

Federal Reserve Bank of Cleveland

# Measuring Pricing Bias in Mortgages

by Stanley D. Longhofer

Whether lenders discriminate against minority applicants is a long-standing question that has vexed regulators, bankers, and policymakers alike. The debate over this issue was fueled in the early 1990s by the findings of the so-called Boston Fed Study, which found that minority applicants in Boston were roughly 40 percent more likely to be rejected for mortgage loans than similarly situated whites.<sup>1</sup> In the wake of this study, examiners at the Federal Reserve and other bank regulators began using advanced statistical techniques to help evaluate whether minority applicants face discrimination in home lending.

In recent years, the focus of fair-lending enforcement has expanded to include the pricing of mortgage credit. Thus, in addition to investigating whether lenders' underwriting decisions are affected by an applicant's race or ethnic status, regulators also try to determine whether minorities pay higher interest rates and fees for mortgages once they are approved. Although such an investigation sounds straightforward, measuring discrimination in the pricing of mortgage loans is complicated by the fact that mortgages are typically priced along two dimensions—the interest rate and up-front fees (or “points”)—which may be traded off against each other. As a result, it can be difficult in practice to compare the total price charged to two different borrowers.

This *Economic Commentary* highlights some of the complications this structure creates when comparing the prices charged different borrowers and discusses two ways of making various loans comparable: “overages” and the “annual percentage rate.” Although it is sometimes used in fair-lending investigations,

the annual percentage rate has inherent flaws that make it a poor tool for detecting and measuring discrimination in the pricing of mortgage loans. In contrast, such problems do not exist with overages, making this measure a better tool for evaluating fair-lending compliance.

## ■ Mortgage Loan Pricing

Mortgage loans are priced along two dimensions. The first is the loan's *nominal interest rate*. The second is the up-front fees, or points, that borrowers typically pay at the time the loan is closed. A *point*, which is equal to 1 percent of the loan amount (\$1,000 on a \$100,000 loan), is generally categorized in one of two ways. *Origination points* cover the lender's costs associated with originating the loan, but do not typically cover ancillary services such as credit reports and appraisals (additional processing fees are usually charged to pay for these services). *Discount points*, meanwhile, are used to modify the interest rate paid by the borrower. By paying discount points at the time of closing, borrowers are able to obtain lower nominal interest rates on their loans.

Although most lenders charge a uniform number of origination points to all borrowers with a given loan product, the number of discount points and the nominal interest rate charged on any particular loan is the result of negotiations between the borrower and the loan officer who originates the mortgage. As a baseline from which to begin these negotiations, loan officers work from a *rate sheet*, which details the number of discount points the lender requires for any given nominal interest rate, as well as the length of lock, or commitment period for that rate.<sup>2</sup>

**Detecting and measuring discrimination in the pricing of mortgage loans present unique challenges for bank regulators. This *Economic Commentary* outlines how loans are priced in the mortgage market and the difficulties involved in comparing the prices charged to different borrowers.**

It is important to know that many mortgage lenders—but by no means all—permit their loan officers to deviate from the rate sheet when negotiating the price of the loan. As a result, the ultimate “price” paid for a loan at a given lender may differ among borrowers, depending on their willingness to negotiate and the skill with which they do so.

The pricing of mortgage loans is illustrated by the sample rate sheet in table 1. The columns across the top indicate the different time frames over which the lender is willing to lock in a borrower's rate. For example, a 15-day lock means that the promised interest rate is guaranteed as long as closing occurs within 15 days of the lock date. After that time, borrowers may be required to renegotiate the rate. Those who expect to close their loans in a matter of a few days may choose a relatively short lock in return for a lower interest rate, while those who require more time to close their loans may request a 60-, 75-, or even 90-day lock. Of course, borrowers may choose to *float* their rate, waiting to lock until just prior to closing.

The rows down the first column give the different interest rates the lender is willing to offer. The cells in the table show the minimum number of discount points

required to obtain a given interest rate/length of lock combination (the *required price*). For example, in our sample sheet, the lender is willing to guarantee a 7.25% rate for 30 days with zero points. For the borrower to “buy down” the rate to 6.5% would require paying 2.75 points at the time of closing. In contrast, if the borrower were willing to pay 7.75%, this lender would be willing to pay the *borrower* up to 2.125 points for the same 30-day lock; borrowers often use such funds to pay closing costs and meet down-payment requirements. *Negative points* are sometimes called *premium pricing*, since investors will pay a premium to purchase loans with interest rates above those prevailing in the market.

