

**ARE REJECTED HOUSEHOLDS CREDIT-CONDS TRAINED
OR SIMPLY LESS CREDITWORTHY?**

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Comments Welcome

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ABSTRACT

This paper re-examines consumer participation in credit markets looking specifically at issues related to the market treatment of borrowers of different credit risk. The traditional credit-rationing literature describes some borrowers as being “credit-constrained” as a result of creditors not being able to determine their future income prospects. However, this paper presents evidence that most rejected borrowers have experienced delinquency problems in the past year and/or filed for bankruptcy; therefore, rejected borrowers are often of lower credit quality. Furthermore, a substantial amount of credit has been made available over the past few years, and the lending industry has developed credit and mortgage scoring techniques that allow it to price the credit risk of individual borrowers. As a result, credit has been made to risky borrowers although they must pay higher prices for it. The analysis also shows that creditworthy minorities are not more likely to pay unusually high loan rates. Finally, borrowers that are considered to be creditworthy yet still pay high interest rates are also the ones who report they do little shopping for a loan. In addition to mortgage credit, automobile and revolving credit markets are also analyzed in this study.

Are Rejected Households Credit-Constrained Or Simply Less Creditworthy? ¹

I. Introduction

A large literature has tested capital market imperfections by seeking evidence that households face liquidity or credit constraints. Research studies, such as Jappelli (1990), Canner, Gabriel, and Woolley (1991), Cox and Jappelli (1993) and Duca and Rosenthal (1993), have relied on questions from the 1983 Survey of Consumer Finances (SCF).² All of these studies find evidence of consumer credit market imperfections. Jappelli (1990) specifically found that black and Hispanic, single, renter, and young households are more likely to be denied credit and should be considered credit constrained. The traditional credit-rationing literature (as well as the life-cycle hypothesis) maintains that borrowers face credit constraints because creditors are unable to observe their future income prospects.³

Ironically, consumer credit use has increased significantly for almost two decades despite research demonstrating evidence of limited credit access. Luckett (1986) and Canner, Fergus, and Luckett (1988) discuss the various innovations in consumer credit markets that have made it easier for consumers to finance their expenditures with credit. Automated credit scoring, the growth of asset securitization, and more flexible underwriting standards have also encouraged greater competition among lenders to supply credit. Several years of robust economic growth has stimulated the demand for credit, and economists have gathered evidence that support this prediction. Kennickell, Starr-McCluer, and Surette (2000) find evidence from the 1998 SCF that the median level of household indebtedness has risen over the 1983 to 1998 period.⁴ Yoo (1998), also using the SCF, finds an increase in the number of households with credit cards as well as an increase in average credit card balances since 1983. In addition to greater credit use, Black and Morgan (1999) show that families with a wider range of economic characteristics are borrowing on credit cards. Although all forms of consumer credit—mortgage debt, automobile debt, and revolving debt—have risen, it seems paradoxical that household credit access is still of much concern in the academic literature.

¹ The author is currently an economist at the U.S. Department of Housing and Urban Development in the Office of Policy Development and Research. I gratefully acknowledge the insights and comments from Paul Calem and Paul Kupiec which were particularly helpful in the direction of this research. In addition, I thank Harold Bunce, Theresa DiVenti, Nandinee Kutty, John Krieg, Tim Yeagar, and seminar participants at Freddie Mac and the Federal Reserve Board of Governors. All views expressed in this paper are my own and do not necessarily reflect the position of the Department of Housing and Urban Development.

² For more information about the 1983 SCF, see Avery and Elliehausen (1983).

³ For more information about the theoretical models of credit rationing, see Bernanke and Gertler (1989), (1990); Jaffe and Russell (1996); and Stiglitz and Weiss (1981), (1983).

⁴ The SCFs, compiled every three years by the Federal Reserve Board, provides information on the assets, liabilities, and demographic characteristics of more than 4000 U.S. families. For more information about the 1998 SCF, see Kennickell, Starr-McCluer, and Surette (2000).

Credit access may no longer be the ideal way to evaluate consumer credit market performance since most high credit quality consumers appear to have access to credit. Instead, the behavior of consumer credit markets should be evaluated in terms of how well these markets identify and price consumer credit risk. The traditional literature on consumer credit constraints did not consider consumer credit quality. However, this study finds that households who pay their obligations on time are more likely to enjoy access to credit and follow life-cycle consumption patterns. Households that are unable to obtain additional credit usually have had past delinquency or bankruptcy episodes or other financial setbacks that make them less creditworthy. Many rejected borrowers that would be identified as “credit-constrained” under the existing literature have been found in this study to pose a high credit risk to lenders.

As the lending environment grows more competitive, even *fewer* borrowers of low credit quality should be denied access to credit if lenders can charge higher rates to risky borrowers to cover the real possibility of poor payment performance. Cutts, Van Order, and Zorn (2000) develop a theoretical framework in which lending markets expand as more information about the borrower becomes available. This model is relevant given that lenders can now obtain more information that allows them to distinguish between high and low credit quality borrowers. Because of improvements in credit scoring, lenders can now segment borrowers into different markets and effectively price the risk.⁵ Hence, it is unlikely that credit constraints arise as a result of lenders being unable to determine the future income prospects of borrowers. Credit rejection and pricing is likely to be based on the past repayment performance of borrowers which lenders can easily obtain.

This paper revisits the subject of household credit market participation using the 1998 SCF household level data. The research findings show that most rejected households are likely to be poor credit risks. Moreover, only high credit quality households who either have no credit history or inaccuracies on their credit report should truly be considered credit-constrained. The findings also show that borrowers of low credit quality may still access modern credit markets, but they are likely to pay higher loan rates which compensate lenders for the additional risk. Hence, rejection of borrowers of low credit quality or pricing them according to their risk actually serves as evidence of greater credit market efficiency as opposed to credit market imperfections. On the other hand, consumer credit market imperfections are detected when high credit quality borrowers who could qualify for credit at lower rates pay extremely high rates for their loans. Descriptive and multivariate analyses addressing these issues are presented in the next sections followed by concluding remarks.

