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Beyond Account Ownership: Digital Payments and Formal Savings as Robust Correlates of Financial Inclusion

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Abstract

Financial inclusion sits at the heart of global development policy, yet cross-country evidence on what actually drives account ownership over time remains scattered across survey waves and shifting indicator definitions. This study addresses that gap by drawing on six waves (2011–2024) of the World Bank Global Findex Database, covering up to 145 economies per wave, to document global and regional trends in account ownership and to identify which usage-dimension behaviors are most robustly associated with it in a country-year panel of 294 observations covering 162 economies. Global average account ownership rose from 50.6% in 2011 to 78.7% in 2024, with the fastest gains recorded in South Asia and Sub-Saharan Africa, even as the gender gap remained broadly unchanged at roughly 6 percentage points and the within-country income gap narrowed only modestly (14.1 to 11.7 percentage points). A two-way fixed-effects panel regression shows that digital payment use ($\beta = 0.552$, $p < 0.01$) and formal savings behavior ($\beta = 0.418$, $p < 0.01$) remain robust, statistically significant correlates of account ownership ($R^2 = 0.972$), whereas the association with mobile money and formal borrowing shrinks toward zero once country-specific heterogeneity is absorbed. This pattern is confirmed by a median-regression robustness check. The originality of this study lies in tracing these relationships consistently across the 2014–2024 Findex waves in which all four usage indicators are available (with descriptive trends from 2011) rather than a single wave, while its novelty and significance rest on isolating within-country correlates net of persistent cross-country differences, a distinction largely absent from prior single-wave work. These results have important policy implications. Continued investment in digital payment infrastructure and the formalization of savings, rather than credit access alone, is likely to do more to close remaining inclusion gaps than account-ownership campaigns pursued in isolation.

1. Introduction

1.1 Background

Access to a transaction account is widely regarded as a first step toward broader financial inclusion, enabling households and firms to save, make payments, and manage risk (Demirgüç-Kunt et al., 2008). Since 2011, the World Bank's Global Findex Database has provided the most comprehensive cross-country, demand-side survey evidence on how adults access and use financial services, and remains the only globally comparable source of this kind (Klapper et al., 2025). The fifth edition of the database, covering surveys conducted in 2024 across 141 economies (140 of which are available in the extract analysed here; see Table 1), reports that global account ownership reached 79% of adults, up from 51% in 2011, with the fastest growth occurring in low- and middle-income economies (Klapper et al., 2025). This broad progress has been driven substantially by mobile phones and digital payment infrastructure: 86% of adults worldwide now own a mobile phone, and digital payment use has become the primary channel through which previously unbanked adults acquire their first account (Klapper et al., 2025). Earlier Findex editions documented similar momentum, including the marked acceleration of digital

financial services during the COVID-19 pandemic (Demirgüç-Kunt et al., 2022) and the initial wave of fintech-driven account growth (Demirgüç-Kunt et al., 2018).

Despite this progress, financial inclusion remains highly uneven. Sarma and Pais (2011) show, using an early cross-country index of financial inclusion, that inclusion levels are systematically related to income, inequality, literacy, and physical and electronic connectivity, foreshadowing many of the covariates still used in the literature today. More recent evidence continues to find substantial dispersion: panel-data studies of BRICS economies link financial inclusion to internet penetration and population characteristics (Pandey et al., 2023), while studies of Sub-Saharan Africa identify mobile money as a particularly powerful, region-specific driver of account access (Kemgou Voptia & Stukalina, 2024). At the same time, persistent gender gaps in account ownership have been documented across regions and appear only partially explained by socioeconomic characteristics, with a residual, unexplained component attributed to structural and behavioral barriers (Chen et al., 2023; Chatterjee, 2024). A recurring theme across this literature, and a central motivation for the present study, is the distinction between financial access and financial usage: several reviews note that expanding the number of adults with an account has outpaced the growth of active, sustained use of savings, credit, and payment services (Ozili, 2021; Pesqué-Cela et al., 2021).

A growing body of systematic reviews reinforces this picture of uneven, technology-mediated progress. Reviews focused specifically on Sub-Saharan Africa report that mobile fintech adoption remains the dominant driver of new account access in the region, while identifying persistent gaps in infrastructure, regulation, and digital literacy that constrain further gains (Hornuf et al., 2025; Akenzua, 2025). Chinoda and Kapingura (2024) further show that the strength of the relationship between digital financial inclusion and economic growth in Sub-Saharan Africa depends on the quality of domestic institutions and governance, suggesting that account-ownership gains do not translate uniformly into broader development outcomes. Framing financial inclusion as a Sustainable Development Goal-relevant priority, Nefla et al. (2026) similarly conclude that African economies continue to face structural gaps — in access, usage, and enabling infrastructure — that require coordinated policy attention beyond simply expanding account ownership.

1.2 Aim

This study aimed to document global and regional trends in financial account ownership between 2011 and 2024 using the World Bank Global Findex Database, and to identify which dimensions of financial-service usage are most robustly associated with account ownership once cross-country heterogeneity and common time trends are taken into account.

1.3 Objectives

The specific objectives of the study were to:

1. 1. Describe global and regional trends in financial account ownership across six Global Findex survey waves (2011–2024).
2. 2. Quantify the evolution of the gender, within-country income, and urban–rural gaps in account ownership over the same period.
3. 3. Estimate the association between account ownership and four usage-dimension covariates — digital payment use, mobile money account ownership, formal savings, and formal borrowing — using a country-year panel.
4. 4. Test the robustness of these associations to country and year fixed effects and to a median-regression specification.

1.4 Research Questions

The study is organized around the following research questions:

RQ1. How has global and regional account ownership evolved across Global Findex survey waves from 2011 to 2024?

RQ2. Have the gender, within-country income, and urban–rural gaps in account ownership narrowed over this period?

RQ3. Which usage-dimension covariates — digital payment use, mobile money, formal savings, or formal borrowing — are most robustly associated with account ownership within countries over time, once time-invariant country characteristics are controlled for?

The remainder of the study proceeds as follows. Section 2 reviews the empirical literature and sets out the theoretical and conceptual frameworks that motivate the analysis. Section 3 describes the data, the construction of the country-year panel, and the treatment of missing observations. Section 4 presents descriptive trends and panel-regression results. Section 5 discusses the findings, and Section 6 concludes with policy implications, limitations, and directions for future work.

2. Literature Review

2.1 Empirical Literature

A large body of work motivated by the Global Findex Database has documented substantial progress in global account ownership since 2011, alongside persistent gaps by gender, income, and geography (Klapper et al., 2025; Demirgüç-Kunt et al., 2022, 2018). Cross-country panel studies applying fixed-effects and related estimators to Findex-derived data consistently find that internet access, population characteristics, and macroeconomic conditions are associated with financial inclusion, though the relative importance of each covariate varies by region and specification (Pandey et al., 2023; Sethi & Acharya, 2018). In Sub-Saharan Africa specifically, mobile money has been identified as a particularly powerful driver of account access, reflecting the region's comparatively underdeveloped traditional

banking infrastructure and rapid mobile-network expansion (Kemgou Voptia & Stukalina, 2024); the region continues to report the highest share of mobile-money-only account holders of any world region (Klapper et al., 2025).

This body of country-panel evidence is echoed by a series of recent systematic reviews that synthesize the correlates of digital financial inclusion across a broader set of low- and middle-income economies. Hunter et al. (2025) review the determinants of digital financial-service adoption across low- and middle-income countries and identify network infrastructure, regulatory environment, and financial literacy as recurring predictors, while reviews focused specifically on digital banking find that regulatory quality and institutional trust condition how far digital access translates into effective inclusion (Mohammed & Japee, 2025). Complementary evidence from Sub-Saharan Africa indicates that mobile fintech adoption has been the primary channel of recent account growth in the region but remains constrained by uneven infrastructure and consumer-protection frameworks (Hornuf et al., 2025; Akenzua, 2025), while Kamboj and Sharma (2025) map the wider digital-financial-inclusion literature and propose an integrative framework linking access, usage, and welfare outcomes that closely parallels the access-usage distinction adopted in the present study.

A parallel literature examines the persistent gender gap in financial inclusion. Using cross-country data spanning 2013–2023, Chen et al. (2023) find that a more developed fintech environment is associated with a narrower gender gap in financial inclusion, while Chatterjee (2024) highlights that gender and regional disparities in digital finance remain intertwined with broader structural inequalities in developing countries. These findings are consistent with the Findex 2025 report itself, which shows the global gender gap narrowing only modestly and remaining wider in South Asia and the Middle East and North Africa than elsewhere (Klapper et al., 2025).

A third strand of literature connects financial inclusion to macroeconomic outcomes, providing the underlying rationale for treating account ownership as a policy-relevant outcome rather than a purely descriptive statistic. Sethi and Acharya (2018), using panel cointegration and causality tests across 31 countries, find a positive long-run relationship between financial inclusion and economic growth, while broader reviews of this literature link financial inclusion to poverty reduction and reduced income inequality, particularly in middle- and upper-income economies (Ozili, 2021). This body of work motivates the focus, in the present study, on identifying which measurable dimensions of financial behavior are most closely associated with the access outcome that much of this macro-literature ultimately relies on.

