

**Discrimination, Redlining,
and
Private Mortgage Insurance**

by Geoffrey M.B. Tootell

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Abstract

The existence of discrimination and/or redlining in mortgage lending has been debated intensively for years. Traditionally, the lender's role in credit availability has been scrutinized. Yet other institutions, specifically mortgage insurers, often help determine whether a mortgage is granted; if the behavior of the mortgage insurers is not accounted for, their actions could be attributed to the lenders. This paper examines the determinants of the private mortgage insurance decision. Specifically, the roles of the applicant's race and of the racial characteristics of the neighborhood in which the property is located are examined. The analysis includes the most complete data set extant of the variables in the information set of these insurers. Little evidence is found that discrimination is occurring among insurers, but there is some evidence that redlining is.

Discrimination, Redlining, and Private Mortgage Insurance

The role of race in mortgage lending has been debated intensively for decades. Unfortunately, the data required to examine this issue usually have been unavailable. Recently, however, Munnell, Tootell, Browne, and McEneaney (forthcoming) (MTBM) found that race significantly affects the mortgage lending decision, even after accounting for the relevant variables in the lender's information set. So far, the debate has scrutinized lenders, while ignoring other institutions that are frequently important to mortgage availability.

Private mortgage insurers often play an important role in the lending decision. In fact, most loans with down payments of less than 20 percent that are sold into the secondary market require private mortgage insurance (PMI). Given this secondary market guideline, the ability to obtain PMI is particularly important to minority applicants, since they tend to have small down payments and high loan-to-value ratios. This paper examines the effect of race on the decision to insure a mortgage. The evidence suggests that the applicant's race does not determine whether PMI is granted but that the racial composition of the neighborhood where the property is located seems to play a role.

Redlining minority neighborhoods has been extensively examined for mortgage lending, but not for PMI. Bradbury, Case, and Dunham (1989) and King (1979), among others, have examined

mortgage redlining, using various data sets. The results are difficult to interpret, since the limited nature of the data in these prior studies introduces potentially serious omitted variable bias. The racial composition of the tract tends to be correlated with omitted individual characteristics that are important to the mortgage decision. Tootell, Munnell, Browne, and McEneaney (1992) (TMBM) use basically the entire information set of the lender to show that once these omitted variables are included, redlining does not appear to play an important role in the mortgage lending decision. This paper uses that same data set to examine whether the racial composition of the tract affects the decision to insure a mortgage.

The first section of this paper describes the data. Section II briefly reviews the factors that should determine whether PMI is issued. The third section examines empirically what actually does affect the private mortgage insurer's decision. A brief conclusion follows.

I. The Data

The data set used in this paper resulted from a survey by the Federal Reserve Bank of Boston of approximately 130 mortgage lenders in the Boston area.¹ Information was collected from all applications for conventional mortgages by minorities and a random sample of those by whites from these institutions in 1990. Under the Home Mortgage Disclosure Act (HMDA), information is

gathered on each mortgage applicant's income, gender, race, and desired loan amount, as well as the location of the property to be purchased and the action taken on the mortgage.² The survey questionnaire collected an additional 38 variables in an attempt to replicate the lender's information set.³ These variables included data on the applicant's credit and employment histories, monthly income, obligation-to-income ratios, loan-to-value ratio, net worth, and other personal and financial characteristics, as well as the appraised value of the property and other property characteristics. The entire list of variables can be found in MTBM.

Information on whether the applicant sought PMI and whether that application for PMI was approved was also requested in the survey. Of the almost 3000 observations in the sample, over 700 applied for private mortgage insurance and over 10 percent of these applications were rejected. This paper attempts to model the mortgage insurance decision using these 727 observations. The variables collected by the survey should be sufficient to model the PMI decision, since the variables that determine whether or not PMI is granted should be a subset of the variables that determine whether or not a mortgage application is accepted. In fact, lenders and private mortgage insurers share the identical information set, so the Boston Fed survey data are uniquely suited to examining the PMI decision.

