Determinants of the Type of Mortgage: Conventional or Federally Guaranteed Mortgage (FHA or VA)

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The purpose of this study was to examine the determinants of the type of mortgage that households obtain: a conventional mortgage or a federally guaranteed mortgage, using the 1998 Survey of Consumer Finances. Based on the models of mortgage choice by Hendershott, LaFayette and Haurin (1997) and Gabriel and Rosenthal (1991), the study examined demographic, economic, and credit management factors. The results of logistic regression showed that households headed by individuals who were younger, less well educated, non-white, with low income, a higher debt-to-assets ratio, and a higher loan-to-value ratio were significantly more likely to obtain a federally guaranteed mortgage. Implications for consumer educators and financial advisors are presented.

Keywords: *Mortgage loans*

Introduction

Due to lower interest rates and slower growth in home prices, home-purchase lending to low-income and minority households expanded faster in recent years than lending to other borrowers (Canner, Passmore, & Laderman, 1999). In mid-2000, the U.S. homeownership rate reached a record high of 67 percent, a gain of about 3 percentage points from 1994 (Gabriel, 2001). At the same time, the denial rate for low-income or minority households in conventional lending market also increased (Canner et al., 1999). The Home Mortgage Disclosure Act (HMDA) data showed that, from 1993 to 1998, the denial rates for lower-income applicants rose nearly 66 percent, whereas denial rates for upper-income applicants rose only 9 percent in conventional home-purchase mortgages (Canner et al., 1999). Because home equity is one of the largest components of U.S. household wealth, an increase in the denial rate for conventional home-purchase lending of low-income or minority households is an important issue in the economic well-being of families. However, mortgages guaranteed by federal agencies such as The Federal Housing Administration (FHA) or The Federal Department of Veterans Affairs (VA) as well as the bank regulation to expand the availability of credit for lower-income households have played important roles in the increase in the proportion of credit going to low-income and minority households (Hendershott et al., 1997). In fact, according to the HMDA data, denial rates for government-backed home-purchase mortgages fell nearly 40 percent from 1993 to 1998 (Canner et al., 1999).

Home purchase mortgages may be broadly segmented into two types---conventional and federally guaranteed mortgages (Garman & Forgue, 2003). Federally guaranteed mortgages include primarily FHA and VA mortgages. An FHA-guaranteed mortgage borrower is required to make only a small down payment because the loan is backed by the federal government. FHA finances up to 100 percent of up-front loan closing costs and insurance premiums. In addition, FHA disallows assessments of applicant creditworthiness on the basis of race, gender, age, or property location (Gabriel & Rosenthal, 1991). Also, the FHA imposes spatially uniform underwriting standards while conventional underwriting criteria vary across spatial markets (Ambrose, Pennington-Cross, & Yezer, 2002). Furthermore, the FHA approves of borrowers with higher loan-to-value and with lower quality credit histories, compared to conventional mortgage loans.

However, FHA-guaranteed mortgages have certain restrictions. FHA has maximum regional loan limits that are lower than those with private mortgage insurance. FHA takes longer to receive approval, and has fewer payment plan options (U.S. Department of

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Housing and Urban Development, 1996). FHA requires mortgage insurance whereas most conventional mortgages with a loan-to-value ratio above 80 percent generally require less private mortgage insurance, and those with ratios below 80 percent do not require insurance. For borrowers with high loan-to-value mortgages (greater than 95%), FHA insurance premiums are lower than private mortgage insurance premiums (Ambrose et al., 2002). FHA will no longer collect annual mortgage insurance premiums on the loan when a borrower has reached the 78% loan to value ratio, while private mortgage insurance can be cancelled by the home buyer after he or she has at least 20 percent equity in the home (U.S. Department of Housing and Urban Development, 2000). The VA-guaranteed mortgage operates much like FHA mortgages and little or no down payment is required on VA loans (Garman & Forgue, 2003). In summary, the important characteristics of federally guaranteed mortgages such as FHA or VA are that these mortgage loans are fully guaranteed by the government and they are characterized by lower down payments, but they have a low ceiling.

