



*Research Into
Mortgage Default
and Affordable
Housing: A Primer*

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Introduction

As we enter the twenty-first century, mortgage lending is largely driven by computer-based decision models built on econometric research. These models also lie behind borrower credit scores, are used to help loan servicers track which delinquencies need immediate attention, and direct which workout options may be available to defaulting homeowners. Thus, to understand the risks of mortgage lending to low-income and minority communities, one must have a basic understanding of how to learn from econometric studies. This paper is intended to give such an understanding to affordable housing practitioners.

That there is risk in mortgage lending and borrowing is without question. There is risk from changes in interest rates, which affect the investment value of mortgages, and there is credit risk—the chance of loans going into default and leaving investors with substantial losses. For borrowers, both increases in interest rates and declines in house prices make selling homes more difficult. If prices fall, then homeowners who must move are faced with the loss of investments in the property. They may also lose access to new credit if home prices fall to where the homeowner decides to default and allow the property to go through foreclosure.

This study focuses on credit, or default risk. Much of the research discussed here is of the *scholarly* or *academic* variety, though not all is produced inside universities. Mortgage research is often sponsored by government agencies or prominent firms in the mortgage and housing finance industry. It is disseminated through working paper series and other in-house publications at the sponsoring institutions, and sometimes through

academic journals and various media outlets. In-house publication is often used because the data available to study affordable housing loan performance is proprietary. Thus, university scholars have limited access.

When research does appear in academic journals, one can have more confidence in the results. Such journals have a built-in quality control process, called peer review. Under peer review, research submitted to the journal is reviewed by a knowledgeable editor and up to three outside experts in the field (called referees). These reviewers judge the research by the journal's quality standards and by the current state of knowledge in the area. Editors rarely accept research for publication without asking the author to make some revisions. The downside of academic articles is that often they are very technical and, therefore, more difficult to read. The authors also may not know how to take their results and make them applicable to people in the housing industry.

Among other findings, the paper highlights that: sweat equity reduces default risk; the characteristics of the census tract in which the property is located are more important to determining default risk than borrower characteristics; smaller downpayments and lack of credit history significantly increase risk of early delinquencies; and loss of job is the primary reason for mortgage default.

We begin this review of mortgage default research with a section on its nature, explaining the use of econometrics and the root issues researchers aim to understand. This is followed by sections on models of foreclosures, transitions from delinquency to default, and defaulted-loan workouts. The review ends with a discussion of the role of pre-purchase education in managing default risk for affordable housing mortgage portfolios.

The Nature of Mortgage Default Research

Central Questions

The modern era of research into when and why homeowners default on their mortgages began with George vonFurstenberg's studies of Federal Housing Administration (FHA) and Department of Veterans Affairs (VA) loans in the late 1960s and early 1970s. VonFurstenberg introduced the use of econometric techniques to identify the unique contributions of property equity versus other factors that affect default rates. To no one's surprise, equity was found to be more important than borrower or loan characteristics in determining the rate of default in a pool of mortgages. Yet, this did not mean his research was not valuable, for good research helps us to understand and predict the *rates* at which borrowers will default, given certain loan, property, and economic characteristics, and how changes in any one of those characteristics might impact default rates. Econometric models do this by measuring historical associations between changes in some determining factors and rates of default.

To this day, research into mortgage default has focused on the same basic issues introduced by vonFurstenberg thirty years ago: how can we best measure property equity and how can we use that to determine the

rates of default on pools of mortgages, over time. The idea of a time dimension is very important to mortgage research. Research studies focus on patterns of default over the life cycle of mortgages. In this vein they tap into statistical techniques developed in the biomedical research community for studying effectiveness of treatments on diseases. This genre of analysis is called *duration* or *survival analysis*. The event of interest is whether or not each patient dies during an observation period, given they survive to the beginning of that period. In the medical sciences, interest is in how treatments might lower death rates and extend life expectancies. The analogy in mortgage research is the probability of borrowers terminating their mortgages in a given time period, given they have maintained the mortgages to that date (survived), started with some initial conditions (borrower and loan characteristics), and receive certain treatments (house prices and interest rate changes) in the current time period. The type of data needed for survival analysis is called a longitudinal sample. It involves tracking each case (mortgage) for a period of time, preferably since origination, and matching event occurrence (default) to changes in economic conditions.

Econometrics

Econometrics is the application of statistical techniques to economic problems and data. What makes econometric research unique is that researchers use their knowledge of economic theory to choose statistical techniques and to structure how those techniques are used. The most common statistical technique in econometric research is regression analysis, where one economic variable of interest is presumed to be a function of other, explanatory variables. The magnitude of the relationships between explanatory variables and the variable of interest are estimated using mathematical formulas.

Econometric studies have four basic parts:

- *an introduction to the issue, with context provided by economic theory and past studies;*
- *explanation of the data and statistical methods to be used;*
- *detailed results of the statistical tests;*
- *and a summary/conclusion section that attempts to draw lessons from this research.*

[1] *Statistical significance refers to the probability that the research study has identified some consistent data associations, versus just producing spurious results.*

Because the real-world implications of statistical tests are often difficult to see, good research reports will have a section devoted to using the estimated econometric model to do some type of forecast simulations. This is where one can see what the econometric model can do if used to make predictions. Studies that do not provide simulations, but only discuss the “statistical significance” of econometric estimations are not very helpful.¹

By its very nature, statistics is the realm of probability and not certainty. So, at best, econometric models give probabilities of events or borrower choices; they can never indicate which individual borrowers will conclusively default. Mortgage investors then use econometric models to gauge tolerable probabilities of default. At the underwriting stage and at the loan-default workout stage, investor rules on who are “in” and who are “out” are guided by probabilities. Thus, an entire group of potential homeowners may be denied access to credit even though the vast majority of them will never default. If, say, the expected probability of default is 15 percent for a given borrower-and-mortgage profile, and the cost of those defaults would overwhelm premium income, then that group of borrowers will be denied mortgage credit. Automated underwriting (AU) systems rely upon econometric models and event probabilities. This highlights why AU systems will always require an option for referral to a real-live underwriter who can examine individual cases more closely and weigh compensating factors. This examination may help to distinguish a subset of borrowers whose probabilities of default are in the acceptable range. Yet even the underwriter is basing decisions on probabilities. He/she is simply adding information to the decision process; information that one may not be able to include in the econometric model that sits behind the automated underwriting system.

The notion that econometric research only speaks to probabilities of events means that econometric models are only valid for large groups of borrowers. Predicted probabilities of events can be translated into frequencies of events for a large pool of mortgages, under defined economic conditions. The prime mortgage market has successfully produced large-scale efficiencies and long-term profitability because standardization of loan types and terms has created a database of millions of loans to study for insurance and guarantee pricing. For relatively small portfolios, where econometric analysis may not be as useful, some fairly simple and straightforward statistical analysis may still help find relationships not readily discernable from a cursory look at the data.