In addition to the information in the loan files, neighborhood data from the Census tapes are included in the

analysis. The Census data contain a variety of tract-specific variables that describe potentially important aspects of the neighborhood. Examples of these Census variables are the boarded-up and vacancy rates of properties in the tract, the median household income in the neighborhood, and the rate of return to rental housing in the area. Since not all of the variables that were collected are necessarily important, the next section outlines the factors one might expect would determine the PMI decision and discusses why the information sets of lenders and private mortgage insurers should be identical.

II. The PMI Decision

Private mortgage insurance is purchased by the borrower in order to insure the lender against a portion of the losses that may be incurred if the loan defaults. The insurance protects the lender only up to a pre-agreed fixed amount. The amount of coverage and the premium are fairly inflexible; the premium is discontinuously dependent on the loan-to-value ratio but not on other applicant characteristics. As a result, the applicant is either accepted or denied at the going rate. The secondary market generally requires that mortgages with a loan-to-value ratio above 80 percent have enough mortgage insurance to provide the lender at least a 20 percent cushion if the borrower defaults. However, mortgages held in the lender's portfolio, representing over 30 percent of the observations that sought PMI

and were accepted for a loan, have much more flexibility about how much insurance, if any, is required. For these loans held in portfolio, PMI is not required for applications with a loan-to-value ratio above 80 percent; on the other hand, it can also be required on applications with a loan-to-value ratio below 80 percent.

The decision to insure a mortgage should depend on the same variables as the decision to grant a mortgage. Just like lenders, private mortgage insurers care about both the size of the losses incurred given a default and the probability that the applicant will default. The size of any losses depends on the equity in the home once the loan becomes nonperforming and on the costs incurred by the lender foreclosing on the property.⁴ The larger the foreclosure costs if a default occurs, the more likely the applicant's equity will be depleted and the more likely the lender, the insurance company, or both will have to make good on these losses. On the other hand, the larger the borrower's initial equity in the property, the less likely these costs will actually be so large that they have to be borne by the lender or insurer if the borrower can no longer maintain the loan.

Even before the loan misses a payment, however, the borrower's equity can decline as a result of a fall in real estate values. The relevant equity stake is the equity at the time of the foreclosure, not the equity at the time that the mortgage, or the insurance contract, is originated. With rising nominal real estate prices, the costs of a default rarely will

outweigh the equity in the home. With stable or falling prices, these costs can quickly offset the remaining equity. As a result, variable property values increase the potential for losses for both lenders and insurers. Thus, any potential measure of the riskiness of the asset price might also be important in the decision to lend or to insure a mortgage.

Other than the price of the property, the variables that could reflect possible future asset price risk are extracted from the Census data. Traditional candidates for such variables include the boarded-up and vacancy rates in the tract. A high percentage of boarded-up or vacant properties in a neighborhood may signal a declining area. Another potential measure of this risk, used in MTBM, is a measure of the return on rental property. It is assumed that tracts with higher risk of capital loss require higher returns to rental property. As a result, various measures of the rental rate of return were calculated.⁵ Finally, the median income of the tract is included in the analysis as a possible indicator of the tract's "riskiness," although the justification for this variable is less clear.

The determinants of the probability of default are more straightforward and are taken directly from the standard mortgage application form. Again, the loan-to-value ratio is important since borrowers will hesitate to leave behind equity. Variables measuring the applicant's ability to maintain the mortgage are also important, since most borrowers remain committed to the loan even when the equity is negative so long as they have the ability

to make the payments, thus protecting either the lender or the insurer or both from any losses. These variables include the payment-to-income ratios as well as the applicant's credit history and employment variability. If the property includes rental units, the vacancy rates in the area might also affect the probability of defaulting, as the expected cash flow from the rental portion of the property might be affected.