Reinforcing the study's focus on savings and borrowing as usage-dimension covariates, Sabbaghi (2025) finds that mobile money and digital-financial-inclusion measures are systematically associated with saving and borrowing behavior across a large cross-country sample, lending direct support to the covariates examined in the present analysis. At the same time, a systematic review of reviews by Duvendack and Mader (2020) cautions that the causal evidence linking financial inclusion to development outcomes in low- and middle-income countries remains mixed, while Chinoda and Kapingura (2024) show that institutional and governance quality moderates the inclusion-growth

relationship in Sub-Saharan Africa specifically — together underscoring why the present study treats its panel-regression findings as descriptive correlates rather than causal effects.

2.2 Theoretical Framework

The analysis draws on two complementary theoretical traditions. The first is the access–usage–quality framework developed by Sarma (2008) and extended by Sarma and Pais (2011), which conceptualizes financial inclusion as a multidimensional process encompassing the accessibility, availability, and usage of formal financial services, rather than a single binary indicator of account ownership. This framework, along with the closely related “finance for all” perspective of Demirgüç-Kunt et al. (2008) and the cross-country access indicators developed by Honohan (2008), motivates the study's distinction between account ownership as an access-dimension outcome and digital payments, mobile money, savings, and borrowing as usage-dimension behaviors that plausibly precede or reinforce access.

The second theoretical strand concerns the adoption of the digital technologies that increasingly mediate financial inclusion. Rogers's (2003) Diffusion of Innovations theory characterizes the spread of an innovation such as mobile money or digital payments through a population as a function of its relative advantage, compatibility, and observability, and has been widely applied to explain uneven adoption of digital financial services across countries and social groups. The Technology Acceptance Model (Davis, 1989) and its extension, the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003), further suggest that perceived usefulness and ease of use shape whether individuals who gain access to digital financial infrastructure go on to use it regularly — a distinction that is directly relevant to interpreting why some usage covariates in this study's regression (e.g., digital payment use) may be more tightly linked to account ownership than others (e.g., formal borrowing), which typically requires a more deliberate, higher-friction adoption decision.

2.3 Conceptual Framework

Figure 1 summarizes the conceptual framework guiding the empirical analysis. Four usage-dimension covariates — digital payment use, mobile money account ownership, formal savings, and formal borrowing — are modeled as correlates of account ownership, the access-dimension outcome, consistent with the Sarma (2008) framework. The diffusion and technology-acceptance literature (Rogers, 2003; Davis, 1989; Venkatesh et al., 2003) motivates the expectation that covariates requiring lower adoption friction, such as digital payments, will show a tighter association with account ownership than higher-friction behaviors such as formal borrowing. Country and year fixed effects are included as a structural feature of the empirical design, absorbing time-invariant institutional differences across countries and common shocks across waves (such as the global acceleration of digital payments during the COVID-19 pandemic), so that the estimated associations are identified from within-country changes over time rather than from cross-country differences in financial-sector development.

3. Data and Methodology

3.1 Data Sourcing

The primary data source is the World Bank Global Findex Database, which reports nationally representative survey-based indicators of financial inclusion for adults aged 15 and above. Six survey waves are used: 2011, 2014, 2017, 2021, 2022, and 2024. For each wave, the analysis draws on the "Total" population breakdown (both sexes, all age groups pooled at 15+, all urbanization strata, no income-group split) to construct the core country-year indicators, together with disaggregations by sex, urbanization, and within-country income quintile group used to compute the gender, urban–rural, and income gaps reported in Section 4.2. The core indicator is account ownership — the share of adults with an account at a financial institution or through a mobile-money provider — together with four covariates: use of digital payments, mobile-money account ownership, formal savings, and formal borrowing, all measured as percentages of the adult population.

3.2 Data Processing and Missing Data Handling

Country-level indicators were extracted from the World Bank Global Findex Database (2011, 2014, 2017, 2021, 2022, and 2024 survey waves), restricting each series to the "Total" (all adults 15+, both sexes, all urbanization strata, no income-group split) breakdown to construct a comparable country-year panel. The 2022 wave, which surveyed a small, non-representative subsample of 16 countries, was retained for the gap-trend descriptive tables but excluded from all regional trend figures and from the regression sample, since its restricted coverage would bias mean comparisons across waves. Coverage of individual indicators varied by wave: the digital-payment, mobile-money, formal-savings, and formal-borrowing indicators were not collected in the 2011 wave, and the urban–rural breakdown of account ownership is populated only for the 2024 wave in this extract; these indicators are therefore reported only for the waves and breakdowns in which they are available, and are noted accordingly in each table. For the multivariate determinants analysis, the panel was restricted to the 2014, 2017, 2021, and 2024 waves and to complete cases across all four covariates (digital payment use, mobile money account ownership, formal savings, and formal borrowing), yielding 294 country-year observations across 162 countries; no imputation was performed, and countries or country-years with missing values on any regression covariate were dropped listwise. A median (quantile) regression on the same complete-case sample was estimated as a robustness check against the influence of outlier countries on the mean-based ordinary least squares estimates.

3.3 Empirical Strategy

The determinants of account ownership are estimated using the country-year panel described above. Three nested specifications are reported: (1) pooled ordinary least squares (OLS) with heteroskedasticity-robust (HC1) standard errors; (2) OLS augmented with survey-wave fixed effects and standard errors clustered by country; and (3) a two-way fixed-effects specification adding country fixed effects, also with standard errors clustered by country. The country fixed effects absorb all time-invariant country characteristics — institutional quality, financial-sector structure, and other slow-moving factors — so that the coefficients in specification (3) are identified from within-country changes over time. As a

robustness check, a median (quantile) regression with wave fixed effects is estimated on the same complete-case sample to assess whether the OLS results are driven by outlier countries.

4. Results

4.1 Global and Regional Trends in Account Ownership

Table 1 summarizes coverage and account ownership by survey wave. Global average account ownership among surveyed countries rose steadily, from 46.3% in 2011 to 70.5% in 2024 (unweighted country means; see Table 3 for the World aggregate, which differs slightly as it is population-weighted). Table 2 reports descriptive statistics for the core indicators in the most recent (2024) wave, and Table 3 and Fig. 2 present the regional decomposition of the World Bank's population-weighted account-ownership aggregates. The World aggregate increased from 50.6% in 2011 to 78.7% in 2024. High-income economies started from a substantially higher base (87.5% in 2011) and have since plateaued near 95%. The largest absolute gains occurred in South Asia, where account ownership rose from 35.2% to 83.9%, and in Sub-Saharan Africa, where it rose from 23.3% to 58.2%, though the latter region remains the lowest-ranked among those shown. The Middle East, North Africa, Afghanistan, and Pakistan aggregate shows both the lowest 2024 level (43.4%) and a non-monotonic path, including a decline between 2017 and 2021.

Table 1
Sample Coverage and Account Ownership by Survey Wave

Wave	Countries (n)	Mean (%)	SD	Min (%)	Max (%)
2011	144	46.3	32.2	0.4	99.7
2014	142	55.2	30.6	6.5	100.0
2017	145	61.5	26.6	8.6	99.9
2021	123	70.3	25.6	5.8	100.0
2022	16	38.5	17.4	11.7	66.2
2024	140	70.5	23.0	14.8	99.8

Note: Account ownership = share of adults (15+) with an account at a financial institution or mobile-money provider, unweighted across surveyed countries. The 2022 wave surveyed a small, non-representative subsample of 16 countries and is excluded from trend comparisons elsewhere in this study. Source: World Bank Global Findex Database.

Table 2
Descriptive Statistics of Key Financial-Inclusion Indicators, 2024 Wave

Indicator	N	Mean	SD	Min	Median	Max
Account ownership (%)	140.0	70.5	23.0	14.8	72.9	99.8
Digital payment use (%)	98.0	40.4	20.0	4.5	38.2	95.7
Mobile money account (%)	80.0	32.4	20.8	2.6	31.9	87.5
Formal savings (%)	98.0	26.9	13.8	3.2	25.4	67.2
Formal borrowing (%)	98.0	16.3	9.4	1.4	13.8	46.9
Internet use (%)	140.0	73.7	23.4	11.1	83.0	99.1

Note: All indicators are percentages of adults aged 15+, country-level. Source: World Bank Global Findex Database, 2024 wave.