The probability of greatest interest to mortgage investors is lifetime default potential. This is measured first by developing an econometric model of default rates in each time period, and then translating those period-specific rates into a lifetime rate. But the lifetime default rate will depend on unknown economic events. To fully capture the lifetime default rate, one must combine an econometric model of period-specific default rates with large-scale simulations of potential economic conditions. Setting up the economic conditions for such a model is easier said than done, so a common short cut is to insert borrower and loan characteristics into an econometric model and add very severe economic conditions. Such *stress tests* then rank borrowers by life-of-loan probabilities of default under depression-like conditions. Stress tests are most often used to determine how much capital an investor wants to hold against potential credit risk on a portfolio.

Default as Foreclosure

[2] *Tranche is a French wording meaning slice. The cash flows from mortgage backed securities are "sliced" into various groupings based on order of responsibility for absorbing default losses. Thus, in a three-tranche security, the A piece has the highest credit rating and will only experience default losses under depression like conditions, the B piece is a mezzanine slice that will pay default losses after the C piece is exhausted, and the C piece is responsible for absorbing normal, expected defaults. The size of each tranche is determined by what is needed to get the desired credit ratings on the A and B pieces.*

Researchers generally think of mortgage defaults as foreclosures. That is because the impetus for research has been helping investors and guarantors understand and price *credit risk*, which has traditionally meant losses associated with foreclosure. Not until the 1990s did mortgage investors and guarantors become interested in the delinquency process that precedes foreclosure. However, to date, most research on delinquencies has been proprietary and not available to the general public in any detail.

Defaults are of interest to both investors in and guarantors of mortgages. Investors, who are usually protected by mortgage insurance and/or other guarantees, are concerned with the return of principal when loans terminate, and the uncertainty surrounding available investment yields at the time of reinvestment. Guarantors, who are exposed to credit risk from default, exist in many forms. There are direct mortgage insurers, mortgage-backed security (MBS) guarantors, loan servicers, and holders of residual *tranches*² of private-label MBS. Insurers bear the greatest losses when foreclosure occurs, and insurance claims primarily arise from foreclosure. Mortgage insurers include both private firms and government entities. Federal government insurance agencies are found in the

Federal Housing Administration (FHA) within the U.S. Department of Housing and Urban Development (HUD), the Veteran's Benefit Administration in the Department of Veterans Affairs (VA), and the Rural Housing Service (RHS) of the Department of Agriculture (USDA).

MBS guarantors are government owned (Ginnie Mae) or sponsored (Fannie Mae, Freddie Mac) agencies that guarantee timely payment of principal and interest to MBS investors. Their primary purpose is to indemnify investors against potential insolvency of the loan servicers. Yet Fannie Mae and Freddie Mac also take risk of loss in the event of foreclosure, above what is covered by private mortgage insurance, and they are large investors in MBS. When private firms pool mortgages into securities without the backing of government owned or sponsored guarantors they typically must reserve a percentage of the payments from the pool for absorbing default losses. This *residual tranche* or *residual interest* allows the protected cash flows to be sold in investment grade securities to pension and mutual funds, as well as to other investors.

Research Studies

Research into mortgage default analyzes mortgage, borrower, and economic factors that help explain differences in default rates across mortgages and mortgage pools. The default rates modeled are specific to the types of loans studied and the unit of time. In the first study we look at here (Quercia, McCarthy, and Stegman, 1995), the observation unit is an individual borrower in one

month's time. Thus, the econometric results are pertinent to monthly borrower default rates. More information is needed to understand lifetime default rates. These are the sum of observation period defaults, over time, which are functions of the period-specific default and prepayment rates.

Subsidized Mortgages

A good example of how econometric research can be used to understand the risks of affordable lending is a study on USDA Farmer's Home Administration loans* (Quercia, McCarthy, and Stegman, 1995). It is based on a sample of loans originated in 1981 and tracked through 1987. These loans had many interesting characteristics:

* Now administered by Rural Housing Service.

- They were exclusively for low-income households (below 80 percent of area median income);
- Interest rate subsidies provided by the USDA varied by borrower and by year as the program goal was to keep housing costs at 20 percent of household income;
- Shared-appreciation provisions allowed the USDA to recapture a portion of the subsidy when the property was sold; and
- More than nine percent of the loans experienced default terminations over the study period.

Because mortgage payments were readjusted annually, USDA collected valuable data on changes in borrower income, amounts of (welfare) transfer income, marital status, and numbers of dependents. This information was available to the authors of this study.

Households who put sweat-equity into building their own home [have] a nearly 75 percent reduction in monthly default probabilities.

What did the researchers find? Their statistical results are reported as multiplier ratios. These ratios give the relative strength of various influencing factors on incentives to default. Deviations from a value of one (1.0) tell direction and strength of effects. For example, the ratio reported for marital problems is 4.48. That means the incentive to default is 4.48 times as high for families experiencing marital problems than for those without such difficulties. This is not quite the same as saying probabilities of default will be 4.48 times as high, but it is close. Without delving into the mathematics of it, just note that because default

probabilities are very small to start with, these incentive multiplier ratios are close to being default rate multipliers.

With this in mind, some interesting findings of this study for affordable housing initiatives are:

- *The multiplier ratio for households who put sweat-equity into building their own home is just 0.265, reflecting a nearly 75 percent reduction in monthly default probabilities for such families.*
- *Households who received double subsidies—a below market interest rate plus further payment reductions—had default propensities equal to those of households who receive only the below market interest rate (equal to a government borrowing rate). Since all subsidies were used to bring mortgage payments in line with income, we can say basic affordability was all that mattered for default rates.*
- *There was some evidence that households receiving government income support had lower default propensities—which the authors attribute to more stable income flows than for the working poor—but the measured effect lacked statistical validity. Perhaps this was because there were too few households in this category for a statistically valid result to emerge.*

The authors found no differences in multiplier ratios by level of home equity. This could be due to their use of a general price index, rather than a house-price index for appreciating property values over time. Movements in general price indices do not always coincide with movements in property values. This would make it difficult for an econometric model to discern differences in default rates based on property values and home equity.

FHA Loan Performance

FHA insured loans are generally considered to support affordable housing through less stringent underwriting standards than are used in the conventional market. Work done at HUD showed that FHA does have a higher concentration of loans with low downpay-

ments, to first-time homebuyers, and in lower-income areas, than does the conventional market (Bunce, et al, 1996). Thus, research on FHA loan performance can provide valuable insights into affordable housing default risk.

