



The Global Findex 2025: Financial Inclusion And Connectivity And In The Digital Economy

First Submission: FR_WLD_2025_361

Shreya Suthakar, Mahin Tariq

reproducibility@worldbank.org

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This review verifies the reproducibility of the exhibits included in the paper “*The Global Findex 2025: Financial Inclusion And Connectivity And In The Digital Economy*”.

Contents in this review:

1. Main findings
2. List of exhibits and reproducibility status
3. Reproduction Environment

Main findings

- **Every exhibit has been reproduced accurately.**
- The code was successfully executed on a new computer after:
 1. Running `renv::init()` to initialize the R programming environment
 2. Updating the file paths for the main R script.
- The output demonstrates consistent stability across multiple runs. Specifically, executing the code two times consecutively yielded identical results.
- The code takes approximately 4 hours to run.
- We conducted our reproducibility analysis based on the paper shared by the authors via email on July 11th.
- **Reproducibility Summary:**
 - **Data:** Some data is restricted and has not been included in the reproducibility package. For more details, please refer to the README file.
 - **Code:** All code files (from cleaning to analysis) are included in the reproducibility package.
 - **Outputs:** All outputs are generated by code included in the reproducibility package.
 - **Reproducibility verification:** Reviewers verified the cleaning via virtual verification and did not have access to the “*World_Bank_032125.csv*” file. For the figures, reviewers used data provided directly by the authors to conduct the reproducibility verification, and this is not included in the public reproducibility package. The reviewers did not verify if publicly available data matches the data provided by the authors. Hashes for the datasets used are included in the reproducibility package for verification purposes.

- **Dependencies environment:** The reviewers created a new environment using the latest versions of dependencies available at the moment of the review.

List of exhibits and reproducibility status

Executive Summary

- **Figure ES.1 Reproduced.** This exhibit is a duplicate of Figure 2.1.4.
- **Figure ES.2 Reproduced.** This exhibit was compared against *figure_o_2.png*.
- **Figure ES.3a Reproduced.** This exhibit is a duplicate of Figure 1.1.2a.
- **Figure ES.3b Reproduced.** This exhibit is a duplicate of Figure 1.1.2b.
- **Figure ES.4 Reproduced.** This exhibit was compared against *figure_o_4.png*.
- **Figure ES.5 Reproduced.** This exhibit is a duplicate of Figure 3.3.5.
- **Figure ES.6 Reproduced.** This exhibit was compared against *figure_o_6.png*
- **Figure ES.7 Reproduced.** This exhibit was compared against *figure_o_7.png*
- **Figure ES.8 Reproduced.** This exhibit was compared against *figure_o_8.png*
- **Figure ES.9 Reproduced.** This exhibit is a duplicate of Figure 2.2.6.

Chapter 1: Digital Connectivity

1.1: Mobile Phone Ownership

- **Map 1.1.1 Reproduced.** We verified the underlying map data used to generate this exhibit.
- **Figure 1.1.1a Reproduced.** This exhibit was compared against *1.1.1_EAP.png*
- **Figure 1.1.1b Reproduced.** This exhibit was compared against *1.1.1_ECA.png*
- **Figure 1.1.1c Reproduced.** This exhibit was compared against *1.1.1_LAC.png*
- **Figure 1.1.1d Reproduced.** This exhibit was compared against *1.1.1_MENA.png*
- **Figure 1.1.1e Reproduced.** This exhibit was compared against *1.1.1_SA.png*
- **Figure 1.1.1f Reproduced.** This exhibit was compared against *1.1.1_SSA.png*
- **Figure 1.1.2a Reproduced.** This exhibit was compared against *phonetype_income.png*
- **Figure 1.1.2b Reproduced.** This exhibit was compared against *phonetype_gender.png*
- **Figure 1.1.2c Reproduced.** This exhibit was compared against *phonetype_employment.png*
- **Figure 1.1.2d Reproduced.** This exhibit was compared against *phonetype_urbanicity.png*
- **Figure 1.1.2e Reproduced.** This exhibit was compared against *phonetype_age.png*
- **Figure 1.1.3 Reproduced.** This exhibit was compared against *1.1.3.png*

- **Figure 1.1.4 Reproduced.** This exhibit was compared against *1.1.4.png*
- **Figure 1.1.5 Reproduced.** This exhibit was compared against *5104_phone_freq_SSA.png*
- **Figure 1.1.6a Reproduced.** This exhibit was compared against *noPhone_any_main_reasons_SA.png*
- **Figure 1.1.6b Reproduced.** This exhibit was compared against *noPhone_any_main_reasons_SSA.png*