⁵ For example, see Harney, Kenneth, “An e-loan rebel discloses secret mortgage ratings”, *Baltimore Sun*, April 9, 2000, pp. 1L. This article concurs that borrowers with FICO scores 700 and above are quoted lower loan rates than borrowers with lower FICO scores. In addition, Black and Morgan (1999) show that credit cards have been going to borrowers of lower credit quality, and these households are more likely to rely on credit card borrowing and pay higher rates if they are unable to obtain credit elsewhere.

II. Descriptive Evidence on Less Creditworthy Households

Are rejected applicants really “credit-constrained” or simply less creditworthy? Applicants that have experienced past delinquency problems or would face greater financial stress if they took on additional payment obligations may deserve to have their loan requests rejected. Low credit quality applicants may have also been rejected because they applied at rates offered to applicants of higher credit quality but would have received credit if they had applied at higher rates. Descriptive evidence presented in this section demonstrates that traditionally “credit-constrained” households are often of low credit quality.

In the 1998 Survey of Consumer Finances, respondents were first asked if they applied for credit, and then if they had been turned down or unable to get as much credit as desired within the last five years. A similar question was asked in the 1983 SCF and used by economists who found evidence of credit constraints.⁶ The definition of credit refers to any type of mortgage, home equity, automobile, credit card, or any type of personal loan. Families turned down once were then asked if they had later re-applied for credit. Families that were rejected a second time or still not able to receive as much as they requested or did not re-apply are considered “rejected” for credit in this study.

For the purpose of this study, a low credit quality household is defined to possess one or more of the following unfavorable credit characteristics. A household that reported missing or being delinquent repaying any loans during the last year, ever filing for bankruptcy, currently receiving welfare, currently unemployed, or is liquidity constrained as defined by Zeldes (1989) is a poor credit risk. Zeldes argued that households with financial assets totaling less than two months of income were liquidity constrained.⁷ Being liquidity constrained may indicate a lack of capacity or inability to service the loans in the future especially after some trigger or unanticipated negative shock. Thus, lenders may be hesitant to extend credit to these households. Having filed for bankruptcy, being unemployed and/or receiving welfare is likely to make applicants ineligible to receive any credit.

Twenty percent of all 1998 SCF households were rejected for credit. Table 1 presents all households that were rejected for credit and their credit risk characteristics. Approximately 40 percent of these households had experienced delinquency problems, and some of these problems may have eventually turned into default problems. An estimated 19.1 percent reported having filed for bankruptcy at some point in their lives, and approximately 10 percent were currently receiving welfare. All of these characteristics, including the small percentage of households that were unemployed, make it more difficult for these applicants to qualify for credit or at least credit offered at rates reserved for borrowers with more favorable credit characteristics.

⁶ Studies that used the 1983 SCF did not have the “apply” question. In 1983, the respondents were only asked if they had “applied for credit in the last *few* years and got turned down”. In addition to asking the “apply” question, the 1998 SCF was more specific about the time period, what type of credit they were rejected for, and the reason given for being turned down.

⁷ Financial assets include checking, savings, money market accounts, certificates of deposit, directly held stock, and quasi-liquid retirement accounts.

Table 1

**Rejected Households by Unfavorable
Credit Risk Categories**

<u>Unfavorable Credit Characteristics</u>	<u>Percent of Rejected Households</u>
Late Paying Bills this Past Year	40.8
Has Filed for Bankruptcy	19.1
Currently Receiving Welfare	10.3
Currently Unemployed	2.8
Financial Assets Totaling Less than Two Months Income	49.4
All Rejected Households having one or more Unfavorable Characteristics	72.3

Having financial assets totaling less than two months of income does not necessarily make a household ineligible to receive certain types of credit. However, households at or below this threshold may find themselves unable to meet their payment obligations after some unanticipated negative shock. Because these households could already be under financial stress, lenders may view them as being unable to comfortably service any additional payment obligations and refuse to extend them more credit.

Table 1 also reports that 72 percent of all rejected households had at least one or more of the unfavorable credit characteristics. This finding suggests that it may be inaccurate to refer to rejected households as “credit-constrained” because they have demonstrated a lack of creditworthiness. Lenders did not reject these loan requests because they are unable to determine the future income prospects of the borrower. Instead, these households were rejected either because of current payment problems or because the applicant may have already been under financial stress. Lenders can justifiably reject non-creditworthy applicants, and this would actually serve as an indication of consumer credit markets functioning properly.

Table 2 reports on the 28 percent of rejected households that did not have any of the unfavorable credit characteristics. Over half of these households were rejected for revolving credit. It is quite possible that many of these households simply wanted to raise their current credit limit and asked for more than they knew would be possible to receive. Many of these households probably did not get all of the credit they requested, but this probably does not represent a severe lack of access to credit markets.

Moreover, when rejected households with favorable credit characteristics were asked the reason given for rejection, the most popular answer was previous payment problems. While these households reported not having payment problems in the *last* year, they may have had payment problems that occurred more than a year ago. The second and third most popular reason has to do with financial stress and lack of ability to service any additional obligations. Even a person with financial assets totaling at least two months of income may still have large front or back-end ratios indicating a sizeable amount of financial stress.⁸ Regardless if the reason cited is for having too much debt or too little income, approximately 26 percent of households with more favorable credit characteristics still did not have the financial capacity to take on additional credit. It is probably more accurate to refer to these households as being income-constrained rather than credit-constrained.

Other top problems for households with favorable credit characteristics are related to credit report inaccuracies or not having established a credit history. These households truly face credit constraints since lenders either have no information or misinformation about them. Finally, over 20 percent of households with more favorable characteristics had a black or Hispanic family head, but there is not enough evidence provided by the SCF to show that these households suffered discrimination.

To quickly summarize, only 3.5 percent of the entire sample of SCF households that were

⁸ The front-end ratio refers to the monthly mortgage payment-to-monthly income. The back-end ratio refers to the total monthly debt obligations-to-monthly income.

