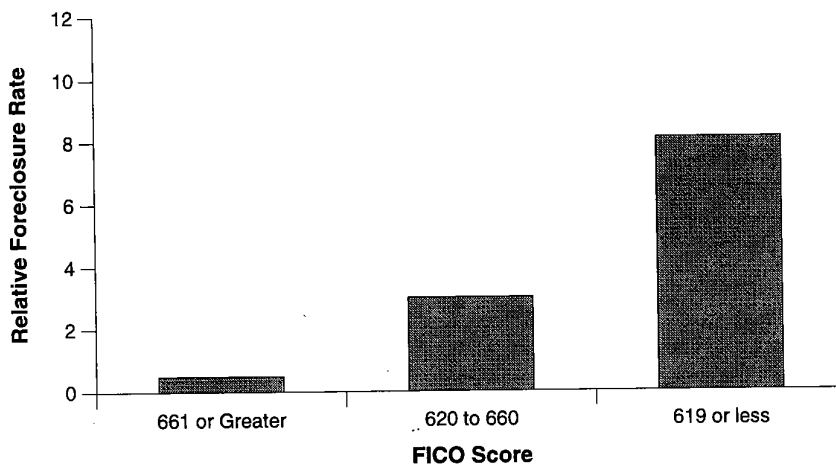
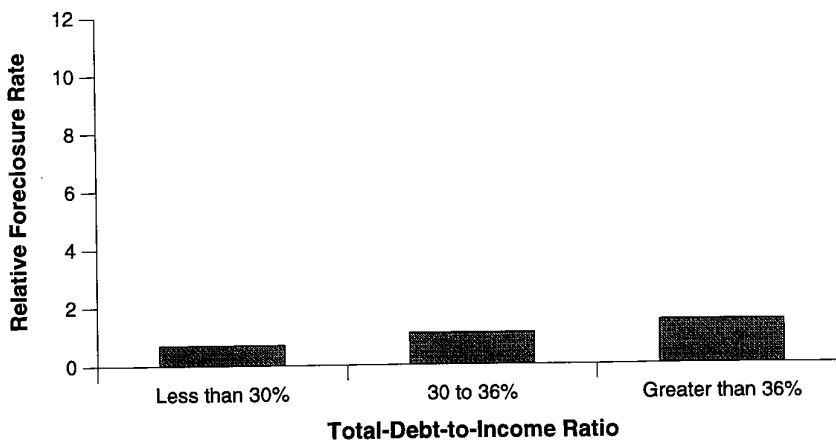


Figure 4. Foreclosure Rates Are Lower for Borrowers with Lower Total-Debt-to-Income Ratios



scores and mortgage performance, they concluded: "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."⁷

Capacity

A borrower's financial wherewithal to repay a mortgage constitutes the last of the trio of credit determinants. Typically, capacity is evaluated using two ratios that express the percentage of an applicant's income needed to cover monthly debt obligations, including the mortgage payment.⁸ Borrower savings, referred to as cash reserves, also are used to assess capacity.

The linkage between total-debt-to-income ratios and foreclosure rates is demonstrated in Figure 4. For example, based on Freddie Mac's 1994 purchases, borrowers with total-debt levels greater than 36% of their incomes were twice as likely to enter foreclosure as those with ratios below 30%.

While capacity is an important underwriting component, debt-to-income ratios generally are less powerful predictors of loan performance than other factors. This sample points to both downpayments and credit-bureau scores as better indicators of mortgage risk.

THE LOAN PROSPECTOR DIFFERENCE: ACCURATE AND PREDICTIVE

Once the components of a mortgage application have been analyzed, a lender must determine whether the risks associated with collateral, credit reputation and capacity combine to make an investment-quality mortgage. Default probabilities will grow when multiple risk factors are present, which is known as layering of risk.

Risks can be layered across the three Cs. For example, Freddie Mac has found that borrowers with both smaller downpayments

(collateral) and riskier credit profiles experience dramatically higher defaults than borrowers with only one of these two risk factors present. Layering also can appear within one of the three Cs. In terms of capacity, for example, a borrower may possess both a high debt-to-income ratio and minimal reserves.

Along with analyzing layers of risk, the need to identify strengths that offset those risks further complicates the lending decision. Yet this is the job the human underwriter is expected to perform. Like traditional underwriting, automated underwriting evaluates mortgage applications on the basis of the three Cs—collateral, credit reputation and capacity. However, Loan Prospector represents a quantum leap forward in the ability to identify sound mortgage loans. Its unique strength lies in the ability to analyze a multitude of factors simultaneously.

