Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Digital Payments and Formal Savings as Robust Within-Country Correlates of Account Ownership: Evidence from the Global Findex Panel

Isaac Nyame
Kwame Nkrumah University of Science and Technology
Baffour Osei
University of Skills Training and Entrepreneurial Development (USTED)
Abigail Boatemaa
University of Bradford
Gabriel Osei Forkuo
gabriel.forkuo@unitbv.ro

Transilvania University of Brasov

Research Article

Keywords: financial inclusion, global findex database, account ownership, digital payments, gender gap, panel data analysis

Posted Date: November 17th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11750139/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Digital Payments and Formal Savings as Robust Within-Country Correlates of Account Ownership: Evidence from the Global Findex Panel

Isaac Nyame[1], Baffour Osei[2], Abigail Boatemaa[3], Gabriel Osei Forkuo[4,*]

[1]Kwame Nkrumah University of Science and Technology, Kumasi, Ghana; https://orcid.org/0009-0005-7308-2670 (I.N.)

[2]University of Skills Training and Entrepreneurial Development (USTED), Kumasi, Ghana; https://orcid.org/0009-0001-8523-568X (B.O.)

[3]Faculty of Health Studies, University of Bradford, Richmond Road, Bradford BD7 1DP, United Kingdom; https://orcid.org/0009-0004-5919-4361 (A.B.)

[4]Department of Forest Engineering, Forest Management Planning and Terrestrial Measurements, Transilvania University of Brasov, Brasov, Romania; https://orcid.org/0000-0001-8478-8066 (G.O.F).

*** Corresponding author:** gabriel.forkuo@unitbv.ro

Abstract

Financial inclusion sits at the heart of global development policy, yet cross-country evidence on what is associated with account ownership over time remains scattered across survey waves and shifting indicator definitions. This study draws 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 from the 2014, 2017, 2021, and 2024 waves covering 95 mostly low- and middle-income economies. Population-weighted global account ownership rose from 50.6% in 2011 to 78.7% in 2024, with the largest absolute gains in South Asia and Sub-Saharan Africa. Averaged across surveyed countries, 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 ($\beta = 0.418$, $p < 0.01$) remain statistically significant correlates of account ownership within countries over time, whereas the associations with mobile money (negative in the pooled specifications) and formal borrowing, which are significant in the pooled and wave-fixed-effects models, shrink toward zero once country fixed effects are included. Median regressions, with and without country effects, suggest that the results are not driven by outlier countries. The study contributes a consistent comparison of pooled and within-country associations across the four Findex waves in which all four usage indicators are available, with descriptive trends from 2011. Because the usage indicators overlap conceptually with account ownership and the design is observational, the estimates are descriptive correlates, not causal effects. They suggest that digital payment ecosystems and formal savings deserve policy attention alongside, rather than instead of, account-ownership efforts.

Keywords: financial inclusion, global findex database, account ownership, digital payments, gender gap, panel data analysis

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 is the main 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 the report notes that payment digitalization can help motivate account ownership (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 an important driver of account access in the region (Kemgou Voptia & Stukalina, 2024). At the same time, persistent gender gaps have been documented: the Findex 2025 report puts the account-ownership gap at 4 percentage points globally and 5 points in low- and middle-income economies (Klapper et al., 2025), while cross-country survey evidence on fintech use finds that observable country and individual characteristics explain only about a third of the gender gap, with differences in willingness to adopt new financial technology accounting for much of the remainder (Chen et al., 2023). Evidence for developing economies likewise shows that women lag behind men in digital finance use (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), although Pesqué-Cela et al. (2021) find that the access and use dimensions of widely used inclusion indices are highly correlated, which questions how separable the two are in practice.

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 has been a major 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. Describe global and regional trends in financial account ownership across the Global Findex survey waves from 2011 to 2024 (five waves in the trend analysis; the small 2022 wave is reported only in Tables 1 and 4).

2. Quantify the evolution of the gender and within-country income gaps in account ownership over the same period, and describe the urban–rural gap, which is available for the 2024 wave only.