Table 2

**Information on Rejected Households with
Favorable Credit Characteristics**

Percent of Rejected Housholds with Favorable Characteristics (Not delinquent in the past year, never filed for bankruptcy, not on welfare, employed not liquidity constrained)	27.7 (146 Households)
<u>Type of Credit Applied For When Rejected</u>	<u>Percent of Rejected Households with Favorable Credit Characteristics</u>
Credit Card	56.6
Other Installment Loan	10.1
Line of Credit	9.7
Car Loan	9.6
Mortgage	5.6
Various Other Types of Credit	8.4
<u>Reason Given for Rejection</u>	
Previous Payment Problems	28.6
Amount of Debt/Size of Other Loans	13.4
Amount of Income	13.0
Credit Bureau Reports	8.6
Have not Established Credit History	7.3
Various Other Reasons	29.1
<u>Other Information</u>	
Median 1997 Income	\$50,779
Percent of Rejected Households with Favorable Credit Characteristics that are African-American or Hispanic	21.8
Rejected Households with Favorable Credit Characteristics as a Percentage of Entire 1998 SCF Sample	3.5

rejected had favorable credit characteristics, and approximately 15 percent of those households with inaccuracies on their credit reports or no credit history are the only ones that can be truly identified as credit-constrained. Therefore, the evidence overwhelmingly suggests that the rejected households were not creditworthy (for the type and terms of the loan they applied for). Most of these households experienced payment problems, bankruptcy, or lacked the financial capacity to take on additional debt. Furthermore, households that do not earn enough income to qualify for as much credit as they want should be considered income rather than credit-constrained.⁹

The SCF does not ask rejected borrowers if they had tried to obtain credit at rates reserved for borrowers of lower credit quality. Perhaps some of the low credit quality households may have avoided rejection if they had initially applied for credit at higher or subprime loan rates. Table 3 shows the distribution of interest rates for mortgage, automobile, and revolving credit by the percentages of households with unfavorable credit characteristics. This group has been further divided into two categories: those households with bad credit that have either been delinquent this year or filed for bankruptcy and those households that are liquidity constrained as defined by Zeldes or because they are currently on welfare or unemployed.

A sample of current mortgage rates for the respondents' first or primary mortgage was obtained from the 1998 SCF. The mortgages were restricted to those originating between 1996-1998 where interest rates were fairly stable.¹⁰ The evidence shows that borrowers of low credit quality pay higher mortgage rates. For example, while approximately 25 percent of low credit quality borrowers pay mortgage rates in the lower half of the mortgage rate distribution, risky borrowers are heavily concentrated in the top percentiles. Almost 70 percent of all borrowers paying rates in the highest (90-100) percentile of the mortgage rate distribution during this period are of low credit quality and could not get prime loan rates.¹¹

⁹ Economists would also include respondents who answer affirmatively to the 1983 SCF question “[over] the past few years, did you think about applying for credit . . . but changed your mind because you thought you might be turned down?” as being credit constrained. The reasons most frequently given by discouraged households when asked why they thought they might be turned down included having established a poor credit history or filed for bankruptcy, having low income, already carrying large amounts of debt and making large monthly debt payments, having established not credit history, or having a previous bad experience trying to obtain credit. These reasons, except for not having established a credit history, would suggest that these households did not perceive themselves to be creditworthy.

¹⁰ There were not enough observations of variable rate mortgages originating in 1996-1998 to treat them as a separate category, so the analysis is done for all fixed and variable mortgage rates and then fixed mortgage rates separately.

¹¹ Lax et. al. (1999) define the “critical” interest rate which separates prime from subprime mortgage loans as being in the 90th percentile of prime mortgage rates calculated from the distribution of Freddie Mac purchases. This study follows that convention for the SCF data on first mortgages. Lax et. al. also report exclusively on first mortgages (both purchases and refinance) since the number of first liens originated by subprime lenders grew significant between 1996 and the first half of 1997.

Table 3**Loan Rates Paid By Low Credit Quality Borrowers**

First Mortgage Rates 1996-1998 (fixed and variable rates)				
Percentiles	Variable Ranges (in basis points)	Percentage Bad Credit & Liquidity Constrained Bad Credit	Percentage	Percentage Liquidity Constrained
1 - 49	580-749	25.4	11.9	17.3
50 - 74	750-836	37.2	23.2	20.1
75 - 89	837-999	59.1	35.7	41.0
90 - 100	1000-1600	65.9	36.8	50.3
699 Observations				
First Fixed Mortgage Rates 1996-1998 (in basis points)				
Percentiles	Variable Ranges (in basis points)	Percentage Bad Credit & Liquidity Constrained Bad Credit	Percentage	Percentage Liquidity Constrained
1 - 49	600-749	23.6	11.5	16.0
50 - 74	750-837	35.6	21.9	19.7
75 - 89	838-999	60.1	38.1	40.2
90 - 100	1000-1600	67.6	35.1	50.0
581 Observations				

Table 3 (Continued)**Loan Rates Paid By Low Credit Quality Borrowers**

Loan Rate on Primary Car 1996-1998				
Percentiles	Variable Ranges (in basis points)	Percentage Bad Credit & Liquidity Constrained Bad Credit	Percentage	Percentage Liquidity Constrained
1 - 49	190-889	39.6	22.0	26.0
50 - 74	890-1099	50.0	28.8	32.6
75 - 89	1100-1599	59.5	38.6	42.4
90 - 100	1600-3500	80.4	52.7	62.4
777 Observations				
Rates on Primary Credit Card 1996-1998				
Percentiles	Variable Ranges (in basis points)	Percentage Bad Credit & Liquidity Constrained Bad Credit	Percentage	Percentage Liquidity Constrained
1 - 49	391-1499	30.2	15.8	20.2
50 - 74	1500-1799	27.3	12.8	20.8
75 - 89	1800-1969	41.0	23.0	26.7
90 - 100	1979-3900	58.5	37.9	37.6
3233 Observations				

The same pattern is also seen when looking at loan rates in the automobile and revolving credit markets, also chosen between the 1996 and 1998 period. Low credit quality borrowers are still concentrated in the top loan rate categories. Of all borrowers paying automobile rates in the highest percentile of the distribution, 80 percent were of low credit quality. The primary credit card is defined as the card with the largest outstanding balance. Approximately 50 percent of borrowers paying credit card rates in the highest category are of low credit quality. It is quite apparent from Table 3 that households posing the greatest credit risk pay more for credit.¹² Again, the descriptive evidence is consistent with expectations of well-functioning consumer credit markets.