Consider, for instance, the need to balance 10 or more elements in a loan application.

The possible combinations of these factors alone can number in the thousands. Human underwriters cannot be expected to assess them accurately and consistently from application to application. In contrast, statistically based automated underwriting systems such as Loan Prospector are designed to handle risk combinations numbering in the millions. Built on the past performance of similar loans, Loan Prospector strengthens the underwriting process by accurately assessing the layering of risks and compensating factors. In balancing the strengths in a loan application against risk factors that traditionally lead to loan denial, Loan Prospector can identify many new families who represent acceptable mortgage credit risks.

The proof of any underwriting system lies in its ability to assess risk. By using its technology to evaluate previously purchased loans, Freddie Mac compared actual mortgage performance with the risk classification that would have been provided by Loan Prospector. The upshot: Loan Prospector

excels at identifying which loans will perform and which will not. A look at the foreclosure experience of Freddie Mac's 1994 mortgage purchases illustrates this point. Mortgages classified as "caution" by Loan Prospector, as shown in Figure 5, entered foreclosure at about 32 times the rate of those in the "accept" category.

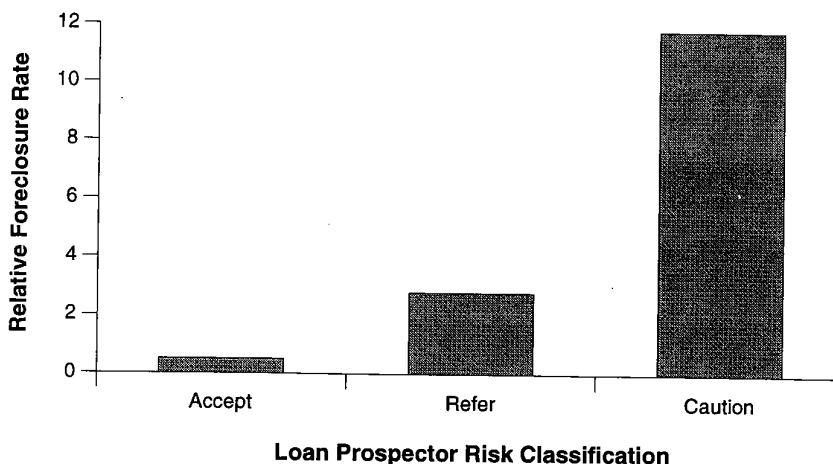
Automated underwriting combines the best in statistical analysis with state-of-the-art technology that collects and sorts a wealth of critical information. Its accurate assessment of mortgage applicants improves the process, reduces costs and opens the doors to homeownership for more American families.

FASTER, FAIRER DECISIONS

Automated underwriting is good news for homebuyers eagerly waiting for loan approval. Many families enter the mortgage market with high hopes and expectations, which later fade when days stretch into weeks as their applications undergo processing and review. In some cases, confusion and frustration prevent families, especially those with limited experience in the mortgage market, from purchasing homes.⁹

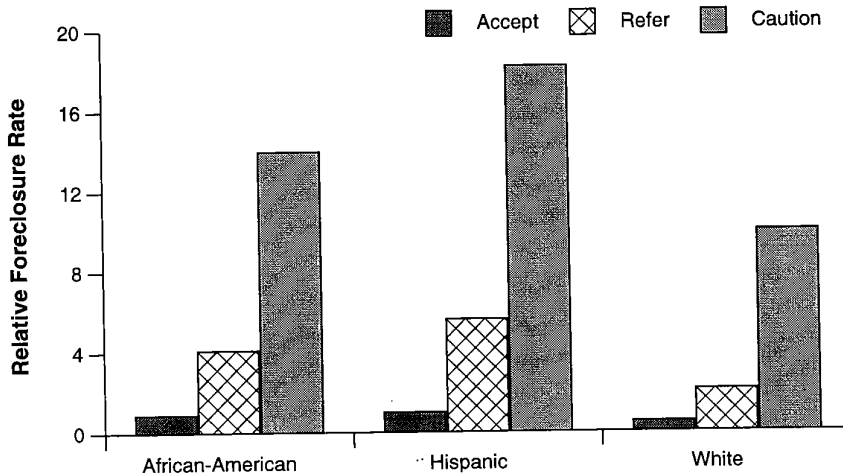
The challenge of navigating the mortgage approval process intensifies when the demand for mortgages is high. Ironically, when mortgage rates fall and homeownership becomes most affordable, lenders are busiest and can least afford to give extra time to families in need of more attention. Traditional loan processing puts every loan application—whether a clear-cut approval or a tough call—through the same paces. Automated underwriting can eliminate these bottlenecks without shortchanging the integrity of the decision-making process. By returning an accurate loan evaluation within four minutes, Loan Prospector slashes the time between loan application and closing from weeks to days, greatly reducing borrower uncertainty and costs.