Table 3
Regional Trends in Account Ownership (%), 2011–2024

Region	2011	2014	2017	2021	2024
World	50.6	61.7	69.3	73.8	78.7
High income	87.5	92.2	93.0	95.8	94.9
Low & middle income	41.6	54.7	64.0	69.0	75.4
East Asia & Pacific*	55.0	68.8	70.4	79.7	83.3
Europe & Central Asia*	44.4	57.4	65.5	77.6	77.8
Latin America & Caribbean*	39.5	51.6	54.4	67.1	69.7
Middle East, North Africa, Afghanistan & Pakistan*	23.8	30.3	39.3	35.4	43.4
South Asia	35.2	51.0	76.2	74.8	83.9
Sub-Saharan Africa*	23.3	34.2	42.5	49.3	58.2

*Note: * denotes regional aggregate excluding high-income countries. Population-weighted aggregates. Source: World Bank Global Findex Database.*

4.2 Gender, Income, and Urban–Rural Gaps

Despite the overall rise in account ownership, the gender gap in account ownership — the difference between male and female ownership rates, averaged across countries — has not narrowed over the sample period, fluctuating between roughly 5.5 and 8.5 percentage points from 2011 to 2024 (Fig. 3, Table 4).

Table 4
Global Gap Trends in Account Ownership, 2011–2024 (percentage points)

Wave	Gender gap (M − F)	Urban–rural gap	Income gap (rich60 − poor40)
2011	6.0	n/a	14.1
2014	5.5	n/a	12.9
2017	6.8	n/a	13.0
2021	6.0	n/a	10.4
2022	8.5	n/a	12.2
2024	6.1	6.7	11.7

Note: Urban–rural breakdown is available only for the 2024 wave in this extract of the Global Findex data.

The within-country income gap, comparing the richest 60% to the poorest 40% of each country's income distribution, has narrowed somewhat, from 14.1 percentage points in 2011 to 11.7 points in 2024, though it remains sizable (Fig. 4). The urban–rural gap is observable only in the 2024 wave in this data extract, at 6.7 percentage points nationally.

4.3 Cross-Country Variation in 2024

Cross-country variation in account ownership remains wide even in the most recent wave. Figure 5 and Table 5 show the ten highest- and lowest-ranked countries in 2024. Ownership exceeds 98% in several high-income European economies (Iceland, Finland, Austria) while remaining below 25% in Niger, Chad, and Lebanon — a gap of more than 80 percentage points between the top and bottom of the distribution.

Table 5
Ten Lowest- and Ten Highest-Ranked Countries by Account Ownership, 2024 (%)

Highest	%	Lowest	%
Iceland	99.9	Niger	14.8
Finland	99.8	Chad	20.9
Austria	99.5	Lebanon	23.0
United Kingdom	99.3	Nicaragua	23.5
France	99.2	Madagascar	24.5
Netherlands	99.2	Pakistan	27.3
Lithuania	99.0	Mauritania	27.3
Estonia	98.9	Iraq	30.2
Slovenia	98.7	Libya	33.1
Denmark	98.7	Algeria	35.3

Source: World Bank Global Findex Database, 2024 wave.

4.4 Correlation Analysis of Financial-Inclusion Indicators

Figure 6 presents a pairwise Pearson correlation matrix examining the relationships among six key financial-inclusion indicators across 80 countries with complete data for the 2024 wave. The heatmap utilizes a color gradient ranging from deep blue (representing a perfect negative correlation of -1.00) to deep red (representing a perfect positive correlation of 1.00). Overall, the matrix reveals predominantly positive relationships among the indicators, though the strength of these associations varies notably.

The strongest positive relationship is observed between Account ownership and Digital payment (r = 0.88), indicating that countries with higher rates of formal account ownership also tend to exhibit high levels of digital payment adoption. Account ownership also demonstrates relatively strong positive correlations with both Formal savings (r = 0.71) and Formal borrowing (r = 0.70).

Additionally, Mobile money shows a strong positive correlation with Formal savings (r = 0.77) and a moderate-to-strong association with Digital payment (r = 0.70). This suggests a robust link between mobile-based financial services and broader engagement in formal savings activities within the surveyed economies.

In contrast, Internet use displays much weaker and more varied correlations with the other financial-inclusion metrics. Its strongest positive association is with Formal borrowing (r = 0.41) and Account ownership (r = 0.38). Interestingly, Internet use has a weak negative correlation with Mobile money (r = -0.15) and shows almost no linear relationship with Formal savings (r = 0.05), suggesting that the spread

of general internet access does not automatically correspond to higher levels of mobile-based financial transactions or formal savings in these countries.

4.5 Relationship Between Account Ownership and Digital Payment Use

Figure 7 presents a country-level scatter plot (n = 98) illustrating the relationship between the percentage of the population that made or received a digital payment (x-axis) and the percentage of the population with formal account ownership (y-axis) in 2024. A red linear regression line is fitted to the data to highlight the overall trend.

The visualization demonstrates a strong, positive relationship between the two metrics. In countries where digital payment adoption is low, formal account ownership rates also tend to be lower. For instance, among countries where fewer than 20% of respondents reported making or receiving a digital payment, account ownership rates generally remain below 50%, with some falling below 25%.

Conversely, in countries with high levels of digital payment activity, account ownership rates are consistently high. Where digital payment use exceeds 70%, account ownership rates regularly cluster above 80%, with several countries approaching near-universal account ownership.

While the general upward trend is clear, there is noticeable dispersion in the middle of the distribution. For countries with digital payment rates between 30% and 50%, account ownership rates vary widely, ranging from approximately 40% to nearly 90%. This variation suggests that while digital transactions and formal account ownership are closely aligned, the pace of their adoption can differ depending on country-specific financial infrastructures and regulatory environments.

4.6 Determinants of Account Ownership: Panel Regression Results

Table 6 and Fig. 8 report the panel-regression results. In the pooled OLS specification (column 1), all four covariates are statistically significant predictors of account ownership, with digital payment use showing the largest coefficient (0.837, $p < 0.01$). Adding survey-wave fixed effects (column 2) leaves the pattern essentially unchanged. Once country fixed effects are added (column 3), absorbing all time-invariant cross-country heterogeneity, the coefficients on digital payment use (0.552, $p < 0.01$) and formal savings (0.418, $p < 0.01$) remain positive and statistically significant, while the coefficients on mobile money account ownership and formal borrowing shrink toward zero and lose statistical significance. This pattern suggests that much of the raw cross-sectional association between mobile money or credit access and account ownership reflects stable country-level factors — such as overall financial-sector development — rather than a within-country relationship over time, whereas the association between digital payment use and account ownership is more robust to this distinction.

Table 6
Determinants of Account Ownership: Panel Regression Results

Dependent variable: Account ownership (%)	**(1) Pooled OLS**	**(2) + Year FE**	**(3) + Country & Year FE**
Digital payment use (%)	0.837***	0.818***	0.552***
	(0.046)	(0.058)	(0.111)
Mobile money account (%)	-0.197***	-0.226***	-0.012
	(0.047)	(0.071)	(0.106)
Formal savings (%)	0.491***	0.501***	0.418***
	(0.069)	(0.105)	(0.129)
Formal borrowing (%)	0.242***	0.264***	0.048
	(0.068)	(0.085)	(0.177)
Country fixed effects	No	No	Yes
Year fixed effects	No	Yes	Yes
Standard errors	Robust (HC1)	Clustered (country)	Clustered (country)
Observations	294	294	294
R^2	0.872	0.877	0.972

*Note: Standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. Sample restricted to country-years with non-missing data on all covariates across the 2014, 2017, 2021, and 2024 waves (n = 294 country-year observations, 162 countries). Dependent and independent variables are all measured in percentage points. The high R^2 in column (3) reflects the large number of country fixed effects (162) relative to the sample size and should not be read as indicating strong out-of-sample predictive power; see* Section 6 *for discussion.*

4.7 Robustness Check

Table 7 reports a median (quantile) regression with wave fixed effects on the same complete-case sample used in Table 6, column (2). The sign, statistical significance, and relative magnitude of the coefficients closely match the wave-fixed-effects OLS specification, indicating that the results are not driven by outlier countries with unusually high or low account-ownership rates.

Table 7
Robustness Check — Median (Quantile) Regression

Covariate	Coefficient	p-value
Digital payment use (%)	0.864	0.000
Mobile money account (%)	-0.192	0.000
Formal savings (%)	0.461	0.000
Formal borrowing (%)	0.275	0.000

Note: Median regression (q = 0.5) with survey-wave fixed effects. Coefficient signs and relative magnitudes are consistent with column (2) of Table 6.

5. Discussion

This study set out to document global and regional trends in financial account ownership between 2011 and 2024 and to identify which dimensions of financial-service usage are most robustly associated with account ownership once cross-country heterogeneity and common time trends are taken into account. Three findings stand out against this aim.

