Oral Roberts University

Senior Project Preparation

Project Specification Document

*Formulating a New Real Denial Rate of Mortgage Applications*

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# Formulating a New Real Denial Rate of Mortgage Applications

## Introduction

The financial crisis of 2008 sent a shockwave throughout the economy and it primarily resulted from the poor handing of loans in the housing market by lenders to debtors. The denial rate of mortgage applications is one of the key component in the housing market. By analyzing the denial rate of mortgage applications, researchers can try and better understand trends in the housing market. These trends can be studied before, during, and after the financial crisis. This can provides the potential to have a higher statistical understanding of how the financial crisis started and how it moved through the years. However, the conventional denial rate of mortgage applications were found to be ineffective. A group of researchers at Urban Institute has developed their own method of calculating a real denial rate for the years of 1999 up to 2014. This research project aims to devise a new real denial rate for the year of 2014 to 2021 that is different than the one cracked by the research team at Urban Institute.

## Prior Research

The conventional way of calculating a denial rate of mortgage applications is to take the total number of denied applications and divide it by the total number of applications. This method is simple and is later found to be a crude and ineffective way to use it to analyze housing data trends. It ignores important factors of mortgage applications like the creditworthiness of an applicant as an example. Urban Institute is a nonprofit organization that advocates the betterment of the social and economic policy of the urban sphere. Researchers at Urban Institute were able to come up with a calculation for the real denial rate of mortgage applications. They did this by excluding what they termed “high-credit profiles” applicants from the equation. Essentially, their method boils down to two main parameters. First, the total number of denied loan applications by applicants of “low-credit profiles”. Second, the total number of loan applications by applicants of “low-credit profiles”. We’ll assign the first parameter to ‘K’ and the second parameter to ‘I’. The calculated real denial rate, therefore, would be K divide by I, or Real Denial Rate (RDR) = K / I. This new method gives them a real denial rate that can better accurately tells credit access of applicants than the conventional method of calculating a denial rate.

## Proposed New Method

This research project will focus on formulating a new real denial rate of mortgage applications. This new real denial rate will be different from the one already formulated by the researchers at Urban Institute in multiple ways. First, their data and analysis goes only up to the year 2015. A real denial rate for the years after 2015 is currently unavailable. This new proposal aims to come up with a new real denial rate for the years 2015 to 2021. Secondly, the researchers at Urban Institute uses publicly available data but they also used proprietary data from third-party sources. Proprietary data from third-party sources often have to be paid in monetary exchange for the data they provide. This new method will only use publicly available data. Sources will be Home Mortgage Disclosure Act (HMDA) and other sources. HMDA will provide the primary source of data for mortgage applications information. Supporting data on historic interest rates will also be used. Urban Institute’s researchers put emphasis on the creditability of the applicants. This new research will put emphasis instead more on the denial reasons of the applications and the debt-to-income ratio of the applicants.

Thanks to another research group, HMDA data will be provided on a need-by-basis. HMDA data are stored on the Titan supercomputer and can be accessed through a shared network. There is consistency in the formatting of the columns of the data in some of the years. A script is being written and tested to clean and properly format all the years in the same format. It will be formatted to optimize analytical tools to be run on the data. Python is the programming of choice to write the analytical scripts with analytical tools provided in the Python language library to be use.

## Reports

Reports on the findings of this research project will be in the form of a research paper and a presentation. The breakdown of the new real denial rate would be presented in either a visual graph or table format. Trends in the real denial rate across different factors such as loan types, race of applicants, and years will be explained mainly through line and bar graphs. This is a statistical oriented research. As such, many statistical analytical tools will be used to analyze data and present them. The real denial rate calculation method by the Urban Institute is provided below as an example:

## Definition of Success

The success of this research project will be first and foremost measured by the production of a new method of calculating the real denial rate of mortgage applications. Furthermore, the new calculated real denial rate will be used to do further analysis on housing market trends from the years 2015-2021. Trends such as the behavior of the RDR over the past decade will be examined. The RDR trends from 2015-2021 will be compared to the RDR trends from 1998 to 2015. Studying and analyzing these trends will help us further answer important research questions that could not be otherwise explored without a real denial rate. The new real denial rate will calculate the RDR of the years that were calculated already calculated by the researchers at Urban Institute. An accuracy range of the new real denial rate can then be tested against the RDR method formulated at Urban Institute.