Figure 5. Loan Prospector Accurately Predicts Foreclosure



AUTOMATED UNDERWRITING

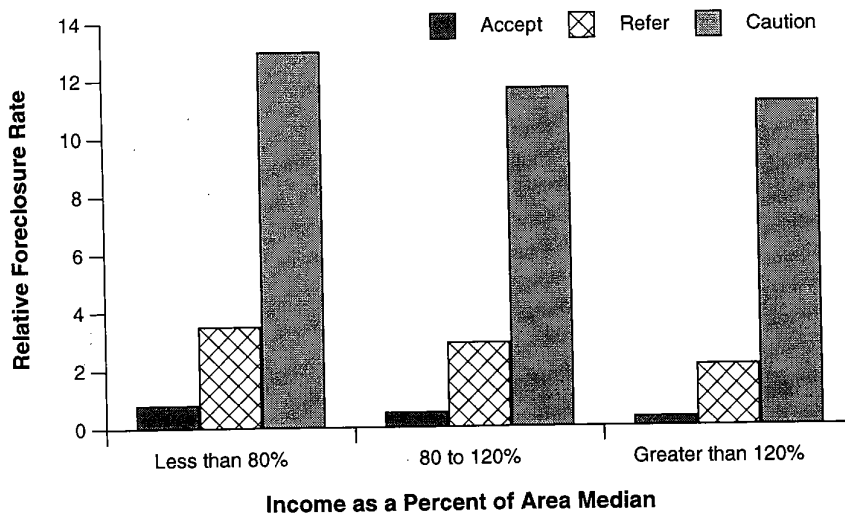
Figure 6. Loan Prospector Predicts Foreclosure Across Racial and Ethnic Groups



In addition to being frustrating, all too often homebuying is also an intimidating process, particularly for minority families. In part, this wariness is a legacy of misguided policies of the past. "Redlining" and other discriminatory lending practices occurred with some frequency in the housing market in earlier decades.

At least since the passage of the Fair Housing Act of 1968, however, the mortgage industry and the public have fought to stamp out lending discrimination. While industry observers continue to debate the effectiveness of these efforts, one fact is beyond dispute: Perceptions of unfair treatment in the mortgage market continue today. A 1994 Gallup Poll commissioned by the Mortgage Bankers Association of America (MBA) documented a widespread view among minority renters that they would fare poorly when seeking a mortgage. Among those who had never applied for a mortgage, 32% of African-Americans and 24% of Hispanics believed they would encounter discrimination because of their race or ethnic background.¹⁰

Figure 7. Loan Prospector Predicts Foreclosure Across Income Groups



Traditional underwriting remains dependent on subjective human judgment. Each of the thousands of mortgage originators in the country employs many individual loan underwriters with different backgrounds and skills. Many of these lenders also purchase a substantial portion of their loans from mortgage brokers or other third-party originators. Inevitably, different people make different decisions. These inconsistencies stem from the complex and multifaceted task of tallying up all the factors that go into an underwriting decision—including assessing the voluminous material contained within applicants' credit files.

The result is an uneven process whereby loan applicants are treated differently from case to case. Some families who are ready to become homeowners get turned away. Others who are not ready for the financial

responsibilities of homeownership obtain mortgages only to suffer foreclosure. The cumulative effect of each of these mistakes weighs heaviest on households whose applications fall in the gray area between acceptance and denial.

By consistently applying uniform standards of creditworthiness, Loan Prospector provides the same objective treatment to all borrowers. Every attribute entered into the system is evaluated the same way for every borrower every time. Moreover, automated risk assessment is blind to the demographic or cultural characteristics of a loan applicant.