Although the profits of both the lender and the insurer depend on the same variables, the two expected profit functions do differ slightly. For loans without PMI, the lender's profits start declining once the costs of default, including asset price depreciation, exceed the borrower's initial equity in the home. For loans with PMI, the lender's profits do not start declining until these losses are greater than the initial equity in the home plus the value of the insurance contract. The resulting reduction in risk is transferred from the lender to the private mortgage insurer and ultimately is paid for by the borrower. For the mortgage insurer, once losses are large enough to wipe out the equity in the home, the expected profits of the PMI contract fall continuously with expected losses until the value of the insurance is depleted; any further losses are borne by the lender. The expected profit function for private mortgage insurers is similar to that of lenders holding a loan without PMI in portfolio, except the profits of private mortgage insurers have a lower bound.

This slight difference in expected profit functions may

affect the relative importance of the application information but not the relevant variables in that decision. The losses of private mortgage insurers are truncated compared to those of the lenders without PMI, or they are truncated differently from those of lenders for loans with PMI, but the variables that predict these expected losses are identical. The same variables that determine the lending decision also determine the PMI decision.

III. Estimation of the Determinants of PMI

Because the profit functions of lenders and mortgage insurers depend on the same factors, the variables used initially to estimate the mortgage lending decision in MTBM are used to estimate the PMI decision. Since the dependent variable is dichotomous, whether PMI is granted or not, logit estimation is performed. The coefficients from this procedure are presented in column 1 of Table 1. Many of the variables that are significant in the mortgage lending equation are also statistically significant in the PMI equation. The total obligations-to-income ratio, elements of the applicant's credit history, the loan-to-value ratio, and whether the property was owner-occupied each had a statistically significant effect on the PMI decision.⁶ The applicant's consumer credit history and whether the property had multiple units were of borderline significance. In fact, the coefficients in the PMI denial regression are of similar size to those found in the mortgage denial regressions in MTBM. However,

the coefficient on race in the PMI regression is not statistically significant at the 5 percent level, although it is at the 10 percent level. MTBM found that race played a significant role in the lending decision, while these results suggest that its role in the decision to insure a mortgage is less clear.

The slight differences between the profit functions of mortgage lenders and mortgage insurers could make mortgage insurers more sensitive to concerns about neighborhood characteristics.⁷ As a result, geographical rather than racial discrimination might be more likely. Columns 2 and 3 of Table 1 examine whether geographical discrimination based on the racial composition of the neighborhood is occurring. In the second equation, a dummy variable indicating whether the property is in a Census tract where the population is more than 80 percent minority replaces race in the equation in column 1.⁸ The minority neighborhood variable created in this way is statistically and economically significant. Being in a minority tract roughly doubles one's probability of being rejected for PMI, given the other right-hand-side variables, from roughly 10 percent to 20 percent. The results from estimation using a continuous measure of the tract's racial composition, the minority share of the population in the tract in 1990, are shown in column 3. Again, the variable describing the tract's racial composition is statistically significant. These two equations suggest that private mortgage insurers are less apt to insure

mortgages in minority neighborhoods even holding the other individual, property, and financial characteristics constant.

The results in Table 1 could be explained by something other than redlining minority neighborhoods. Either a misspecified functional form, or an omitted variable important to the PMI decision and correlated with the racial composition of the tract, could explain the significance of the variables measuring the racial composition of the neighborhood. Both these alternatives are examined.

Misspecification of the Functional Form

The linear specification on the loan-to-value ratio is the best candidate for a misspecified functional form that could bias the estimate of the coefficient on the variable measuring the racial composition of the tract. If, for example, mortgage insurers are much more averse to insuring borrowers with loan-to-value ratios above 90 percent than those below 90 percent, and borrowers with these high ratios are more likely to buy homes in minority tracts, then the minority tract variable may appear significant only because the specification of the loan-to-value ratio in Table 1 is linear. Table 2 examines a different functional form of the equation. The loan-to-value ratio is separated into three different segments - applications with a loan-to-value ratio below 80 percent, those with a ratio above 95 percent, and those whose ratio is in between. These thresholds were selected because of their importance as secondary market guidelines and in PMI pricing practices.