An *overage* occurs when the total discount and origination points paid by a borrower exceed those required by the lender to originate the loan (its standard origination points plus the required discount points as listed on the rate sheet). Overaging is often used as a way to compensate loan originators; the larger the overage a loan officer negotiates on a loan, the higher his commission. Overaging is also a method that lenders use to adjust their prices to meet local competitive and economic conditions, particularly when they issue a common rate sheet across several markets. It is worth noting that *underages* (also called *shortages*) can also occur, in which case the lender accepts fewer points at origination than it would ordinarily require; such pricing may be necessary for a lender to remain competitive or to build market share in certain markets.

### ■ Comparing Prices: Overages in Action

The Equal Credit Opportunity Act and the Fair Housing Act effectively prohibit lenders from charging borrowers different prices for mortgage loans on the basis of race, color, religion, national origin, sex, marital status, familial status, handicap, or age.<sup>3</sup> While this might seem a straightforward prohibition, the fact that mortgage loans are priced along these two dimensions makes it difficult for regulators and others involved in fair-lending enforcement to compare the ultimate prices different borrowers are charged for their loans. For example, how can we determine if a borrower who pays 1 point with a rate of 7.25% is paying more or less than another borrower who receives a rate of 8% with no up-front fees? To compare these loans, we must convert this two-dimensional

**TABLE 1 SAMPLE RATE SHEET**

Interest rate, percent	15 Days	30 Days	45 Days	60 Days
8.00	-3.500	-3.375	-3.250	-3.125
7.75	-2.250	-2.125	-2.000	-1.875
7.50	-1.875	-1.750	-1.625	-1.500
7.25	-0.125	0.000	0.125	0.250
7.00	0.250	0.375	0.500	0.625
6.75	2.250	2.375	2.500	2.625
6.50	2.625	2.750	2.875	3.000

SOURCE: Adapted from an actual lender rate sheet.

**TABLE 2 COMPARING THE PRICES OF TWO LOANS**

	Ms. Wyatt	Mr. Larson
Loan amount	\$100,000	\$100,000
Origination points	1.0	1.0
Discount points	3.0	-2.0
Nominal interest rate	6.75%	7.75%
Overage in points	0.50	0.00
Other processing fees	\$1,000	\$1,000
Total up-front fees	\$5,000	\$0
APR	7.26%	7.75%

SOURCE: Author’s calculations.

price into a single number that can be easily compared across borrowers.

There are several ways around this problem, but the overage calculation introduced above is the most natural and, it turns out, the most useful method for comparing prices across loans. The first step in this process involves calculating the overage paid by each borrower, according to the following formula:

$$\begin{aligned}
 &+ \text{Total points charged borrower} \\
 &- \text{Origination points required by lender} \\
 &- \text{Discount points stated on rate sheet} \\
 &- \text{Closing costs paid by lender} \\
 &= \text{Overage}
 \end{aligned}$$

In essence, an overage is calculated by adding up all the points the borrower paid (as disclosed on the HUD-1 Settlement Statement) and comparing it to the total number of points the lender required to originate the loan, given the prevailing rate sheet on the day the borrower’s interest rate was locked. In some cases, a lender may agree to waive or pay some of the borrower’s closing costs. Since such credits constitute a reduction in a borrower’s total out-of-pocket expenses, we subtract their value to come up with a final overage calculation.

Consider the following example. Table 2 shows the fees charged to two borrowers, Ms. Wyatt and Mr. Larson, by a hypothetical lender, Acme Mortgage. Acme’s policy is to charge a 1-point origination fee on its 30-year, fixed-rate mortgages.<sup>4</sup> Ms. Wyatt, anticipating that

she will live in her house for several years without refinancing her mortgage, agrees to pay 3 points to buy down her nominal interest rate to 6.75%. In contrast, Mr. Larson chooses to pay a higher nominal interest rate; in return, Acme Mortgage agrees to credit \$2,000 toward Mr. Larson’s closing costs.