[3] The non-black default rate would be close to 3.5 percent.

Research at the Federal Reserve Board in the early 1990s looked for evidence of discrimination in mortgage markets through FHA loan default data (Berkovec, et al, 1996, 1998). These studies controlled for a large number of loan and borrower characteristics, but they did not control for differences in the economic circumstances of borrowers in different areas of the country. In particular, home appreciation rates varied greatly across different regions of the country in the late 1980s and early 1990s, as did the timing and severity of regional housing recessions, but these issues were ignored in these studies. If concentrations of minority or low-income borrowers vary by region of the country, then default factors attributed to minority or low-income status in the econometric models could really be driven by (unmeasured) local economic factors.

As in most default studies, data on borrower credit ratings were not available for this research. What helped was that the authors controlled for downpayments, income, and liquid assets at loan closing. There tends to be a high correlation between these borrower characteristics and borrower credit quality.

Cumulative default rate models were estimated separately for loans from three origination years, 1987-89. Loans were tagged as defaulted if they resulted in a claim to FHA by the first quarter of 1993. That means that this performance analysis looked at default in the first three to five years of loan life. Many of the findings were inconsistent across these origination cohorts, likely reflecting the missing economic variables mentioned above. Yet some qualitatively consistent results do stand out:

- *Black households had default incentive multiplier ratios between 1.51 and 2.05. What does this mean? Around 4 percent of all FHA loans originated in the 1987-89 period went to claim by early 1993, so if 30 percent of loans were made to minority households, the average probability of default for black households was in the 5 to 7 percent range.³ Would lifetime default rates for blacks have the same multiples over non-minority default rates? No. Apart from caveats listed above, it could also be that those that do default tend to do so earlier in the life of the mortgage. So one must be very careful making inferences from these statistical results;*

- *First time homebuyer default incentive multiplier ratios were between 1.08 and 1.21, making their average default rates by early 1992 (claims by early 1993) between 4 and 4.25 percent; and*

- *Census tract vacancy rates (1990) had a small but measurable impact on early mortgage defaults. With default incentive ratios between 1.48 and 2.67, and a mean vacancy rate of just over 6 percent, tracts with 20 percent vacancy rates (near the upper end of the sample range) would have early default rates in the 4.2 to 4.4 percent range.*

Performance of Low-Income and Minority Conventional Loans

Two researchers at Freddie Mac studied the relative performance of mortgage loans made to low-income and minority households and purchased by Freddie Mac (Van Order and Zorn, 2001). The loans were to prime borrowers and were originated in the 1993-95 period. That period was before Freddie Mac had the automated underwriting system it now uses to increase purchases of minority and low-income loans. This is reflected in the small proportion of loans to minorities (3 percent black, 4 percent Hispanic, 6 percent other). While 19 percent of the loans are to low-income households, Freddie Mac purchased few loans with downpayments of under 10 percent in the early and mid 1990s.

This study looked for effects of income level and ethnicity, after controlling for downpayments, borrower credit scores, loan age and property location, census tract income (tract

median, relative to area median income), and percent minority in census tract. Unfortunately, the authors do not report the effects of downpayment size or credit quality. This is likely due to restrictions Freddie Mac places on publicly disseminated research. What is shown in the research report is that borrower ethnicity and income appear to matter (minorities have higher default propensities) until one controls for census tract effects. Census tract minority composition and income dominate borrower characteristics in explaining default rates.

Census tract minority composition and income dominate borrower characteristics in explaining default rates.

Like the Quercia, McCarthy, and Stegman, (1995) study, this research paper reports regression outputs that can only be translated into default rate multipliers. In order to protect what it considers proprietary research, Freddie Mac does not allow enough information to be presented in the report for base probabilities to be calculated. Still, some relative effects can be discerned. For example, low-income census tract mortgages exhibit default rates that are 15 percent higher than default rates in moderate-income tracts (81-100 percent of area median income), and 31 percent higher than default rates in middle-income (101-120 percent of area median) census tracts. The authors of this study hypothesize that the importance of census tract income may have to do with volatility of house prices, that lower-income communities have less stable house prices.

One additional avenue of inquiry taken in this study was an analysis of default severity rates: the losses expected when loans go to foreclosure, as a percent of the loan balance. This is an oft neglected part of mortgage default, but it is vitally important for understanding mortgage risk and insurance pricing. The analysis here is set up like that for default rates, with all reported results indicating default loss rates relative to an unreported base rate. The purpose of this analysis

appears to be to confirm a principal finding of the default rate analysis: that census tract characteristics clearly overwhelm borrower ethnicity and income, with the largest effects being across tract income levels. Low-income tract losses from default tend to be 21 percent higher (1.21 multiplier) than in low-moderate income tracts, 27 percent higher than in high-moderate-income tracts, and 38 percent higher than in high-income tracts.

An earlier study by the same authors provides more detail on mortgage default risk by borrower and census tract characteristics (Van Order and Zorn, 2000). That analysis tracked performance of loans originated in 1975-1983, with defaults recorded from 1983-1992. These again are standard prime loans purchased by Freddie Mac well before the advent of affordable housing programs at the enterprise. Still, reported tables of default and default-loss rates by household income and initial downpayment rate help us understand what it means to layer mortgage risk factors, an issue we will turn to shortly. Highlights of this study are:

- *While there are no loans with downpayments of less than 5 percent, there is a very clear exponential trend of increased default risk as downpayments get smaller. Loans with downpayments of 5 percent have default rates double those of loans with 10 or 15 percent downpayments.*
- *Default risk increases as one moves away from the moderate-income market (80-to-100 percent of area median income) in either direction. Loans made to low-income households, and very-low income households (less than 60 percent of area median income) have similar risk to those made to households with incomes more than double the area median.*
- *Differences by census tract income show very high default risk in very-low income areas, and declining default risk as census tract income rises. Default rates for very-low income tracts are double those of very-low income households (5.12 versus 2.66 percent).*

• *Loss rates on defaulted loans increase as household income and census tract income decrease. Loss rates differences are more pronounced by household income, with low and very-low income households having default loss rates substantially higher than average (58.6 and 61 percent versus the average rate of 39.2 percent).*

Layering of Credit Risks

Movements to increase affordable mortgage lending in the early 1990s led to some successful and some unsuccessful experiments. Even the unsuccessful ones provided the mortgage industry with new information on credit risk. The buzzword became layering of risk factors, meaning the industry could now decompose default risk into its component parts, based on standard underwriting variables. These included the effects of reducing borrower funds for downpayments and cash reserves, increasing allowable housing expense and debt payment ratios, and reducing credit-history requirements.