Table 2 shows that the change in the specification has little effect on the results in Table 1. A couple of variables that were of borderline significance in Table 1, the consumer credit history index and whether the property had multiple units, are now significant. On the other hand, the coefficient on race in column 1 is no longer significant even at the 10 percent level. However, the coefficients on the variables measuring the racial composition of the tract, shown in columns 2 and 3, are still both economically and statistically significant. The marginal effect of this change in the specification is not surprising since the data frequently cannot reject the constraint of a linear specification of the loan-to-value ratio.⁹ Alternatively, allowing a nonlinear relationship between PMI denials and the obligation ratio also has no significant effect on the results. The redlining of minority neighborhoods found in Table 1 does not appear to be an artifact of the equation's specification.

Misspecification Due to an Omitted Variable

Although changing functional forms has little effect on the results in Table 1, the racial composition of the tract may still be proxying for an omitted variable. For example, Canner and Passmore (1994) suggest that private mortgage insurers are less apt to insure mortgages for condos and mortgages with adjustable rates. As a test for possible omitted variables, these factors, along with whether the loan had a cosigner, whether a gift was used as part of the down payment, indicator variables for whether

the loan was defined as a jumbo mortgage or qualified for a mortgage under a special loan program, as well as the age, years of education, gender, and income of the applicant are added to the specification in Table 1.¹⁰ The estimated coefficients from these regressions are presented in Table 3. None of these added variables are important in the PMI decision nor does their inclusion, in general, affect the estimates or significance levels of the other coefficients. Specifically, the race of the applicant is still insignificant, while the racial composition of the neighborhood in which the property is located remains significant, particularly the coefficient on the dichotomous measure of a minority neighborhood.

These other loan, personal, and financial characteristics do not explain the significance of the tract's racial composition, but other, tract-specific variables might. The rent-to-value ratio of the tract has already been included in the regressions in Tables 1, 2, and 3, since it was the only tract characteristic that was statistically significant in the original mortgage lending regressions in MTBM. As a measure of asset risk it may be the most theoretically sound, but its coefficient in the PMI equation is incorrectly signed and not statistically significant.¹¹ Alternative measures of this risk include the boarded-up and vacancy rates for the tract, both collected from the 1990 Census. Because of the serious collinearity between all these tract-specific measures, dummy variables were used to indicate whether the application was for a property in a

neighborhood with high boarded-up or vacancy rates.¹² Table 4 replicates Table 1, adding the boarded-up and vacancy rates in the tract to each equation. The race of the applicant is still insignificant. However, the racial composition of the tract remains statistically significant at the 5 percent level.¹³ The other tract variables are statistically insignificant in every regression.

Finally, it is possible that private mortgage insurers treat minority applicants in minority neighborhoods differently than they treat white applicants in these tracts. The interaction of the applicant's race with the racial composition of the neighborhood might affect the PMI decision. Column 1 of Table 5 tests this hypothesis by examining the importance of an interactive term between minority status and the indicator variable for a minority tract. The second column presents the coefficients from an equation where the interaction is between the race of the applicant and the minority percent in the tract. These interactive effects are highly significant.¹⁴ The final two columns contain the coefficient estimates when the vacancy and boarded-up rates are added to the first two columns. The interaction effects remain significant.

Whether the minority composition of the tract or the interaction between minority status and minority tracts helps determine the PMI decision is difficult to untangle, since the lion's share of all applications in the minority tracts are made by minorities. The correlation between the minority status of

the tract and the interaction variables is 0.96. What is more certain is that racial characteristics of the neighborhood play some role in the PMI decision.