When borrowers can get a conventional loan with no insurance or a lower price for private mortgage insurance than that of a federally guaranteed loan, they would be more likely to choose a conventional loan. When borrowers are constrained by conventional lending standards, meaning that they would have to buy default insurance from private insurers whose price is higher than that of a federally guaranteed loan, then they would be more likely to apply for a federally guaranteed mortgage. Therefore, households who borrow through federally-guaranteed mortgages tend to be credit constrained or rationed by the conventional mortgage market. Federally guaranteed mortgage loans have evolved into a vehicle for expanding access to mortgage credit for first-time homebuyers and traditionally underserved borrowers, including lower income households, minorities, and those living in neighborhoods with lower income or minority concentrations. As shown by the Home Mortgage Disclosure Act (HMDA) data, the FHA market share among loans originated to minority populations has moved up perceptibly in recent years (Gabriel, 2001). Between 1993 and 1998, the FHA share among home purchase loans originated to Blacks increased from 37 to 42 percent and from 37 to 46 percent for Hispanics (Gabriel, 2001).

For households who are credit constrained or rationed by the conventional mortgage market, federally guaranteed mortgages can be an important option.

Ambrose et al. (2002) suggested a special role for FHA-guaranteed mortgages as a mechanism for maintaining a supply of mortgage credit in declining housing markets. Many previous studies related to the type of mortgage obtained by households have focused on racial discrimination in mortgage markets and most research has used data from lenders (Calem, 1995; Canner, Gabriel, & Woolley, 1991; Gabriel & Rosenthal, 1991; Munnell, Tootell, Browne, & McEneaney, 1996). However, in mortgage lending, lenders must consider maximizing profits and minimizing costs along with the probability of the borrower's default. Thus, studies focusing and identifying the factors that influence the household's risk of default and the cost of default are important. Recent studies have examined some economic and credit history factors in the household's choice of mortgage (Ambrose et al, 2002; Pennington-Cross & Nichols, 2000). Thus, studies with the households' demographic, economic, and credit management factors and utilizing recent data from households are needed to identify the type of mortgage that households obtain.

The purpose of this study is to identify the determinants of obtaining a federally guaranteed mortgage (FHA or VA) instead of a conventional mortgage using recent data from households. This study will examine which demographic, economic, and credit management factors are determinants of obtaining a federally guaranteed mortgage based on the models of mortgage choice by Hendershott et al. (1997) and Gabriel and Rosenthal (1991).

The findings will be useful for consumer educators and financial advisors. Consumer educators can use the information to develop educational programs related to housing purchase and mortgage selection. Financial advisors can use the information to help clients determine which type of mortgage to seek.

Review of Literature
Credit Rationing and the Mortgage Market
According to the models of mortgage choice by Hendershott et al. (1997) and Gabriel and Rosenthal (1991), homebuyers select FHA financing when the cost of FHA mortgage insurance is lower than that of conventional or private mortgage insurance (PMI), and when they are constrained by conventional lending standards. If the desired amount of housing is greater than the maximum available from conventional lenders, then homebuyers are value-constrained. For these credit-constrained borrowers, conventional lenders are concerned about their default risk and cost. These models suggest that for credit-constrained borrowers, credit risk and cost

have important effects on the mortgage lending. Stiglitz and Weiss (1981) also argue that economically rational lenders in competitive markets apply tighter credit constraints to borrowers identified as having a higher probability of default. Thus, a household's ability to qualify for a loan, their credit risk, and the cost will be significant factors that influence the type of loan that households obtain.

Ambrose et al. (2002) examined mortgage credit rationing across geographic markets and time using the Home Mortgage Disclosure Act (HMDA) data, the Housing and Urban Development (HUD) data, and Mortgage Bankers Association (MBA) data. They were especially interested in the response of conventional mortgage supply to higher risk conditions associated with regional recessions. They used a logistic probability model and developed a series of four indirect tests based on the spatial variation of the FHA share of mortgages including endorsements and applications, as well as FHA and conventional rejection rates. Results of the four tests indicated that conventional mortgage underwriting criteria did not become more flexible and might become more demanding when local economic conditions deteriorated. Ambrose et al. found that non-price credit rationing was being used in the mortgage market.