Neither the mortgage insurers nor Fannie Mae and Freddie Mac release actual default rates, but they did provide a wealth of information in two magazine articles (Steinbach, 1995, and Stamper, 1997). Stamper (1997) showed that, based on the first two years of mortgage life, affordable loans with higher debt ratio allowances and five-percent downpayments had default rates 2.5 times the average for all Freddie Mac loans, while affordable loans with just three percent downpayments from homebuyers funds had default rates six times those of average Freddie Mac loans. The average Freddie Mac loan has a two-to-three percent lifetime

default rate, so these affordable loans were expected to have default rates from three percent to 18 percent. An 18 percent default rate, outside of a severe housing recession, is beyond what private insurers are equipped to handle. Even FHA only saw rates this high on loans originated in the early 1980s, and that led to tighter underwriting requirements and Congressional intervention.

The lesson here is that stretching debt payment limits has some modest increase in risk but, if added to this are reduced downpayments and other relaxed underwriting requirements, default rates can quickly escalate to unreasonable levels. The worst loans from the early 1990s experience turned out to be ones where lenders could substitute a premium interest rate for two percent of the five percent downpayment requirement. These performed like three percent downpayment loans, and led to the start of three-percent downpayment programs, only with stricter requirements on borrower credit ratings.

Steinbach (1995) reported on the early performance of affordable housing loans in private mortgage insurer portfolios. He looked at early delinquency rates of special affordable housing loans, and then at longer-term claim performance of standard loans with relaxed underwriting. With respect to affordable mortgage products, early delinquencies were:

- *Twice as high for three percent downpayment loans, compared to five percent downpayments;*
- *Eight times as high for borrowers with no credit histories, yet only 4 times as high for borrowers with adverse credit histories (compared to prime credit);*
- *60 percent higher if debt ratios were above standard limits for affordable products (33 percent mortgage expense ratio, 38 percent total debt ratio); and*
- *40 percent higher if borrowers did not have cash reserves equivalent to two months of mortgage payments.*

The lesson here is that stretching debt payment limits has some modest increase in risk but, if added to this are reduced downpayments and other relaxed underwriting requirements, default rates can quickly escalate to unreasonable levels.

In a study of layering risk factors on standard loan products, and their effects on claim rates over longer time periods (five to 10 years), Steinbach reports:

- *Reducing downpayments from 10 to five percent doubled claim rates. This is entirely consistent with what is shown by Van Order and Zorn (2000);*
- *Allowing extra high debt ratios (above the normal limit for affordable loan products) had a claim rate multiplier of 3.6; and*
- *Going from excellent credit history (usually defined as credit (FICO) scores of at least 720), to adverse credit (usually defined as credit (FICO) scores below 620), had a claim rate multiplier of 6.6.*

Mortgage Credit Scores

The ubiquitous FICO score is the most recognizable summary measure of borrower credit quality in use today. The software used to generate the score from individual credit reports is licensed by Fair Isaac Corporation (FICO) to the three major credit repositories—TransUnion, Experian, and Equifax. They, in turn, sell FICO scores to lenders and now to consumers too. These scores provide a ranking of potential borrowers by probabilities of having some negative credit event in the next two years. Probabilities are rescaled into a range of 400-900, with higher scores meaning lower probabilities of events, and nearly all scores lying between 550 and 800. The negative credit events foreshadowed by the FICO score can be as small as one missed payment or as large as bankruptcy. Borrowers with lower scores are proportionally more likely to have all types of negative credit events than are borrowers with higher scores.

As we enter the new millennium, the marginal risks of lower downpayments and credit score differences are no longer a mystery. Private mortgage insurers are offering zero downpayment loans for borrowers with moderate credit scores (FICO over 660), and zero downpayment plus financing of closing cost loans for better credit borrowers (FICO over 700). Just a few years ago, insurers were not permitted by State regulators to offer such products, but now 48 States allow them to

offer zero-down loans, and 44 allow them to offer products with negative initial borrower equity in the home (loans amounts up to 103 percent of home value).

For most of the 1990s, the mortgage market viewed a FICO score of 620 as the bottom cut off for prime loans, meaning loans that could be sold to Fannie Mae or Freddie Mac. Scores in the 580-620 range were considered “near” prime, with labels such as A-minus, and those above 720 were considered low risk borrowers. About seven percent of all mortgage borrowers fit in the sub-prime category, with FICO scores under 580. Fair Isaac reports that about 10 percent of all households—whether or not they are mortgage borrowers—have scores under 580. They are expected to account for over 42 percent of all loan defaults (90-day plus delinquencies). The odds of an individual with a borderline 580 score having a 90-day default on some line of credit, including mortgages, in a two-year window are 1:1. That means a 50 percent chance of having a significant credit problem within two years. An individual with a 620 score still has a substantial 33 percent chance of a 90-day default event in a two-year period. Once we reach the 720 level, there is only a six-percent chance of a borrower having a 90-day default event. The individual with an 800 score has only a one percent chance of such an event (Fair Isaac, 1998).

How do FICO scores translate more directly into mortgage risk? Fesbach and Schwinn (1999) provide a good summary.⁴ In a snapshot of loan performance taken in September, 1997, based upon loans current six months earlier, they found that 2.28 percent of conventional loans (and 3.22 percent of government loans) with FICO scores under 580 had gone into default, while 0.21 percent (0.31 for government loans) with FICO scores of 660 had gone into default during the six month window. The factor of increase in defaults from moderate to low FICO score borrowers is more than 10. These authors also show that FICO scores are correlated with initial downpayments of borrowers. More than 70 percent of loans with downpayments of 40 percent or more had FICO scores over 720, while less than 30 percent of loans with downpayments smaller than five percent had scores that high.

[4] Another source of information on credit scores and mortgage default risk is Freddie Mac (1996). This report deals with risk layering, and is designed to convince affordable housing advocates that the “black box” of their automated underwriting system would not unfairly jeopardize low-income and minority borrowers.

Fesbach and Schwinn go on to show that mortgage risk is, ultimately, environment specific: if home prices are rising at a healthy rate, there will be few foreclosures even on loans with low FICO scores. FICO score rankings give relative probabilities of negative credit events within a given market, but not across the nation. So the more important question becomes, in times of housing recessions, do defaults on affordable housing loans rise at a faster rate than do defaults on loans to households with higher incomes with larger downpayments? Mortgage research studies have not looked closely at this issue of vulnerability of households during economic downturns. In particular, a central question is how quickly do FICO scores change in recessions?

A number of questions have been raised about the use of FICO scores in mortgage underwriting. First is whether or not scores based on statistical results from the population at large are appropriate for subgroups, like low-income and minority households. This is especially an issue if these groups tend to have less complete credit records. Fair Isaac Corporation has gone to great lengths to test their models, and claim that they are accurate even for low-income and minority populations (Martell, et al , 1997).