IV. Conclusion

So far, the debate about equal access to the mortgage market for minorities has been restricted to an analysis of mortgage lender behavior. This paper attempts to examine the role of another important player in the mortgage lending market, the private mortgage insurer. Mortgage insurers are particularly important to minority borrowers, since their financial characteristics are more likely to require PMI.

Although the sample is limited to a sample of applications in the Boston MSA for 1990, some results are clear. The coefficients on the variables in both mortgage and PMI denial equations are similar. One major difference, however, is that the race of the applicant alone does not appear to play an important role in the PMI decision. On the other hand, the racial composition of the tract does appear to affect significantly the chances that an applicant will receive PMI. Such redlining does not appear in the mortgage denial decision. One potential explanation for this difference is that lenders are merely shifting the behavior to the mortgage insurers; that hypothesis is explored in detail in TMBM (1995).

The racial composition of the neighborhood may be correlated

with other tract-specific information that is difficult to measure. The dimensions we can measure, like the boarded-up and vacancy rates, do not seem to explain the effect of the racial composition of the tract on the PMI decision. If tract-specific omitted variables correlated with the racial composition of the neighborhood do exist, they are not variables that mortgage lenders believe are overwhelmingly important, since TMBM found that redlining did not occur in the mortgage lending decision. The evidence in these data suggests that discrimination based on the racial composition of the tract is occurring in the PMI decision, however.

ENDNOTES

1. With the help of the other federal supervisory agencies, every institution with more than 25 mortgage applications in the Boston MSA in 1990 was surveyed. The additional data for all mortgage applications by minorities in that year and a random sample of applications from whites were collected.
2. HMDA also requires the collection of other information, such as whether a loan was sold into the secondary market. These variables are contained in the data set, but are irrelevant to the study since they are conditioned on whether the applicant was accepted or denied the loan.
3. All of the variables that are systematically related to the lending decision, variables that affect every mortgage decision and are in the lender's information set, were collected. Possible idiosyncratic factors or special circumstances were not, and by their very nature could not be, gathered.
4. These costs can be substantial. If the foreclosure takes any length of time, missed payments will be a major source of losses for the lender. The accrual of property tax liabilities will also increase these losses. Finally, the legal fees required to actually carry out a foreclosure can add substantially to these costs.
5. Various measures of the rent-to-value ratio were used and are discussed in MTBM. The change in the median house price in each tract was also examined in MTBM, but is not included here since it is unclear what it captures and what it measures. The variable seems to be dominated by changes in the composition of houses in the tract rather than price changes.
6. The mortgage lending equation in MTBM does not include whether the property was to be occupied by the owner. The significance of this variable is much more robust in the PMI decision than in the lending equation, so it is included in the PMI equation.
7. For loans with PMI, lenders could be less concerned about declines in real estate prices since PMI covers them for a significant percent of the decline. Comparing how lenders view loans without PMI to how insurers view loans with PMI, lenders might be more concerned about asset risk because the tail of the risk is not truncated. In general, whether lenders or insurers are more concerned with asset price risk depends on the percentage of loans covered by PMI, the risk aversion of the two institutions, and the distribution of possible asset prices.

8. About 13 percent of the applications seeking PMI were for properties located in minority tracts defined in this way. If the threshold is lowered to 50 percent minority, about 17 percent of the applications would be in "minority tracts." The results are not sensitive to the threshold used.

9. For example, the likelihood ratio of 7.22 testing the constraint of equality of the coefficients on the loan-to-value ratio in the minority population share regressions cannot reject that the coefficients are the same along each segment of the loan-to-value.

10. The duration of the loan was also examined. Almost all of the applications were for 30-year mortgages so the coefficient could not be estimated. There simply was not enough variation in this variable to produce an estimate. As a result, the duration of the loan could not explain any of the differences in denial rates between the different neighborhoods. Furthermore, the inclusion of these other variables in Table 3 reduces the sample by 7 observations since these observations were missing values for one of these variables.