One may argue that such high rates may over-compensate lenders for the amount of risk they assume and contribute to borrower payment problems by adding to their financial stress. This paper does not speak to whether the rate charged over-compensates lenders for the degree of borrower risk. However, it may be possible to obtain more evidence from the SCF that borrowers paying extremely high rates were initially of lower credit quality.

The SCF asks homeowners why they chose their particular type of mortgage loan. Table 4 compares the top five responses of borrowers paying mortgage rates in the upper 90th percentile as well as those paying lower rates. The most popular answer for all groups was “best available rate”. For those respondents paying mortgage rates in the 90th percentiles, this answer is surprising since mortgage rates generally were very low over that time period. These applicants either decided it was not in their best interest to search for lower rates or it really was the best rate they could get given their credit profile.

The next most popular response to why the borrower took this loan is that it was easier to get credit due to less information, collateral requirements, or rules. The willingness to accept such abnormally high mortgage rates may indicate that borrowers did not think they could obtain better offers given their credit and collateral situations. The “less information, collateral requirements, or rules” response is second in popularity for all fixed mortgage holders in the top percentile but third in popularity for all borrowers paying rates in the top percentile. The second most popular response for all borrowers paying rates in the top percentile is that the mortgage was assumed or seller-financed. To obtain financing this way, it is possible for borrowers to avoid dealing with lending institutions altogether. Many borrowers in this category often pay higher rates to sellers since they may have difficulty getting credit elsewhere. This response was also among the top five responses for the fixed rate borrowers in the top percentile.

Both borrowers of high and low credit quality may rely on recommendations when choosing a lender, but it is possible that borrowers of low credit quality rely more heavily on referrals to locate lenders specializing in making low credit quality loans. In Table 4, a higher

¹² While delinquency and default risk increase with rates beginning at the 50th percentile increase, this relationship is not evident throughout. When the 1-49 percentile is further divided, the direct relationship between the loan rates and the percentages of households reporting late payments disappears. There appears to be no relationship between risk and lower loan rates. Hence, while it is possible to find evidence of loan price discrimination by risk, it is not possible to find evidence of *perfect* loan price discrimination by risk particularly at the low end of the interest rate distribution

Table 4

**Why Did You Choose This Typr of (Mortgage) Loan?
(Only the top 5 reasons are recorded for each group)**

Reasons (as stated in the 1998 SCF codebook)	<u>0-89 Percentile all Mortgage Rates</u>	<u>90-100 Percentile all Mortgage Rates</u>	<u>0-89 Percentile Fixed Rates Only</u>	<u>90-100 Percentile Fixed Rates Only</u>
Interest Rate Low (er)/ Reasonable; Best Available Rate	27.5	36.6	29.1	41.4
Easier to Get Credit-- Requires Less Information/Collateral; Less Stringent Rules for Giving Credit; Get Credit Approval Faster; No Red Tape	15.2	16.6	15.4	19.2
Amount of the Downpayment	13.5		14.0	
Recommended	10.5	14.0	9.4	16.3
Assumed or Assumable; Seller-Financed		21.4		8.8
No Choice	11.1	6.8	10.2	7.9
Various other Reasons	22.2	4.6	21.9	6.4

percentage of borrowers paying rates in the top percentiles relied upon referrals than those paying rates in the lower percentiles. Finally, respondents paying rates in the top percentiles did not choose many of the other available reasons. Respondents in the lower percentiles were able to answer “best (or better) deal”, “used before; always use”, and “affordable terms”. Even if these reasons cannot be counted among the top five, more borrowers paying lower rates were able to use them to explain their choices.

The descriptive evidence presented in this section demonstrates that the overwhelming majority of borrowers that were denied credit requests were of lower credit quality. Less creditworthy borrowers could still obtain some credit if they were willing to pay higher loan rates for it. Only those applicants with no credit information or inaccurate credit information yet still had favorable credit characteristics face limited credit access, and that still represented a very small fraction of the overall sample.

III. Multivariate Evidence of Risk-Based Pricing In Consumer Credit Markets

The purpose for the multivariate analysis below is to see what economic and demographic characteristics are associated with borrowers who pay loan rates in the top percentile. The model is assumed to follow a logistic distribution function using borrower characteristics as explanatory variables. The binary dependent variable takes on the value of one if the household pays an interest rate in the highest percentile (90-100 percent) for one or more of the following loans: a first mortgage loan for a primary residence, an automobile considered to be the primary car, or the credit card with the largest balance. The dependent variable takes on the value of zero if all of these loan rates fall in the lower percentiles. Ideally, this analysis should be performed separately for the mortgage, automobile, and revolving credit. However, limiting the loans to originate between 1996 and 1998 reduces the number of observations in the top percentiles if the samples are separated by type of credit market. Therefore, characteristics common to all borrowers paying rates in the top ten percent of any credit distribution are observed collectively.

The economic characteristics consist of financial assets as defined in the previous section and income (both variables in logarithms) as well as a measure of financial burden. To get a true measure of the financial burden households carry, the ratio of monthly payment obligations to monthly income includes all of the monthly debt obligations of the household, monthly rent for those who are not homeowners, and monthly alimony and/or child support payments. Variables that pick up whether or not the borrower is a homeowner or is a bad credit risk (defined in the previous section as having been delinquent repaying loan obligations in the past year, filed for bankruptcy, unemployed, on welfare, or lacks two month income in financial assets) are also included.