A second question asked of FICO scores is the applicability of scores available at loan origination to lifetime default rates. By design, FICO measures the probability of a negative credit event over just a two-year horizon. Mortgage lenders are interested in credit risk over a much longer period of time. The continued acceptance of FICO scores in automated underwriting systems indicates that there is a level of comfort with their value in determining lifetime default probability differences. An econometric study by Freddie Mac researchers showed that the predictive power of FICO scores drops by about 25 percent once one moves to the three-to-five year performance window (Holloway, MacDonale and Straka, 1993). That is, FICO scores are still predictive, but do not add as much to the default rate probability equation after the first two years.

Should Low-Income Households Purchase Homes?

Home ownership is not risk free. If a recession occurs, unemployment rates increase, and house prices fall, then homeowners that must move to find work are faced with the difficult decision of whether or not to allow the property to go to foreclosure. In addition, homeowners face the risk of major home repair expenses, something renters pass on to landlords. Renters have the advantage of only paying for the housing services they use, as they use them, without large one-time expenses for maintenance.

Beyond these factors, some authors have argued that the structure of income taxes in the U.S. makes homeownership financially unattractive to low-income households. Because the higher income investor faces a higher marginal tax rate on earned income, he/she has lower costs of financing and maintaining a home, and thus can pass some of these savings on to renters (Goetzmann and Spiegel, 2001; Mills, 1990). Higher income landlords can also take advantage of deducting all of the housing expenses against rental income, while the low-income owner may not be able to deduct any housing expenses from taxable income.

While these arguments have validity, they are not sufficient for declaring that all low-income households should be renters. In particular, tax-bracket arguments do not recognize how market prices for rental housing are affected by other forces, so that advantages to ownership can accrue to low-income households in many areas. When is ownership financially more beneficial than renting for low tax-bracket households? It depends on the confluence of three factors: house price appreciation, expected tenure in the home, and local market rental prices (Capone, 1995). In tight rental markets, where the ratio of the rental price to the value of homes is high, homeownership can be beneficial to low-income households with expected tenures of just five years.

Delinquency versus Default

Delinquencies are messier to analyze than are defaults. They involve borrowers who miss one, two, three or more payments, who might reinstate or sell the property at any time, or who can catch up on payments only to enter delinquency again in the future. Foreclosure, on the other hand, is a one-time event that can only happen once for any given loan. Because delinquencies do not affect investors directly—as mortgage backed security agreements guarantee timely payment of principal and interest regardless of borrower behavior—they have been treated as an internal servicer issue. Thus, there has been very little research into delinquency behavior. The most extensive work has been done at Fannie Mae and Freddie Mac, over the past five years. These firms have developed econometric models that help servicers manage the delinquency process using predicted probabilities of transitions from delinquency to default and foreclosure. Which borrowers get immediate attention after missing a payment, and which may not be contacted until the delinquency becomes more serious, are now determined by econometric models of borrower behavior.

[5] There are exceptions to this, in cases where there is private insurance without an additional federal agency guarantee (Fannie Mae, Freddie Mac, or Ginnie Mae), or with VA guarantees. In such cases, there are times when the insurer pays a default claim to the servicer and relinquishes any rights to the property. In such cases, where losses are expected to exceed the insured amount, the loan servicer must decide on its own foreclosure bidding rules and take possession, rehabilitate, and sell the property.

There is actually a middle ground between delinquency and foreclosure: 90-day default. A 90-day default or delinquency occurs when a borrower has missed three payments and a fourth is due and payable. This is the point at which foreclosure becomes a serious option; serious on two fronts. First, because with three missed payments and a fourth due, it becomes significantly more difficult for borrowers to raise enough cash to bring their loans current again. Second, at this point state property laws permit initiation of foreclosure processes. These processes are designed to pay back the lender for the loan. In theory, they are meant to liquidate the property and give the proceeds to the lender as payment-in-full on the defaulted loan. In practice, however, foreclosure sale procedures do not permit capturing full market value of the property, leaving the lender in the position of outbidding other potential buyers and taking title to the property rather than receiving a cash settlement. The lender then cleans and markets the property to final-

ly get repaid for the defaulted loan. Because this process—from foreclosure initiation to property sale—can take anywhere from six to 18 months, lenders are anxious to start the process immediately at the 90-day default mark. Early initiation of foreclosure both signals to the borrower that the lender is serious about ending the delinquency—increasing the probability of prompt repayment of arrears—and protects the lender from further time delays in foreclosure should the borrower be unwilling or unable to reinstate the loan.

Here we speak generically of *lenders*. The loan servicers manage the foreclosure process on behalf of those bearing the credit risk. The credit risk bearing agencies—insurers and guarantors—dictate the procedures servicers must follow. In foreclosure, title to the property is transferred from the homeowner to either the insurer or the guarantor.⁵

Statistics on how precarious borrowers find themselves at the 90-day default mark are scarce, but analysis of FHA data from the early 1990s suggests 50-60 percent will still cure the delinquency on their own, and another 6 percent may sell their properties to payoff the mortgage (Capone, 1996, p. 79). Rates of reinstatement and property sale in the private market are even higher than among FHA borrowers. That leaves, at most, one-third who, barring some workout assistance, will have their homeownership experience end in foreclosure. This percentage will vary according to economic conditions at the time, but it is a good rule-of-thumb to begin with.

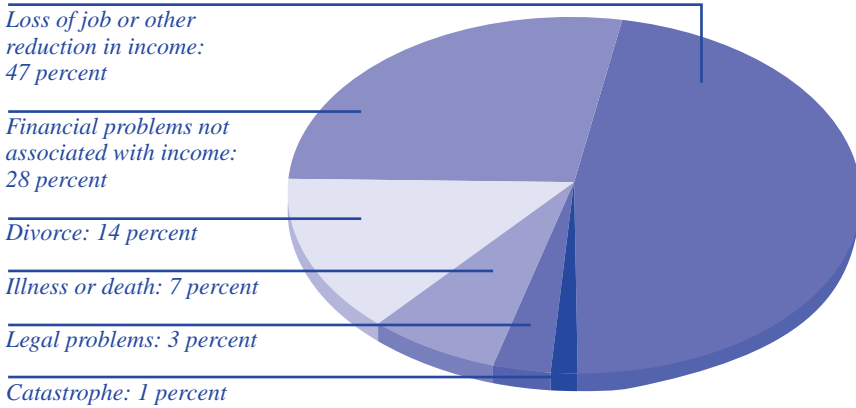
Research Studies

Servicing of delinquent and defaulted mortgages changed dramatically in the 1990s. Today, loan servicers are instructed to save loans, if at all possible. Because these procedures are so new, there are no publicly available studies of transitions from default to foreclosure in this new environment. But by looking at studies performed before the current age in mortgage servicing, we can understand better where the challenges of retaining homeownership lie.

