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**Is There Discrimination in Mortgage Pricing?
The Case of Overages**

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The Case of Overages

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Abstract: We conduct an empirical investigation to explain observed differentials in mortgage overage pricing. Our analysis makes several contributions. First, we study an area of mortgage pricing that is little understood by consumers and has received little scrutiny in the literature. Second, we consider the impact of the market power of individual loan officers on overages paid by borrowers, particularly minorities. Third, we include a number of borrower and lender characteristics not available in previous analysis.

Importantly, we introduce a new direct measure of the market power of individual loan officers. We also incorporate the interactive effects of loan officer market power and the race of the borrower in determining the rate of the mortgage loan. Through the use of these new variables and employing proprietary data from different branches of a nationwide mortgage lending institution, we conclude that the market power of the lender and the bargaining or negotiating ability of the borrower are important determinants of overages. We find that overages paid by minorities who purchase homes are larger than those paid by whites. Our evidence suggests that this is due to differences in the pools of borrowers rather than to racial discrimination. Indeed, tests show that the pool of refinancings is more homogeneous across races than the pool for purchases, and we find no differences by race for refinancings. We conclude that a more effective way to eliminate racial differences in overages is to pursue policies designed to increase the ability of minorities to bargain more effectively rather than to enact additional antidiscrimination laws.

JEL classification: G18, G21, G28, G38

Key words: discrimination, lending, minority, overages, race

1. Introduction

Lending practices of financial institutions have been subject to close regulatory scrutiny for decades. Financial institutions that offer mortgage loans are governed by laws and regulations prohibiting lending discrimination. Enforcement efforts of federal regulators have mainly been concerned with whether minorities are denied loans that similarly situated whites would have been granted.

A relatively new regulatory interest is the pricing of mortgage overages to minorities. Overages, sometimes called yield spreads, are typically expressed in units of percent of the loan, called points. Overages are usually calculated as total loan points, less origination fees, less minimum acceptable points charged on the loan. Thus, overages represent the amount charged in excess of the lowest rate acceptable to the lender.

The question explored in this paper is whether overages differ across groups. That is, do certain groups of the population such as minorities, women, the elderly and the less educated, have a different average incidence and size of overage than the rest of the population? The Office of the Comptroller of the Currency has examined banks to determine if collecting overages is discriminatory (Courchane and Nickerson (1997)), and the Department of Justice has entered into settlements after contending that overages resulted in minority borrowers paying higher overages than non-minority borrowers.[1] These settlements limited the amount of overages that could be collected and instituted comprehensive fair lending policies by the lenders.

Although there has been a great deal of work concerning discrimination in the accept/reject mortgage decision (e.g. Black, Schweitzer and Mandell (1978), Longhofer (1996) and Munnell, Browne, McEneaney, and Tootell (1996), as well as Horne's critiques of the latter (1994, 1997)), very little work has been done on the pricing of accepted mortgages with respect to race. There are

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[1] US v. Fleet Mortgage Corporation No. 96CV2279 and US v. Long Beach Mortgage Company No. 96-6159 DT.

noteworthy exceptions. Black and Schweitzer (1985) study mortgage lending terms at commercial banks and find that race and marital status play significant roles in determining lending terms at the bank that they analyzed. Their study is the first to examine an individual bank and generate results that are consistent with the possibility of discrimination in loan terms established for *accepted* loans. Similarly, Crawford and Rosenblatt (1995) examine yield premiums for originated loans. They compared premiums across three racial groups over a two-year period in the late 1980s. In contrast to the results of Black and Schweitzer (1985), they find little evidence of significant differences across racial groups, although small premiums are observed for VA and FHA loans. Calem and Stutzler (1995) state that there is little evidence regarding whether minority borrowers receive less favorable loan terms than white borrowers, but that may have more to do with the lack of rate data than with the absence of discrimination.

Ayres and Siegelman (1995) study differential pricing by race. They use paired testers in Chicago automobile dealerships to study sales offers to white and minority buyers. They find that white males are quoted lower purchase prices than minorities and females, and that these differences are generally statistically and economically significant. They report that racial discrimination does not explain their results. They argue that automobile salesmen (and women) believe that minorities and women have higher reservation prices and that profit maximizing salesman rationally quote higher prices to them.

To our knowledge, the only studies to look directly at the issue of overages are Courchane and Nickerson (1997) and Black, Boehm and DeGennaro (forthcoming). Courchane and Nickerson analyze three financial institutions separately and focus primarily on the applicant's race. In all three cases, they find differences by race in either overages or the likelihood of being charged an overage, though no consistent pattern is evident. Investigation of the actual loan documents leads the authors to suggest that differences in bargaining or negotiating power of whites and minorities may have caused the

observed racial differences in overages, but their data do not allow them to test this hypothesis.[2] Black, Boehm and DeGennaro study overages from an area with a high population of Hispanics and African-Americans. They find that the yield spreads of Hispanic applicants who purchase homes are larger than those of whites. They find no differences in overages between black and white applicants. They do find significant racial differences in overages for Hispanics and blacks for houses that are refinanced.

Our paper offers an important new dimension to studies of racial differences in markets. Previously, lack of information on overages has severely limited research in this area. Featuring proprietary data gathered from loan offices of a leading nationwide lending institution, this paper fills that void. Using variables unavailable to previous researchers, we analyze the relative importance of various hypotheses that may explain observed differentials in overages. For both purchases and refinancings, we find strong evidence that bargaining power has a substantial influence on the magnitude of overages charged. In contrast, traditional risk measures that are crucially important to the accept/reject decision have little impact on overage pricing. This is not surprising, because all loans in our dataset are originated and thus have at least minimally acceptable risk levels.

Our direct measure of the net market power of individual loan officers suggests that their expertise in financial negotiations has both a statistically and economically significant impact on overages charged. However, these loan officers apparently either do not use their full capabilities when bargaining with minorities, or else their bargaining skills with whites do not extend to minorities. Finally, the insignificance of race variables and reduced importance of bargaining in the results for refinancings suggest that less bargaining occurs in these transactions. Based on our results, the implication is that the disparate impact observed for minority overages (at institutions like the one we study) is best reduced

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[2] For a discussion of bargaining and negotiating power, see Section 4 below.

not through stricter regulatory enforcement of anti-discrimination laws, but rather by increasing competition and the financial information and bargaining skills of borrowers who are purchasing homes.

2. The Nature of Overages

Overages are not well understood by the consumer. In fact, most consumers are unaware of their existence. An overage is the difference between the price at which a loan closes and the minimum price acceptable to the lending institution as quoted on the lender's rate sheet. The rate sheet, an important tool in the pricing of the loans, shows the various combinations of interest rates and discount points at which a lender will make a loan. Typically, lower interest rates are coupled with higher points. Some rate sheets also show the interest rates offered in the secondary market for loans that will be delivered in 15, 45 and 60 days. Normally, the rates quoted by lenders to customers and those advertised by the lenders are 60-day rates.

There is no well-defined industry practice with regard to overages. Across financial institutions there is great variability in the use of overages. Many lending institutions allow and even encourage their loan officers to charge overages. In such institutions overages typically constitute a significant portion of the loan officers' compensation.[3] Some financial institutions do not allow overages to be collected at all, while others restrict the size of overages.[4] Overages may vary across regions and across branches of the same institution, and may differ substantially from one loan officer to another. Overages may also differ across loan types. For example,
government insured mortgages generally have higher incidences of overages than conventional loans. However, in some markets with strong competition for government-insured mortgages, conventional loans may have higher overages. Overages may also differ across borrowers, which has caused federal

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[3] Loan officers' total compensation for our lender includes a base salary, income from overages and a commission earned on successful loan closings.

[4] Our lender limits overages to two percent.

scrutiny (and led to Department of Justice settlements) because charging different rates for the same product may result in disparate treatment of minorities.

Overages may occur because of the behavior of borrowers, lenders or sellers. For the borrower, a lack of financial information, a severe liquidity constraint, risk aversion, or the unwillingness to pursue negotiations for a better deal could lead to an overage. Because the borrower may be unaware of how the loan is priced, the most common way that an overage results is if the borrower agrees to a mortgage rate that is above the minimum quoted on the lender's rate sheet. Since the consumer is generally unaware of the terms listed on the rate sheet, the lender may quote a higher rate or a larger number of points, resulting in an overage. If the borrower chooses to bargain for a lower rate, the overage may be reduced, eliminated or even converted to a negative overage, which is called an underage. Borrowers who do not shop for a better offer, perhaps due to the opportunity cost of time, are less likely to negotiate a better deal.