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. Examine how these associations change when year and country fixed effects are added, and test whether the pooled results are sensitive to outlier countries using median-regression specifications with and without country fixed effects.

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 and within-country income gaps in account ownership narrowed over this period, and how large is the urban–rural gap in the latest wave?

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 together with their policy implications, limitations, and directions for future work, and Section 6 concludes.

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). Panel studies applying fixed-effects and related estimators find that internet access and population characteristics are associated with financial inclusion in BRICS economies (Pandey et al., 2023), though the relative importance of each covariate varies by region and specification. In Sub-Saharan Africa specifically, mobile money has been identified as an important 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 emphasize the role of regulation and

institutional trust in how far digital access translates into effective inclusion (Mohammed & Japee, 2025). Complementary evidence from Sub-Saharan Africa indicates that mobile fintech adoption has been a major 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 parallels the access-usage distinction adopted in the present study.

A parallel literature examines the persistent gender gap in financial inclusion. Using a survey of more than 27,000 adults in 28 economies, Chen et al. (2023) find that 29% of men but only 21% of women use fintech products, that country characteristics and individual-level controls explain about a third of this gap, and that differences in willingness to use new financial technology account for over half of the remainder. Chatterjee (2024), using Findex 2021 data for developing economies in East Asia and Pacific, South Asia, and Sub-Saharan Africa, finds that women lag behind men in digital finance use, although digital wage payments encourage them to transact digitally. For account ownership itself, the Findex 2025 report documents a gender gap of 4 percentage points globally and 5 percentage points in low- and middle-income economies (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 over 2004–2010, find a positive long-run relationship between financial inclusion and economic growth, with causality running in both directions, while broader reviews of this literature discuss links between financial inclusion, poverty reduction, and income inequality (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), using Global Findex 2021–2022 data in cross-sectional regressions, finds that access to mobile money accounts is positively related to the share of adults who save and who borrow, somewhat more strongly for saving; this motivates examining savings and borrowing alongside mobile money, although that study treats saving and borrowing as outcomes whereas the present analysis treats them as correlates of account ownership. 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 multidimensional framework developed by Sarma (2008), whose dimensions are banking penetration, availability, and usage, and extended by Sarma and Pais (2011); it 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 access–usage distinction in 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.