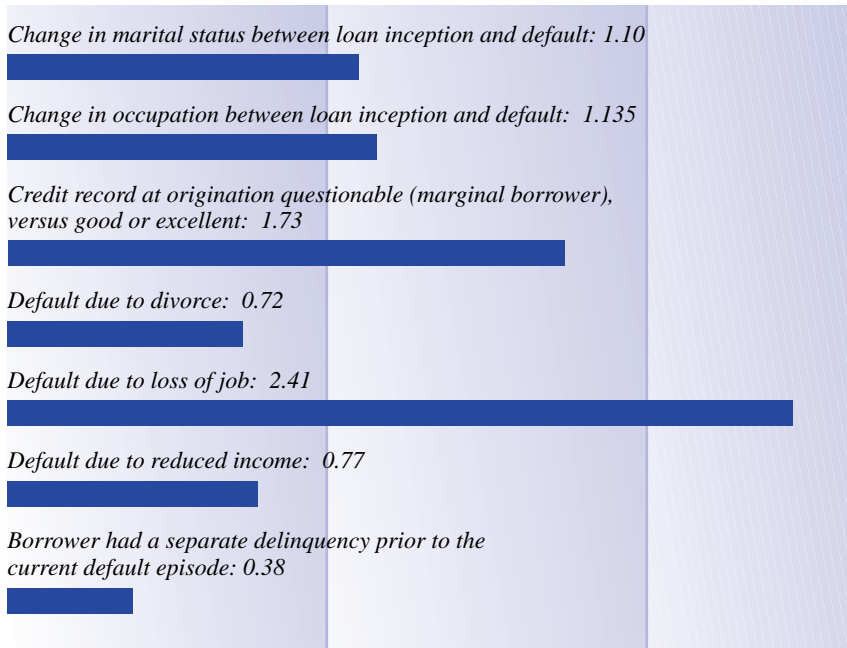
[6] Note that 14 percent of the cases had unidentified reasons. We assume these are distributed across known reasons at the same frequencies that the known reasons are reported. Thus, the frequencies shown here do not exactly match those shown in Exhibit 1, p.57, of the article.

Transition from Default to Foreclosure in the Conventional Market

In the late 1980s, two academic researchers analyzed mortgage defaults at a major Midwest bank, focusing on reasons for entering default and eventual resolutions (Gardner and Mills, 1989). Nearly 28 percent of borrowers in 90-day default lost their homes, another 37 percent cured the default, and the remaining 35 percent were able to sell their properties. The following list is a summary of findings on reasons for default⁶:



The authors investigated factors contributing to foreclosure of defaulted loans with econometric analysis. From their reported results, we can derive foreclosure-incentive ratios associated from factors that had statistical validity:



It is somewhat counterintuitive that borrowers defaulting due to a reduction in income would have lower-than-average incentives to and probabilities of foreclosure. But the comparison group is loans already in 90-day default, not loans that are current. The results of this study also indicate that borrowers with previous delinquencies learn how to manage the process of bringing defaulted loans current again, as they exhibited much lower foreclosure incentives (62 percent) and probabilities.

Transition from Default to Foreclosure in the FHA Market

A similar study of default transitions was performed by other researchers on FHA loans (Ambrose and Capone, 1998). These authors did not have data on reasons for default, but they did model transitions to all outcomes, not just foreclosure. They also controlled for housing market conditions and local unemployment rates, and captured effects of race and income class on default outcomes. A full 80 percent of the defaulted borrowers in their study sample were classified as low- or very-low income. Almost 40 percent were minorities and 68 percent were first-time homebuyers.

The FHA study confirmed findings of the conventional market study with regard to repeat defaulters. While only 50 percent of first-time defaulters reinstated their loans, 80 percent of borrowers in their third or fourth default were able to do so. One interesting outcome not seen in other studies is the impact of state laws regarding post-foreclosure deficiency judgments. In states where it is relatively easy for lenders to pursue borrowers for the full debt, even after foreclosure, and where local house prices have fallen, borrowers are less than half as likely to go to foreclosure (21.5 versus 51.7 percent), and much more likely to reinstate (75.6 versus 42.2 percent).

Defaulted borrowers in areas where house prices had not fallen appeared to be in a different class, with different reasons for default. Their foreclosure and reinstatement rates were very similar across states where

deficiency judgments are easy-to-get and difficult-to-get (27 percent foreclosure, 63 percent reinstatement). The authors of the study label these as “trigger-event” defaulters, as opposed to the more financially ruthless defaulters in areas where house prices have declined. Trigger-event default is more likely due to some bad event, like unemployment or divorce. This is an important finding in mortgage research because there has been a long-standing debate among researchers concerning just how “ruthless” borrowers are in their intents to allow foreclosure to rid themselves of properties with values less than the mortgage balance. The FHA study showed that ruthless defaulters do exist in times when house prices fall, but that, in general, mortgage defaults are dominated by trigger event defaulters.

The race effect found in this study was different for trigger-event and ruthless defaulters, as defined. In areas where house prices did not decline, minorities had probabilities of foreclosure three percent lower than those of whites, and probabilities of reinstatement four percent higher. However, in areas where house prices had declined, minorities were four percent more likely to go to foreclosure and six percent less likely to reinstate (the difference is a two percent increase in likelihood of home sale). That would confirm standard measures that show minorities have commensurately larger increases in unemployment rates during economic downturns, thus they will produce more trigger-event defaults.

Loan Workouts

Workout plans for helping defaulted borrowers salvage bad situations has long been a mainstay of the commercial loan landscape, where each default can mean significant dollar losses for lenders. But low default rates, combined with ample insurance coverage, left single-family mortgage defaults below the loan-workout radar screen for many decades. Not until the end of the 1980s, as rolling regional recessions led to large and growing default rates, did the mortgage industry begin to look seriously at how to implement workouts with homeowners on any large scale (see Capone, 1996). The Magna Carta of this movement was a rela-

tively obscure servicer bulletin signed by Rob Engelstad of Fannie Mae in May, 1991. It laid out a menu of options for servicers to pursue with defaulted borrowers to avoid foreclosure, and it promised to reimburse them for their efforts. Mortgage insurers soon began offering the same options and incentives to servicers, and training efforts got underway to teach servicers a new way of thinking: acting like credit counselors to defaulted borrowers rather than as collection agents. By 1994 Freddie Mac had joined the effort, and in 1996 Congress directed and empowered FHA to do the same.