Another common way overages arise is if the borrower is risk averse. Assume that the borrower is fully aware of the various pricing alternatives and expects to close in 30 days, but wants a 60-day lock (i.e., a rate guaranteed to be available for 60 days) because of risk aversion and fears that the loan may not close in time. If the lender believes the loan will close sooner, he can lock the lower 45-day rate in the secondary market. When the loan closes at the higher 60-day rate, an overage is created.[5]

Consistent with the practice of many lenders, the overages collected in our dataset are shared equally between the loan officer and the lender. Given that our lender limits the overage to two percent, the maximum amount that could have been collected is $3,765,172.[6] As noted above, consumers are

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[5] Other scenarios may give rise to an overage. These scenarios are available from the authors on request.
[6] The lender reported to us that this limit on overages was motivated by two forces. First, the loan sheet rates were similar to those of competitors and an excess marking up of the rate using overages could result in lower loan volume if customers shopped the rate. Second, overages were an expected form of compensation in their market and their loan officers expected overages as a salary supplement.

generally unaware that overages exist. Consequently, one would anticipate that both the loan officers

and the lender would seek to maximize the incidence and the dollar amount of overages. In fact, only

17.9% of the mortgages in our dataset had a positive overage. The dollar value of overages collected

was only $183,536, far below the maximum of $3,765,172. Why aren't overages maximized within the

limits set by the lender? That is, why would loan officers and the lender not maximize income in the

absence of regulatory constraints and consumers' awareness? This paper addresses these issues.

3. Data and Descriptive Analysis

The unique data used in this analysis are for loans made during 1996 for a major mortgage

lending institution at its loan offices nationwide. The name of the institution is not disclosed for

confidentiality reasons. It is important to note that the lender actively pursues fair lending policies and

does not permit overages on certain products marketed to low-income borrowers, as well as limiting

overages on allowable products to two percent. These policies conform to previous settlements

between the Department of Justice and two lenders accused of discriminating against minorities in

collecting overages.

A list of variable names, definitions and means is in Table 1. Because tests show that loans for

purchases differ from refinancings, we partition the data accordingly. The variable of interest, and the

dependent variable in our regressions, is the *overage,* calculated as the dollar amount of the overage

collected divided by the dollar amount of the loan, expressed as a percentage. For the institution we

study, all loans in our sample were sold in the secondary market and the overage depends solely on the

amount the loan brings in the market relative to the rate stated on the rate sheet at the time of the loan.[7]

Again, overages can be negative if the borrower pays fewer points than those stated on the rate sheet.

The minimum points charged on a particular type of loan with a particular interest rate are established

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[7] Institutions tend to retain nonconforming loans. We do not discuss nonconforming loans in this paper.

by bank management and communicated to loan officers via rate sheets as frequently as four times daily. To the extent other institutions use other definitions, this may limit the generality of our results.[8]

Table 1 reveals several key features of the data. First, overages are smaller on purchases than on loans for refinancing. This is true proportionately (10.27 basis points vs. 13.35 basis points) and in dollars ($97.57 vs. $122.44). Purchases are also of longer maturity than refinancings and less likely to be conventional loans. The vast majority of borrowers are white and male, but because our sample is large (2,002), we have adequate numbers of loans to minorities.

Tables 2 and 3 provide information on overages in the sample. Panel A of Table 2 shows differences in overages across branches. The percentage of positive overages varies from 7.4% in City I to 40.9% in City J. The mean overage amount varies from 0.279% in City I to 0.801% in City J. Overall, the percentage of loans with positive overages is only 17.9%. Given that the majority of consumers are unaware of the practice of collecting overages, one might expect this percentage to be higher. Thus, market forces may be limiting the incidence as well as the amount of overages.

Panel B of Table 2 reports differences across individual loan officers. The median (mean) loan officer collects overages on 19.4% (21.5%) of the loans in our sample. Of those positive overages, the mean overage collected by the median (mean) loan officer 60 basis points (61.5 basis points). Panel B makes it clear that some loan officers collect overages much more often than others, and some collect much larger overages than others.

Panel C of Table 2 shows that the frequency of overages varies across racial groups. Point estimates show that black borrowers have the highest incidence of overages, followed by Hispanic

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[8] Overages can be defined as more than yield spreads (Jaworski, 1996). They can also include a service release premium (the originator sells the right to service the loan to the lender) and back-end points (the lender pays the broker extra if, at the end of a given period, the broker has delivered a specified volume of loans to the lender). We do not consider these components of overages for several reasons. First, our data simply do not include them. Second, a service release premium represents a second decision solely at the discretion of the lender. The applicant has no say in the matter. Finally, back-end points are related not to individual loans, but rather to total volume.

borrowers, members of other minority racial groups and whites. All but one of these is statistically significant with respect to white borrowers (t-statistic, black vs. white = 7.64; Hispanic vs. white = 2.81; other vs. white = 0.23). The mean overage amount is highest for Hispanics, followed by blacks, whites and other minorities (t-statistic, black vs. white = 2.52; Hispanic vs. white = 2.85; other vs. white = -0.41). Thus, it is clear that blacks and Hispanics have higher incidences of overages and have higher overages than do whites.

Panel A of Table 3 reports overages by race and market. The mean amount by which overages paid by minority groups exceeds those paid by whites varies widely, from highs of 0.458% (for blacks), 0.795% (for Hispanics) and 0.185% (for others) to lows of -0.060% for blacks, -0.128% for Hispanics, and -0.206% for others. This relatively large range, along with several of these differences actually being negative, suggests that this lender has no overt policy that would promote differential treatment of different racial groups. In addition, large variation in minority overages exists across the branches. Panel B of Table 3 shows the two branches that have the highest and the lowest differentials between each minority and whites of any branches with more than five loans to minorities. Regardless of racial group or branch, almost 50% to 75% of the loans have no overage charged. Again, this occurs even though most borrowers are unaware of overages and make no conscious effort to reduce them. In addition, in only one instance is any overage greater than two percent.

4. The Determinants of Overages

We postulate that overages are a function of four factors: market power, individual bargaining skill, the race of the borrower, and risk, which we partition into default risk and approval risk. Table 4 lists variables likely to be associated with these four factors and the signs of their expected relations to overages. We provide the intuition of these signs next.

At certain times, either lenders or borrowers may enjoy temporary advantages in certain markets for certain loan products. Thus, the relative market power between the two parties is a function of a specific *time, place*, and *asset*. For example, a fall in mortgage rates could lead to an increase in the market power of either group. When mortgage rates fall substantially and the quantity of mortgages demanded increases, new mortgage banking firms may enter the market, increasing competition and bidding rates down. This increases the market power of the borrowers in the lending process. Another example might trace to a sudden drop in rates, which increases the number of borrowers seeking to refinance on short notice. In this case, the fall in rates increases the market power of lenders. We arbitrarily view this from the lender's side and treat an increase in the market power of lenders as likely to increase overages.

Despite the richness of our dataset, obtaining useful proxy variables for market power is difficult. First, though the loans in our sample were closed in 1996, the specific dates are not included in the dataset so it is not possible to indicate *time* precisely. Second, although we know the city in which the loans are originated, it is impossible to predict the sign of that variable's impact on market power. Therefore, we do not include *place* as a variable to proxy for market power (though we do include *city* in sensitivity analysis later; it proves to be insignificant).

We have more promising variables to control for *asset*. The markets for 30-year and conventional mortgages are generally deeper and more competitive than for other types of mortgage loans, reducing the lender's market power. In addition, adjustable-rate loans often have below-market interest rates for the first year. If a borrower is attracted to this for any reason, market power is likely to be ceded to the lender. For example, the borrower may require the lower initial payment in order to qualify for the loan. If the borrower expects to move before the lender can recoup, the borrower may

be willing to pay extra for this opportunity. If market power is a factor in determining overages, then we expect fixed-rate loans to have lower overages than other types.