Race and the Mortgage Market
Calem (1995) investigated factors affecting white and minority mortgage loan approval rates during 1990-1991 using a cross-sectional analysis of U.S. metropolitan counties. The purpose was to examine whether minority loan applicants were denied credit more frequently than white applicants because of information externalities. All predominantly minority, low-or-moderate-income census tracts were grouped together and all white census tracts were grouped together. Separate approval rate equations were estimated for conventional and federally guaranteed home purchase loans (FHA or VA). The approval rate regressions indicated that across white tract groupings, the number of sales of owner-occupied units during 1989 had a positive and statistically significant effect on the loan evaluations. However, this relationship did not hold for the minority tract grouping.

Canner et al. (1991) examined the effects of default risk and race in an analysis of mortgage lending using a consumer survey. The results indicated that higher levels of default risk and cost decreased the probability of conventional loan use. After controlling for individual and neighborhood proxies of default risk and cost, results of the analysis

suggested that minority households were less likely to obtain conventional financing than whites.

Gabriel and Rosenthal (1991) examined the effects of borrower race and default risk on mortgage lending, using the 1983 Survey of Consumer Finances with probit analysis to determine whether borrowers obtained FHA or conventional mortgages. Results of the analysis indicated that the purchaser was likely to obtain a FHA mortgage if households had low wealth, if the household head was employed in an occupation characterized by high unemployment, if the home was located in the central city, and if the location was characterized by a low rate of home price appreciation. Minority households were significantly less likely to obtain conventional financing than whites, even after controlling for various proxies of default risk.

Munnell et al. (1996) examined differential treatment affecting minorities' access to credit and opportunities for homeownership, using data from the Home Mortgage Disclosure Act (HMDA) data and the Panel Study of Income Dynamics (PSID). The results indicated that minority applicants, on average, had less wealth, weaker credit histories, and higher loan-to-value ratios than white applicants, and that these disadvantages accounted for a large portion of the difference in denial rates. They found that black and Hispanic mortgage applicants in the Boston area were more likely to be turned down than white applicants with similar characteristics.

Credit Management and the Mortgage Market
Chakravarty and Scott (1999) examined the effect of the relationship between individual households and their creditors on the probability of being credit rationed, using the 1989 Survey of Consumer Finances. They found that households headed by individuals who were older, white, with a longer relationship between the household and the creditor, with higher assets and income, and smaller household size were less likely to be credit-rationed. However, households having a poor credit history and those who received public assistance were more likely to be credit-rationed.

Hendershott et al. (1997) modeled the simultaneous decisions of home purchasers regarding loan-to-value (LTV) and mortgage instrument. They estimated a nested logit model of mortgage choice using a sample of 819 purchasers from the 1984 Metropolitan American Housing Survey. They argued that the purchase of a home required three interrelated household financial decisions: what level of debt to obtain, whether to select an adjustable rate mortgage

(ARM) or fixed rate mortgage (FRM), and whether to choose a FHA or a conventional loan. They found that debt and mortgage choices were driven by the need to finance the down payment and monthly payment constraint ratios, and to lower mortgage insurance costs.

Pennington-Cross and Nichols (2000) expanded the standard choice model by including measures of borrower credit history using a large and geographically diverse sample. They estimated a conditional discrete choice model and found that the ability of a homebuyer to avoid credit problems was an important part of the choice between FHA and conventional mortgages. In addition, they showed that credit scores of FHA borrowers were worse, on average, than those of conventional borrowers. Further, they found that as loan-to-value increased, credit scores of conventional borrowers declined.