The demographic characteristics include age, marital status, family size, whether or not the borrower has a college education, and race of borrower. The 1998 SCF also asks respondents if, when making major decisions about credit or borrowing, they shop around for the very best terms. A dummy variable was created to capture those respondents who reported that they do a great deal of shopping for the best terms. This variable captures the influence that wealth-maximizing behavior of the consumer may have on the rates they pay for credit.

The findings in Table 5 indicate that households with low wealth, of low credit quality, and lack a college education are significantly more likely to pay top loan rates for their credit. Young people are likely to pay for credit, but the age variable only has a 10 percent level of significance. Moreover, the race variable is not statistically significant. While most research on credit market participation often concludes that black and Hispanic households are more likely to be rejected for credit, this analysis shows that, after controlling for bad credit risk factors, black and Hispanic households with favorable credit risk factors do not pay *unusually* high rates for credit. To determine if minority households are still more likely to pay higher rates for loans than white households requires additional research.

The identical analysis was performed using households paying loan rates in the top 25 percent of the credit distributions by each type of credit since the dependent variable would be able to pick up more observations. The results are reported in Table 6. In the market for first mortgages, having low wealth, low income, no college education, and having unfavorable credit characteristics increased the probability of paying high mortgage rates. Age and race were not statistically significant this time. However, those borrowers who shopped for the best rates were significantly more likely to reduce the rates they paid.

Surprisingly, being married increased the probably that households would pay mortgage rates in the highest percentile. This finding is possibly explained by the fact that approximately 90 percent of the households paying rates in this quartile are married, and over 60 percent of them refinanced an earlier mortgage to pull equity out of their homes and consolidate other debts. Because many of these borrowers were already of low credit quality, the higher mortgage rate still may have reduced the overall interest paid on credit and increased cash flow especially for those households that deduct mortgage interest from their taxes.

In the market for automobile credit, being a homeowner and having high amounts of wealth significantly reduces the probability of paying high rates for loans. However, being a bad credit risk was no longer statistically significant, but the race variable became significant at the 10 percent level. These findings suggest imperfections in the market for automobile loans. Meanwhile, being a bad credit risk does increase the likelihood that borrowers will pay the highest rates for revolving credit; being a homeowner reduces that probability.

The results show that households who pose greater credit risks, if not completely rejected, are more likely to pay rates in the top percentile. Wealthy households and homeowners consistently pay lower rates for loans, and homeowners tend to spend more time shopping for the best credit rates. The automobile market appears to be imperfect as the race of the applicant became a more significant predictor of the loan rate paid by the borrower than the credit risk characteristics.

IV. Credit Market Imperfections

Credit market imperfections occur when applicants with favorable credit characteristics are rejected because they have no credit history, inaccuracies on their credit reports, or discrimination occurs in credit markets. Credit market imperfections can also be associated with the ability to predict delinquency behavior due to some persistent or recurring error in the

Table 5
Characteristics of Borrowers Paying Rates in
Top Ten Percent for All Types Credit
(Consumer Loans Originating 1996-1998)

Dependant Variable: 1= Loan Rate in Top Ten Percent of All Credit Distributions
0= Otherwise

All Households Heads

Independent Variables	Estimate	Odds Ratio
Financial Assets	-0.0817***	0.922
Income (in logarithms)	0.0170	1.017
Ratio Monthly Payment Obligations Monthly to Income	-0.0007	0.999
Homeowner	-0.0539	0.947
Bad Credit Risk Characteristics	0.7951***	2.215
Age	-0.0082*	0.992
Married	-0.0082	1.100
Family Size	0.0954	1.016
College	-0.3472***	0.707
Black or Hispanic	0.2279	1.256
Great Deal of Shopping for Best Terms	-0.1181	0.889
Constant	-1.3418***	
No. of Households	3440	
Percent Paying Top Rates	10.58	
Akaike Information Criteria	10742.059	
- 2 Log Likelihood	10718.059	
Concordance (%)	69.7	

Significant at 10 percent level (*), 5 percent level (**), 1 percent level (***)

Table 6

**Characteristics of Borrowers Paying Rates in Top Quartile by Credit Type
(Consumer Loans Originating 1996-1998)**

Dependant Variable: 1= Loan Rate in Top Twenty-Five Percent of Distribution 0= Otherwise						
Independent Variables	First Mortgage Estimate	Loans Primary Odds Ratio	Car Loans Estimate	Odds Ratio	Main Credit Card Estimate	Odds Ratio
Financial Assets	-0.1557**	0.850	-0.0997**	0.905	0.0060	1.006
Income (in logarithms)	-0.2231*	1.000	-0.0409	0.960	0.0125	1.013
Ratio Monthly Payment Obligations Monthly to Income	0.016	1.019	-0.3184	0.727	0.0035	1.003
Homeowner	-----	-----	-0.9334***	0.393	-.2216**	0.801
Bad Credit Risk Characteristics	0.6383**	1.893	-0.3498	1.484	0.5180***	1.679
Age	-0.002	0.998	0.0134*	1.013	.0067**	1.007
Married	1.1227***	3.073	-0.4559*	0.634	-0.2018*	0.817
Family Size	-0.1013	0.904	0.2247***	1.252	0.0498	1.051
College	-0.4691	0.626	-0.1994	0.819	-0.1071	0.898
Black or Hispanic	0.4229	3.397	0.3946*	1.484	0.0426	1.044
Great Deal of Shopping for Best Terms	-0.6043**	0.546	-0.2771	0.758	-0.1528	0.858
Constant	-2.2559*		-0.1809		-1.1824	
No. of Households	699		777		3233	
Percent Paying Top Rates	19.62		23.64		32.23	
Akaike Information Criteria	2918.503		3791.147		20027.669	
- 2 Log Likelihood	2896.503		3773.147		2003.669	
Concordance (%)	77.5		73.2		57.6	

Significant at 10 percent level (*), 5 percent level (**), 1 percent level (***)

underwriting process. In other words, if lenders grow more efficient at identifying creditworthy borrowers and evaluating credit risk, any subsequent consumer repayment problems should occur largely as a result of random negative shocks that neither the lender nor the borrower could anticipate.¹³ Another credit market imperfection has to do with borrowers being mispriced for credit. Borrowers of low credit quality pay higher loan rates to cover the higher level of credit risk, and high credit quality households should pay relatively lower loan rates consistent with their level of credit risk. If high and low credit quality borrowers pay similar loan rates, that outcome also serves as an indication of an imperfection in the consumer credit markets.