Overages are more often charged on FHA and VA loans than on conventional loans. In large part, this is because of the cost of making an FHA/VA loan. Because FHA/VA loans are generally smaller than conventional mortgages, the origination fee (which is proportional to loan size) may not cover the cost of origination. However, regulatory agencies do not allow explicit increases in rates or fees to compensate for this. As a result, an overage is often extracted to make the loan profitable.[9]

For at least two reasons, we predict that as LOAN AMOUNT increases, the applicant's market power also increases. First, applicants for larger loans may be more financially astute, have more funding options, and be better able to shop for lower rates which result in a lower overage. Second, under competition, lenders can only recover the economic costs of processing the loan application. To the extent that overages compensate the loan officer, they would not increase proportionately to loan size. Thus, larger loans have lower percentage overages, which compensate the loan officer for the time required to make a smaller loan.

Finally, we measure the intensity of competition and the lender's market strategy by using the variables MARKET PENETRATION and VOLUME. We define MARKET PENETRATION as the percentage of loans made by the lender to the borrower's racial sub-market. We assume that borrowers tend to apply for mortgages where they think the application will most likely be accepted. If a lender makes a larger proportion of loans to a given ethnic group, then it likely faces less competition in that sub-market and has greater market power among that group. Consequently, overages should be higher because the borrower is less likely to shop for another rate. This argument presumes that we

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[9] These costs could also be reflected in the rate sheets. If this were the case, then we would not expect recouping the cost of making the loan to be a function of the bargaining power of the loan officer. Such a strategy is

have controlled for the lender's marketing strategy: some lenders choose to operate with high volume and low profit margins. This probably extends to lower overages. To disentangle this from MARKET PENETRATION we also include VOLUME, defined as the total number of loans made by a particular lender. Lenders with higher total volume likely have lower overages in a given market.

One problem with this approach is that MARKET PENETRATION and VOLUME are probably determined simultaneously with the dependent variable, OVERAGE. To resolve this we use the corresponding values of MARKET PENETRATION and VOLUME from the previous year, 1995, as instruments. As a practical matter, the results are virtually indistinguishable.

Note that neither the race of the borrower nor other individual traits such as gender, education, income or credit record appear as determinants of bargaining power. Thus, for market power to differ across groups or traits, one must argue that the group is in the market a disproportionate amount for a particular loan at a particular time and place. Absent that, groups have the same market power.

Individual Bargaining Skill

Some individuals might be better at bargaining than others. Two key distinctions exist between this and market power. The first is the word *individual*. Regardless of the status of the market, individual *x* might bargain better than individual *y*. Second, we wish to separate bargaining *skill* from bargaining *position*. For example, some borrowers might have poor credit records and thus be in bad bargaining positions, yet if they are excellent negotiators, they may obtain better terms than would similarly situated borrowers who lack these skills. Similarly, a loan officer with a track record of collecting large overages is likely to be a good bargainer, and other borrowers who deal with such a loan officer are likely to pay more.

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reasonable, and a direct subsidy paid by FHA/VA to the loan officer would probably be a more efficient way to cover origination costs. Why these agencies do not use this approach, however, is beyond the scope of this paper.

An important component of individual bargaining skill is the willingness to exploit the advantages at one's disposal. Some borrowers or lending officers may sometimes be unwilling to expend the effort needed to negotiate effectively, even though at other times they are skilled negotiators. Because it takes two to bargain, we interpret Individual Bargaining Skill (IBS) as *net* IBS. As with Market Power, we view this from the loan officer's perspective. Thus, an increase in (net) IBS tends to increase overages.

We call the first ten variables that control for IBS *indirect components* of IBS because they do not measure bargaining skill directly. Rather, they identify traits correlated with negotiating acumen. The first of these is a dichotomous variable (MALE) to control for possible differences in bargaining ability between men and women. Our education measure is captured by four binary variables signifying high school graduate, training beyond high school, college graduate and education beyond college (EDU1 through EDU4). We anticipate that as the borrower's EDUCATION increases, so do confidence and reasoning ability, reducing net IBS and tending to reduce overages. PRIOR OWNERSHIP provides experience in the loan application process and is negatively related to net IBS.

We assume that a loan officer's net individual bargaining skill increases on SECONDARY residences and with YEARS IN HOME. First, we assume that borrowers are less likely to negotiate for loans on SECONDARY residences than on primary residences. The borrower might be more attracted to a particular feature or the location of the home and pay higher overages because of greater concern for a rapid, sure approval than for bargaining for the best loan terms. Second, loan applicants who have occupied the same home for longer periods are likely to bargain less than more mobile applicants who have owned more primary residences. Both of these tend to increase the loan officer's bargaining advantage.

The sign for AGE is less clear. One might argue that older people's experience (perhaps in other negotiating or bargaining relationships, such as car buying) helps them during the mortgage lending process. Alternatively, one might postulate that older people are more interested in a fast, sure closing with a minimum of stress, and therefore are less likely to bargain. If so, then higher AGE reduces negotiating skills (more precisely, the willingness to negotiate), thus tipping net individual bargaining skill towards the loan officer.

The next component of IBS is the loan rate. Individuals with the best bargaining skills should obtain loans with lower interest rates or points. However, as extensive as our dataset is, it does not encompass all variables that might plausibly affect these skills. For example, marital status or some idiosyncratic aspect of the borrower's background may affect the individual's ability to bargain successfully. On average, one would expect individuals with weaker bargaining skills to pay higher interest rates. They would pay higher rates on loans, *per se*, which would be correlated with overages. Thus, including LOAN RATE controls for unmeasurable bargaining skills.[10]

Like MARKET PENETRATION and VOLUME, LOANRATE might seem to be simultaneously determined with overages, but this is not necessarily the case. Both the borrower and the loan officer take the lender's rate sheet as given; it is predetermined. To the extent that negotiations turn on the number of points rather than the interest rate, LOANRATE is not subject to simultaneity problems.

In contrast to the variables discussed so far, the last variable for Individual Bargaining Skill is a *direct* measure of IBS. We define MOW as the *M*ean *O*verage the loan officer handling the application extracts from *W*hite applicants. This variable is new to the literature and is useful in understanding the importance of the bargaining skill of the loan officer in determining the loan rate. To

avoid simultaneous equations bias, if loan application i is from a white applicant and is processed by loan officer j, we delete observation i from the computation of the mean overage for loan officer j for that observation. If loan officer j made only one loan in our dataset, we use the mean overage collected from white borrowers for that branch office. For expositional ease we sometimes refer to this variable as the mean overage that a loan officer collects from whites, even though this is not quite accurate in the case of white borrowers.

Racial Factors

Some researchers might include race as a proxy for individual bargaining skill. Certainly, differences in bargaining power could exist across different racial groups. For example, anecdotal evidence suggests that middle-class black males associate the need (or willingness) to negotiate with poverty, which may limit their desire to bargain (Brown, 1990). However, categorical race variables could also indicate the presence of discrimination. Theory tells us that discrimination is absent from fully competitive markets. Mortgage markets may not be fully competitive, though, and discrimination may exist.

Race variables may also be correlated with risk differentials between minority and white households. However, our dataset omits detailed credit information on individual credit risk. While our dataset does not allow us to control for all risk, we believe that it is highly unlikely that differential credit risk plays any significant role in influencing the magnitude of overages. Our sample comprises only loans that have been originated, not merely applications. Since the underwriter is responsible for approving these loans, default risk would seem to be relatively unimportant to the loan officer in negotiations with the borrower. Given this, if minorities are charged higher overages, it is either because of discrimination or because (as a group) they bargain less effectively than other groups.

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[10] As pointed out by an anonymous referee, there are tradeoffs between loan terms. However, the tradeoff between

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To investigate these effects empirically, we include both categorical variables for race and interaction terms between race and MOW, our direct measure of loan officer bargaining skill. We define BLACKMOW, HISPANICMOW, and OTHERMOW as equal to MOW if the borrower is a member of the respective race and zero otherwise. The signs for these interaction terms could be positive or negative. If loan officers are more successful in extracting overages from minorities, then the interaction terms would be positive and significant. If loan officers are equally successful with minorities as they are with white borrowers, then these interaction terms would be insignificant. Finally, loan officers may make a special effort *not* to elicit high overages from their minority clients, perhaps due to training by the bank or fear of legal problems. Consequently, the sign could be negative.