The most compelling evidence of Loan Prospector's objectivity and fairness is found in the accuracy with which it predicts default risk for all groups of borrowers. This predictive power is illustrated in Figure 6, which is based on 1994 Freddie Mac purchases. The comparison looks at the foreclosure experience of borrowers in each of Loan Prospector's risk classifications, across racial and ethnic groups. Whether a borrower is African-American, Hispanic or White, loans rated caution performed far worse than those rated refer, which in turn performed far worse than those rated accept.¹¹ Figure 7, which is also based on 1994 Freddie Mac purchases, shows that Loan Prospector does an equally predictive job across borrowers with different incomes.

COST SAVINGS

Some lenders report that using Loan Prospector already is saving them \$300 to \$650 per loan. As the service expands and improves, Freddie Mac fully expects these savings to grow. Industry-wide competitive pressures will compel lenders to pass cost savings on to borrowers. Adding up the potential impact, a \$400 reduction in closing costs on every mortgage made in 1995 would have saved borrowers \$2 billion.¹²

Not only will automated underwriting expand mortgage credit to a new generation of homeowners, it also will allow many existing borrowers to take advantage of lower mortgage rates. Early evidence from a pilot program shows that automated underwriting will classify many borrowers now relegated to the higher-cost subprime market as acceptable risks by conventional market standards.¹³

To address lender demand for an automated underwriting service capable of evaluating loans in any mortgage market, Freddie Mac joined forces with Standard and Poor's Corporation (S&P), a rating agency with significant experience evaluating subprime loans. In the course of the pilot program, Freddie Mac made a significant discovery. Not only did Loan Prospector improve the processing of subprime mortgages, it also identified applicants in the subprime market who would have qualified for lower-cost conventional financing. Preliminary Freddie Mac estimates suggest that between 10% and 35% of borrowers who obtained mortgages in the subprime market could have qualified for a conventional loan.¹⁴

Breaking out of the subprime market promises to confer significant benefits to these families. Subprime borrowers who would have qualified for conventional loans pay mortgage rates on the order of one to two-and-one-half percentage points higher in the subprime market, based on Freddie Mac estimates.¹⁵ This means that qualifying subprime borrowers could save roughly \$50 to \$130 a month on a \$75,000 30-year, fixed-rate mortgage. In the aggregate, these families could save up to \$100 million in interest costs each year by obtaining conventional loan financing.

Minority and low-income borrowers are most likely to obtain these benefits. African-American and Hispanic borrowers are represented in the subprime market at nearly triple their rates in the conventional market,

while low-income borrowers are represented at about one-and-one-half times their rates.¹⁶

INCREASED HOMEOWNERSHIP

Automated underwriting will increase homeownership in four ways—lowering closing costs, leveling the playing field, improving the accuracy of lending decisions and reducing the risk of mortgage lending.

Lowering closing costs will help reduce a particularly onerous barrier to homeownership: out-of-pocket fees paid at settlement. A \$400 reduction in closing costs for every borrower, for example, would increase the number of families qualifying to buy a home by roughly 70,000 households, according to Freddie Mac estimates based on Census Bureau research.¹⁷

Closing costs hit low-income families particularly hard. Most of the documentation, appraisal and other third-party services necessary to close a loan cost the same for every homebuyer, regardless of the price of the home. More than one-half of these additionally qualifying households would be low income, with incomes 80% or less than their area medians. African-American and Hispanic families would experience significant gains as well. A \$400 reduction in closing costs would increase the number of minority renters who have adequate funds to buy a home by 8%, while providing a 2% increase for White families.

Leveling the playing field, and thereby promoting system-wide fairness, also has the potential to increase dramatically the number of minority families who own their homes. As more minorities approach lenders with the belief they will receive fair treatment—and as the treatment they are accorded confirms those beliefs—the gap in homeownership rates that currently exists between minority and nonminority households should begin to dissolve. The potential impact is enormous. Automated underwriting could bring an

additional 400,000 of today's African-American and Hispanic renters into the ranks of homeowners.¹⁸

Improving the accuracy of lending decisions helps provide lenders with the confidence they need to offer low-cost conventional mortgage financing to borrowers who may not fit the traditional profile. Estimating the number of potential borrowers who could be helped by the increased precision of Loan Prospector is admittedly difficult. However, based on preliminary evidence, Freddie Mac believes the impact will be significant—increasing the number of homeowners by as many as 250,000 families.¹⁹

Automated underwriting also will identify as high-risk some applicants who might have been approved under traditional underwriting. A high-risk classification does not always result in a loan denial, however.²⁰ Some applicants have extenuating circumstances that make them acceptable credit risks. Nevertheless, as automated underwriting becomes more widespread, the number of high-risk applicants who receive loans will decline.