Defaulted homeowner workouts have enjoyed phenomenal success in the late 1990s. Now, the conventional loan market reports loan workout rates of over 50 percent on loans that 10 years ago would have all gone to foreclosure. Even FHA, with its relatively new program, had a workout rate of over 50 percent in 2000. But these loss-mitigation/loan-workout programs are just now being tested in a true economic downturn. To what extent homeownership can be maintained for defaulted borrowers through recessionary times is still unknown.

Now, the conventional loan market reports loan workout rates of over 50 percent on loans that 10 years ago would have all gone to foreclosure.

Because foreclosure is very expensive to insurers and guarantors, they have a significant incentive to look for ways to avoid it. In industry jargon, workouts are called “loss mitigation,” which reflects the profit incentive driving workout offers. The primary tools used in loss mitigation are described in Exhibit 1.

There are obviously conditions and limits to the use of loss mitigation tools to assist borrowers to avoid foreclosure. First, for defaulted borrowers to retain their homes there must be both the willingness and ability to do so. That means whatever circumstances led to the loan default must have been resolved in a manner that puts the borrower on solid financial footing for maintaining the mortgage and the property in the future.

Second, for alternatives that help the borrower leave a property they can no longer afford, there must be no impediments to a clear title (e.g., tax liens or unsettled mechanics liens),

and for a preforeclosure sale the property also must be in saleable condition. An important point to understand is that leaving the property is sometimes the best thing for a defaulted borrower because he/she can no longer afford to maintain it. In such cases, transition to lower-cost housing is the prudent path for helping the household regain financial stability.

Decisions on loan workouts are made in the fourth and fifth months of a delinquency. If a workout plan is not signed by that time, servicers commence the foreclosure process. To stay in the home, the borrower must regain sufficient income to support the mortgage, or else remedy whatever other situation led to the extended mortgage delinquency, before foreclosure processes get too far along. Lenders walk a fine line in allowing defaulted borrowers additional opportunities for workouts once foreclosure has been initiated. If they tell the borrower that workouts are still available, then the foreclosure could

Exhibit 1 Loss Mitigation Options

Loan modification

is essentially a refinance without the normal up-front costs. This option can work when interest rates are low but the borrower would not qualify for a full refinance due to the loan arrears. Often, borrowers are permitted to include some arrears in a modified loan balance.

Special forbearance

is an extended repayment plan, which can last up to 18 months. Prior to the 1990s, typical repayment allowed only six months to make the loan current, which could then mean very large monthly payments. The new rules also indemnify loan servicers from losses should these loans still go to foreclosure.

Preforeclosure (or short) sales

help borrowers market properties with a normal house sale process, after agreeing with the investor on some loss sharing arrangement. Borrowers are often allowed to pay back their loss share over many years. This process saves foreclosure and property-disposition costs while also fetching a higher price for the property than is possible once it has a foreclosed label on it. FHA and VA do not require loss sharing with borrowers, but rather have limits on what the sale price must be relative to the outstanding loan balance.

Deed-in-lieu of foreclosure

is a friendly transaction whereby the borrower assigns title to the investor without having to go through a foreclosure process. Often the borrower will be paid some cash inducement, and maybe even moving assistance, to induce them to help the investor avoid the time and expense of foreclosure.

Partial Claim

is a new tool unique to FHA. With this, FHA puts up cash to make the defaulted borrower current with the loan servicer. In exchange, the borrower signs a promissory note payable when the property is sold, to the extent there is equity in the property. Up to 12 months of arrears can be included in the payment from FHA to the loan servicer.

be voided in court because the lender was not truly serious about needing to foreclose in order to cure the default. Yet, if a borrower can come forward with a viable plan, lenders are generally willing to stop the foreclosure and enter into a workout agreement.

What foreclosure rate destabilizes neighborhoods and jeopardizes the homeownership investments of others?

One important point to note is that the advent of loss mitigation has lowered the effective cost of mortgage default, making it possible for the mortgage industry to lower credit-risk thresholds at the underwriting stage. But this poses a moral dilemma: if it can be profitable to insure mortgages with higher probabilities of default, is it morally right to encourage households to invest whatever financial assets they might have into home ownership, knowing there is a significant chance they will not make it? They will lose their investment and lose some self-respect too if their home goes to foreclosure. What probability of mortgage failure is too high? If the mortgage industry could, say, profitably insure borrowers with 50 percent chances of failure, is that acceptable? What foreclosure rate destabilizes neighborhoods and jeopardizes the homeownership investments of others?

[7] There was some confusion about this for borrowers filing Bankruptcy Court protection, but that was resolved by the Supreme Court in 1996 (Nobelman v American Savings Bank). In that case, the Court affirmed that home mortgages hold a special place in Chapter 13 debt reorganizations, and that Bankruptcy judges cannot order a reduction in the amount of the debt, as they can for other consumer debts. One exception to the Court's ruling exists when the lender originally required more than just the mortgaged property for collateral on the home loan. In such cases, the Nobelman ruling has not proved binding on the Bankruptcy Courts.

The borrower may or may not face a risk of further losses should the home go to foreclosure. The balance of negotiating power between lender and borrower depends on state laws respecting post-foreclosure deficiency judgments against borrowers. In the majority of states, borrowers are still liable for the mortgage debt, even after foreclosure.⁷ At that point it includes not just back interest and loss of property value, but also late fees assessed during the delinquency, and all foreclosure expenses paid out by the servicer. If the lender/investor does not pursue a deficiency judgment against the borrower, then it must report the debt write-off as discharge-of-indebtedness income to the IRS. This quirk in the tax code appears to have been meant for commercial interests,

but it is just as applicable to homeowners, making them liable for what could be a rather hefty tax bill. Thus we can say that both borrowers and lenders have an incentive at good-faith workout efforts. The challenge of the 1990s was to both reeducate loan servicers on how to approach defaulted borrowers, and to reclaim the trust of borrowers so they would work with the loan servicer toward a solution.

Research Studies

Because workout programs are fairly new, and most of the data is proprietary, there is little information available on the success rates of these efforts. Information from FHA indicates that, from 1998-2000, failures dropped from 35 percent to under 20 percent of all workout cases—lender initiated forbearance and formal loss mitigation filings with FHA. This occurred while workouts increased from 39,000 to 120,000 cases per year, and speaks well of the industry's increased ability to match borrower circumstances to optimal outcomes.

How Low Can We Go?

However it may also be that industry practice is still too conservative in its approach to workouts. This will become a critical issue should regions of the country have housing recessions in the near future. Work by Ambrose and Capone (1996) indicates that an 80 percent success rate may be too high for a profit-maximizing workout strategy. The point is that gains from success are very large compared to the additional losses from failure, thus investors can afford to be very aggressive in attempting workouts with defaulted borrowers.