Assuming Acme priced both of these loans using the rate sheet in table 1 (with a 45-day lock), we see that, although she has a lower nominal interest rate than Mr. Larson, Ms. Wyatt paid more for her loan. Acme’s required price for a loan with a 6.75% rate was only 2.5 points, but Ms. Wyatt was charged 3.0 points—a 50-basis-point overage. In contrast, Mr. Larson’s loan was made at “par” (with neither an overage nor a shortage).

This example illustrates how overages can be used to compare the prices paid by different borrowers, making it possible to test for fair-lending compliance. By comparing the frequency and magnitude of overages paid by similarly situated minority and white borrowers, regulators can better determine whether or not lenders have illegal racial disparities in the pricing of their loans. Such investigations usually involve a statistical comparison of the average overages charged each group, controlling for other factors that might legitimately affect the size of overages, such as loan amount, borrower education, and market conditions.<sup>5</sup> If, after controlling for these alternative explanations for differential

overages across groups, a statistically and economically significant price disparity remains, a *prima facie* case of illegal discrimination would exist.

### ■ What About the APR?

Measuring pricing disparities using overages essentially involves converting the nominal interest rate a borrower pays into up-front fees, or the number of points required to originate the loan. Alternatively, one could imagine making the opposite conversion, calculating the effective interest rate implied by a given set of up-front fees. This is exactly the idea behind the *annual percentage rate* (APR) that must be disclosed under the Truth in Lending Act.<sup>6</sup>

At first blush, the APR would seem a straightforward way to compare prices across mortgage loans and hence be a reasonable tool for regulators evaluating fair-lending compliance. Given that the APR must be calculated and disclosed on all loans, it would appear to be a low-cost tool as well. In fact, a calculation similar to the APR has been used in conjunction with overages in several high-profile anti-discrimination settlements, including the well-publicized Long Beach case in 1996 and the more recent settlement by Roslyn Bancorp. Unfortunately, the APR has certain fundamental flaws that make it a potentially misleading measure of pricing bias in mortgage lending.

The APR's essential problem is that it assumes all borrowers will hold their loans to maturity. In other words, APR-like price measures necessarily assume that every borrower expects to continue making mortgage payments for the same length of time. The very fact that some borrowers choose to "buy down" their rate by paying discount points, however, implies that this assumption is invalid. Indeed, standard consumer guides advise that borrowers who anticipate holding their mortgage for more than four or five years should consider paying discount points to reduce their interest rate, while those who anticipate moving or refinancing their mortgage soon should not. Unlike the overage calculation described earlier, the APR cannot account for such differences in borrower preferences regarding the rate/point tradeoff.<sup>7</sup>

To see this problem more starkly, consider again the example in table 2. Assuming that, in addition to discount and origination points, Acme charges borrowers \$1,000 in processing fees, Ms.

Wyatt's total out-of-pocket expense for her mortgage will be \$5,000 (3 discount points, 1 origination point, and \$1,000 in processing fees), giving her an APR of 7.26%. In contrast, Mr. Larson's up-front expenses are zero because of the closing-cost credit from Acme. Thus, his APR is 7.75%, almost 50 basis points higher than Ms. Wyatt's.

This difference in APRs, however, is extremely misleading, since both borrowers were asked to pay exactly the same origination points and processing fees. That is, Mr. Larson presumably had the option of paying additional discount points in return for a lower interest rate, but he chose not to do so, either because he had fewer liquid assets with which to pay his closing costs or because he anticipated paying off his mortgage in the near future.<sup>8</sup> As a result, focusing on the APR could lead regulators to mistakenly conclude that Mr. Larson unfairly paid more for his mortgage, when in fact he demonstrably preferred his loan to the one obtained by Ms. Wyatt. Indeed, as we showed above, it is Ms. Wyatt who paid the higher price. Thus, focusing on the APR not only can lead to the false conclusion that a non-biased lender discriminates, but it can also mask actual disparities that do exist.