Zhang and DeVaney (1999) examined the determinants of consumer's debt repayment patterns to predict consumers' credit risk using the 1995 Survey of Consumer Finances. They found that households headed by individuals who were younger, non-white, unmarried, and with more children were more likely to have debt repayment difficulties. Further, if the household had a low income, was a renter, was a short-term planner, and had a higher total debt to total assets ratio, the household was more likely to have debt payment difficulties.

In summary, previous studies indicate that credit rationing has occurred and that additional characteristics such as the household's economic, demographic, and credit factors as well as race might also influence the type of mortgage that is obtained. Hence, this study will examine the type of mortgage that is obtained using a comprehensive model consisting of demographic, economic and credit management factors.

Hypotheses

Demographic Factors

Age, education level, marital status, gender, and race appear to influence the type of mortgage that is obtained. Age is an indicator of future earnings potential as the slope of the age-earnings profile changes over the average person's working life (Munnell et al., 1996). Also, wealth and creditworthiness were found to improve with age (Chakravarty & Scott, 1999). Conventional lenders may apply less stringent credit constraints to older households so that their likelihood of obtaining a conventional loan will increase. Thus, a negative relationship between the household head's age and

the probability of obtaining a federally guaranteed mortgage is hypothesized.

Previous studies related to consumers' credit risk showed that education level and marital status had a positive relationship with credit worthiness and income stability (Sullivan & Fisher, 1988; Zhang & DeVaney, 1999). Thus, conventional lenders may apply less stringent credit constraints to households headed by individuals who are better educated and married. It is expected that the relationship between a household head's education level and the probability of obtaining a federally guaranteed mortgage will be negative. It is expected that unmarried households will be more likely to obtain a federally guaranteed mortgage.

It is often argued that female entrepreneurs face discrimination in formal credit markets (Baydas, Meyer, & Aguilera, 1994). Thus, it is expected that households headed by women will be more likely to obtain a federally guaranteed mortgage. Many studies related to mortgage choice indicated that racial discrimination in mortgage markets has existed (Calem, 1995; Canner et al., 1991; Gabriel & Rosenthal, 1991; Munnell et al., 1996). It is expected that non-white households will be more likely to obtain a federally guaranteed mortgage than white households.

Economic Factors

Because the credit-risk of borrowers depends primarily on the household's economic factors (Chakravarty & Scott, 1999; Gabriel & Rosenthal, 1991), this study will examine income, net worth, debt-to-assets ratio, and the loan-to-value ratio. Conventional lenders tend to apply tighter credit constraints to households with low income or low net worth (Gabriel & Rosenthal, 1991; Pennington-Cross & Nichols, 2000). The larger the applicant's income or net worth, the less likely the applicant is to default (Munnell et al., 1996). Thus, it is hypothesized that the relationship between household income and net worth and the probability of obtaining a federally guaranteed mortgage will be negative.

Zhang and DeVaney (1999) showed that households having a higher debt-to-assets ratio were more likely to have debt payment difficulties. It is expected that the relationship between the debts-to-assets ratio and the probability of obtaining a federally guaranteed mortgage will be positive.

Many previous studies have emphasized that loan-to-value is important in mortgage lending (Ambrose et al., 2002; Gabriel & Rosenthal, 1991; Munnell et al., 1996; Pennington-Cross & Nichols, 2000). Goodman

and Nichols (1997) introduced the term "FHA wedge" to describe the group of applicants whose loan-to-value ratio is between 95% and 100% and/or their front end housing ratio is between 28% and 33%. These applicants are likely to be rejected for a conventional mortgage, but they are likely to qualify for a FHA-guaranteed mortgage. Munnell et al. (1996) used the amount of the loan relative to the appraised value of the property as a measurement of both the applicant's equity share in the property and the lender's margin of safety if housing prices decline or the loan becomes delinquent. The larger the applicant's equity share, the less likely the applicant will default. In this study, the amount of mortgage loan to the current value of the home as a proxy for loan-to-value will be examined. It is expected that the relationship between the loan-to-value ratio and the probability of obtaining a federally guaranteed mortgage will be positive.