11. In MTBM tract dummy variables were included in almost every regression in order to capture all the neighborhood effects. Since redlining examines the importance of certain tract effects, these tract indicator variables cannot be included. One regression in MTBM dropped the indicator variables for each tract and examined the tract-specific characteristics; the rent-to-value was the only tract-specific characteristic that was significant in that regression.

12. Since the vacancy and boarded up rates are tract variables, it is not surprising that they are collinear with the neighborhood racial composition variables. The correlation is roughly 0.8 between the continuous boarded-up and vacancy rates and the minority tract variables. To examine the effects of the vacancy and boarded-up rates while minimizing the problems due to their collinearity, dummy variables for tracts with high vacancy and boarded-up rates are used, high being defined as greater than one standard deviation above the mean. The results are not sensitive to the level at which these rates were defined as high.

13. The median income of the tract was also added to the equations in Table 4. The results are not reported since the coefficient on the median tract income was insignificant, its inclusion had no effect on any of the results, and the sample had to be reduced due to missing observations. Furthermore, a specification allowing a nonlinear relationship between the PMI decision and the loan-to-value ratio was estimated including these variables, with no effect on the results.

14. In regressions with race and the racial composition of the tract, or race and the interactive term between race and the racial composition of the tract, race seems to be dominated by these other measures. Although collinearity makes the determination of each effect difficult, when both are included, the racial composition of the neighborhood seems to dominate the race of the applicant in the PMI decision.

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TABLE 1
The PMI Decision

Variable	PMI Denial (1)	PMI Denial (2)	PMI Denial (3)
Constant	-8.92 (-5.45)	-8.74 (-5.32)	-8.79 (-5.35)
Housing Expense/Income	.32 (.95)	.31 (.90)	.31 (.89)
Total Debt Payments/Income	.09 (4.18)	.09 (4.22)	.09 (4.12)
Net Wealth	-.0003 (-.62)	-.0003 (-.49)	-.0003 (-.53)
Consumer Credit History	.14 (1.93)	.14 (1.83)	.14 (1.83)
Mortgage Credit History	.05 (.13)	-.02 (-.06)	-.006 (-.02)
Public Record History	1.46 (3.57)	1.47 (3.59)	1.48 (3.62)
Probability of Unemployment	.03 (.42)	.03 (.40)	.03 (.43)
Self-Employed	.64 (1.16)	.62 (1.11)	.62 (1.11)
Loan/Value	2.91 (2.45)	2.83 (2.43)	2.88 (2.48)
Not Owner Occupied	2.68 (2.40)	2.61 (2.36)	2.68 (2.41)
Rent/Value in Tract	-1.27 (-.87)	-1.40 (-.83)	-1.88 (-.95)
Two- to Four-Family Home	.56 (1.72)	.62 (1.91)	.57 (1.73)
Race	.56 (1.93)		
Minority Neighborhood		1.02 (2.93)	
Minority Population Share (%)			.01 (2.63)
Log of Likelihood Function	-198.56	-196.37	-197.02
Number of Observations	727	727	727