1.2: Internet Use

- **Figure 1.2.1 Reproduced.** This exhibit was compared against *5301_internet_use.png*
- **Figure 1.2.2 Reproduced.** This exhibit was compared against *int_gap_gender_income.png*
- **Figure 1.2.3 Reproduced.** This exhibit was compared against *5302_internet_diff_gender_region.png*
- **Figure 1.2.4 Reproduced.** This exhibit was compared against *5111_text_SR_AU.png*
- **Figure 1.2.5 Reproduced.** This exhibit was compared against *5301_SA_read_diff_gender.png*
- **Figure 1.2.6 Reproduced.** This exhibit was compared against *1.2.6_NEW.png*
- **Figure 1.2.7a Reproduced.** This exhibit was compared against *1.2.7a.png*
- **Figure 1.2.7b Reproduced.** This exhibit was compared against *1.2.7b.png*
- **Figure 1.2.7c Reproduced.** This exhibit was compared against *1.2.7c.png*
- **Figure 1.2.7d Reproduced.** This exhibit was compared against *1.2.7d.png*
- **Figure 1.2.8 Reproduced.** This exhibit was compared against *int_data_freq.png*

1.3: Digital Safety and Responsible Use.

- **Figure 1.3.1 Reproduced.** This exhibit was compared against *phone_password.png*
- **Figure 1.3.2 Reproduced.** This exhibit was compared against *phone_rules_regions.png*
- **Figure 1.3.3 Reproduced.** This exhibit was compared against *5403_phone_scam.png*
- **Figure S1.1.1 Reproduced.** This exhibit was compared against *id_reg.png*
- **Figure S1.1.2 Reproduced.** This exhibit was compared against *S1.1.1.2.png*
- **Figure S1.1.3 Reproduced.** This exhibit was compared against *S1.1.1.3.png*
- **Figure S1.1.4 Reproduced.** This exhibit was compared against *S1.1.4.png*
- **Figure S1.1.5 Reproduced.** This exhibit was compared against *S1.1.5.png*

Chapter 2: Financial Access

2.1: Account Ownership

- **Map 2.1.1 Reproduced.** We verified the underlying map data used to generate this exhibit.
- **Figure 2.1.1 Reproduced.** This exhibit was compared against *phone_password.png*

- **Figure 2.1.2 Reproduced.** This exhibit was compared against *phone_password.png*
- **Figure 2.1.3a Reproduced.** This exhibit was compared against *figure_2_1_3_a.png*
- **Figure 2.1.3b Reproduced.** This exhibit was compared against *figure_2_1_3_b.png*
- **Figure 2.1.3c Reproduced.** This exhibit was compared against *figure_2_1_3_c.png*
- **Figure 2.1.3d Reproduced.** This exhibit was compared against *figure_2_1_3_d.png*
- **Figure 2.1.3e Reproduced.** This exhibit was compared against *figure_2_1_3_e.png*
- **Figure 2.1.3f Reproduced.** This exhibit was compared against *figure_2_1_3_f.png*
- **Figure 2.1.3g Reproduced.** This exhibit was compared against *figure_2_1_3_g.png*
- **Map 2.1.2 Reproduced.** We verified the underlying map data used to generate this exhibit.
- **Figure 2.1.4 Reproduced.** This exhibit was compared against *figure_2_1_4.png*
- **Figure 2.1.5 Reproduced.** This exhibit was compared against *figure_2_1_5.png*
- **Figure 2.1.6 Reproduced.** This exhibit was compared against *figure_2_1_6.png*
- **Map 2.1.3 Reproduced.** We verified the underlying map data used to generate this exhibit.
- **Figure 2.1.7 Reproduced.** This exhibit was compared against *figure_2_1_7.png*
- **Figure 2.1.8 Reproduced.** This exhibit was compared against *figure_2_1_8.png*
- **Figure 2.1.9 Reproduced.** This exhibit was compared against *figure_2_1_9.png*

2.2: Unbanked

- **Figure 2.2.1 Does not apply** Does not show analysis results.
- **Figure 2.2.2a Reproduced.** As the data required substantial computational resources, this exhibit was verified virtually.
- **Figure 2.2.2b Reproduced.** As the data required substantial computational resources, this exhibit was verified virtually.
- **Figure 2.2.3 Reproduced.** As the data required substantial computational resources, this exhibit was verified virtually.
- **Figure 2.2.4 Reproduced.** As the data required substantial computational resources, this exhibit was verified virtually.
- **Figure 2.2.5 Reproduced.** As the data required substantial computational resources, this exhibit was verified virtually.