Risk

Most economists agree that risk plays an important role in lending. Yet, there are reasons to believe that risk variables may not explain much variation in overages. First, credit risk may already be reflected in the rate sheets. Second, because all loans in our sample are immediately sold in the secondary market and thus meet the credit standard for that market, one could make a case that the risk characteristics of our sample are sufficiently homogenous as to render plausible explanatory variables insignificant. Indeed, the biggest risk facing a loan officer is that the loan may fail to close, resulting in a lost commission.

As a practical matter, though, we adopt the conservative strategy of considering a broad spectrum of risks, relying on regression techniques to identify insignificant variables. These risk variables could be important for two reasons. First, if their coefficients are insignificant, it enhances our contention that categorical race variables (if significant) are picking up either discrimination or differential bargaining power and not risk. Second, it is possible that these risk variables could capture

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rates, points and term to maturity are explicitly incorporated into the rate sheet.

a dimension of bargaining power not controlled for elsewhere. Specifically, a borrower may be an

acceptable credit risk, yet his unfamiliarity with credit standards could create a bargaining disadvantage,

particularly if there is a potential problem and uncertainty whether the loan will be granted. For our

purposes, mortgage risk has two components, default or credit risk and approval risk. We take each

in turn.

Table 5 lists the variables that control for default risk and provides the intuition justifying their

expected relation to overages. Note that some variables appear in more than one determinant of

overages. Consider, for example, TERM30. In Market Power, its predicted relation to overages is

negative, because competitive pressure reduces a lender's market power, resulting in lower overages.

In Default Risk, the predicted relation is positive. Longer maturities imply greater default risk, resulting

in higher overages. If these conflicting signs result in statistical insignificance, it might be interpreted as

an unfortunate result. If, however, the coefficient is statistically significant, it constitutes evidence in

favor of one determinant of overages and against the other, helping us distinguish between these

competing explanations (or, at least, their relative impacts).

In addition to default risk, we argue that the lending officer is concerned with the risk that the loan

may not close, resulting in the loss of the commission. We call this *approval risk*. The variables

proxying for approval risk and the intuition of their signs are identical to default risk, except that:

> 1) We add LIQUID/TOTAL ASSETS; higher values mean that the applicant is more likely
> to have funds to close. A better variable would encompass funds *needed* to close, but this
> is not available.
> 2) The relation between 30-year loans (TERM30) and overages is reversed because they
> have smaller payments for a given loan size and market value, so they are more likely to be
> approved.

3) We exclude loan amount as there is no reason why, *ceteris paribus*, larger loans are

less likely to be approved.

We assume that these four factors -- market power, individual bargaining skill, racial factors and

risk -- describe all systematic factors that determine overages.

Assuming that the factors are linearly related to overages, a regression specification can be

written:

(1) $OVERAGE = \beta_0 + \beta_1 TERM30 + \beta_2 FIXED + \beta_3 CONVENTIONAL + \beta_4 LOAN\ AMOUNT +$

$\beta_5 COMPETITION + \beta_6 VOLUME + \beta_7 MALE + \beta_8 EDU1 + \beta_9 EDU2 + \beta_{10} EDU3 + \beta_{11} EDU4 +$

$\beta_{12} PRIOR\ OWNERSHIP + \beta_{13} SECONDARY\ RESIDENCE + \beta_{14} YEARS\ IN\ HOME + \beta_{15} AGE +$

$\beta_{16} LOAN\ RATE + \beta_{17} MOW + \beta_{18} BLACK + \beta_{19} HISPANIC + \beta_{20} OTHER\ MINORITY +$

$\beta_{21} BLACKMOW + \beta_{22} HISPANICMOW + \beta_{23} OTHERMOW + \beta_{24} LTV + \beta_{25} LTV{\geq}80 +$

$\beta_{26} INCOME + \beta_{27} CREDIT\ PROBLEM + \beta_{28} JOB\ YEARS + \beta_{29} SELF\text{-}EMPLOYED +$

$\beta_{30} OBLIGATIONS/INC + \beta_{31} CHECKING + \beta_{32} SAVINGS + \beta_{33} LIQUID/TOTAL\ ASSETS + u.$

In some cases, β_i measures the combined effect of the associated variables impact as they operate

through more than one argument in Equation (1).

In all of the equations we estimate, regardless of how we stratify the data, no overage is charged

for at least half of the observations. Given this type of dependent variable, ordinary least squares is

asymptotically biased and inefficient. Therefore, we estimated a Tobit model (see Maddala, 1983).

However, tests indicated nonnormality and heteroskedasticity. Tobit models are inconsistent in this

case. Consequently, we estimated a selectivity bias model (see Heckman, 1976). This model differs

from Tobit in that it assumes heteroskedasticity and that the observations come from different

populations. In the first stage, a probit or logit model is estimated in which the dependent variable is

defined to be whether or not the borrower paid an overage. The coefficients from this equation are used to calculate a Mill's ratio for inclusion in a second OLS regression in which the sample is constrained to only those households that paid an overage.[11]

The results presented below separate the loans into two types, purchases and refinancings. Initially, we pooled all loans and used intercept and slope binary variables to capture the differences between purchases and refinancings. This model, in conjunction with our discussions with those in the industry, suggested that equations should be estimated separately for these two types of loans.

5. Results

Purchases

Table 6 contains results from estimating Equation (1) using 1,414 loans for purchases (columns 1 and 2) and 588 loans for refinancings (columns 3 and 4). Of these borrowers, 222 purchases (column 2) and 136 refinancings (column 4) had positive overages. For purchases, the Market Power hypothesis predicts the signs of coefficients quite well. In the logit regression, estimating the likelihood that a borrower will pay an overage, all variables controlling for Market Power (TERM30, FIXED, CONVENTIONAL, LOAN AMOUNT, MARKET PENETRATION, VOLUME) have the predicted signs except for a single case, MARKET PENETRATION, for which the coefficient is insignificant. Two variables (FIXED and CONVENTIONAL) are significant. In the Stage 2 regression FIXED, MARKET PENETRATION and VOLUME have the expected sign. FIXED is significant at the 10% level using a one-tailed test. The estimates from these regressions imply that on a

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[11] The Mill's ratio is computed as follows: $M = \gamma Z + \ln(1 - P) / P$ for cases in which there is no overage and $M = \gamma Z + \ln(P) /(1-P)$ for cases that pay an overage. P = the probability that an overage was charged = $1 / (1 + \exp(-\gamma Z))$. Z represents a set of independent variables used in estimating the logit model and γ represents the corresponding parameter estimates. Subsequently, using OLS, the following model is estimated for those borrowers who pay overages: $y = \beta X + \lambda M + \varepsilon$. X represents a vector of independent variables hypothesized to explain the magnitude of the overages for those borrowers who have one. Note that Z may include X, but it must also include at least one continuous variable that is not in X for the two-equation model to be identified.

fixed rate loan there is a 27.40 percentage point lower likelihood that an overage will be charged. Similarly, for a conventional loan there is a 12.44 percentage point lower likelihood that an overage will be charged. If overages are charged, point estimates imply that overages on fixed-rate loans are about 31.69 basis points lower than on adjustable rate loans ($316.90 on a $100,000 loan).[12] In addition, higher volume of activity in a market decreases the amount of the overage charged by 1.90 basis points.

Of the indirect measures of Individual Bargaining Skill, only LOAN RATE is correctly signed and significant in both purchase equations. YEARS IN HOME is correctly signed and just misses significance at the 10% level in the logit equation. This indicates that applicants who have spent more years in their home are more likely to be charged an overage. In addition, of those who are charged overages, male applicants have a significantly lower average overage than do their female counterparts.

The direct measure of loan officer bargaining skill (MOW) and the categorical race variables are all significant in the logit equation, and in the Stage 2 regression, column 2 of Table 6, HISPANIC is significant. In addition, the interactions between MOW and the race variables are all significant in the logit equation that predicts the likelihood of receiving an overage and have a comparable sign in the conditional regression predicting the magnitude of any overage paid. Together these variables paint an interesting picture of minority lending. The coefficient for MOW is highly significant and positive. The estimates suggest that a one percentage point increase in MOW increases the likelihood of a borrower having an overage by 54.94 percentage points. In the overage regression, for those that do have an overage, the point estimate of MOW's impact is relatively large at 143.50 basis points. The

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[12] Note that the variable CONVENTIONAL is not included in the regression. For the equations to be identified with the inclusion of the Mills ratio, one variable must be excluded . CONVENTIONAL is a good candidate because it is a significant predictor of whether an overage was charged, but it was never a significant predictor of the magnitude of the overage in any specification of the model.

coefficients on the categorical race variables are also highly significant in the logit equation and have positive signs, but of those who do pay an overage, only Hispanics pay a statistically greater amount than whites. Finally, all interaction terms between race variables and MOW are highly significant and negative in the logit equation.