Reducing the risk of mortgage lending by decreasing the number of high-risk borrowers initially will lower the average risk that the mortgage industry must absorb. As average risk declines, competitive pressures will spur the market to expand at the margin, bringing in borrowers whose current profiles put them just beyond existing standards.

The net effect on the size of the market inevitably will be positive. Substituting borrowers just at the margin for borrowers with significantly higher rates of default will enable the industry to serve a greater number of families without increasing overall risk.

The net effect of these four factors is that, when fully adopted, automated underwriting will create nearly three-quarters of a million additional homeowners, 80% of whom will be low-income or minority families.

A PROMISING FUTURE

To keep pace with the changing mortgage marketplace, automated underwriting will undergo continuous updating and refinement. Building on the benefits these systems already have brought, Freddie Mac, in cooperation with industry participants, is exploring a wide range of applications for Loan Prospector. For example, in July 1996 Freddie Mac and the Department of Housing and Urban Development (HUD) launched a pilot program to evaluate benefits that automated underwriting could bring to Federal Housing Administration (FHA) borrowers. Working with HUD, Freddie Mac built a version of Loan Prospector that provides risk classifications based on actual FHA default insurance claims. Ten pilot participants—representing state housing finance agencies, nonprofit housing groups and large and small mortgage lenders—will join with HUD and Freddie Mac to assess the benefits and possibilities of the new automated underwriting service.

Developing Loan Prospector also expanded Freddie Mac's understanding of which loans perform well—and why. As a result, Freddie Mac is able to offer new mortgage products, such as mortgages with downpayments as low as 3%. Knowledge gained about the layering of risks and the factors that offset those risks was key in making this traditionally high-risk mortgage product available to borrowers.

Over time, improvements in Loan Prospector will generate new insights and lending opportunities. For example, Freddie Mac participates in the NeighborWorks Campaign for Homeownership®, which provides extensive pre- and post-purchase homeownership counseling. Initiatives like these ultimately will generate data that can be used to assess the impact of counseling on loan performance. Potentially, future versions of Loan Prospector could be modified to recognize counseling as a compensating factor.²¹

America has arguably the best housing-finance system in the world, but automated underwriting systems such as Loan Prospector are capable of making it better still. By producing a simpler, fairer and more affordable approach to mortgage-lending decisions, automated underwriting promises to help put hundreds of thousands more Americans into homes they can afford and keep.

NOTES

¹ Senate Document No. 21, 92d Congress, 1st Session III, 1971.

² Freddie Mac was early to recognize the benefits of automation, however. In the 1970s, Freddie Mac used and made available to lenders the company's underwriting guidelines in a matrix they could program into their computers.

³ The experience of the Chicago neighborhood of Roseland illustrates the effect of geographically concentrated foreclosures. See "A Blight in the Neighborhood: Activists Demand FHA Foreclosure," *Chicago Tribune*, September 12, 1993.

⁴ The exhibits are based on the actual performance of millions of loans purchased by Freddie Mac. Although the findings are presented for specific years, they are consistent with trends observed by Freddie Mac for other time periods. However, results will vary from year to year. Figure 2 is based on one-unit purchases by Freddie Mac from 1985 through 1989. Figures 3 through 7 are based on one-unit newly originated mortgages (loans originated within one year of purchase) purchased by Freddie Mac in 1994. Foreclosure in all exhibits is measured through April 1996, and foreclosure rates are presented relative to the average in the data used in each exhibit. Thus a relative foreclosure rate of 4 in Figure 2 represents a rate 4 times the average of the sample.

⁵ FICO scores are developed by Fair, Isaac and Company, Inc. of San Rafael, CA.

⁶ MDS bankruptcy scores are developed by CCN-MDS, Inc. of Atlanta, GA.

⁷ Robert B. Avery, Raphael W. Bostic, Paul S. Calem and Glenn B. Canner, "Credit Risk, Credit Scoring, and the Performance of Home Mortgages," *Federal Reserve Bulletin*, July 1996.

⁸ The housing-debt-to-income ratio, or "front-end" ratio, focuses on housing-related payments and is calculated as the ratio between monthly mortgage payments (including taxes and insurance) and gross monthly income. The total-debt-to-income ratio, or "back-end" ratio, also includes nonhousing debt, such as car payments and consumer installment debt. Underwriting guidelines generally recommend front-end ratios of up to 28% and back-end ratios of up to 36%, although many loans are originated for borrowers with higher ratios.