Table 7 shows the percentage of households with *favorable* credit characteristics that are paying loan rates in the top ten and top quarter percentiles. If these households could qualify for cheaper loans, then the numbers in Table 7 would certainly be indicative of consumer credit market imperfections. However, while some of these households did not report any delinquencies in the last year, they may have experienced some delinquency problems two or more years ago which means they are being priced for their risk. Approximately 80 percent of all households in each category also reported that they do not regularly shop for the lowest rates when obtaining credit. Hence, it is quite possible that some of these households could have obtained cheaper loans if they had determined it was in their best interest to shop for lower credit terms. Because credit information for previous years is unavailable for these households and they also admit to not shopping aggressively for the lowest credit terms, these measures of consumer credit market inefficiency are ambiguous. However, these numbers may represent the upper limits of the percentage of borrowers in the population that are mispriced for credit.

¹³ See Getter (2002) for empirical evidence on the randomness of consumer repayment problems.

Table 7

High Credit Quality Borrowers Paying Top Loan Rates

	<u>Percent of Households with Favorable Credit Characteristics</u>	<u>Percent of Households with Favorable Credit Characteristics Reporting that they do not Shop Aggressively for the Best Credit Terms</u>
All Loan Rates in Top Ten Percent of All Distributions	8.0	81.8
Loan Rates in Top Twnty-Five Percent of		
First Mortgage Distribution	15.5	84.5
Primary Automobile Distribution	19.1	81.2
Main Credit Card Distribution	29.8	79.8

Source: Survey of consumer finances, 1998.

Conclusion

This paper has demonstrated that rejection of low credit quality borrowers or pricing them according to risk is consistent with well-functioning credit markets. Most of the rejected households found in the 1998 SCF are not “credit-constrained” as a result of the lender not having enough information about applicant future income prospects. Instead, this analysis suggests that lenders have sufficient information about the past payment performance of these applicants which indicates that they are less creditworthy. Truly credit-constrained households are those with favorable credit risk characteristics who are unable to obtain credit because the lender has either no credit information or misinformation about applicant payment history.

One method for identifying credit market imperfections is to evaluate how well consumers are being priced according to risk. The multivariate analysis shows that households with low amounts of wealth and those that have unfavorable credit risk characteristics are likely to pay more to access consumer credit markets. However, age and race variables are not significant which suggests that young people or black and Hispanic people are not statistically significantly more likely to pay unusually high rates for credit if they have favorable credit characteristics. More research is required, however, to determine if households with minority and young family heads that have favorable credit characteristics are still more likely to pay higher rates for credit than their demographic counterparts households that also have favorable credit characteristics. Finally, credit market imperfections exist when high credit quality borrowers pay higher loan rates when they can qualify for cheaper loans. It would be useful to identify and determine the size of transaction costs that discourage some high credit quality borrowers from shopping for lower rates in future research.

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Housing Finance WORKING PAPER SERIES¹

- HF-016 **Are Rejected Households Credit-Constrained Or Simply Less Creditworthy?,** *by Darryl E. Getter*, July 2002.

This paper re-examines consumer participation in credit markets looking specifically at issues related to the market treatment of borrowers of different credit risk. The traditional credit-rating literature describes some borrowers as being “credit-constrained” as a result of creditors not being able to determine their future income prospects. However, this paper presents evidence that most rejected borrowers have experienced delinquency problems in the past year and/or filed for bankruptcy; therefore, rejected borrowers are often of lower credit quality. Furthermore, a substantial amount of credit has been made available over the past few years, and the lending industry has developed credit and mortgage scoring techniques that allow it to price the credit risk of individual borrowers. As a result, credit has been made to risky borrowers although they must pay higher prices for it. The analysis also shows that creditworthy minorities are not more likely to pay unusually high loan rates. Finally, borrowers that are considered to be creditworthy yet still pay high interest rates are also the ones who report they do little shopping for a loan. In addition to mortgage credit, automobile and revolving credit markets are also analyzed in this study.

- HF-015 **Goal Performance and Characteristics of Mortgages Purchased by Fannie Mae and Freddie Mac, 1998-2000,** *by Paul B. Manchester*, May 2002.

This paper (an update of HF-006) analyzes the performance of Fannie Mae and Freddie Mac, the two major Government-Sponsored Enterprises (GSEs) in the conventional secondary mortgage market, in meeting the housing goals established by HUD for 1998-2000. It also presents information on detailed borrower, locational, and loan characteristics of single-family mortgages purchased by the GSEs in this period. The report is based on the loan-level data that the GSEs submit annually to the Department. The paper finds that the GSEs passed all of their housing goals in 1998-2000 and generally achieved the highest levels of performance on the housing goals to date in 2000. It also finds that in most areas, by 2000 Freddie Mac had eliminated the performance gap with Fannie Mae that had existed in previous years.

- HF-014 **Black and White Disparities in Subprime Mortgage Refinance Lending,** *by Randall M. Scheessele*, April 2002.