What do these results imply? Obviously, the bargaining skill of the loan officer is very important in determining whether a white borrower is charged an overage and the magnitude of those overages. However, it is also clear from the interaction effects that the loan officers who are the most skilled at bargaining with white clients do not, for whatever reason, exhibit the same effectiveness when bargaining with their minority clients. The signs of these interaction effects are the opposite of MOW, and in fact, essentially negate the impact of bargaining for blacks and other minorities. To see this, we note that the sum of the coefficients for MOW and the interaction term measures the net impact of bargaining on borrowers of that race. Wald tests show that the hypothesis that these coefficients sum to zero cannot be rejected for blacks (t-statistic = -0.319) or for other minorities (t-statistic = -0.750) in the logit equation. For the Stage 2 regression, the hypothesis is rejected for all groups (t-statistic = 1.028 for blacks, -0.447 for Hispanics, and –0.619 for other minorities). Either lenders' bargaining skills do not transfer to these minority groups or they are not being used.

Given the results for MOW and the race interaction terms it is important to note that we still observe an adverse impact across all minority groups. The coefficients for the minority variables, BLACK, HISPANIC, and OTHER MINORITY are all statistically significant and positive in the logit equation, and all are positive in the Stage 2 regression. This indicates that minorities are significantly more likely to pay an overage than similarly situated whites, and when they do, they tend to pay higher overages. Yet, these overages are less than they would be if loan officers utilized their full bargaining power. This result is particularly interesting for several reasons. First, we have a

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market that should be highly competitive. Second, we have already documented that loan officers'

bargaining skills are either not as effective or are not fully utilized in minority negotiations. Third, the

institution's stated policy and past performance suggest that it discourages discrimination. Finally, we

find little evidence of higher overages for other groups that might be thought to be at a bargaining

disadvantage. For the logistic equation that predicts the likelihood of a borrower having an overage,

the coefficients for MALE, EDUCATION, AGE, PRIOR OWNERSHIP, SECONDARY, and

YEARS IN HOME are all statistically insignificant. In the Stage 2 regression (for those borrowers

who do pay an overage) only MALE is significant. Even in this case, the magnitude of the coefficient is

very small compared to MOW and the race variables.

One explanation for the result that the bargaining skills of loan officers do not transfer to

minorities, yet minorities pay more, is that a larger portion of minority borrowers do not shop or

negotiate at all. Evidence suggests this is true for automobile purchases. For example, the Consumer

Federation of America (1991) reports that 61% of blacks believe that car prices are not negotiable,

while 31% of whites believed this. Suppose that racial differences in automobile purchases are similar

to those in mortgage lending. Most likely, the extra 30% of blacks who do not bargain or shop are

distributed randomly across loan officers – certainly, there is no reason to believe that they gravitate to

loan officers who are good bargainers. Yet, they are likely to pay higher overages because they fail to

negotiate. It is also reasonable to conclude that, at this particular lender, a loan officer who is a good

bargainer would not seek a still higher overage. The employer offers fair-lending training, monitors

overages by race, and limits overages to 2%. Under such circumstances, a loan officer might well

conclude that collecting a higher overage is not worth the extra time and risk required to extract it. This

result will be explored further in our discussion of refinancings.

The results are mixed for the hypothesis that risk is an important determinant of overages. In both equations, a likelihood ratio test confirms that the 10 variables that control only for risk are jointly significant at the 5% level. In the logistic analysis, two of these 10 are statistically significant individually. In the Stage 2 regression, of the 10 variables included to control only for risk, none are significant. However, LTV, INCOME, CREDIT PROBLEM, JOB YEARS, SELF-EMPLOYED, CHECKING, and SAVINGS all have the expected sign. Higher total income and longer job tenure are associated with lower risk, as are applicants with checking and savings accounts. Alternatively, higher loan-to-value ratios, self-employed borrowers and borrowers with credit problems would tend to have higher risk. The signs of all of these variables, therefore, tend to lower overages under this hypothesis. However, it is difficult to reconcile the significantly positive coefficient on the applicant's number of years in current profession (JOB YEARS) in the logit equation. One would expect this to signal stability and thus lower overages. In fact, we observe the opposite.

We also performed sensitivity tests. We replaced the set of four binary variables for education with two variables signifying HIGH-SCHOOL GRADUATE and COLLEGE GRADUATE. We also included the square of AGE, because at some point additional bargaining skill, experience or stability make little difference. We included a control for jumbo loans. Such changes had little effect. In short, the data on loans for purchases provide support for the market-power and bargaining hypotheses and for the influence of race in the pricing of mortgages, but relatively little support for the importance of risk in determining of overages.

We next explore the results from refinancings in our dataset.

Refinancings

Likelihood ratio tests (not reported here) show that refinancings are substantially different from loans for purchases. This is not surprising. First, the original lender has a competitive advantage over

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other potential lenders. Searching for a different lender is time consuming and costly. A borrower, satisfied with the existing lending relationship, is less likely to shop for better deals or to negotiate as strenuously. Also, the original lender can easily produce a list of borrowers likely to benefit by refinancing and contact them through routine mailings. A portion of these borrowers who refinance would otherwise not have done so without this initial contact. We believe that they are less likely to comparison shop extensively. In addition, refinancings are typically approved and closed more quickly than are purchases. This also suggests that there is less incentive to shop and negotiate. Finally, borrowers who refinance are likely to be doing so because refinancing makes them better off. As such, they typically refinance for one of two reasons: (1) either they wish to borrow money and realize that mortgage loan interest is tax deductible or (2) interest rates have fallen and they realize that they will be better off by refinancing even given closing costs. Thus, those who refinance are most likely to do so because the net result of the stated terms increases their economic wealth; at least a portion of these borrowers may be satisfied with an improved position and be less likely to bargain for a still-better deal. Consequently, we would anticipate that overages on refinancings should be higher than overages on purchases.

The refinancings dataset is slightly different from the dataset for purchases. There is no information on whether the home is a primary or secondary residence, and of course all refinancings represent prior ownership. There is strong evidence that bargaining power and competition help explain overage pricing for refinancing mortgages. VOLUME is significant and negative in the logistic equation, but insignificant in determining the magnitude of the overage for those borrowers who pay an overage. Thus, lenders with higher volumes of loans are less likely to collect overages, even though there is no apparent impact on the amount of the overage collected. Similarly, the coefficients on FIXED and CONVENTIONAL have a negative and significant impact on the likelihood that an

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overage is charged, and FIXED mortgages tend to have lower overages when one is collected. Thus, the evidence that market power and competition help determine whether or not overages are charged is quite strong.

For the various indirect measures of bargaining skill, results are very similar to the purchase estimates in the logit equation. In the Stage 2 regression for refinancings, MALE has a statistically insignificant impact on the magnitude of the overage for those borrowers who pay an overage while two education variables are significant. With the exception of the magnitude of the overage charged for Hispanics who pay an overage (column 4), though, the coefficients on the various racial groups are insignificant. In fact, the significance of the coefficient for HISPANIC is driven by a single observation having an overage at the financial institution's designated upper limit of 2%. If this one loan is omitted, the coefficient on HISPANIC also becomes statistically insignificant. Alternatively, if this observation is retained and all minorities are pooled, then there is no significant difference in the minorities as a group when compared to loans refinanced by whites. Similarly, interaction effects corresponding to the insignificant race variables are also insignificant. Thus, race is not a significant factor in the likelihood of an overage being charged or in the magnitude of overages that are charged.