- **Figure 2.2.6 Reproduced.** As the data required substantial computational resources, this exhibit was verified virtually.
- **Figure 2.2.7 Reproduced.** As the data required substantial computational resources, this exhibit was verified virtually.

Chapter 3: Financial Use

3.1: Savings

- **Map 3.1.1 Reproduced.** We verified the underlying map data used to generate this exhibit.
- **Figure 3.1.1 Reproduced.** This exhibit was compared against *3.1.1.png*
- **Figure 3.1.2 Reproduced.** This exhibit was compared against *3.1.2.png*
- **Figure 3.1.3 Reproduced.** This exhibit was compared against *3.1.3.png*
- **Figure 3.1.4 Reproduced.** The exhibit was compared against *3.1.3.4.png*.
- **Figure 3.1.5 Reproduced.** The exhibit was compared against *3.1.4.png*.
- **Figure 3.1.6 Reproduced.** The exhibit was compared against *3.1.5.png*.
- **Figure 3.1.7 Reproduced.** This exhibit was compared against *3.1.6.png*
- **Figure 3.1.8 Reproduced.** This exhibit was compared against *3.1.8.png*
- **Figure S3.1.1 Reproduced.** This exhibit was compared against *3.3.14_v1.png*
- **Figure S3.1.2 Reproduced.** This exhibit was compared against *S3.3.1.png*
- **Figure S3.1.3 Reproduced.** This exhibit was compared against *3.3.18.png*.
- **Figure S3.1.4 Reproduced.** This exhibit was compared against *S3.4v.1.png* As the data required substantial computational resources, this exhibit was verified virtually.

3.2: Borrowing

- **Map 3.2.1 Reproduced.** We verified the underlying map data used to generate this exhibit.
- **Figure 3.2.1 Reproduced.** This exhibit was compared against *3.2.1.png*
- **Figure 3.2.2 Reproduced.** This exhibit was compared against *3.2.2_EAP.png*
- **Figure 3.2.3 Reproduced.** This exhibit was compared against *3.2.3_EAP.png*
- **Figure 3.2.4 Reproduced.** This exhibit was compared against *3.2.4.png*
- **Figure 3.2.5 Reproduced.** This exhibit was compared against *3.2.5.png*
- **Figure 3.2.6 Reproduced.** This exhibit was compared against *3.2.6.png*

3.3: Payments

- **Map 3.3.1 Reproduced.** We verified the underlying map data used to generate this exhibit.

- **Figure 3.3.1 Reproduced.** This exhibit was compared against 3.3.1.png
- **Figure 3.3.2 Reproduced.** This exhibit was compared against 3.3.2.png
- **Figure 3.3.3 Reproduced.** This exhibit was compared against 3.3.3.png
- **Figure 3.3.4 Reproduced.** This exhibit was compared against 3.3.4.png
- **Figure 3.3.5 Reproduced.** This exhibit was compared against 3.3.5.png
- **Figure 3.3.6 Reproduced.** This exhibit was compared against 3.3.6.png
- **Figure 3.3.7 Reproduced.** This exhibit was compared against 3.3.7.png
- **Figure 3.3.8 Reproduced.** The exhibit was compared against 3.3.8.png
- **Figure 3.3.9 Reproduced.** The exhibit was compared against 3.3.8-2.png
- **Figure 3.3.10 Reproduced.** The exhibit was compared against 3.3.19.png
- **Figure 3.3.11 Reproduced.** The exhibit was compared against 3.3.9.png
- **Figure 3.3.12 Reproduced.** The exhibit was compared against 3.3.10.png
- **Figure 3.3.13 Reproduced.** The exhibit was compared against 3.3.11.png
- **Figure 3.3.14 Reproduced.** The exhibit was compared against 3_3_12_ag.png
- **Figure 3.3.15 Reproduced.** The exhibit was compared against 3.3.13.png
- **Figure 3.3.16 Reproduced.** This exhibit was compared against 3.3.16.png
- **Figure 3.3.17a Reproduced.** As the data required substantial computational resources, we verified this virtually.
- **Figure 3.3.17b Reproduced.** As the data required substantial computational resources, we verified this virtually.