First, the global rise in account ownership since 2011 has been broad-based but uneven: South Asia and Sub-Saharan Africa recorded the largest absolute gains, consistent with the Findex 2025 report's emphasis on mobile-money-driven inclusion in Sub-Saharan Africa (Klapper et al., 2025; Kemgou Voptia & Stukalina, 2024), yet the Middle East, North Africa, Afghanistan, and Pakistan aggregate shows little net progress and even reversal between 2017 and 2021, underscoring that expansion has not been monotonic everywhere. Second, the gender gap in account ownership has proven far more persistent than the income gap over the same period. This mirrors the broader gender-gap literature, which finds that a substantial share of the gap is not explained by observable socioeconomic characteristics and instead reflects structural and behavioral barriers (Chen et al., 2023; Chatterjee, 2024), suggesting that the policy levers that have narrowed income-based disparities — such as digital payment rollouts and government transfer programs — have not been equally effective at closing gender disparities. Third, the panel-regression results indicate that digital payment use and formal savings, rather than mobile money or credit access per se, are the covariates most robustly associated with account ownership within countries over time. This pattern is broadly consistent with the technology-adoption literature (Rogers, 2003; Davis, 1989; Venkatesh et al., 2003) reviewed in Section 2.2: digital payments are a comparatively low-friction behavior that plausibly diffuses alongside account ownership, whereas formal borrowing requires a more deliberate adoption decision and additional screening by lenders, consistent with prior evidence that credit access lags behind account ownership and savings in most developing economies (Demirgüç-Kunt et al., 2008; Ozili, 2021). The results should nonetheless be read as descriptive of association rather than causal effect: the analysis cannot rule out that all four covariates are jointly determined with account ownership by unobserved within-country developments, such as financial-sector reforms or macroeconomic conditions, that are not fully captured by year fixed effects.

These findings can also be situated within the wider systematic-review literature on digital financial inclusion. The finding that formal savings, rather than mobile money or credit access, is a robust correlate of account ownership is consistent with Sabbaghi's (2025) cross-country evidence linking digital financial inclusion to saving and borrowing behavior, and with reviews concluding that digital banking's contribution to inclusion depends heavily on the surrounding regulatory and institutional environment (Mohammed & Japee, 2025; Chinoda & Kapingura, 2024). The weakening of the mobile-money coefficient once country fixed effects are included is also consistent with reviews of the Sub-Saharan African literature, which attribute much of mobile money's apparent explanatory power to country-level infrastructure and regulatory conditions rather than to a stable within-country relationship (Hornuf et al., 2025; Akenzua, 2025; Kamboj & Sharma, 2025). More broadly, the cautious, correlational framing adopted in this study echoes Duvendack and Mader's (2020) systematic review of reviews, which finds that the causal evidence connecting financial inclusion to development outcomes in low- and middle-income countries remains limited, and aligns with Nefla et al.'s (2026) call for African financial-inclusion policy to address structural and institutional gaps rather than account-ownership metrics alone.

5.1 Policy Implications

The findings suggest three priorities for policymakers seeking to deepen financial inclusion. First, given the robust association between digital payment use and account ownership, continued investment in digital payment infrastructure — including government-to-person transfer digitization and merchant payment acceptance — is likely to remain an effective lever for expanding access, particularly in regions that have not yet reached the digital payment penetration seen in East Asia and Europe and Central Asia. Second, the persistence of the gender gap despite broad-based growth in account ownership indicates that generic expansions in access are not sufficient to close gender disparities; targeted interventions addressing the structural and behavioral barriers identified in the gender-gap literature (Chen et al., 2023; Chatterjee, 2024) are likely to be necessary. Third, the weaker and less robust association between formal borrowing and account ownership, once country fixed effects are included, suggests that credit-market development may require distinct policy instruments — such as credit information infrastructure and collateral registries — rather than relying on account-ownership expansion alone to translate into greater credit access, consistent with the access-usage distinction emphasized in the Sarma (2008) framework.

5.2 Limitations

Several limitations should be kept in mind when interpreting these results. The analysis is correlational: the Global Findex panel does not support a causal interpretation of the regression coefficients, and reverse causality — for example, account ownership enabling digital payment use rather than the reverse — cannot be ruled out. The regression sample, while spanning 162 countries, includes at most four waves per country and a saturated set of country fixed effects, which mechanically inflates the reported R^2 and limits the precision of country-specific estimates. Coverage gaps in several covariates,

particularly before 2014 and for the urban–rural breakdown outside the 2024 wave, constrain the years and disaggregations available for analysis, as detailed in Section 3.2. Finally, the analysis relies exclusively on Findex-derived indicators and does not incorporate macroeconomic, regulatory, or institutional covariates that prior literature identifies as relevant to financial inclusion (e.g., Pandey et al., 2023; Sethi & Acharya, 2018), which may confound the within-country associations reported here.

5.3 Future Work

Future research could extend this analysis in at least three directions. First, incorporating macroeconomic and regulatory covariates external to the Findex database — such as GDP per capita, inflation, and financial-sector regulatory quality — would help disentangle the within-country associations identified here from broader structural change. Second, exploiting specific policy episodes, such as national digital identity rollouts or government-to-person payment digitization programs, could move the analysis toward a more causal identification strategy, in the spirit of event-study or difference-in-differences designs. Third, given the persistence of the gender gap documented here, future work could apply decomposition methods to the Findex panel to separate the portion of the gap explained by observable characteristics from the residual, unexplained component, following approaches used in single-country gender-gap studies (Chen et al., 2023).

6. Conclusions

This study documents substantial global progress in financial account ownership between 2011 and 2024, alongside a persistent gender gap and continuing wide cross-country dispersion. A country-year panel regression indicates that digital payment use and formal savings are the most robust correlates of account ownership once country and year fixed effects are included, a pattern confirmed by a median-regression robustness check, and consistent with the access–usage–quality and technology-adoption frameworks set out in Section 2. The findings point to continued digital payment infrastructure investment and targeted gender-specific interventions as priority areas for policy, while underscoring that closing the remaining gaps in financial inclusion will likely require instruments beyond simple account-ownership expansion. These results carry broader relevance beyond the specific covariates examined here. As digital financial ecosystems continue to evolve rapidly across low- and middle-income economies, the distinction between simply owning an account and actively using the full range of formal financial services is likely to become an increasingly important lens for evaluating progress. Sustained gains in inclusion will likely depend not only on continued expansion of digital payment infrastructure, but also on strengthening the institutional, regulatory, and consumer-protection environments that determine whether new account holders go on to save, borrow, and transact through formal channels over the long term. Achieving deeper and more equitable financial inclusion, particularly in regions where progress has been most uneven, will therefore require sustained attention from policymakers, financial institutions, and development partners alike.

Declarations

Author Contribution

Conceptualization, I.N., B.O., A.B. and G.O.F.; methodology, I.N., B.O., A.B. and G.O.F.; software, G.O.F.; validation, I.N., B.O., A.B. and G.O.F.; formal analysis, I.N., B.O., A.B. and G.O.F.; investigation, I.N., B.O., A.B. and G.O.F.; resources, I.N., B.O., A.B. and G.O.F.; writing—original draft preparation, I.N., B.O., A.B. and G.O.F; writing—review and editing, I.N., B.O., A.B. and G.O.F.; supervision, G.O.F. All authors have read and agreed to the publication of the manuscript.

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Data Availability

The dataset and Python script used for data analysis and visualisation are available as supplementary files on the figshare repository at: https://figshare.com/s/2d77fcc6becfe2254ce9.

References

1. Akenzua, P. O. U. (2025). The impact of digital banking on financial inclusion in Sub-Saharan Africa: A systematic review of existing literature and reports. *International Journal of Intellectual Discourse*, *8*(1), 148–160
2. Chatterjee, A. (2024). Digital finance: A developing country perspective with special focus on gender and regional disparity. *Digital Policy, Regulation and Governance*, *26*(4), 394–419. https://doi.org/10.1108/DPRG-10-2023-0149
3. Chen, S., Doerr, S., Frost, J., Gambacorta, L., & Shin, H. S. (2023). The fintech gender gap. *Journal of Financial Intermediation*, *54*, Article 101626. https://doi.org/10.1016/j.jfi.2023.101626
4. Chinoda, T., & Kapingura, F. M. (2024). Digital financial inclusion and economic growth in Sub-Saharan Africa: The role of institutions and governance. *African Journal of Economic and Management Studies*, *15*(1), 15–30. https://doi.org/10.1108/AJEMS-09-2022-0372
5. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008
6. Demirgüç-Kunt, A., Ansar, S., Klapper, L., & Singer, D. (2022). *The Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19*. World Bank. https://doi.org/10.1596/978-1-4648-1897-4