This paper examines patterns in Home Mortgage Disclosure Act (HMDA) data in an effort to understand the types of neighborhoods with high concentrations of subprime refinance lending. The HMDA data clearly demonstrate the growth in subprime refinance lending and its disproportionate impact on low-income and predominantly black neighborhoods throughout the nation. Since home equity is typically the main source of wealth for borrowers in low-income and minority neighborhoods, it is essential that creditworthy borrowers in these neighborhoods have access to lower cost prime credit and weaker credit borrowers in these neighborhoods have

¹ For more information about any of the Housing Finance Working Paper Series, please contact the authors by calling (202) 401-0388 or (202) 708-1455 (TTY) or by writing to the author(s) at: U.S. Department of Housing and Urban Development, Office of Policy Development and Research, 451 7th Street, SW, Washington, DC 20410. Additional information on housing finance topics also may be found by visiting <http://www.huduser.org/publications/hsgfin.html>.

access to subprime credit that is priced appropriately to their credit circumstances.

HF-013 **The GSEs' Funding of Affordable Loans: A 2000 Update**, by *Harold Bunce*, April 2002.

This study compares the borrower and neighborhood characteristics of single-family mortgages purchased by Fannie Mae and Freddie Mac between 1992 and 2000 with the characteristics of loans originated in the primary market during the same time period. The study finds that both Fannie Mae and Freddie Mac improved their affordable lending performance during the 1990s, but they continued in the year 2000 to underperform the conventional conforming market in funding mortgages for lower-income borrowers and for properties located in low-income and high-minority census tracts (i.e., underserved areas). Furthermore, the GSEs account for a significant share of the total market for home purchase loans, but their market share for each of the affordable lending categories is much less than their share of the overall market, and they contribute only a small share of funding in important market segments such as the market serving first-time minority homebuyers. The GSEs' small market share in the first-time homebuyer market could be due to the preponderance of high (over-20-percent) downpayment loans in their mortgage purchases, although further study is needed to fully explain the reasons for their limited role in these markets.

HF-012 **The GSEs' Funding of Affordable Loans: A 1999 Update**, by *Harold Bunce*, December 2000.

This study examines the borrower and neighborhood characteristics of single-family mortgages purchased by Fannie Mae and Freddie Mac, the two major Government Sponsored Enterprises (GSEs) in the conventional secondary market. The purpose of the study is to determine whether Fannie Mae and Freddie Mac lead or lag the overall conventional conforming mortgage market in funding loans for low-income borrowers and other groups who historically have not been well served by the mortgage market. This study is the third in a series of working papers examining the affordable lending performance of the GSEs. There are two main findings. First, while both GSEs have improved their affordable lending performance since 1992, they continue to lag the conventional conforming market in funding mortgages for lower-income borrowers and for properties located in low-income and high-minority census tracts (i.e., underserved areas). Second, Fannie Mae has traditionally out-performed Freddie Mac in purchasing loans for lower-income borrowers and underserved neighborhoods; however, the relative performance of the two GSEs has recently shifted, as Freddie Mac's performance slightly surpassed Fannie Mae's during 1999.

HF-011 **An Analysis of GSE Purchases of Mortgages for African-American Borrowers and Their Neighborhoods**, by *Harold Bunce*, November 2000.

This study examines the record of Fannie Mae and Freddie Mac in providing mortgage funds for African-American borrowers and their neighborhoods. The study has four main findings. First, Fannie Mae has traditionally out-performed Freddie Mac in purchasing loans for African-American borrowers and their neighborhoods; however, between 1997 and 1999, there was a shift in the relative performance of the two GSEs, as Fannie Mae's performance declined and Freddie Mac's performance increased. Second, both GSEs lag the conventional conforming market in funding mortgages for African-American borrowers and their neighborhoods. Third, the GSEs' shares of mortgage originations for both upper-income and lower-income African-

American borrowers appear low. The GSEs' market shares for loans to upper-income African-American borrowers are similar to their market shares for loans to very low-income White borrowers. Finally, the market share data reported in this paper illustrate the relatively small role that the GSEs play in funding loans for African-American borrowers in the overall (conventional and government) mortgage market.

HF-010 **The Property Owners and Managers Survey and the Multifamily Housing Finance System**, by *William Segal*, September 2000.

The HUD Property Owners and Managers Survey (POMS) can be utilized to analyze a number of policy issues relating to financing for rental properties. In this paper, adjustment techniques to correct for the effects of data truncation are developed and are applied to derive estimates of number of units per property, the size of the multifamily mortgage stock, and the magnitude of annual mortgage origination volume, a critical parameter for benchmarking the performance of Fannie Mae and Freddie Mac. Mortgage origination volume for 1995 is estimated using both a “hot-deck” and a regression-based imputation approach. Results from the internal POMS file at the Census Bureau as well from the public-use version of the file are included here. Advantages and shortcomings of POMS in relation to a number of other multifamily data sources are noted, as are possible directions for future research.

HF-009 **1998 HMDA Highlights**, by *Randall M. Scheessele*, October 1999.

This paper describes home purchase and refinance mortgage market trends at the national level using HMDA data on mortgage denials and originations from 1998 and earlier. An important contribution of the paper is the recognition of manufactured home and subprime lenders that report to HMDA and their effect on mortgage market trends. The paper provides a list of 21 lenders that specialize in manufactured home lending and 200 lenders that specialize in subprime lending. The paper finds that manufactured home loan applications and their increasing denial rates were the primary reason for the increasing conventional denial rate since 1993. The paper also finds that conventional prime home purchase lending to minority and lower-income borrowers increased substantially between 1993 and 1994 but growth in lending to these groups since 1994 was attributable to growth in FHA, manufactured home, and subprime lending.

HF-008 **Do FHA Multifamily Mortgage Insurance Programs Provide Affordable Housing and Serve Underserved Areas? An Analysis of FHA's Fiscal Year 1997 Book of Business and Comparison with the GSEs**, by *Edward J. Szymanoski and Susan J. Donahue*, October 1999.