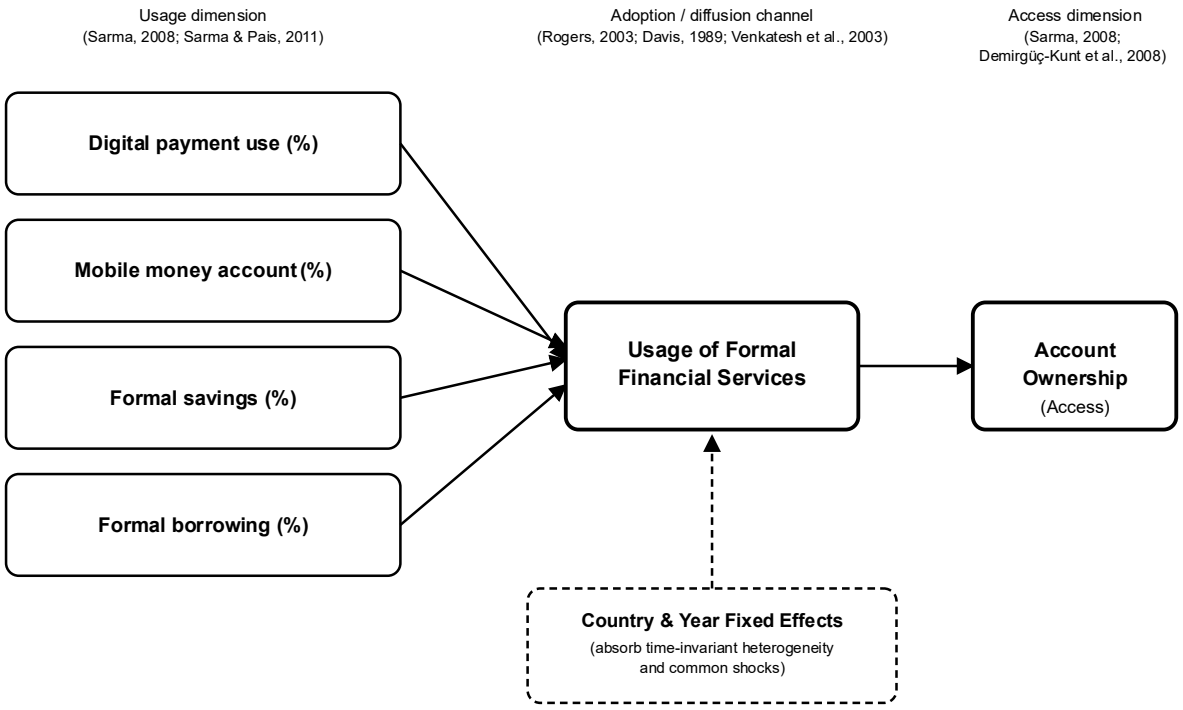


Figure 1. Conceptual Framework: Usage Correlates and Account Ownership. *Note: Author's construction, informed by the access–usage framework (Sarma, 2008; Sarma & Pais, 2011) and the technology-adoption*

literature (Rogers, 2003; Davis, 1989; Venkatesh et al., 2003). The central box is a conceptual grouping of the four usage behaviors; it is not estimated as a latent variable, and all four covariates enter the regressions directly.

3. Data and Methodology

3.1 Data Sourcing

The primary data source is the World Bank Global Findex Database (World Bank, 2024; Klapper et al., 2025), 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 group (richest 60% versus poorest 40%) 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 adults aged 15 and above: respectively, adults who made or received a digital payment, who have a mobile-money account, who saved at a financial institution, and who borrowed from a financial institution or used a credit card in the past year. Internet use (the share of adults using the internet) is used in the descriptive analysis only. Regional and World aggregates are the population-weighted series published with the database, whereas the cross-country means and gaps in Tables 1 and 4 are unweighted.

The four covariates are not independent of the outcome. Mobile-money accounts are counted within the account-ownership indicator itself, and digital payments, formal savings, and formal borrowing largely presuppose holding an account, so part of any association between them and account ownership is definitional. The covariates are therefore best read as behaviors that co-move with account ownership, not as independent determinants (see Section 5.2).

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 covers only 16 economies, was retained in the coverage and gap-trend descriptive tables (Tables 1 and 4) but excluded from all trend figures (Figures 2–4) and from the regression sample, since its small, non-random country coverage (11 of the 16 economies are in Sub-Saharan Africa) makes mean comparisons with the other waves unreliable. Coverage of individual indicators varied by wave: the digital-payment, mobile-money, and formal-borrowing indicators are not available for the 2011 wave in the extract analysed here (formal savings is available, but the regression requires all four covariates), 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 95 economies (an unbalanced panel with 74, 77, 66, and 77 observations in 2014, 2017, 2021, and 2024; the sample is limited by mobile-money data, which are available for only 74, 77, 66, and 80 countries in those waves, and it consists almost entirely of low- and middle-income economies); no imputation was performed, and countries or country-years with missing values on any regression covariate were dropped listwise. Because the number of surveyed countries differs across waves (Table 1), unweighted cross-

country means mix changes in inclusion with changes in country composition. 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 wave-fixed-effects 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 wave-fixed-effects OLS results (specification 2) are driven by outlier countries; a second median regression adds country fixed effects and therefore corresponds to specification (3). Because specification (1) ignores repeated observations of the same country, its HC1 standard errors are likely too small, and inference should rest on specifications (2) and (3).

Formally, $AO_{it} = \alpha + \beta_1 DP_{it} + \beta_2 MM_{it} + \beta_3 SAV_{it} + \beta_4 BOR_{it} + \gamma_t + \mu_i + \varepsilon_{it}$, where AO is account ownership, DP digital payment use, MM mobile-money account ownership, SAV formal savings, and BOR formal borrowing in country i and wave t; γ_t are wave fixed effects (included in specifications 2–3) and μ_i are country fixed effects (included in specification 3 only).