TABLE 2
The PMI Decision: Different Functional Form

Variable	PMI Denial with Non Linear Loan/Value (1)	PMI Denial with Non Linear Loan/Value (2)	PMI Denial with Non Linear Loan/Value (3)
Constant	-11.48 (-5.92)	-11.23 (-5.66)	-11.28 (-5.69)
Housing Expense/Income	.25 (.73)	.25 (.73)	.25 (.70)
Total Debt Payments/Income	.09 (4.29)	.09 (4.29)	.09 (4.20)
Net Wealth	-.0004 (-.75)	-.0003 (-.61)	-.0003 (-.64)
Consumer Credit History	.16 (2.04)	.15 (1.95)	.15 (1.97)
Mortgage Credit History	.10 (.25)	.04 (.09)	.05 (.13)
Public Record History	1.49 (3.63)	1.50 (3.65)	1.52 (3.68)
Probability of Unemployment	.02 (.39)	.02 (.28)	.02 (.33)
Self-Employed	.63 (1.15)	.63 (1.14)	.63 (1.13)
Loan/Value-Low	8.40 (3.69)	7.79 (3.29)	7.94 (3.37)
Loan/Value-Medium	5.39 (3.42)	5.32 (3.25)	5.36 (3.29)
Loan/Value-High	4.95 (3.51)	4.77 (3.24)	4.85 (3.31)
Not Owner Occupied	3.00 (2.54)	2.91 (2.47)	2.95 (2.50)
Rent/Value in Tract	-1.58 (-.92)	-1.64 (-.88)	-2.11 (-1.00)
Two- to Four-Family Home	.67 (2.01)	.73 (2.19)	.68 (2.03)
Race	.56 (1.86)		
Minority Neighborhood		.95 (2.51)	
Minority Population Share (%)			.01 (2.23)
Log of Likelihood Function	-194.65	-193.32	-193.89
Number of Observations	727	727	727

TABLE 3
The PMI Decision: Possible Omitted Variables

Variable	PMI Denial (1)	PMI Denial (2)	PMI Denial (3)
Constant	-7.89 (-3.97)	-7.88 (-3.95)	-7.97 (-3.99)
Housing Expense/Income	.22 (.63)	.24 (.66)	.24 (.66)
Total Debt Payments/Income	.09 (4.05)	.09 (4.15)	.09 (4.03)
Net Wealth	-.0003 (-.52)	-.0003 (-.42)	-.0003 (-.46)
Consumer Credit History	.15 (1.91)	.14 (1.77)	.14 (1.79)
Mortgage Credit History	-.03 (-.08)	-.06 (-.15)	-.04 (-.10)
Public Record History	1.55 (3.71)	1.53 (3.66)	1.55 (3.70)
Probability of Unemployment	.03 (.52)	.03 (.44)	.03 (.47)
Self-Employed	.87 (1.52)	.80 (1.38)	.79 (1.37)
Loan/Value	2.95 (2.50)	2.85 (2.42)	2.93 (2.49)
Not Owner Occupied	3.00 (2.56)	2.85 (2.44)	2.91 (2.49)
Rent/Value in Tract	-1.47 (-.90)	-1.60 (-.85)	-2.02 (-.97)
Two- to Four-Family Home	.43 (1.18)	.38 (1.03)	.38 (1.03)
Adjustable Rate	.16 (.48)	.15 (.45)	.15 (.43)
Jumbo Meeting	.02 (.04)	.04 (.07)	.04 (.06)
Cosigner	.49 (.84)	.59 (1.01)	.59 (1.01)
Gift	.06 (.18)	.09 (.30)	.08 (.27)

Table 3 continued

Variable	PMI Denial (1)	PMI Denial (2)	PMI Denial (3)
Special Loan Program	.19 (.48)	.09 (.23)	.10 (.24)
Condo	-.20 (-.49)	-.41 (-.95)	-.31 (-.75)
Gender	.18 (.50)	.05 (.13)	.08 (.21)
Total Income	-.0001 (-1.10)	-.0001 (-1.01)	-.0001 (-.96)
Education	-.02 (-.43)	-.03 (-.46)	-.03 (-.45)
Age	-.002 (-.11)	.002 (.12)	.002 (.10)
Race	.36 (1.10)		
Minority Neighborhood		.96 (2.32)	
Minority Population Share (%)			.009 (1.86)
Log of Likelihood Function	-195.72	-193.66	-194.57
Number of Observations	720	720	720