This leads to a particularly interesting interpretation of our analysis when combined with two other facts. First, while still significant, the impact of MOW is much smaller in the refinancing equation than in the purchases equation (a 37.11 versus 54.94 percentage point change in the likelihood that overages will be charged and a statistically insignificant 29.66 versus a significant 143.50 basis point change in the magnitude of the overages charged, respectively). This is consistent with our argument that households which refinance tend to be more financially sophisticated than households which purchase homes. Our evidence also suggests that more sophisticated borrowers are less likely to pay overages. In addition, the proportion of minorities that refinance (12.6% versus 14.6%) is somewhat lower. A

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series of t-tests confirms that the applicant pools for refinancing are more homogeneous with respect to race. Table 7 reports paired t-tests of the means of the independent variables in both samples. Comparing whites to blacks on the purchase pool, the number of significant differences is 13 for purchases but only eight for refinancings. Eighteen of the 25 test statistics decline in absolute value. For whites and Hispanics, the difference is even more dramatic. Again, 18 of the 25 test statistics decline in absolute value, but here the number of significant differences falls from 12 for purchases to only one for refinancings. Because the pools of borrowers who refinance are more similar, there is no evidence of a differential impact across racial groups.

The variables that control for risk in Table 6 fair poorly. We see that of the risk variables, only the binary variable for CREDIT PROBLEM is statistically significant and only in the logistic equation. Borrowers who refinance with a credit problem on their record have about a 44.23 percentage point higher likelihood of being charged an overage. Paradoxically, though, the insignificance of these risk coefficients can be interpreted as providing some support for risk-based explanations of overages. That is, virtually every borrower who successfully refinances is a good credit risk. These owners have not only had loans originated but have been paying them for a period of time. Thus, there is not enough variation in credit stature for us to detect pricing differentials. The only exceptions are borrowers with a severe credit problem -- collections, garnishments, bankruptcy, or foreclosure.[13]

6. Summary and Conclusions

Lack of data on overages has severely limited research in the pricing of mortgages. We conduct an empirical investigation of the relative importance of competing hypotheses to explain the observed differentials in overage pricing. Our analysis makes several contributions. First, we are directly able to consider the impact of the bargaining capabilities of individual loan officers on the overages paid by

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[13] This is consistent with Rosenblatt (1997).

minority borrowers. Second, the dataset is unique and contains a number of variables not available to previous researchers. Third, we use a two-stage selectivity bias model to estimate the parameters of the model. This is the appropriate way to estimate a model in which a relatively large number (in our case over 50%) of the observations have dependent variable values that are truncated at zero and where heteroskedasticity or non-normality concerns make Tobit analysis inappropriate.

We find that a large component of the explained variance in overages is due to a set of variables proxying for the degree of market power in markets associated with these loans. Much of the observed overage differentials are due to differences in the bargaining skill and expertise of both loan officers and borrowers. Variables controlling for risk prove less effective in explaining overages, perhaps because risk is already incorporated in the rate sheets, or perhaps because our sample includes only loans that were approved and made. Thus, all applicants have relatively good credit records, and might not display enough risk variation to detect. Our direct measure of the relative bargaining-power of the individual loan officers, the mean overage for their white borrowers (MOW), suggests that their abilities in financial negotiations have an impact on overages that is both statistically and economically significant. However, the coefficients on the interactions between MOW and racial subgroups suggest that loan officers do not use their full capabilities when bargaining with minorities. Coupled with the reduced importance of bargaining power in the equation for refinancings, this leads us to conclude that the significance of the race variables in the purchase equation is obtained because more bargaining occurs. Consequently, differential bargaining skills have an impact on overages.

The implications of this paper for policy are particularly important. The lending institution in our study has taken an active and aggressive role in promoting fair lending policies. The lender's policies conform to those imposed by the regulator on other institutions to address discrimination in overage pricing. Indeed, this lender would pass regulatory scrutiny regarding CRA efforts and

is nondiscriminatory in its accept/reject decision making. These points are borne out by the observed behavior of the institutions' loan officers regarding the use of their bargaining power toward minorities. Yet, although there is no evidence of discriminatory treatment for those who refinance, an adverse impact is observed for minority home purchasers. There are two implications. First, in a case like this, eliminating the racial differentials in overages may likely be best accomplished by providing borrowers with more financial information to promote competition and bargaining, rather than by enacting additional laws. Second, lenders and regulators may wish to give increased consideration to monitoring loan officer behavior in this area.

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TABLE 1

Variable Names, Definitions, and Means

Variable Name	Definition	Purchases	Refinancings
OVERAGE	overage ($) / loan ($), in basis points.	10.27	13.35
TERM30	1 = Loan maturity is 30 years; 0 = Otherwise.	0.925	0.633
FIXED	1 = Loan is fixed-rate; 0 = Otherwise.	0.864	0.966
CONVENTIONAL	1 = Loan is conventional; 0 = Otherwise.	0.581	0.730
LOAN AMOUNT	Amount of the loan ($).	95000	91720
MARKET PENETRATION	Percentage of loans to the racial group of the borrower made by the lender in the SMSA of the loan.	2.077	2.175
VOLUME	Number of loans made by a lender in that market.	177.0	174.1
EDU1	1 = High school graduate; 0 = Otherwise.	0.277	0.252
EDU2	1 = Training beyond high school; 0 = Otherwis e.	0.258	0.267
EDU3	1 = College graduate but no further education; 0 = Otherwise.	0.217	0.216
EDU4	1= Education beyond college; 0 = Otherwise.	0.162	0.162
PRIOR OWNERSHIP	1 = At time of application, borrower owned home; 0 = Otherwise.	0.337	1.000
SECONDARY	1 = House is borrower's secondary residence; 0 = Primary residence or investment property.	0.014	0.0000
YEARS IN HOME	Number of years in current home.	4.228	5.867
AGE	Borrower age, in years.	37.19	42.55
LOAN RATE	Contract interest rate on loan (%).	7.427	7.244
MOW	Mean overage for a loan officer's white borrowers. If the borrower is white, the mean excludes the observation for that borrower.	8.450	11.44
BLACK	1 = BLACK; 0 = Otherwise.	0.058	0.060
HISPANIC	1 = HISPANIC; 0 = Otherwise.	0.063	0.034
OTHER MINORITY	1 = Other racial group; 0 = black, Hispanic or white.	0.024	0.032
MALE	1 = Borrower is male; 0 = Borrower is female.	0.774	0.825
LTV	Loan amount $ / property value $.	0.888	0.725
INCOME	Borrower's Monthly Income ($).	4622.9	4569.5
CREDIT PROBLEM	1 = Borrower suffered collections, garnishments, bankruptcy, or foreclosure; 0 = Otherwise.	0.0496	0.031
JOB YEARS	Years in current profession.	5.339	7.332
SELF-EMPLOYED	1 = Self-employed; 0 = Otherwise.	0.053	0.099
OBLIG/INC	Borrower's monthly obligations / income (%).	31.12	83.37
CHECKING	1 = Borrower has checking account; 0 = Otherwise.	0.828	0.672
SAVINGS	1 = Borrower has savings account; 0 = Otherwise.	0.570	0.458
LIQUID/TA	Borrower's liquid assets / total assets (%).	26.41	9.177
Number of observations:		1414	588

TABLE 2

Panel A: Difference in Overages by City Branch

	Number of Observations	% Positive Overages	Mean Overage in basis points *
City J	88	40.9	80.1
City F	274	9.5	74.6
City E	141	22.7	72.6
City L	81	27.2	71.4
City A	144	31.9	67.5
City C	136	26.5	66.5
City N	181	14.4	65.5
City B	244	12.7	62.8
City H	45	22.2	57.0
City G	109	11.9	51.0
City D	115	19.7	49.6
City M	149	16.8	45.1
City K	66	24.2	37.5
City I	229	7.4	27.9
Total	2002	17.9	51.4

The mean in the line marked Total is equally weighted by city.

Panel B: Distribution of Mean Overage by Loan Officer

Total Number of Loan Officers: 61 (58 with Positive Overages)

	% of the time a loan officer at this point of the distribution collects a positive overage.	Mean overage collected by a loan officer at this point of the distribution.*
Maximum:	66.7	2.000
Top quartile:	27.3	0.750
Mean:	21.5	0.615
Median:	19.4	0.600
Bottom quartile:	8.8	0.406
Minimum:	0.0	0.125

Panel C: Difference in Overages by Race

	White	Black	Hispanic		Other Minorities
Number of Observations	1,722	118	109	53	
% Positive Overages	15.9	41.5	25.7		17.0
Mean Overage Amount*	0.57%	0.76%	0.92%		0.50%

* Mean includes only those observations with a positive overage.