⁹ See Donald S. Bradley and Peter M. Zorn, "Fear of Homebuying: Why Financially Able Households May Avoid Homeownership," *Secondary Mortgage Markets*, May 1996.

¹⁰ Calculated as the percentage of African-American and Hispanic renters who said they were somewhat or very likely to face discrimination, multiplied by the percentage of each group that attributed that discrimination to their race or ethnicity rather than to other reasons. *Study on Barriers to Homeownership and Perceptions of Discrimination in Mortgage Lending*, Executive Summary, Mortgage Bankers of America, March 22, 1994.

¹¹ The relatively high foreclosure rates shown for Hispanic borrowers in these data likely reflect the recent poor house-price appreciation rates in California and the fact that Hispanic borrowers in this sample disproportionately live in this state.

¹² HMDA data report 5.1 million loans originated in 1995.

¹³ The subprime mortgage market accounts for about 5% of total mortgage originations. Typically, borrowers turn to this market when credit problems or other circumstances make

them ineligible for conventional or FHA financing. Borrowers with subprime mortgages usually pay significantly higher interest rates and up-front fees than other borrowers.

¹⁴ To assess the potential size of this group, Freddie Mac used Loan Prospector technology to evaluate a sample of 15,000 subprime mortgages originated by four financial institutions.

¹⁵ This estimate is based on a comparison of interest rates on approximately 1,000 subprime mortgages to the interest rates on mortgages purchased by Freddie Mac during the same time interval.

¹⁶ Computed using HMDA data from 21 of the largest subprime lenders in 1994.

¹⁷ Peter J. Fronczek and Howard A. Savage, "Who Can Afford to Buy a House in 1991?" *Current Housing Reports*, U.S. Census Bureau, July 1993. The report estimates that the number of renters who would qualify to buy a median-priced home would increase by 167,000 if they had an additional \$1,000 in cash at their disposal. By extension, a reduction in the closing costs by \$400 would increase the number of qualified buyers by 66,800. Data were further adjusted using HUD's American Housing Survey data to make the racial and ethnic breakdowns mutually exclusive.

¹⁸ Susan M. Wachter and Isaac F. Megboluge, "Racial and Ethnic Disparities in Homeownership," *Housing Policy Debate*, Spring 1992. This research estimates that, after accounting for income, housing prices, age, marital status and other characteristics, about a 20% differential in homeownership rates remains between nonminority and minority households—a difference of approximately one million households. Similarly, see George C. Galster, Laudon Aron and William J. Reeder, "Estimating the Number, Characteristics, and Risk Profile of Potential Homeowners," March 1996. These researchers estimate that between 500,000 and 600,000 families would become homeowners "if the lending practices found in white suburban

areas were applied uniformly across the nation." Freddie Mac's estimate of 400,000 families adjusts for the fact that these studies did not consider factors such as credit history.

¹⁹ This preliminary estimate was derived from a sample of about 2,300 conventional loan applications obtained from several industry sources that were denied during 1992 using traditional underwriting. We do not know whether some of these applicants were eventually approved by other lenders, perhaps in the subprime market. However, Freddie Mac's analysis suggests that as many as 25% of the loan denials would have been accepted under automated underwriting. HMDA data report that approximately 1 million applicants for conventional home purchase loans were denied in 1995.

²⁰ In the case of Loan Prospector, for example, all mortgage applications classified as caution are referred to human underwriters and are accompanied by feedback to help lenders work with families to shore up the weaknesses within their mortgage applications.

²¹ Beth Prentice, "Automated Underwriting: Friend or Foe?" *Stone Soup, The NeighborWorks® Partnership Report*, Summer 1996. As a Neighborhood Reinvestment Corporation director recently concluded: "Opinions . . . are not good enough. We need cold, hard facts to demonstrate clearly the risk mitigation provided by comprehensive counseling systems such as NeighborWorks® Full Cycle LendingSM. . . [M]y opinion is that a lending system that pays more attention to a borrower's proven credit experience and attitude can be a positive trend for lower-income families." Also see Roberto G. Quercia and Susan M. Wachter, "Homeownership Counseling Performance: How Can It Be Measured?" *Housing Policy Debate*, Volume 7, Issue 1, 1996.