7. Demirgüç-Kunt, A., Beck, T., & Honohan, P. (2008). *Finance for all? Policies and pitfalls in expanding access*. World Bank.
8. Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). *The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution*. World Bank. https://doi.org/10.1596/978-1-4648-1259-0
9. Duvendack, M., & Mader, P. (2020). Impact of financial inclusion in low- and middle-income countries: A systematic review of reviews. *Journal of Economic Surveys*, *34*(3), 594–629. https://doi.org/10.1111/joes.12367
10. Honohan, P. (2008). Cross-country variation in household access to financial services. *Journal of Banking & Finance*, *32*(11), 2493–2500. https://doi.org/10.1016/j.jbankfin.2008.05.004
11. Hornuf, L., Safari, K., & Voshaar, J. (2025). Mobile fintech adoption in Sub-Saharan Africa: A systematic literature review and meta-analysis. *Research in International Business and Finance*, *73*, Article 102529. https://doi.org/10.1016/j.ribaf.2024.102529
12. Hunter, S., Pham, C., Kim, K., Trinh, L. Q., Chai, A., Deshpande, S., Johl, S., Morgan, P. J., & Obucina, M. (2025). Factors influencing digital financial services adoption in low- and medium-income countries: A systematic literature review. *International Journal of Bank Marketing*, *43*(9), 1884–1909. https://doi.org/10.1108/IJBM-09-2024-0580
13. Kamboj, V., & Sharma, D. (2025). Mapping the landscape of digital financial inclusion and proposing integrative framework: Trends, influential works, and future directions. *Humanities and Social Sciences Communications*, *12*, Article 1082. https://doi.org/10.1057/s41599-025-05500-9
14. Kemgou Voptia, E. B., & Stukalina, Y. (2024). Financial inclusion in Sub-Saharan Africa: The case of mobile money. *Ekonomika*, *103*(4), 81–96. https://doi.org/10.15388/Ekon.2024.103.4.5
15. Klapper, L., Singer, D., Starita, L., & Norris, A. (2025). *The Global Findex Database 2025: Connectivity and financial inclusion in the digital economy*. World Bank. https://doi.org/10.1596/978-1-4648-2204-9
16. Mohammed, M., & Japee, G. P. (2025). The role of digital banking in advancing financial inclusion: A systematic literature review. *Asian Journal of Economics, Business and Accounting*, *25*(5), 335–342. https://doi.org/10.9734/ajeba/2025/v25i51805
17. Nefla, D., Hassan, R., Jellouli, S., & Ben Thabet, S. (2026). Financial inclusion as a sustainable development imperative in Africa: Trends, gaps, and future directions. *Sustainable Development*, *34*(3), 3053–3079. https://doi.org/10.1002/sd.70491
18. Ozili, P. K. (2021). Financial inclusion research around the world: A review. *Forum for Social Economics*. https://doi.org/10.1080/07360932.2020.1715238
19. Pandey, A., Kiran, R., & Sharma, R. K. (2023). Investigating the determinants of financial inclusion in BRICS economies: Panel data analysis using fixed-effect and cross-section random effect. *Sustainability*, *15*(2), Article 1603. https://doi.org/10.3390/su15021603
20. Pesqué-Cela, V., et al. (2021). Defining and measuring financial inclusion: A systematic review and confirmatory factor analysis. *Journal of International Development*. https://doi.org/10.1002/jid.3524

21. Rogers, E. M. (2003). *Diffusion of innovations*(5th ed.). Free Press.
22. Sabbaghi, O. (2025). Mobile money, digital financial inclusion, and evidence on saving and borrowing. *Digital Policy, Regulation and Governance*, *27*(4), 389–403. https://doi.org/10.1108/DPRG-04-2024-0060
23. Sarma, M. (2008). *Index of financial inclusion*(ICRIER Working Paper No. 215). Indian Council for Research on International Economic Relations.
24. Sarma, M., & Pais, J. (2011). Financial inclusion and development: A cross country analysis. *Journal of International Development*, *23*(5), 613–628. https://doi.org/10.1002/jid.1698
25. Sethi, D., & Acharya, D. (2018). Financial inclusion and economic growth linkage: Some cross country evidence. *Journal of Financial Economic Policy*, *10*(3), 369–385. https://doi.org/10.1108/JFEP-11-2016-0073
26. World Bank. (2024). *Global Findex Database (2011, 2014, 2017, 2021, 2022, and 2024 waves)*. World Bank.

Figures

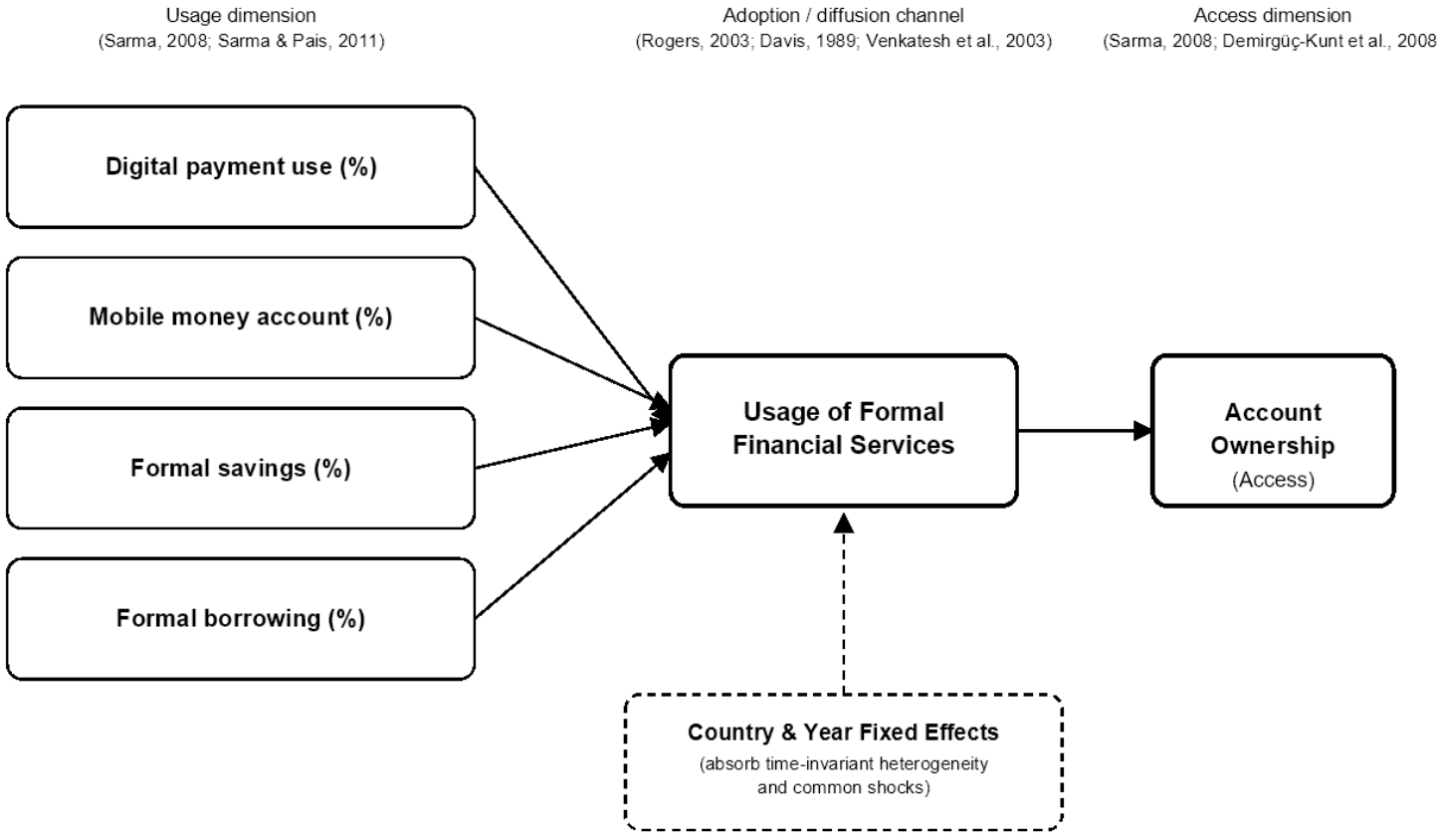


Figure 1

Conceptual Framework: Usage Correlates and Account Ownership. *Note: Author's construction, informed by the access–usage–quality framework (Sarma, 2008; Sarma & Pais, 2011) and the technology-adoption literature (Rogers, 2003; Davis, 1989; Venkatesh et al., 2003).*

