

HMDA Vital Statistics: Description of Loan Analyses Sharon Kelly, Ph.D.

With the modifications to the Federal Reserve Board's ("Fed") Regulation C, of the Home Mortgage Disclosure Act ("HMDA"), 2005 was the first year that the Fed released "pricing" information relating to residential mortgage lending. Specifically, lenders must now report rate spreads for loans whose annual percentages rates (APR) are above threshold Treasury rates.¹ The threshold for first lien loans with application dates before October 1, 2009 is 3 percentage points or more and 1.5 percentage points or more for loans with application dates October 1, 2009 or later. The threshold for junior lien loans with application dates before October 1, 2009 is 5 percentage points or more and 3.5 percentage points or more for loans with application dates October 1, 2009 or later. From these data, the Fed generates a Table 11 Series of summary tables.

The HMDA data are presented and analyzed in separate tables based on loan type, loan purpose, lien status, property type, and owner occupancy. The loan groups of 1-to-4 family owner occupied dwellings for which the Fed reports pricing information in its Table 11 Series are:

- FHA Home-Purchase Loans, First Lien
- VA Home-Purchase Loans, First Lien
- Conventional Home-Purchase Loans, First Lien
- Conventional Home-Purchase Loans, Junior Lien
- FHA Refinancing Loans, First Lien
- VA Refinancing Loans, First Lien
- Conventional Refinancing Loans, First Lien
- Conventional Refinancing Loans, Junior Lien
- Conventional Home Improvement Loans, First Lien
- Conventional Home Improvement Loans, Junior Lien

Each table contains summary statistics by borrower characteristics and Census Tract characteristics. For each of these characteristics the table reports the number of loans exceeding and not exceeding the Treasury threshold. For loans exceeding the threshold, the number of loans are also counted based on the magnitude of the rate spread; the mean and median rate spread are also reported. All of this information will be found in the Fed's Table 11 Series.

We add statistical analyses to these tables. Each group's percentage of loans exceeding the threshold is compared to the percentage for a "base" group, generating an "odds ratio".² For example, if 80% of the loans to Asians exceed the rate threshold and 40% of the loans to Whites exceed the rate threshold, the odds ratio is 2. An odds ratio of 2 tells us that Asians are twice as

¹ The rate spread is calculated as the difference between the annual percentage rate (APR) on the loan and the rate on Treasury securities of comparable maturity.

² The base group changes depending on what set of characteristics is being looked at. For race, the base group is whites; for ethnicity the base group is Non-Hispanic; for minority status the base group is non-minority; for borrower income relative to median MSA income the base group is 120% or more of MSA income; for gender the base group is male. Looking at Census Tract characteristics, the base group for minority is less than 10% minority; for income characteristics the base group is upper income.

likely as Whites to receive a loan with a rate spread exceeding the threshold.³ We use a statistical test, the Fisher's Exact Test, to determine whether this result is statistically significant or is the result of chance.

The Table 11 Series also includes counts of reportable loans in categories based on the size of the rate spread threshold. The rate spread threshold depends on the loan's lien status and application date. For first lien loans with loan applications before October 1, 2009, the rate spread threshold is 3 percentage points and the categories above the comparable Treasury security are: 3 to 3.99, 4 to 4.99, 5 to 5.99, 6 to 6.99, 7 to 7.99, and 8 or more percentage points. For junior lien loans with loan applications before October 1, 2009, the rate spread threshold is 5 percentage points and the categories are: 5 to 5.99, 6 to 6.99, 7 to 7.99, 8 to 8.99, 9 to 9.99, and 10 or more percentage points. For loan applications from October 1, 2009 forward, the threshold rate spreads reported start at 1.5 percentage points for first lien loans and 3.5 percentage points for junior lien loans.⁴

We also add a statistical analysis on the rate spread tables. A t-test is performed to determine whether the average rate spread for one group is statistically different from chance compared to the average rate spread for the base group. The value of the t-test statistic is listed, along with the associated probability. A probability of 0.05 or less is considered statistically significant or unlikely to have occurred by chance.⁵ A positive test statistic indicates that the group's average rate spread is higher than the base group's rate spread; a negative test statistic indicates that the group's average rate spread is lower than that of the base group.

³ An odds ratio less [greater] than one indicates that the group is less [more] likely than the base group to receive a loan with a rate spread exceeding the threshold. If the odds ratio is equal to one, the odds are the same for the two groups. The odds ratio for the base group is one.

⁴ HOEPA loans are included in the counts for refinancing and home improvement loans. HOEPA - Home Ownership and Equity Protection Act of 1994.

⁵ Statisticians and social scientists routinely use the 5% level or a smaller level of 1% to identify results that are considered to be *statistically significant* because they occur with a small likelihood of being a random result. These probability levels of 5% and 1% are also equivalent to 1.96 standard deviations (often rounded to 2 standard deviations) and 2.57 standard deviations. These standards are commonly used in employment litigation. See, for example, Hazelwood School District v. United States, 433 U.S. 299, 308, n.14 (1977).