TABLE 3

Panel A
Mean Differences in Overage by Race Across Cities

Branch	Overage Difference, Black vs. White	Overage Difference, Hispanics vs. White	Overage Difference, Other vs. White	White, Mean Overage, (No. of OBS)	Blacks, Mean Overage, (No. of OBS)	Hispanics, Mean Overage, (No. of OBS)	Other, Mean Overage, (No. of OBS)
City A	0.057	0.081	-0.206	0.206 (115)	0.263 (2)	0.286 (24)	0.000 (3)
City B	0.098	-0.072	0.026	0.072 (222)	0.170 (15)	0.000 (4)	0.098 (3)
City C	0.334	0.058	0.037	0.151 (144)	0.484 (8)	0.208 (12)	0.188 (2)
City D	0.101	-0.091	-0.091	0.091 (94)	0.192 (15)	0.000 (3)	0.000 (3)
City E	0.274	-0.097	0.135	0.097 (100)	0.371 (32)	0.000 (2)	0.232 (7)
City G	0.186	0.202	-0.033	0.033 (92)	0.219 (8)	0.234 (8)	0.000 (1)
City H	-0.023	-0.128	0.185	0.128 (39)	0.105 (1)	0.000 (3)	0.313 (2)
City I	0.190	---	-0.018	0.018 (223)	0.208 (3)	---	0.000 (3)
City J	0.458	0.110	-0.115	0.265 (62)	0.723 (14)	0.375 (2)	0.150 (10)
City K	-0.021	0.429	-0.071	0.071 (326)	0.050 (5)	0.500 (4)	0.000 (5)
City L	-0.060	0.638	-0.153	0.153 (69)	0.094 (4)	0.792 (6)	0.000 (2)
City M	0.252	0.795	-0.023	0.048 (136)	0.300 (4)	0.844 (4)	0.025 (5)
City N	0.099	0.001	-0.094	0.094 (130)	0.193 (7)	0.095 (37)	0.000 (7)

Panel B
Distribution of Overages for the Branches with the Highest and Lowest Differences between Overages Collected from Whites and Minorities.
Minimum 5 Observations on Each Group.

	City J		City K		City E		City J		City N		City L	
	Black	White	Black	White	Other	White	Other	White	Hispanic	White	Hispanic	White
Maximum Value	3.125%	2.000%	2.500%	2.000%	1.375%	2.000%	1.500%	2.000%	0.750%	1.750%	2.000%	2.000%
75% Above	1.250%	0.250%	0.000%	0.000%	0.250%	0.000%	0.000%	0.250%	0.000%	0.000%	2.000%	2.000%
Median Value	0.187%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.375%	0.000%
25% Below	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Minimum Value	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Mean Value	0.723%	0.265%	0.050%	0.071%	0.232%	0.097%	0.150%	0.265%	0.095%	0.094%	0.792%	0.153%
Number of Observations	14	62	5	326	7	100	10	62	37	130	6	69

TABLE 4

Variable Names, Definitions, and Means

Factors	Variables Associated with Factors	Definition	Expected Relation to Overages
Market Power, Default Risk, Approval Risk.	TERM30	1 if loan maturity is 30 years; 0 otherwise.	-, +, -
Market Power, Default Risk, Approval Risk.	FIXED	1 if loan is fixed-rate; 0 otherwise.	-, -, -
Market Power, Default Risk, Approval Risk.	CONVENTIONAL	1 if loan is conventional; 0 otherwise.	-, -, -
Market Power, Default Risk.	LOAN AMOUNT	Amount of the loan ($).	-, -
Market Power.	MARKET PENETRATION	Percentage of loans to the racial group of the borrower made by the lender in the SMSA of the loan.	+
Market Power.	VOLUME	Number of loans made by a lender in that market.	-
Individual Bargaining Skill.	MALE	1 if borrower is male; 0 if borrower is female.	?
Individual Bargaining Skill, Default Risk, Approval Risk.	EDU1	1 if high school graduate; 0 otherwise.	-, -, -
Individual Bargaining Skill, Default Risk, Approval Risk.	EDU2	1 if training beyond high school; 0 otherwise.	-, -, -
Individual Bargaining Skill, Default Risk, Approval Risk.	EDU3	1 if college graduate but no further education; 0 otherwise.	-, -, -
Individual Bargaining Skill, Default Risk, Approval Risk.	EDU4	1 if education beyond college; 0 otherwise.	-, -, -
Individual Bargaining Skill, Default Risk, Approval Risk.	PRIOR OWNERSHIP	1 if at time of application, borrower owned home; 0 otherwise.	-, -, -
Individual Bargaining Skill, Default Risk, Approval Risk.	SECONDARY	1 if house is borrower's secondary residence; 0 if primary residence or investment property.	+, -, -
Individual Bargaining Skill, Default Risk, Approval Risk.	YEARS IN HOME	Number of years in current home.	+, -, -
Individual Bargaining Skill, Default Risk, Approval Risk.	AGE	Borrower age, in years.	?, -, -

Individual Bargaining Skill.	LOAN RATE	Contract interest rate on loan (%).	+
Individual Bargaining Skill.	MOW	Mean overage for a loan officer's white borrowers.	+
Race.	BLACK	1 if BLACK; 0 otherwise.	+
Race.	HISPANIC	1 if HISPANIC; 0 otherwise.	+
Race.	OTHER MINORITY	1 if other racial group; 0 if black, Hispanic or white.	+
Race.	BLACKMOW	MOW if borrower is BLACK; 0 otherwise.	?
Race.	HISPANICMOW	MOW if borrower is HISPANIC; 0 otherwise.	?
Race.	OTHERMOW	MOW if borrower is OTHER; 0 otherwise.	?
Default Risk, Approval Risk.	LTV	Loan amount ($)/ property value ($).	+, +
Default Risk, Approval Risk.	LTV≥80	1 if LTV≥80%, 0 otherwise.	+, +
Default Risk, Approval Risk.	INCOME	Borrower's monthly income ($).	-, -
Default Risk, Approval Risk.	CREDIT PROBLEM	1 if borrower suffered collections, garnishments, bankruptcy, or foreclosure; 0 otherwise.	+, +
Default Risk, Approval Risk.	JOB YEARS	Years in current profession.	-, -
Default Risk, Approval Risk.	SELF-EMPLOYED	1 if self-employed; 0 otherwise.	+, +
Default Risk, Approval Risk.	OBLIG/INC	Borrower's monthly obligations / income (%).	+, +
Default Risk, Approval Risk.	CHECKING	1 if borrower has checking account; 0 otherwise	-, -
Default Risk, Approval Risk.	SAVINGS	1 if borrower has savings account; 0 otherwise.	-, -
Approval Risk.	LIQUID/TA	Borrower's liquid assets / total assets (%).	-

TABLE 5

Economic Intuition of the Signs of the Variables Controlling for Default Risk

A higher loan-to-value ratio *(LTV)* means less collateral backs the loan, which implies greater risk and higher overages. Thresholds are important, though. An increase in LTV from 50% to 55% means little, but an increase from 80% to 85% means a great deal; in particular, private mortgage insurance is necessary if the loan is to be sold in the secondary market. Hence, we also have *LTV³80* which is unity if LTV ≥ 80% and zero otherwise.   Above 80%, increases in loan-to-value mean more than they do at lower levels.

Age. Maturity, stability and wealth tend to increase with age, reducing the chance of default and decreasing overages.

Higher *income* tends to mean less chance of missed payments or default, decreasing overages.

Higher *education* level means better employment prospects, stability, understanding of contracts and of the responsibilities of home ownership (e.g. maintenance), etc. It is probably correlated with the wealth of family members, who might implicitly back the loan. Thus, higher education levels tend to reduce overages.

Credit problem signals that the borrower has had some difficulty meeting financial obligations in the past, tending to increase overages.

Prior ownership means that the borrower is likely to face fewer surprises in the loan and home-ownership process, and is more likely to understand what he is undertaking. This tends to reduce overages.

Higher *years in home* also means that the borrower is likely to face fewer surprises and is more likely to understand what he is undertaking. This tends to reduce overages.

Higher *years in profession* suggests that the person is likely to remain in that profession, leading to stable income. This tends to reduce overages.

Self-employed individuals generally have less stable incomes, tending to increase overages.

Higher *obligations/income* means less money is available to service the mortgage, tending to increase overages.