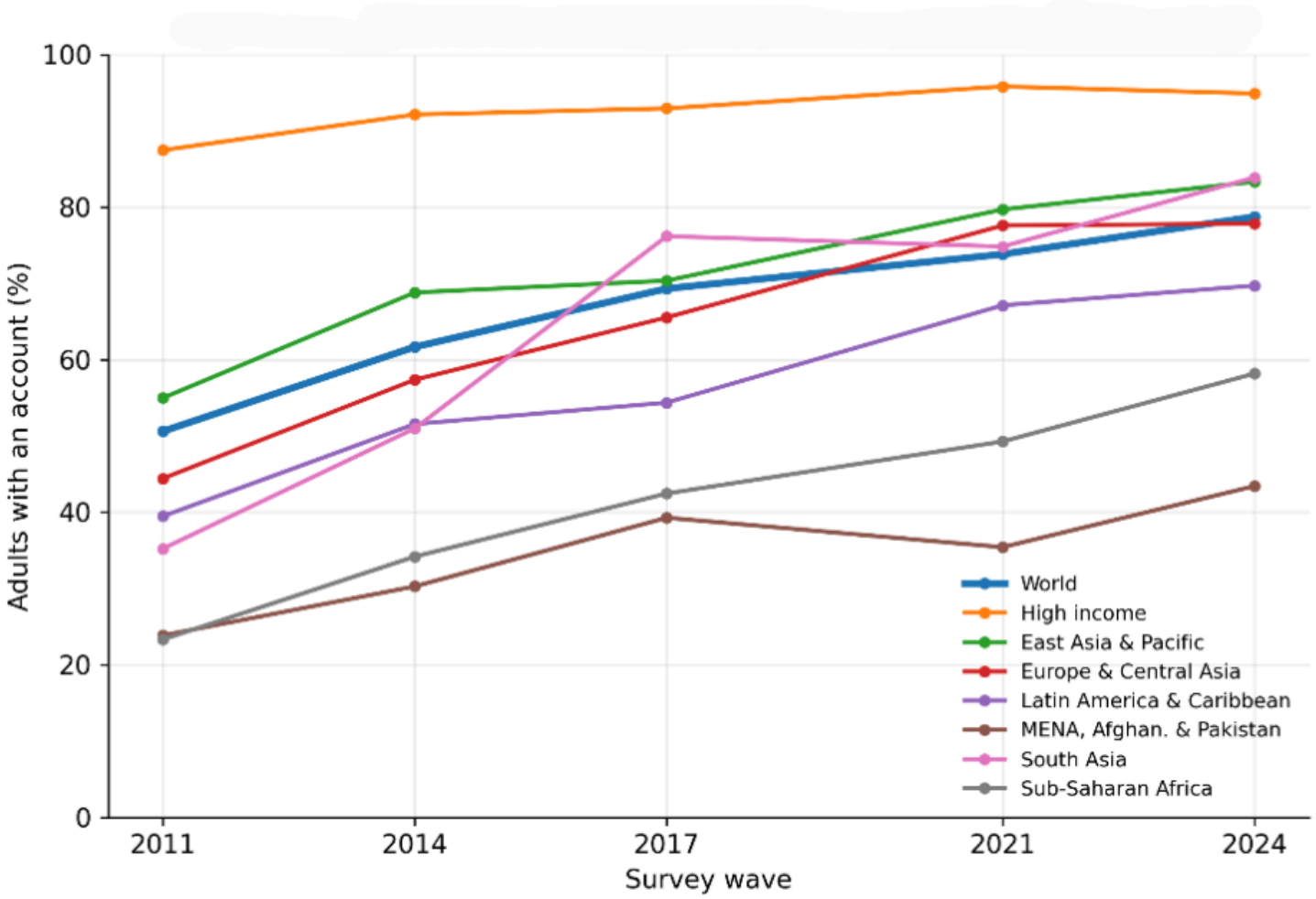


Figure 2

Regional Trends in Account Ownership, 2011–2024. *Note: Regional aggregates as classified by the World Bank; "excluding high income" subsets exclude high-income countries within each region. 2022 wave omitted (sparse, non-representative coverage).*

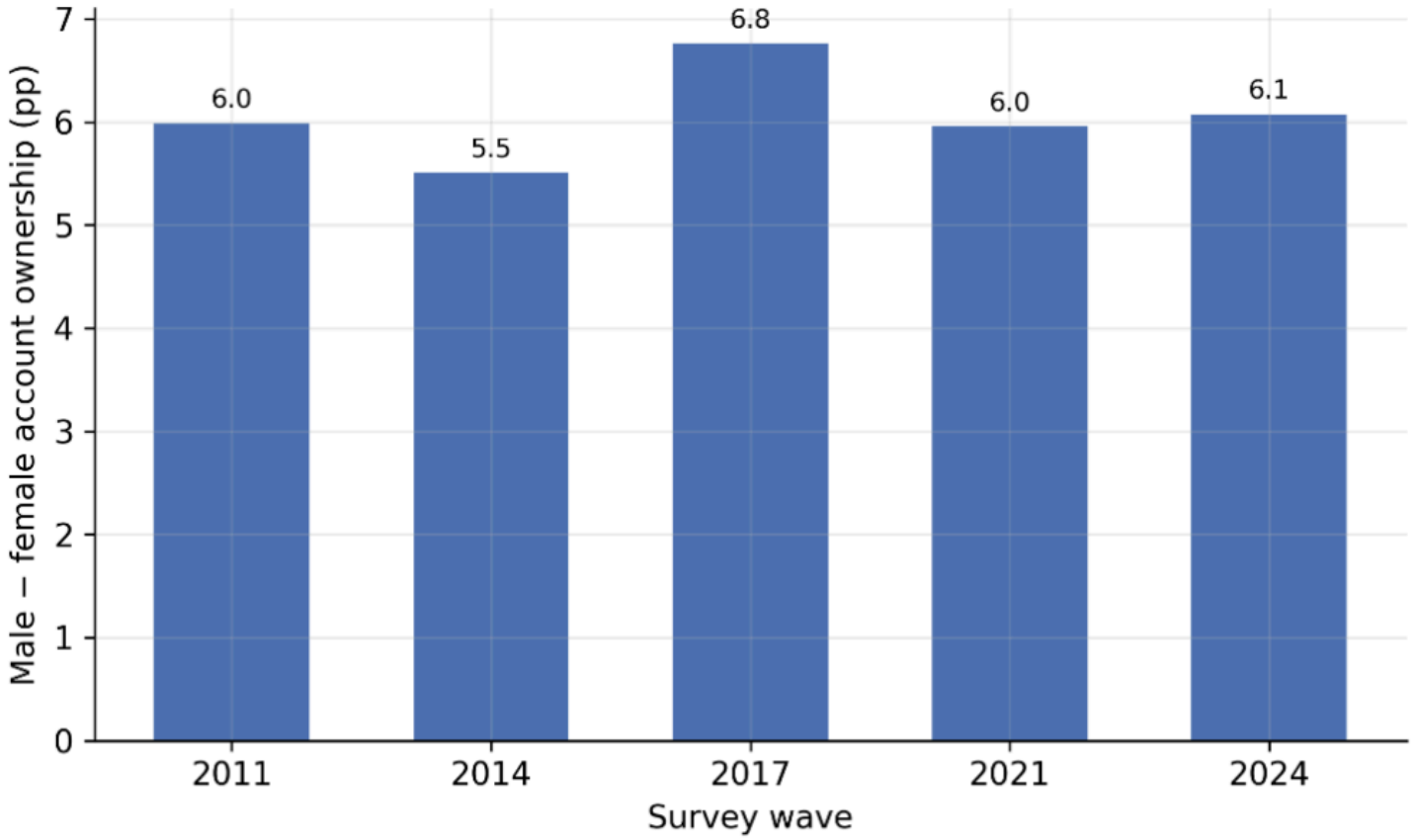


Figure 3

Average Global Gender Gap in Account Ownership. *Note: Gap = male account ownership minus female account ownership (percentage points), averaged across countries with non-missing data in each wave.*