Exhibit 2 gives some results from simulations performed by Ambrose and Capone. It shows break-even probabilities of success by initial downpayment and in a housing market downturn (housing prices falling by 5 percent a year). These simulated probabilities indicate, for large groups of defaulted borrowers, how low the success rate on workout efforts (avoid foreclosure) could become before the lender/insurer is better off foreclosing without attempting a workout. These are minimum probabilities of success

for any individual borrower that should indicate a “go” signal for attempting a workout. If every borrower whose success probability is greater than these breakeven rates is offered a workout opportunity, then the lender/insurer will maximize its savings over sending defaults to immediate foreclosure.

Breakeven probabilities of more than 100 percent for the deed-in-lieu option indicate that the lender is always better off foreclosing rather than attempting to negotiate a deed transfer from the homeowner in this type of market.

It should be noted that since this study was published, the lending industry has significantly enhanced its ability to work out delinquent loans and prevent foreclosure. However, this trend has not been examined in any scholarly research.

Homebuyer Education

The small amount of information available on pre-purchase home buying education suggests that first-time homebuyers are often unaware of the risks they face. One of the broadest results of pre-purchase educa-

tion programs has been that a sizeable percentage of those considering homeownership either decide they are not willing to take the risks, or else they are not yet ready for the investment.

Research Studies

Follow-up to a homebuyer education program funded by the State of Michigan for low-income rural households in the early 1990s indicated that only one-third of participants continued to purchase a home in the near term. Another third decided to delay purchase, and the last one-third decided not to purchase a home (Hembroff, Mireley and Nierman, 1992).

HUD performed an extensive experiment on the impact of pre-purchase homebuyer counseling/education in the mid 1970s (Feins, Gain and Kirilin, 1980). The results were that only about one fourth of households in the program purchased homes. Researchers indicated that a full one-third of participants seemed to lack the income necessary to sustain homeownership, and thus they could be expected to remain renters. The study also found that group counseling had a greater impact on drop-out rates than did individual counseling. Something in the group dynamic caused more households to decide not to purchase a home.

A recent econometric study by researchers at Freddie Mac looked at the impact of pre-purchase counseling/education on mortgage default rates of those who do purchase homes (Hirad and Zorn, 2001). This is one of the first studies of its kind, and its results must still be considered preliminary. Yet it indicates that the self-screening of homebuyers via prepurchase education programs may truly be effective in helping households discover whether homeownership is right for them or not. All forms of counseling—other than telephone—proved effective in reducing default rates on mortgages. Ironically, telephone counseling was the most common form used among sampled homeowners. Non-profit counseling providers had the greatest effect on lowering default rates when the pre-purchase education was either classroom or home based, while mortgage insurers proved most effective with one-on-one counseling.

Exhibit 2
Break-even Success Probabilities for Defaulted Loan Workout Options When House Prices are Falling by 5 percent per Year

| Workout type | LTV Class | |
|---------------------|-----------|-----|
| | 90% | 95% |
| Forbearance | 31 | 30 |
| Modification | 40 | 40 |
| Preforeclosure sale | 48 | 52 |
| Deed-in-lieu | 101 | 107 |

Source: Ambrose and Capone (1996, Table 4)

The self-screening of homebuyers via prepurchase education programs may truly be effective in helping households discover whether homeownership is right for them or not.

Conclusions: Where do we go from here?

Mortgage lending to low-income and minority households increased dramatically in the 1990s, as public policy initiatives combined with new information technologies to open new opportunities for homeownership. New information technologies allowed for more refined analysis of individual borrower credit risk. Using econometric research in particular, the mortgage industry gained new understanding of the tradeoffs among risk factors in new loan products and underwriting flexibilities, and learned to leverage that knowledge to refine existing programs and develop new ones. The principal advantage of statistical and econometric research is that it helps quantify the contributions of individual risk factors. Armed with this information, mortgage providers can price the tradeoffs involved both at underwriting and at default. Pricing these tradeoffs are critical to creating sustainable product strategies.

The research reported here shows that mortgage lending to low-income and minority areas does entail greater risk of default. But it also highlights that there are a combination of factors that can be effectively managed to limit risk on affordable housing products. These include both standard underwriting criteria, like:

- Downpayment levels;
- Cash reserves at loan closing; and
- Debt payment-to-income ratios;

and non-standard assistance in the forms of:

- *(temporary) subsidies to keep mortgage payments from becoming too high a percentage of income, perhaps during the early years of a mortgage;*
- *sweat equity programs where borrowers have a greater stake in their homes; and*
- *pre-purchase counseling to both allow households to screen themselves for homeownership and better prepare home buyers for the financial responsibilities they will undertake.*

Research has also shown that FICO scores are less meaningful as absolute risk indicators than are indications of future housing market conditions. If housing markets enter a downturn, research has shown that, without intensive loss mitigation efforts, defaulting borrowers will be significantly more likely to allow homes to go to foreclosure regardless of origination date FICO scores. Our research survey indicated that, at present, the mortgage industry may be too conservative when it comes to offering workout options, and will need to be more aggressive in an economic downturn. Encouraging early delinquency intervention and broad default-workout availability is a strategy that can clearly benefit both investors and affordable housing availability.

With the nation in the midst of an economic downturn at the time of this writing, we must also ask if this an important time to highlight to potential homeowners the risks of homeownership and the costs to them of foreclosure. Many pre-purchase borrower education programs report that one primary effect of this education is to cause a significant number of households to either delay buying a home, or determine to remain renters. When the economy is in a recession, delaying homeownership by a couple of years may prove a very healthy strategy for many households, increasing their financial stability and prospects for long-term, successful homeownership.

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The LISC Center for Home Ownership

A resource of LISC, the Center for Home Ownership assists community development corporations in expanding home ownership opportunities in inner city neighborhoods and distressed rural communities throughout the United States. By providing technical assistance and training, identifying and disseminating information on effective home ownership models, and conducting research to strengthen the policy environment for home ownership, the Center enhances the home ownership development capacity of community development corporations. The Center for Home Ownership is founded on the premise that home ownership strengthens families, neighborhoods, and cities by giving residents a stake in the welfare of their communities.

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The LISC Knowledge Sharing Initiative (KSI) facilitates information exchange among community development stakeholders. KSI's mission is to improve LISC—and its partners—ability to learn from experience; recognize successes; document and share "best practices" and "lessons learned"; and facilitate access to a wide range of information and expertise. KSI collaborates closely with national LISC programs and local offices to identify and produce useful research papers, case studies, industry tools, and a host of annotated web links. KSI disseminates information by producing publications, holding online training sessions, fostering interactive discussions, and posting information on the LISC Online Resource Library (www.liscnet.org/resources).

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