Borrowers with a *checking account* or a *savings account* are more likely to be familiar with the financial system and to be stable. This tends to reduce overages.

Secondary homebuyers probably have other assets to back the loan, and are more likely to be aware of the responsibilities of home ownership. This tends to reduce overages.

Higher *loan amount* means that the borrower has a bigger stake in the property, and therefore works harder to preserve it. Larger loans also tend to be on upscale homes in upscale neighborhoods, meaning there is peer pressure to maintain the home. This tends to reduce overages. Note that *LTV* is also in the equation, so a bigger loan does *not* suggest higher *LTV*.

30-year mortgages (*TERM30*) are the longest in our sample. Longer maturities increase the chance that the borrower will encounter problems and default. This tends to increase overages.

Fixed rate mortgages have lower default risk. If interest rates move in favor of the borrower, he strives to preserve the favorable terms. If rates move against him, he can refinance. This tends to reduce overages.

Conventional mortgages have lower default risk than FHA/VA mortgages. This tends to reduce overages.

TABLE 6
Model Parameter Estimates

Variable	Stage 1 Logit Purchase	Stage 2 Regression Purchase	Stage 1 Logit Refinancing	Stage 2 Regression Refinancing
	Estimate (t-statistic)	Estimate (t-statistic)	Estimate (t-statistic)	Estimate (t-statistic)
Constant	-5.402	-1.628	-0.680	-1.253
	-3.499**	-1.627	-0.370	-1.558
Term30	-0.1992	0.047	-0.014	-0.160
	-0.494	0.278	-0.053	-1.534
Fixed	-1.623	-0.317	-1.679	-0.535
	-4.656**	-1.408	-2.736**	-1.780*
Conventional	-1.007	n.a.	-0.987	n.a.
	-4.319**	n.a.	-2.859**	n.a.
Loan Amount	$-1.13 \times (10^{-6})$	$1.14 \times (10^{-6})$	$-4.92 \times (10^{-6})$	$7.45 \times (10^{-7})$
	-0.364	0.722	-1.310	0.407
Market penetration	-0.0607	$7.63 \times (10^{-3})$	0.093	$-9.44 \times (10^{-3})$
	-1.052	0.280	1.067	-0.280
Volume	-0.001	$-1.90 \times (10^{-4})$	-0.012	$1.35 \times (10^{-3})$
	-0.478	-0.244	-3.779**	0.742
Male	-0.035	-0.150	-0.078	0.022
	-0.179	-1.789*	-0.261	0.186
Edu1	0.079	0.150	-0.339	0.465
	0.248	1.115	-0.797	2.601**
Edu2	0.151	0.013	-0.435	0.287
	0.466	0.097	-1.035	1.668*
Edu3	0.154	-0.117	-0.265	0.237
	0.449	-0.806	-0.607	1.376
Edu4	-0.035	-0.139	-0.589	0.144
	-0.093	-0.845	-1.226	0.732
Prior Ownership	-0.309	0.031	n.a.	n.a.
	-1.322	0.285	n.a.	n.a.
Secondary Residence	0.114	0.188	n.a.	n.a.
	0.135	0.526	n.a.	n.a.
Years in Home	0.022	-0.002	-0.025	0.010
	1.596	-0.339	-1.095	0.856
Age	-0.011	0.003	0.004	-0.004
	-1.221	0.783	0.342	-0.840
Loan Rate	1.025	0.262	0.531	0.293
	6.353**	2.330**	2.380**	2.586**
MOW	4.771	1.435	1.920	0.297
	4.642**	2.451**	1.872*	0.720
Black	1.907	0.333	-0.126	-0.216
	4.689**	1.454	-0.189	-0.800
Hispanic	2.123	0.543	0.493	1.148
	4.093**	2.139**	0.537	2.935**
Other Minority	1.314	0.354	-3.053	0.285
	2.105**	1.474	-1.303	0.442

	Stage 1 Logit Purchase	Stage 2 Regression Purchase	Stage 1 Logit Refinancing	Stage 2 Regression Refinancing
	Estimate (t-statistic)	Estimate (t-statistic)	Estimate (t-statistic)	Estimate (t-statistic)
BlackMOW	-5.619	-0.095	-0.351	1.365
	-1.984**	-0.084	-0.110	1.023
HispanicMOW	-22.858	-3.814	-3.602	-4.849
	-3.925**	-1.325	-0.715	-2.182**
OtherMOW	-8.175	-2.328	9.019	-1.925
	-1.752*	-1.732*	0.709	-0.713
LTV	-1.101	0.477	-0.030	-0.217
	-0.684	0.696	-0.027	-0.514
LTV³80	-0.232	-0.275	-0.429	0.075
	-0.413	-1.107	-0.987	0.504
Income	$-8.0 \times (10^{-5})$	$-5.07 \times (10^{-5})$	$7.5 \times (10^{-6})$	$1.22 \times (10^{-6})$
	-1.455	-1.582	0.162	0.070
Credit Problem	-0.312	0.170	1.909	-0.025
	-0.835	1.067	3.304**	-0.094
Job Years	0.0316	-0.001	0.003	-0.009
	2.548	-0.148	0.231	-1.549
Self-Employed	0.608	0.196	-0.098	0.235
	1.682*	1.265	-0.242	1.557
Obligations/Inc	-0.003	$-9.40 \times (10^{-4})$	$5.0 \times (10^{-4})$	$-4.49 \times (10^{-5})$
	-0.277	-0.185	0.829	-0.204
Checking	-0.374	-0.011	-0.042	-0.173
	-1.759*	-0.109	-0.152	-1.650*
Savings	-0.117	-0.008	0.370	0.085
	-0.706	-0.116	1.475	0.894
Liquid/Total Assets	$-1.8 \times (10^{-3})$	$3.04 \times (10^{-4})$	$-8.5 \times (10^{-3})$	$4.49 \times (10^{-3})$
	-0.461	0.193	1.297	1.615
Mill's Ratio	n.a.	-0.055	n.a.	0.010
	n.a.	-0.878	n.a.	0.121
Log Likelihood Function	-508.567	n.a.	-265.464	n.a.
Adjusted R^2	0.1748 [a]	0.1259	0.1614 [a]	0.1521
Number of Observations	1414	222	588	136
Mean of Dependent Var.	0.1570	65.12 basis points	0.2313	57.73 basis points
s of Dependent Var.	0.3646	52.76 basis points	0.4220	49.02 basis points

** = significant at 5%

 * = significant at 10%

 a = For the logit equations, the measure presented is McFadden's pseudo R^2

Table 7

T-tests of Means by Race, Purchases versus Refinancings.

Variable Name	Black vs. White		Hispanic vs. White	
	Purchase	Refinance	Purchase	Refinance
Term30	1.79	-1.35	0.71	-0.48
Fixed	-2.77*	0.15	-0.84	-1.67
Conventional	-6.74*	-3.27*	-6.45*	-1.07
Edu1	2.39*	-2.09*	2.93*	0.56
Edu2	0.70	0.03	3.16*	0.98
Edu3	-0.41	-0.05	0.67	0.91
Edu4	-1.27	2.80*	-2.83*	-1.19
Male	-3.53*	-1.39	-0.24	1.42
Credit Problem	-0.10	-0.15	-0.24	-0.83
Self Employed	1.27	-1.53	-1.38	-0.84
Checking	-2.40*	-2.68*	-3.79*	-0.92
Savings	0.96	0.34	1.28	-0.96
Overage	4.46*	1.36	2.45*	1.86
LTV	10.36*	1.75	7.75*	-0.65
Loan Amount	-3.28*	-1.91	-4.42*	-1.05
Market Penetration	-4.91*	-6.71*	-0.88	-0.91
Volume	-4.65*	-3.44*	-3.23*	-2.31*
Years in Home	0.39	0.22	-1.31	0.07
Borrower Age	-0.87	-0.50	-1.79	0.40
Loan Rate	-0.33	1.61	1.76	0.40
MOW	3.16*	1.67	2.67*	0.81
Borrower Income	-4.15*	-2.87*	-4.65*	-1.45
Job Years	0.77	0.17	0.20	0.52
Obligations to Inc.	2.27*	1.60	0.92	1.07
Liquid to Total Assets	-0.58	-5.13*	-1.99*	-0.25

*=significant at the 5% level.