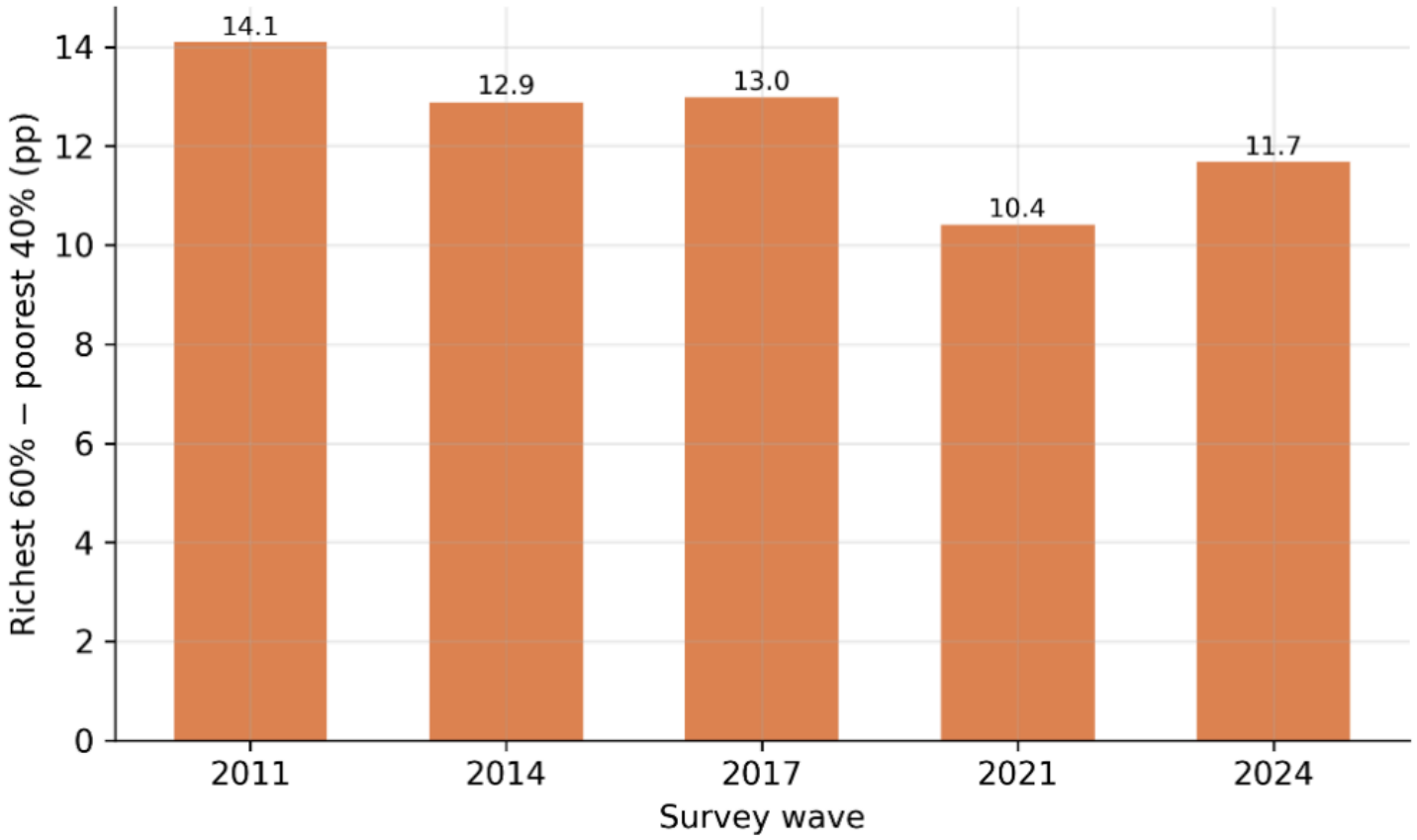


Figure 4

Average Global Within-Country Income Gap in Account Ownership. *Note: Gap = account ownership among the richest 60% of the within-country income distribution minus the poorest 40% (percentage points).*

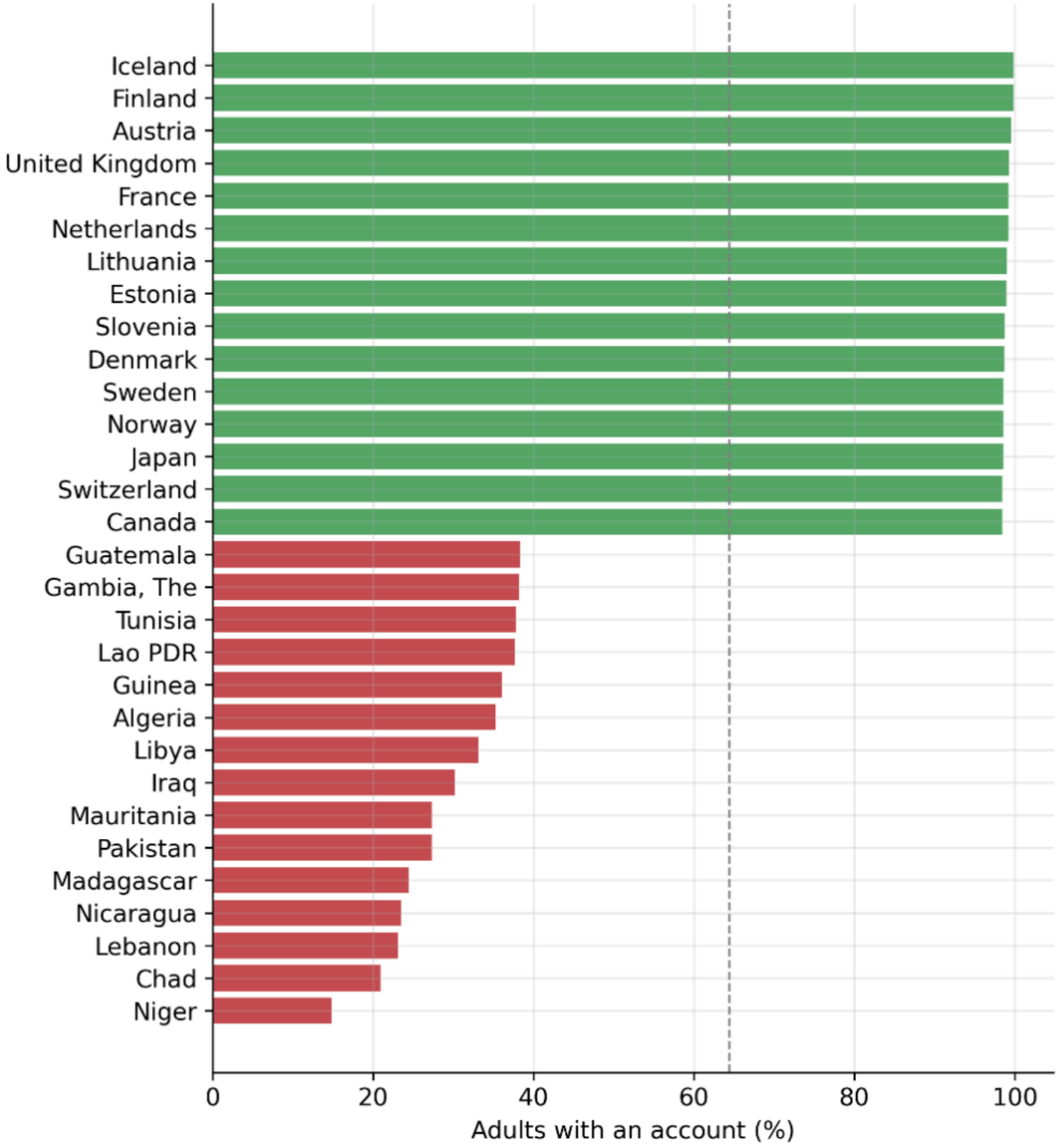


Figure 5

Lowest- and Highest-Ranked Countries by Account Ownership, 2024. *Note: Dashed line marks the cross-country mean. Bars in red/green denote the 15 lowest- and 15 highest-ranked countries, respectively.*

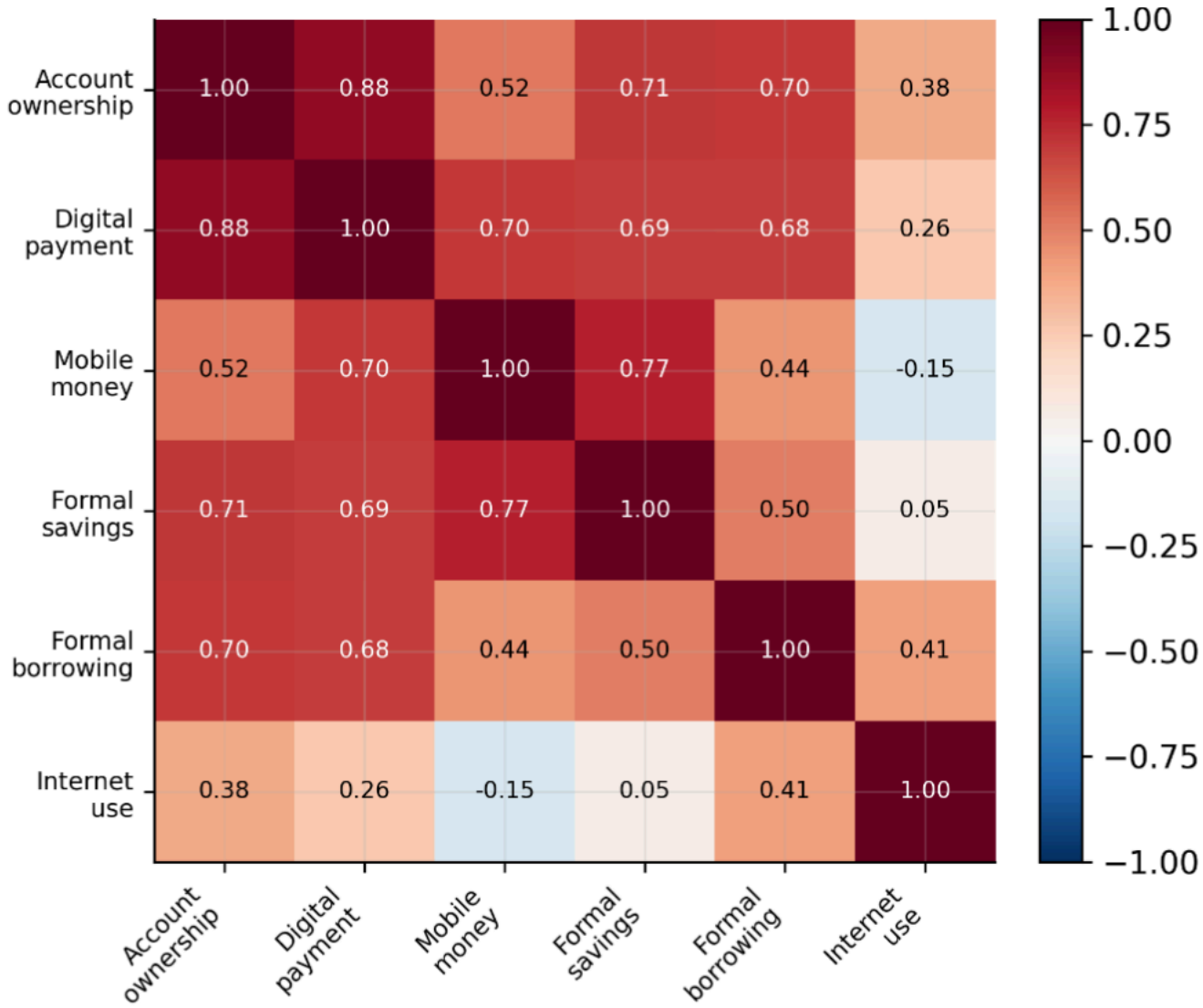


Figure 6

Correlation Matrix of Financial-Inclusion Indicators, 2024 Wave. *Note: Pairwise Pearson correlations across countries with non-missing data for all six indicators (n = 80).*