Credit Management
A borrower's creditworthiness is measured by the household's credit turndown history and delinquency experience. Pennington-Cross and Nichols (2000) showed that the borrower's credit history was important in mortgage lending in addition to their economic status. They found that credit scores of FHA borrowers were worse, on average, than those of conventional borrowers. It is expected that credit turndown history and delinquency experience will be positively related to the probability of obtaining a federally guaranteed mortgage.

Based on the models of mortgage choice by Hendershott et al. (1997) and Gabriel and Rosenthal (1991) and previous research, the following hypotheses are proposed.

H_1: There will be a negative relationship between the age of the household head and the probability of obtaining a federally guaranteed mortgage.

H_2: There will be a negative relationship between the level of education of the household head and the probability of obtaining a federally guaranteed mortgage.

H_3: Married households will be less likely to obtain a federally guaranteed mortgage than non-married households.

H_4: Households headed by a woman will be more likely to obtain a federally guaranteed mortgage than households headed by a man.

H_5: Non-white households will be more likely to obtain a federally guaranteed mortgage than white households.

H_6: There will be a negative relationship between household income and the probability of obtaining a federally guaranteed mortgage.

H_7: There will be a negative relationship between net worth and the probability of obtaining a federally guaranteed mortgage.

H_8: There will be a positive relationship between the debt-to-assets ratio and the probability of obtaining a federally guaranteed mortgage.

H_9: There will be a positive relationship between the loan-to-value ratio and the probability of obtaining a federally guaranteed mortgage.

H_{10}: Households with a history of being turned down for credit will be more likely to obtain a federally guaranteed mortgage than other households.

H_{11}: Households who have been delinquent in making payments will be more likely to obtain a federally guaranteed mortgage than other households.

Methodology
Data and Sample
Data were drawn from the 1998 Survey of Consumer Finances (SCF). The survey was sponsored by the Federal Reserve Board of Governors and conducted by the National Opinion Research Center (NORC) at the University of Chicago. A dual-frame sample design was employed to provide reliable information on items that are broadly distributed in the population and on items that are highly concentrated in a small part of the population such as wealthy households (Kennickell, Starr-McCluer, & Surette, 2000). A multiple imputation technique was used to handle missing and incomplete data for the 1998 SCF. In this study, only the first implicate was used for the analysis.

For the 1998 SCF, 4,305 households were interviewed. The sub-sample for this study consists of the 1,162 households who were homeowners, who reported a positive income, and who obtained their first or main mortgage on their primary residence in the past 5 years (during 1993-1998).

Dependent Variable. The dependent variable is the probability of obtaining a federally guaranteed mortgage such as FHA or VA. It was measured by the response to this question: "Is the first or main mortgage a federally guaranteed mortgage, such as

FHA or VA?" The variable was coded as 1 if the respondent had a federally guaranteed mortgage such as FHA or VA as first or main mortgage and 0 otherwise.

Independent Variables. Demographic variables consisted of the household head's age, education level, marital status, gender, and race. The household head's age and education level were continuous variables. Marital status was coded as 1 if the respondent was married and 0 if otherwise. Gender was coded as 1 if the household head was a woman and 0 otherwise. Race was coded as 1 if the household head was non-white and 0 if the household head was white.

Economic variables consisted of household income, net worth, debt-to-assets ratio, and loan-to-value ratio. Household income was measured as the total annual household income. Net worth was measured by total assets minus total debt. Debt-to-assets ratio was measured by total debt divided by total assets. The loan-to-value ratio was measured by the amount of the first mortgage loan divided by the current appraised value of home. [a]

Credit management variables consisted of credit turndown history and delinquency experience. Credit turndown history was measured by the question: "In the past five years, has a particular lender or creditor turned down any request you made for credit, or not given you as much credit as you applied for?" The variable was coded as 1 if the respondent was turned down for a loan or obtained less credit than he or she required, and 0 otherwise. Delinquency experience was measured by the question: "Were you ever behind in your payments by two months or more?" The variable is coded as 1 if the respondent was ever behind in payments by two months or more and 0 otherwise. The variables are shown in Table 1.