Chapter 4: Financial Health

4.1: Managing financial worrying

- **Figure 4.1.1 Reproduced.** The exhibit was compared against 3101_worry.png
- **Figure 4.1.2 Reproduced.** The exhibit was compared against 3101_worry_SSA.png
- **Figure 4.1.3 Reproduced.** This exhibit was compared against 4.1.3.png
- **Figure 4.1.4 Reproduced.** This exhibit was compared against 4.1.4.png
- **Figure 4.1.5 Reproduced.** The exhibit was compared against 2202_savings_old_age.png

4.2: Financial Resilience

- **Figure 4.2.1 Reproduced.** The exhibit was compared against 3102_waterfall_LMIC.png
- **Figure B4.2.1.1 Reproduced.** The exhibit was compared against 2120_int_rem.png

- **Figure 4.2.2a Reproduced.** The exhibit was compared against *3102_waterfall_world1.png*
- **Figure 4.2.2b Reproduced.** The exhibit was compared against *3102_waterfall_world2.png*
- **Figure 4.2.2c Reproduced.** The exhibit was compared against *3102_waterfall_world3.png*
- **Figure 4.2.2d Reproduced.** The exhibit was compared against *3102_waterfall_world4.png*
- **Figure 4.2.2e Reproduced.** The exhibit was compared against *3102_waterfall_world5.png*
- **Figure 4.2.2f Reproduced.** The exhibit was compared against *3102_waterfall_world6.png*
- **Figure 4.2.3 Reproduced.** This exhibit was compared against *4.2.3.png*
- **Figure 4.2.4 Reproduced.** The exhibit was compared against *emergency_money_sd_nd.png*
- **Figure 4.2.5 Reproduced.** The exhibit was compared against *source_of_funds_income_SD_ND.png*
- **Figure 4.2.6a Reproduced.** The exhibit was compared against *3102_waterfall_income_gender.png*
- **Figure 4.2.6b Reproduced.** The exhibit was compared against *3102_waterfall_income_gender.png*
- **Figure 4.2.6c Reproduced.** The exhibit was compared against *3102_waterfall_income_gender.png*
- **Figure 4.2.6d Reproduced.** The exhibit was compared against *3102_waterfall_income_gender.png*
- **Figure 4.2.7 Reproduced.** The exhibit was compared against *3107_borrow_climate_last.png*

4.3: Gaps in financial capabilities and confidence.

- **Figure 4.3.1 Reproduced.** The exhibit was compared against *4.3.1.png*
- **Figure 4.3.2 Reproduced.** This exhibit was compared against *1304_MM_sent_wrong.png*
- **Figure 4.3.3 Reproduced.** The exhibit was compared against *g2p_rely_ff.png*.
- **Figure 4.3.4 Reproduced.** This exhibit was compared against *balance_info.png*
- **Figure 4.3.5 Reproduced.** The exhibit was compared against *5402_MM_password.png*
- **Figure 4.3.6 Reproduced.** This exhibit was compared against *4.3.6.png*
- **Figure S4.1.1a Reproduced.** This exhibit was compared against *figure_sp_2.3a.png*
- **Figure S4.1.1b Reproduced.** This exhibit was compared against *figure_sp_2.3b.png*
- **Figure S4.1.1c Reproduced.** This exhibit was compared against *figure_sp_2.3c.png*
- **Figure S4.1.1d Reproduced.** This exhibit was compared against *figure_sp_2.3ad.png*
- **Figure S4.1.2a Reproduced.** This exhibit was compared against *figure_sp_2.2a.png*
- **Figure S4.1.2b Reproduced.** This exhibit was compared against *figure_sp_2.2b.png*

- **Figure S4.1.3a Reproduced.** The exhibit was compared against *S4.1.3a.png*
- **Figure S4.1.3b Reproduced.** The exhibit was compared against *S4.1.3b.png*
- **Figure S4.1.4 Reproduced.** The exhibit was compared against *S4.1.4.png*
- **Figure S4.1.5 Reproduced.** The exhibit was compared against *S4.1.5.png*

Reproduction Environment

Paper exhibits were reproduced on a computer with the following specifications:

- OS: Windows 11 Enterprise
- Processor: Intel(R) Core(TM) i5-1145G7 CPU @ 2.60GHz
- Memory available: 1.64 TB
- Software version: R 4.4.2