This paper analyzes the rent affordability of about 67,500 unassisted multifamily units, which were insured by FHA during Fiscal Year 1997, and the proportion of these units located in *underserved areas*. In addition, the paper also compares FHA's 1997 multifamily loans purchased by Fannie Mae and Freddie Mac (the government-sponsored enterprises, or GSEs) in regard to rent affordability and proportion of units located in underserved areas. The analysis shows that FHA is providing a substantial amount of modest cost rental housing and serving underserved areas with its unassisted multifamily mortgage insurance programs. About 95 percent of the FHA units in this study (including new construction and existing housing) were affordable at 100 percent of area median income, and over 40 percent were affordable at 60 percent of area median income. About 40 percent of the FHA units in the study were located in underserved areas. In drawing comparison between FHA and the GSEs, the paper first notes the differences as well as similarities between the multifamily programs of these respective agencies- for example, FHA offers higher loan-to-value ratios, lower debt service coverage ratios, and longer fixed-rate mortgage terms than do the GSEs. These underwriting differences notwithstanding, FHA's affordability and underserved area percentages for FY 1997 were very similar to those of comparable Fannie Mae and Freddie Mac mortgage purchases.

HF-007 **HMDA Coverage of the Mortgage Market**, by *Randall M. Scheessele*, July 1998.

This paper examines the coverage of HMDA data by taking advantage of loan-level data reported to HUD on mortgages insured by FHA and mortgages purchased by the GSEs. The FHA and GSE databases provide an accurate standard against which HMDA data on FHA and GSE loans can be measured. The results of this paper provide background for using HMDA data to estimate the market share of loans for FHA and the GSEs by reporting HMDA coverage rates for FHA originations and GSE acquisitions of mortgages for 1993 through 1996. The paper finds that HMDA data under-reports GSE acquisitions mainly because a few large lenders fail to correctly report the sale of a significant number of their loans to the GSEs. Notwithstanding coverage issues, HMDA data continues to be the most comprehensive data base for measuring primary and secondary mortgage market activity.

HF-006 **Characteristics of Mortgages Purchased by Fannie Mae and Freddie Mac: 1996-97 Update**, by *Paul B. Manchester*, August 1998.

This paper (an update of HF-003) examines the mortgages purchased by Fannie Mae and Freddie Mac, the two major Government-Sponsored Enterprises (GSEs) in the conventional secondary mortgage market. The analyses focus on detailed borrower, locational, and loan characteristics of such mortgages in the 1996-97 period. In general, the report is based on the loan-level data that the GSEs submit annually to the Department. The paper finds that the GSEs generally increased their performance on the goals established by HUD in 1995 and that they surpassed all of their 1996-97 goals, with Fannie Mae's performance exceeding Freddie Mac's performance on each of the goals in both years.

HF-005 **The GSEs' Funding of Affordable Loans: 1996 Update**, by *Harold L. Bunce and*

Randall M. Scheessele, July 1998.

This paper (an update of HF-001) examines the borrower and neighborhood characteristics of (GSEs) in the conventional secondary mortgage market. The analysis is based on Home Mortgage Disclosure Act (HMDA) data on home purchase loans originated in metropolitan areas between 1992 and 1996. The GSEs' mortgage purchases are compared to all mortgages originated in the conventional conforming loan market, including originations retained in portfolio by banks and thrift institutions. The paper finds that there continues to be room for further increases in purchases of affordable loans by Fannie Mae and, especially, Freddie Mac.

HF-004 **The GSEs' Purchases of Single-Family Rental Property Mortgages**, *by Theresa R. DiVenti, March 1998.*

This paper examines the single-family rental mortgages purchased by Fannie Mae and Freddie Mac, the two major Government-Sponsored Enterprises (GSEs) in the conventional secondary mortgage market. These properties are the “mom and pop shops” of the rental market, meaning they are small and largely individually owned and managed. To date there has been little research on this segment of the rental market. This analysis looks at neighborhood, affordability, borrower, and financial characteristics of the GSEs' mortgage purchases. The study finds that, while single-family rental properties are a small portion of the GSEs' overall business, they are a large and important segment of the rental stock for lower income families.

HF-003 **Characteristics of Mortgages Purchased by Fannie Mae and Freddie Mac, 1993-95**, *by Paul B. Manchester, Sue George Neal, and Harold L. Bunce, March 1998.*

This paper examines the mortgages purchased by Fannie Mae and Freddie Mac, the two major Government-Sponsored Enterprises (GSEs) in the conventional secondary mortgage market. The analyses focus on detailed borrower, locational, and loan characteristics of such mortgages in the “1993-95 transition period,” established by Congress in the Federal Housing Enterprises Financial Safety and Soundness Act of 1992. In general, the report is based on the loan-level data that the GSEs submit annually to the Department. The paper finds that although there were significant increases between 1993 and 1995 in the GSEs' funding of loans for groups traditionally underserved by the mortgage market, their support is generally less than that provided by portfolio lenders.

HF-002 **The Multifamily Secondary Mortgage Market: The Role of Government-Sponsored Enterprises**, *by William Segal and Edward J. Szymanoski, March 1997.*

This paper examines the performance of Fannie Mae and Freddie Mac in enhancing the liquidity and efficiency of the affordable segment of the multifamily mortgage market. The paper focuses specifically on the period since 1993, when HUD established affordable housing goals for these two Government-Sponsored Enterprises (GSEs). A private secondary mortgage market has developed to address the finance needs of higher end properties; yet a comparable market for mortgages on properties affordable to lower-income families lags in development. Placed within a wider market context, it is found that the GSEs have been cautious in their affordable multifamily transactions. It is concluded that the GSEs have the potential to do more to enhance the affordable segment of the multifamily mortgage market.

HF-001

The GSEs' Funding of Affordable Loans, by *Harold L. Bunce and Randall M. Scheessele*, December 1996.

This paper examines the borrower and neighborhood characteristics of mortgages purchased by Fannie Mae and Freddie Mac, the two major Government-Sponsored Enterprises (GSEs) in the conventional secondary mortgage market. The GSEs' mortgage purchases are compared to all mortgages originated in the conventional conforming loan market, including originations retained in portfolio by banks and thrift institutions. The analysis is based on Home Mortgage Disclosure Act (HMDA) data on home purchase loans originated in metropolitan areas between 1992 and 1995. The paper finds that there is room for further increases in purchases of affordable loans by Fannie Mae and, especially, Freddie Mac.