4. Results

4.1 Global and Regional Trends in Account Ownership

Table 1 summarizes coverage and account ownership by survey wave. The unweighted average of account ownership across surveyed countries rose from 46.25% in 2011 to 70.25% in 2021 and was essentially unchanged in 2024 (70.55%); this apparent stall partly reflects changes in the set of surveyed countries (144, 142, 145, 123, and 140 economies in the five main waves), and the population-weighted World aggregate in Table 3, which is considerably higher (78.7% in 2024) and rose in every wave, is the better guide to global progress. **Table 2** reports descriptive statistics for the core indicators in the most recent (2024) wave, and **Table 3** and **Figure 2** present the regional breakdown 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 it remains the second-lowest of the regions 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. South Asia's path was also uneven, with a jump to 76.2% in 2017 followed by a slight fall to 74.8% in 2021.

Table 1. Sample Coverage and Account Ownership by Survey Wave

Wave	Countries (n)	Mean (%)	SD	Min (%)	Max (%)
2011	144	46.25	32.20	0.40	99.74
2014	142	55.16	30.61	6.45	100.00

Wave	Countries (n)	Mean (%)	SD	Min (%)	Max (%)
2017	145	61.50	26.63	8.57	99.92
2021	123	70.25	25.56	5.83	100.00
2022	16	38.45	17.42	11.69	66.18
2024	140	70.55	22.98	14.83	99.85

Note: Account ownership = share of adults (15+) with an account at a financial institution or mobile-money provider, unweighted across the countries surveyed in each wave, whose number and composition differ by wave. The 2022 wave covers only 16 economies and is shown for completeness; it is excluded from the trend figures and the regression sample. Values are reported to two decimals as in the underlying data. 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	70.55	22.98	14.83	72.87	99.85
Digital payment use (%)	98	40.43	19.99	4.51	38.21	95.74
Mobile money account (%)	80	32.35	20.81	2.65	31.91	87.50
Formal savings (%)	98	26.92	13.78	3.16	25.42	67.20
Formal borrowing (%)	98	16.26	9.41	1.37	13.75	46.92
Internet use (%)	140	73.66	23.36	11.06	83.05	99.12

Note: All indicators are percentages of adults aged 15+, country-level; N is the number of countries with non-missing data (the usage indicators are available for fewer countries than account ownership). Source: World Bank Global Findex Database, 2024 wave.

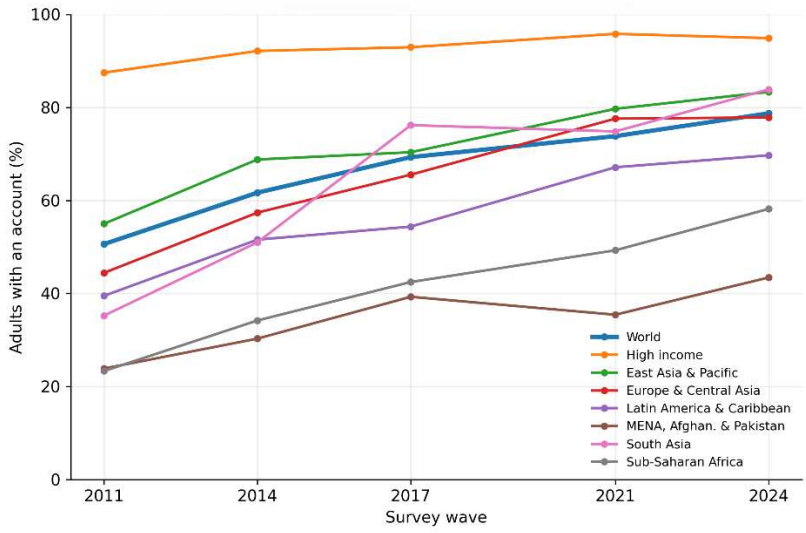


Figure 2. Regional Trends in Account Ownership, 2011–2024. *Note: Population-weighted regional aggregates as classified by the World Bank; "excluding high income" subsets exclude high-income countries within each region. 2022 wave omitted (small, non-random coverage).*

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 6.8 percentage points across the 2011–2024 waves (the 8.5-point value for the small 2022 wave is not comparable; **Figure 3, Table 4**). These are unweighted country averages; the population-weighted gap reported by Klapper et al. (2025) is smaller (4 percentage points globally in 2024).