Analysis. Because the dependent variable was dichotomous, the study employed a logistic regression model to examine the probability of obtaining a federally guaranteed mortgage such as FHA or VA as a function of demographic, economic, and credit management variables. The maximum likelihood method is applied to estimate the coefficients of the explanatory variables for the empirical model (Kennedy, 1998).

When the independent variables were examined using a correlation analysis, income and net worth were highly correlated (Pearson correlation coefficient was 0.78). Therefore, net worth was not included in the logistic regression analysis.

Table 1
Measurement of Variables

Dependent Variable	
Probability of obtaining a federally guaranteed mortgage such as FHA or VA	1 = yes, 0 otherwise
Independent Variables:	
Demographic	
Age	Continuous
Education level	Continuous
Marital status	1 if married, 0 otherwise
Gender	1 if female, 0 male
Race	1 if non-white, 0 white
Economic	
Income	Continuous
Net worth	Continuous
Debt-to-Assets Ratio	Continuous
Loan-to-Value Ratio	Continuous
Credit Management	
Turn down history	1 if turned down for loan or obtained less than requested, 0 otherwise
Delinquency	1 if loan or mortgage payments were ever behind by two months or more, 0 otherwise

Results

Sample Characteristics. Among the 1,162 households who were homeowners, with a positive income, and who obtained their first mortgage on their primary residence in the past 5 years, 31% received FHA or VA loans and 69% obtained a conventional mortgage. A typical household head was 44 years old with 14 years of education. About three-quarters were married. About 14% of households were female-headed, and 16% of household heads were non-white. The average values for household income and net worth were $79,942 and $366,437, respectively. The average values for the debt-to-assets ratio and loan-to-value ratio were 0.46 and 0.64, respectively. About 25% of respondents were turned down for a loan or obtained less than requested and 4.4% of respondents had been two months or more behind in their payments. See Table 2.

Table 2
Sample Characteristics (N=162)

Variables	%	Means (sd)
Dependent variable		
The percentage of federally guaranteed mortgages such as FHA or VA	31.0	
Independent variables:		
Demographic		
Age		44 (11.3)
Education level		14 (2.4)
Married	78.5	
Female-headed household	13.5	
Race is non-white	15.9	
Economic		
Income		$ 79,942 (373,556)
Net worth		$366,437 (1,530,239)
Debt-to-asset ratio		0.46 (0.27)
Loan-to-value ratio		0.64 (0.25)
Credit Management		
Having turn down history	25.1	
Payments ever behind by two months or more	4.4	

Results of Preliminary Tests for Independent Variables

T-tests and Chi-square tests were conducted for continuous and categorical variables, respectively, to examine whether there were significant differences between households obtaining a federally guaranteed mortgage or a conventional mortgage. The t-tests indicated that there were significant differences; households who had obtained an FHA or VA mortgage were younger, with less education, lower income, less net worth, but they had higher values for the debt-to-assets and the loan-to-value ratios. Chi-square tests also showed that there were significant differences; households with an FHA or VA mortgage were more likely to be non-white, have been turned down for credit, but they were less likely to have gotten behind on payments. See Table 3A and 3-B.

Table 3-A
Means and results of t-tests (weighted)

	Means	
Variables and significance	Federally guaranteed mortgage (N=259)	Conventional mortgage (N=903)
Age***	41.9	44.9
Education level***	13.8	14.3
Income ***	62,722	87,673
Net worth ***	193,588	444,045
Debt-to-Assets Ratio ***	0.54	0.42
Loan-to-Value Ratio***	0.72	0.60
* p <.10, ** p <.05, *** p <.01		