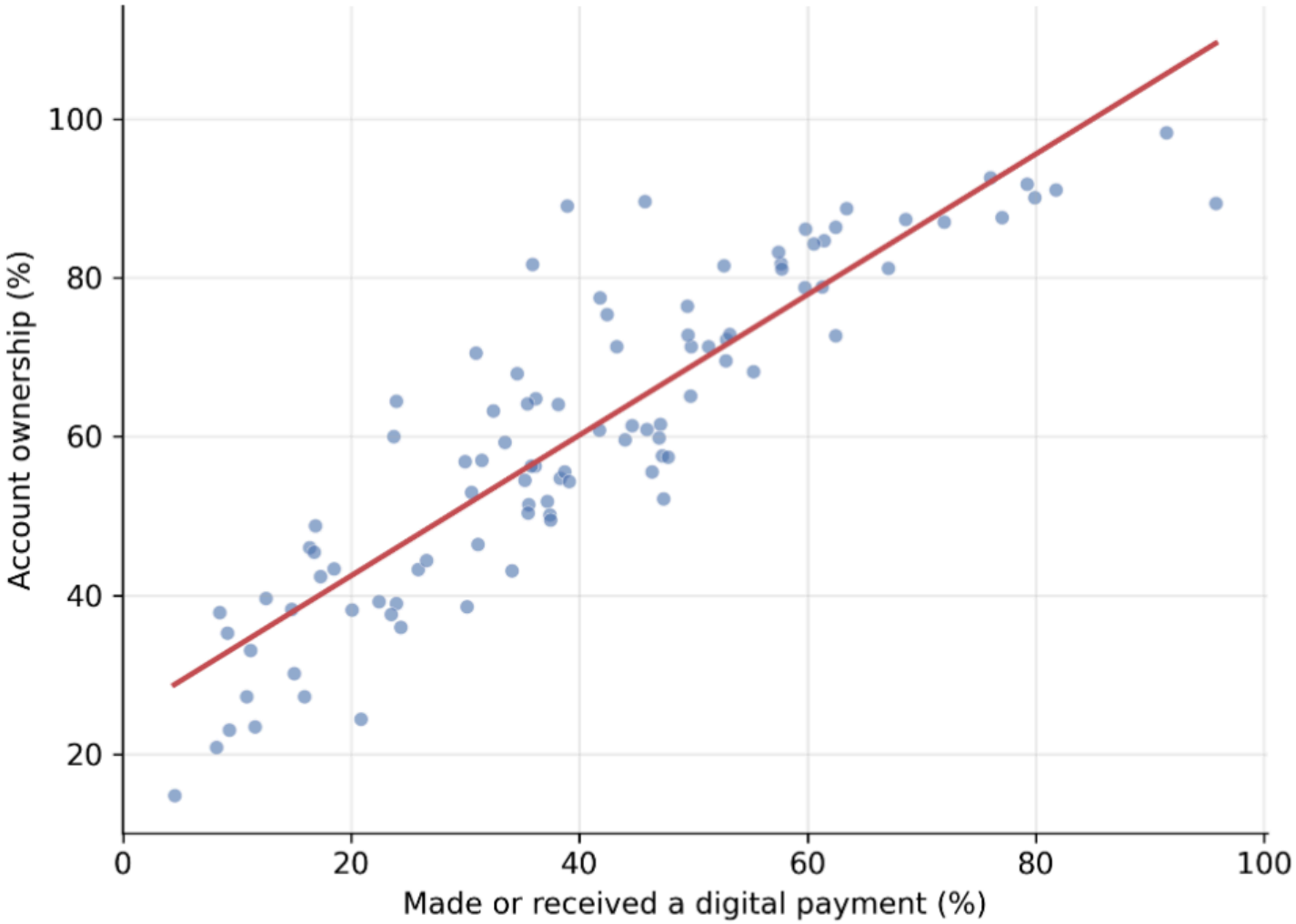


Figure 7

Account Ownership and Digital Payment Use, 2024. *Note: Each point is a country. Red line is the ordinary least-squares fit.*

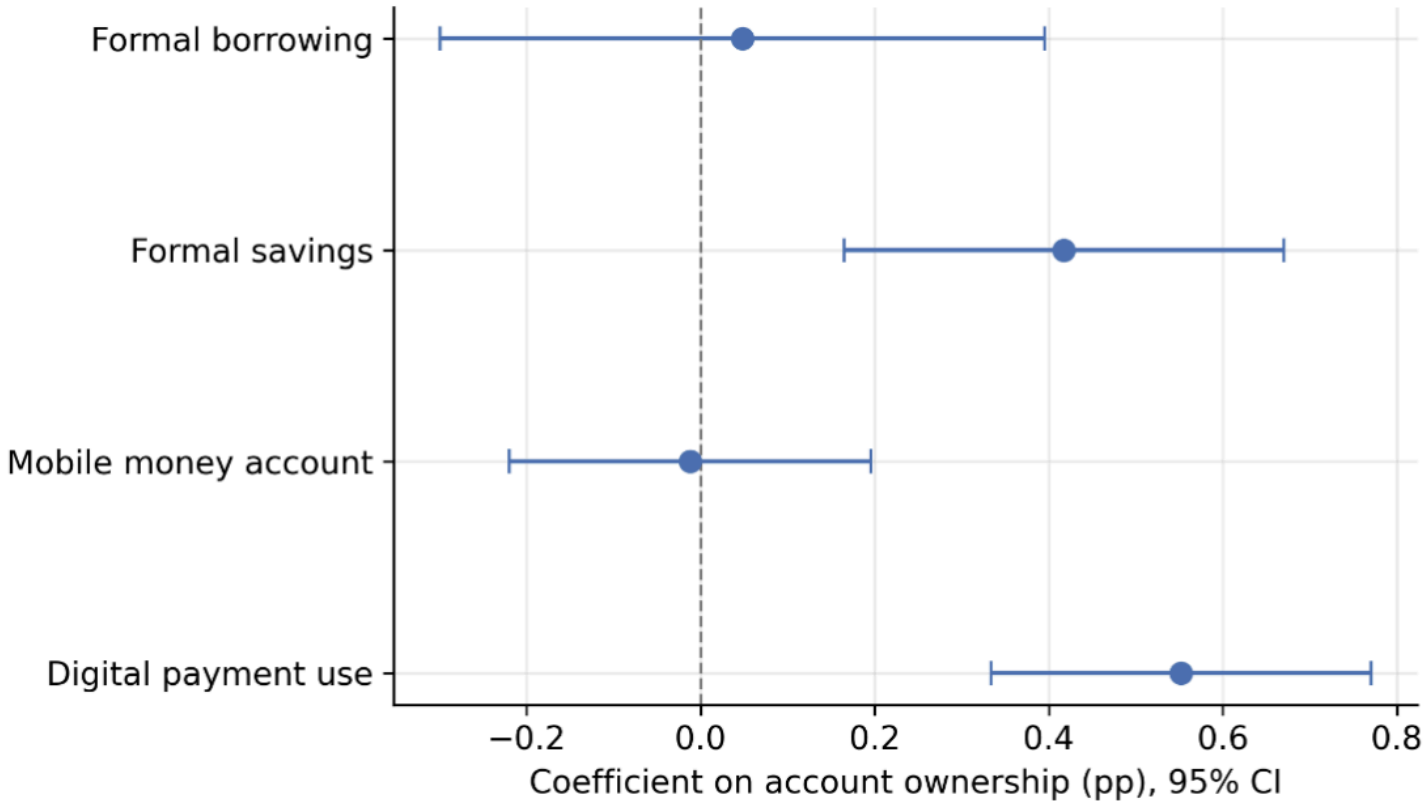


Figure 8

Determinants of Account Ownership — Coefficient Plot (Model 3). *Note: Point estimates and 95% confidence intervals from the two-way fixed-effects specification in Table 6, column (3).*