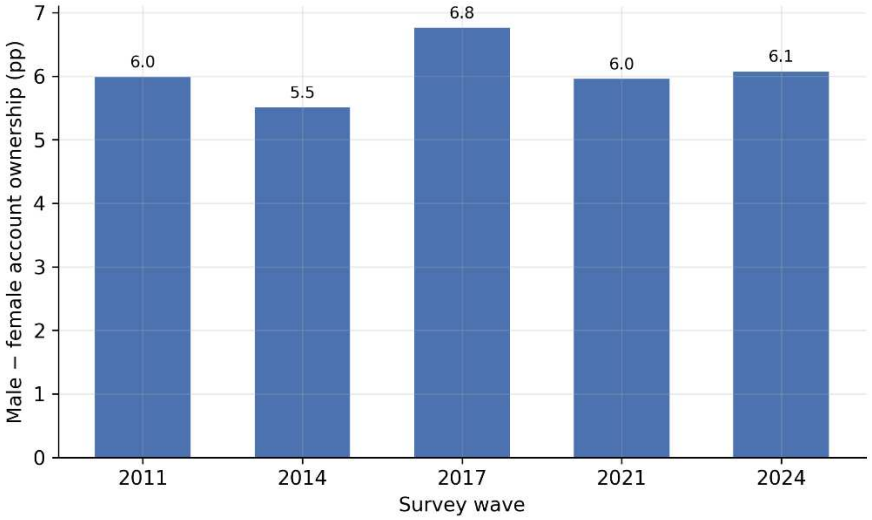


Figure 3. Average Global Gender Gap in Account Ownership. *Note: Gap = male account ownership minus female account ownership (percentage points), averaged across countries with non-missing data in each wave. The 2022 wave is omitted.*

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. Gaps are unweighted averages across the countries with data in each wave, so the set of countries varies by wave (gender gap: 127, 136, 144, 121, 16, and 140 countries in 2011–2024; income gap: 118, 134, 143, 121, 16, and 139); the 2022 wave covers 16 economies and is not comparable with the others.

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 not monotonically (it was 10.4 points in 2021) and it remains sizable (**Figure 4**). The urban–rural gap is observable only in the 2024 wave in this data extract, at 6.7 percentage points on average across countries, so its evolution over time cannot be assessed.