Table 3-B
Percentage distribution and results of Chi-square tests

Variables and significance	Federally guaranteed mortgage (N=259)	Conventional mortgage (N=903)
Marital status		
Married	17.9	63.8
Otherwise	4.4	13.9
Gender		
Female	2.6	7.4
Male	19.7	70.3
Race ***		
Non-white	5.1	7.2
White	17.2	70.5
Turn down history ***		
Having turn down history	13.9	6.5
Otherwise	63.8	15.8
Delinquency***		
Payments ever behind by two months or more	1.2	1.6
Otherwise	21.1	76.1
* p <.10, ** p <.05, *** p <.01		

Results of Logistic Regression Analysis

The results of logistic regression are presented in Table 4. Separate models were estimated to show the results of demographic, economic, and credit management variables on explaining the probability of obtaining a federally guaranteed mortgage. (See Models I, II, and III.) The natural logarithm for income was used in the logistic regression. The fifth column presents the results of Model IV that included all of the variables. The marginal effects for the full model are shown in the final column in Table 4. The following analysis focuses on Model IV.

Demographic Factors. Younger, less well educated, and non-white household heads were significantly more likely to obtain a federally guaranteed mortgage. An increase of 1 year in the age of the household head would decrease the probability of obtaining a federally guaranteed mortgage by 0.24%. An increase of 1 year in the education level of the household head would decrease the probability of obtaining a federally guaranteed mortgage by 0.93%. Hypotheses 1, 2, and 5 on age, education, and race, respectively, were supported. However, marital status and gender were not significant, and hypotheses 3 and 4 on marital status and gender, respectively, of the household head were not supported.

Economic Factors. Households with lower income, a higher debt-to-assets ratio, and a higher loan-to-value ratio were significantly more likely to obtain a federally guaranteed mortgage than other households.

A one unit increase in the log of income would decrease the probability of obtaining a federally guaranteed mortgage by 5.34%. A one unit increase in the debt-to-assets ratio or the loan-to-value ratio would increase the probability of obtaining a federally guaranteed mortgage by 12.92% and 12.34%, respectively. Hypotheses 6, 8, and 9 on income, debt-to-assets, and loan-to-value, respectively, were supported.

Credit Management Factors. In Model III, being turned down for credit and being delinquent with payments were significantly related to the probability of obtaining a federally guaranteed mortgage. However, these variables were not significant in the combined model. Thus, hypotheses 10 and 11 were not supported.

Table 4
Logistic Regression on the Probability of Obtaining a Federally Guaranteed Mortgage

Variables	Model I	Model II	Model III	Model IV	Marginal Effects
Intercept	2.4237 ***	2.6484***	-1.4046 ***	3.2749 ***	0.5012
Demographic Variables					
Age	-0.0366 ***			-0.0158 **	-0.0024
Education level	-0.1455 ***			-0.0605 *	-0.0093
Marital status	-0.0767			0.0965	0.0148
Gender	0.2382			-0.0506	-0.0077
Race	0.9164 ***			0.8660 ***	0.1325
Economic Variables					
Income		-0.4239 ***		-0.3487 ***	-0.0534
Debt-to-Asset Ratio		1.1156 ***		0.8440 **	0.1292
Loan-to-Value Ratio		0.7990 **		0.8064 ***	0.1234
Credit Management					
Turn down history			0.5631 ***	-0.0036	-0.0005
Delinquency			0.7345 **	0.2135	0.0327
Log likelihood function	-573.5644	-560.0735	-607.5271	-545.8949	

* $p < .10$, ** $p < .05$, *** $p < .01$

Discussion

Using data from the 1998 Survey of Consumer Finances, this study examined the determinants of the type of mortgage that households obtain---a federally guaranteed mortgage such as FHA or VA or a conventional mortgage. Demographic, economic, and credit management factors were expected to influence the type of mortgage households obtain. The model was based on the models of mortgage choice by Hendershott et al. (1997) and Gabriel and Rosenthal (1991) and previous research. The results of logistic regression showed that households headed by individuals who were younger, less well educated, non-white, with lower income, with a higher debt-to-assets ratio, and a higher loan-to-value ratio were significantly more likely to obtain a federally guaranteed mortgage.