TABLE 4
The PMI Decision: Alternative Tract Variables

Variable	PMI Denial (1)	PMI Denial (2)	PMI Denial (3)
Constant	-9.19 (-5.58)	-8.76 (-5.25)	-8.90 (-5.34)
Housing Expense/Income	.31 (.90)	.31 (.91)	.31 (.89)
Total Debt Payments/Income	.09 (4.26)	.09 (4.23)	.09 (4.14)
Net Wealth	-.0003 (-.57)	-.0003 (-.48)	-.0003 (-.52)
Consumer Credit History	.15 (1.96)	.14 (1.85)	.14 (1.86)
Mortgage Credit History	.009 (.02)	-.03 (-.07)	-.02 (-.04)
Public Record History	1.46 (3.58)	1.47 (3.59)	1.48 (3.63)
Probability of Unemployment	.03 (.50)	.03 (.43)	.03 (.46)
Self-Employed	.69 (1.26)	.63 (1.12)	.64 (1.14)
Loan/Value	3.15 (2.67)	2.84 (2.39)	2.98 (2.52)
Not Owner Occupied	2.75 (2.44)	2.61 (2.35)	2.69 (2.41)
Rent/Value in Tract	-1.31 (-.85)	-1.35 (-.81)	-1.75 (-.91)
Two- to Four-Family Home	.59 (1.77)	.61 (1.83)	.57 (1.71)
Housing Units Vacant	.08 (.15)	-.16 (-.29)	-.04 (-.08)
Boarded-up Rate	.63 (1.42)	.13 (.23)	.25 (.48)

Table 4 continued

Variable	PMI Denial (1)	PMI Denial (2)	PMI Denial (3)
Race	.44 (1.42)		
Minority Neighborhood		.98 (2.18)	
Minority Population Share (%)			.009 (1.85)
Log of likelihood Function	-197.60	-196.29	-196.89
Number of Observations	727	727	727

TABLE 5
The PMI Decision: Interactive Terms

Variable	PMI Denial Race and Neighborhood (1)	PMI Denial Race and Share (2)	PMI Denial Race and Neighborhood (3)	PMI Denial Race and Share (4)
Constant	-8.76 (-5.35)	-8.79 (-5.39)	-8.72 (-5.24)	-8.82 (-5.33)
Housing Expense/Income	.33 (.96)	.32 (.92)	.34 (.98)	.32 (.92)
Total Debt Payments/Income	.09 (4.27)	.09 (4.22)	.09 (4.26)	.09 (4.21)
Net Wealth	-.0003 (-.46)	-.0003 (-.48)	-.0003 (-.45)	-.0003 (-.48)
Consumer Credit History	.13 (1.75)	.13 (1.72)	.13 (1.76)	.13 (1.74)
Mortgage Credit History	-.02 (-.05)	.01 (.03)	-.02 (-.06)	.006 (.01)
Public Record History	1.46 (3.55)	1.45 (3.53)	1.46 (3.54)	1.46 (3.53)
Probability of Unemployment	.03 (.51)	.03 (.49)	.03 (.53)	.03 (.51)
Self-Employed	.67 (1.19)	.66 (1.18)	.67 (1.18)	.66 (1.18)
Loan/Value	2.79 (2.40)	2.82 (2.44)	2.75 (2.31)	2.85 (2.41)
Not Owner Occupied	2.62 (2.36)	2.68 (2.41)	2.61 (2.35)	2.68 (2.41)
Rent/Value in Tract	-1.51 (-.85)	-2.06 (-1.00)	-1.47 (-.84)	-1.99 (-.98)
Two- to Four-Family Home	.67 (2.05)	.62 (1.89)	.65 (1.96)	.61 (1.83)
Vacancy Rate			-.21 (-.38)	-.10 (-.18)
Boarded-up Rate			.02 (.03)	.10 (.20)
Race * Comp		.01 (3.04)		.01 (2.34)
Race * Minority in Tract	1.12 (3.15)		1.14 (2.44)	
Log of Likelihood Function	-195.76	-195.89	-195.68	-195.85
Number of Observations	727	727	727	727