This example becomes even more troubling when we consider the possibility that the choice of mortgage terms may be directly affected by an applicant's financial condition, which in turn may be correlated with race. In the above example, Mr. Larson may well have chosen his higher-rate loan precisely because he did not have (or did not want to spend) the \$5,000 in up-front expenses associated with Ms. Wyatt's loan. As a consequence, the higher APR paid by liquidity-constrained borrowers (those with less cash available to close their loans) may often be in their best interest. Given the fact that minority mortgage applicants typically have fewer liquid assets than their white counterparts, using the APR as a measure of mortgage pricing could lead to systematic errors when attempting to detect discrimination.<sup>9</sup>

An alternative way of understanding the problem with using APRs for fair-lending compliance comes from noting that many lenders do not permit their loan officers to deviate from their rate sheets (i.e., they do not permit overages). At such lenders, the only possible difference in APRs across loans arises

from borrower choices. To conclude that such a bank was illegally discriminating would clearly be a mistake, but using APRs could easily imply just such a conclusion. If APRs can make a bank that prohibits overaging appear discriminatory, it could make such a mistake about banks that permit overaging as well.

It is important to note that this problem with the APR is present under any effective interest rate calculation using a common holding-period assumption for all borrowers. The APR measures used in the Long Beach and Roslyn investigations were calculated in several ways, using a variety of assumptions about anticipated holding periods. Although such recalculations of the APR can affect the magnitude and statistical significance of observed "disparities," they cannot correct for the fundamental problem inherent in an interest-rate-based measure of mortgage pricing: Borrowers choose different loan products based on their own personal knowledge about how long they are likely to hold their mortgages. As a result, any comparison of "effective interest rates" will provide an inherently unreliable measure of discrimination in the pricing of mortgage loans.

### ■ Concluding Thoughts

Uncovering and eradicating discrimination in credit markets is an important goal for federal and state bank regulators. Unfortunately, determining what constitutes discriminatory behavior is often more difficult than it appears.

This *Economic Commentary* has focused on one problem with identifying discrimination in the pricing of mortgage loans. Although the APR might seem a reasonable way to compare prices across different loans, it does not consider the choices borrowers voluntarily make about the terms of their loans. As a result, relying on the APR can lead to inaccurate conclusions about the presence of discrimination.

This analysis makes it clear that regulators and others involved in fair-lending enforcement should abandon the use of the APR and similar effective-interest-rate comparison tools. Instead, fair-lending compliance should be measured through statistical comparisons of the relative frequency and magnitude of overages across groups. Using overages, regulators can get a clearer, more accurate picture of the true options that were available to different borrowers.

## ■ Footnotes

1. See Alicia H. Munnell, Geoffrey M.B. Tootell, Lynn E. Browne, and James McEneaney, "Mortgage Lending in Boston: Interpreting HMDA Data," *American Economic Review*, vol. 86, no. 1 (March 1996), pp. 25-53.
2. Lenders update their rate sheets frequently, typically each day. Generally, they set these rate sheets based on the prices at which they are able to sell packages of loans to the secondary market, as well as to encourage or discourage specific rates so as to meet prior commitments to sell blocks of loans with particular characteristics.
3. This is not to say that lenders are prohibited from discriminating on the basis of other, non-protected characteristics. For example, individuals with severe credit blemishes often pay substantially more for their mortgages, a practice that does not violate the law.
4. Borrowers must pay other closing costs as well. In addition to the processing fees shown in table 2, there are often title charges, per diem interest, mortgage insurance premiums, escrow reserves, and other expenses.
5. Throughout this analysis, I focus only on loans that are of the same product type (e.g., 30-year, fixed-rate, conventional loans).

Because the pricing of different product types may be differentially affected by competitive conditions and other market factors, one should never attempt to draw any conclusions about discrimination from an analysis that combines loans of multiple product types.

6. Very simply, the APR is derived by subtracting the total up-front fees charged on a loan (prepaid finance charges) from the original principal balance to obtain the *amount financed*. The APR is the interest rate that would result in the borrower's actual monthly payment, if the true loan size were equal to the amount financed; this can be calculated using standard amortization formulas.
7. In an ideal world, regulators would like to observe the entire set of rate/point options made available to each borrower; such information would provide a more complete picture of how a lender treats different groups. Unfortunately, information such as this does not exist.
8. Another potential problem would arise if Mr. Larson chose a longer lock-length than Ms. Wyatt; under the APR, the higher interest rate associated with this implicit "insurance" would make it appear that Mr. Larson was unfairly paying a higher price for his mortgage.

9. Evidence of this fact can be found in Munnell et al., and the Federal Reserve's National Surveys of Consumer Finances.

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