40 Years Later, Are There Still Any Discriminations in House Mortgage Lending? Evidence from Austin Area

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Introduction and Literature Review

Efforts to promote equal access to mortgage capital regardless of sexual, racial and ethnic differences have historically been a key component of the civil rights agenda in the United States.

In 1975, the congress enacted the Home Mortgage Disclosure Act(HMDA) to monitor the access of the minorities in America to the home mortgage loans. Since then, there are massive literatures looking at the discrimination in the house mortgaging market. For example, *Munnell, Alicia H., et al(1996)*[5] found that in Boston area, holding the credit records data gathered from the Federal Reserve Bank in Boston, the minorities are more than twice as likely to be denied a mortgage compared to whites. *Tootell, Geoffrey MB.(1996)*[7] used the geometry data as an instrument to calibrate the endogenous problem in the regression. *Goering, John M., and Ronald E. Wienk.(1997)*[3] and *Ross, Stephen L., and John Yinger.(2002)*[6] separately made detailed literature reviews and general comments about the main topics and methodologies in the field of the discrimination in the house mortgage market. *Apgar, William C., and Allegra Calder.(2005)*[1] discovered that high-cost lenders targeted minority borrowers in different proportion.

Nowadays, mortgage lending discrimination has become subtle. *Kau, James B., Donald C. Keenan, and Henry J. Munneke.(2012)* [4] concluded that the borrowers in predominantly black neighborhoods pay a significantly higher contract rate than in white neighborhoods. In contrast, *Delis, Manthos D., and Panagiotis Papadopoulos. (2018)*[2] found evidence of very little discrimination in loan origination.

As a result, there is no obvious answer to the question that after HMDA has been passed for about four decades, whether there are still discriminations in house mortgage lending? Our team would like to revisit this topic to see whether there is some improvement toward equality in the house mortgaging market.

Data Source

The dataset we use is from HMDA[1], which requires financial institutions to maintain, report, and publicly disclose loan-level information about the house mortgages. We focus on the most recent data, i.e. 2017 Austin area with about 120k data points.

Model Setup and Methodology

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[1] Link of the dataset is as follows: https://www.consumerfinance.gov/data-research/hmda/

The main regression model is:

$$\mathrm{Prob(Y)} = \beta_0 + \beta_1 X + \beta_2 C + e$$

Where Y is the final actions of the banks, X is the demographic data of the applicant, C is the credit records of the applicant and e is error. We will use the stepwise method to select variables and use lasso to check the robustness. If the coefficient of the demographic variable is significant, then we have evidence of discrimination, and vice versa.

The biggest problem with the dataset, as many literatures pointed out before, is that the HMDA data does not include the loan applicant credit records. Intuitively, financial agencies are more willing to lend to applicants who have good credit records since they have high tendency to keep making payments on time. Therefore the credit record would clearly affect the decisions of the lenders, and lack of this attribute hence leads to serious endogenous problems. However, We found that if the applicants are denied, the dataset lists the specific reasons why they are denied for the house mortgage. This allows us to solve the endogeneity concern by using the following methods.

Key Assumptions and Hypothesis Test

The key assumption we made is that the credit records for people with different demographic background are the same. First we need to test the hypothesis.

To test this hypothesis, we use the following step: first, use the cluster method, and automatically divide applicants into different groups based on their demographic characteristics; second, we calculate the Expected Rate of Poor Credit Record (the number of applicants being denied divided by the total number of applicants within the group) for each group; third, check if the expected rates among different groups are different. If our assumption is correct, then we should see similar value of expected rate among groups, and vice versa.

This assumption could easily be false, so we developed two different ways to justify our model given different situations.

If the expected credit records for people with different demographic backgrounds are the same, then we do not need to consider the effect of the credit record, since the endogeneity problem would not exist. So we could ignore the credit record and do stepwise and lasso to get unbiased variables for beta1.

More likely, if the expected credit records for people with different demographic backgrounds are different, then we would use the group Expected Rate of Poor Credit Record as an indicator of the credit record for each applicant, and run the stepwise regression model with this variable added. Although this variable is not the true credit records, it should reduce the endogeneity of the regression, and provide us a more accurate result.

Reference

[1] Apgar, William C., and Allegra Calder. "The dual mortgage market: The persistence of discrimination in mortgage lending." (2005): 101.

[2] Delis, Manthos D., and Panagiotis Papadopoulos. "Mortgage Lending Discrimination Across the US: New Methodology and New Evidence." Journal of Financial Services Research (2018): 1-28.

[3] Goering, John M., and Ronald E. Wienk, eds. Mortgage lending, racial discrimination, and federal policy. Ashgate, 1997.

[4] Kau, James B., Donald C. Keenan, and Henry J. Munneke. "Racial discrimination and mortgage lending." The Journal of Real Estate Finance and Economics 45.2 (2012): 289-304.

[5] Munnell, Alicia H., et al. "Mortgage lending in Boston: Interpreting HMDA data." The American Economic Review (1996): 25-53.

[6] Ross, Stephen L., and John Yinger. The color of credit: Mortgage discrimination, research methodology, and fair-lending enforcement. MIT press, 2002.

[7] Tootell, Geoffrey MB. "Redlining in Boston: Do mortgage lenders discriminate against neighborhoods?." The Quarterly Journal of Economics 111.4 (1996): 1049-1079.