

Readme file- Reproducible package

Readme File for Replication of the Paper: “Automatic Loan Approval and Gender Bias in SME Lending”

This readme file was created to guide the reproducibility package for the analysis of the paper.

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Overview

This paper examines whether automatic credit approval can reduce gender bias in SME lending. We collaborated with a bank in Peru that piloted a new screening tool to generate psychometric credit scores. Applicants who scored above a predefined threshold were automatically offered a loan with a size tied to their score, while those below the threshold were assessed by a loan officer. Using a regression discontinuity design and credit bureau data, we compare loan offers and loan sizes of female and male applicants within a narrow window around the automatic approval threshold. The results show that female applicants below the threshold are less likely to take out loans and receive smaller loan amounts than men. However, this gender bias disappears for applicants above the threshold, suggesting that automated screening methods can reduce loan officer discretion and promote gender equity in lending.

Data Availability

This research utilizes data from proprietary sources that are not publicly available.

Name: Proprietary bank administrative data (loan applications and approvals)

Source: Provided by a private commercial bank under a confidentiality agreement with the authors. Due to these restrictions, the identity of the institution cannot be disclosed and the data cannot be shared publicly.

Name: RCC Histórico

Source: Equifax Peru

Contact: Pierre Freundt (Pierre.Freundt@equifax.com)

Instructions for Replicators

Code

As the reader can see from the folder structure section, there is a Code folder with one (1) Stata do-file script and two (2) grec scripts:

- 1) master.do: produces all the tables and figures of the paper.
- 2) binscatter-femalesB.grec and binscatter-malesB.grec: edit Figures 1 and 2.

The only script that should be executed is master.do. The other grec scripts are executed automatically inside master.do. Before running the scripts, the user must update the file paths to match their local directory structure and install the following Stata packages: rdrandinf, rdlocrand, downloaded from <https://raw.githubusercontent.com/rdpackages/rdlocrand/master/stata>.

Computational settings

The script was developed and tested using **Stata version MP 18.0** and **QGIS version 3.38.1** on a **64-bit Windows system** (MinGW environment) with **32 GB of RAM (32000 MB)**. While the script ran successfully in this environment, we expect it would also run with less RAM.

Under the described settings, the reproducibility package takes around **30 minutes** to run from beginning to end.

List of Exhibits

Exhibit name	Output file name
Figure 1. Credit access after loan application. Panel A: Probability of loan offer	Fig1A.gph
Figure 1. Credit access after loan application. Panel A: Probability of new loan	Fig1B.gph
Appendix Figure A1: Distribution of EFL scores of loan applicants	FigA1.gph
Table 1: Background characteristics	Tables.xlsx, sheet(T1)
Table 2: Loan offer and take-up six months after loan application	Tables.xlsx, sheet(T2)
Table 3: Loan size six months after the loan application	Tables.xlsx, sheet(T3)
Table 4: Repayment performance after loan application	Tables.xlsx, sheet(T4)
Appendix Table A1. Share of female applicants around the threshold	Tables.xlsx, sheet(A1)

Appendix Table A2. Pre-application loan take-up (placebo test) Tables.xlsx, sheet(A2)

Appendix Table A3. Loan offer and take-up six months after loan application (Randomization Inference) Tables.xlsx, sheet(A3)

Appendix Table A4. Loan size of partner bank six months after the loan application Tables.xlsx, sheet(A4)

Notes: All tables and figures are found in the /Results folder, and are produced when running the script /Code/master.do.

Folder structure

~\Replication Package

- Code
 - 0_interest rates.do
 - 0_equifax_long.do
 - 1_firm-bank relations.do
 - 1_equifax_wide.do
 - 2_prepare_data.do
 - 3_analysis.do
 - binscatter-femalesB.grec
 - binscatter-malesB.grec
- Raw data
 - Not shared
- Readme
 - Readme.docx
- Results
 - Fig1A.gph
 - Fig1B.gph
 - FigA1.gph
 - Tables.xlsx
- Temp