According to the marginal effects, the economic variables had larger effects than the demographic or credit management variables on the type of mortgage that households obtain. The results of logistic regressions for each set of factors in Model I, Model II, and Model III were reported to show the variation.

Economic and demographic factors were significant in Model IV as well as in Model I and Model II. But, the credit management factors were not significant in model IV although these factors were significant in model III. These results indicated that the households who were economically vulnerable (with lower down payment or higher loan-to-value or higher debt to assets), rather than those with a bad credit history, were more likely to obtain a federally guaranteed mortgage. The household's economic status such as income, debt-to-assets ratio, and loan-to-value ratio reflects the ability to repay the loan and affects the household's risk of default and the cost of default. Thus, economic variables are the most important factors for lenders to examine when granting credit.

Credit history can provide information on the household's credit management behavior. In fact, Pennington-Cross and Nichols (2000) showed that credit scores played an important role in determining the FHA-conventional mortgage choice. In contrast, this study used credit turndown history and delinquency experience reported by the households themselves as proxies for credit management while

Pennington-Cross and Nichols (2000) utilized the credit scores recorded by lenders, county reporters, and official credit repositories. Thus, there could be a potential bias in the proxies for credit management.

In this study, non-white households were significantly more likely to obtain a federally guaranteed mortgage than white households. Non-white households who were constrained by the conventional mortgage market can search for and obtain federally guaranteed mortgages. The question of racial discrimination in conventional mortgage markets has been an important issue. Many studies have argued that there has been a race effect in conventional mortgage lending (Canner et al., 1991; Gabriel & Rosenthal, 1991; Munnell et al., 1996). Munnell et al. (1996) indicated that non-white mortgage applicants were more likely to be turned down than white applicants in the conventional mortgage market. However, these studies also showed that on average, minority applicants have less wealth, weaker credit histories, and higher loan-to-value ratios than white applicants (Gabriel & Rosenthal, 1991; Munnell et al., 1996). Thus, the possible default by non-white households because of their economic status and credit histories could explain tighter credit standards for minority borrowers in the conventional mortgage market.

Furthermore, the results showed that younger households were more likely to obtain a federally guaranteed mortgage than older households. Generally, younger households have not accumulated much wealth so they are more likely to be credit constrained in the conventional mortgage market.

The level of education was also important in the type of mortgage households obtain. Education level is usually related to occupational status and income stability. These results showed that households headed by individuals with more education were significantly less likely to obtain a federally guaranteed mortgage.

Implications
Implications for Consumer Educators. The findings provide some implications for consumer educators. It is important for consumer educators to provide consumers with knowledge about loan-to-value ratio, mortgage insurance, and mortgage rate (fixed rate or adjustable rate). Compared to other households, the benefits of education about mortgage credit are greater for lower-income or minority households: households headed by individuals who are younger, less educated, non-white, with a lower income, with a higher debt-to-assets ratio, and a higher loan-to-value

ratio. Also, consumer educators can help households improve their ability to qualify for a mortgage by providing information about lenders' standards for granting loans, including credit history, collateral quality, and terms of the loan.

Implications for Financial Advisors. In determining the type of loan that households obtain, their loan-to-value ratio is very important. For households with a loan-to-value ratio below 80 percent, FHA is more expensive because conventional lenders do not require mortgage insurance. But, for households with high loan-to-value ratio (greater than 95%), FHA insurance premiums are lower than private mortgage insurance premiums. Thus, financial advisors can advise which mortgage loan is best suited for the clients' financial situation, considering their loan-to-value ratio and payment-to-income. In addition, financial advisors can inform households with high loan-to-value ratios about other mortgage options such as Fannie Mae or Freddie Mac because loans obtained from them require only a small down payment (Underwriting Guidelines Reference, 2003).

Endnote
[a.] Loan-to-value ratio is defined as the relationship between the amount owed on the mortgage and the appraised value of the home. But, the appraised value of the home when households received the mortgage is not reported in the SCF data. Therefore, we use the current appraised value of the home instead of the original appraised value of the home for measuring 'loan-to-value ratio' variable.

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