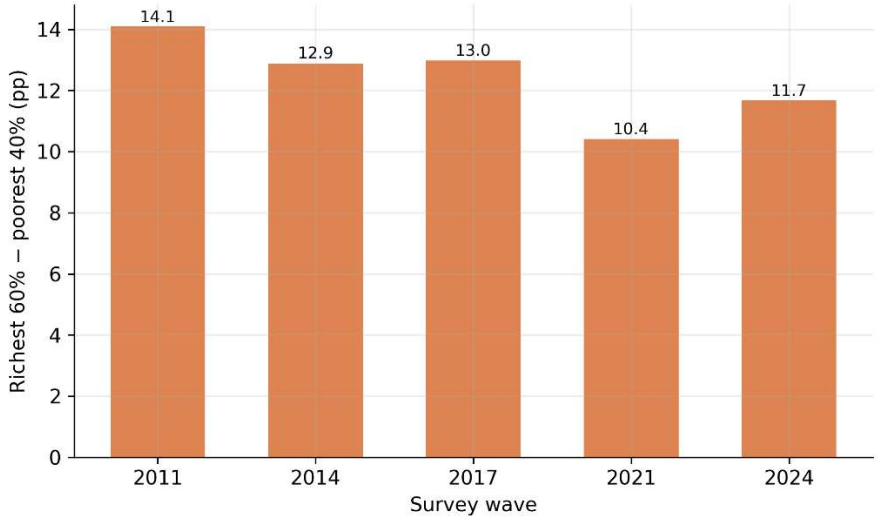


Figure 4. Average Global Within-Country Income Gap in Account Ownership. *Note: Gap = account ownership among the richest 60% of the within-country income distribution minus the poorest 40% (percentage points). The 2022 wave is omitted.*

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 highest- and lowest-ranked countries in 2024 (fifteen at each end in Figure 5; ten at each end in Table 5). Ownership exceeds 98% in several high-income European economies (Iceland, Finland, Austria) while remaining below 25% in Niger, Chad, Lebanon, Nicaragua, and Madagascar, a gap of more than 80 percentage points between the top and bottom of the distribution.

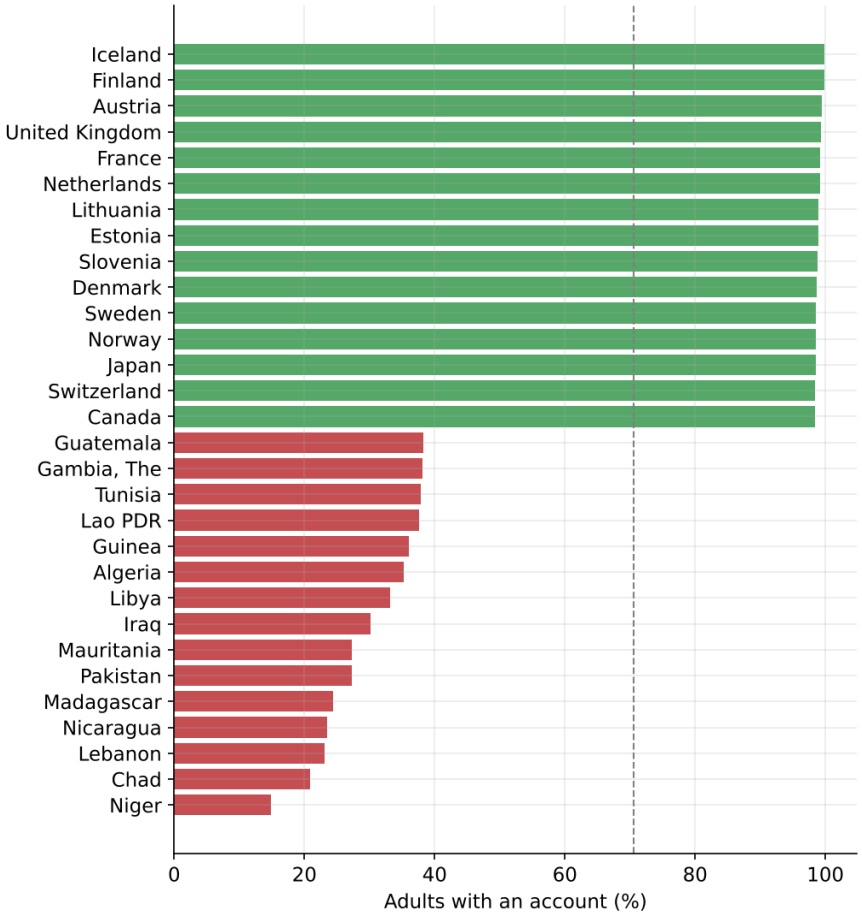


Figure 5. Lowest- and Highest-Ranked Countries by Account Ownership, 2024. *Note: The dashed line marks the unweighted cross-country mean of all 140 countries (70.55%). Bars in red/green denote the 15 lowest- and 15 highest-ranked countries, respectively.*

Table 5. Ten Highest- and Ten Lowest-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

Highest	%	Lowest	%
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 the 77 countries with complete data on all six indicators for the 2024 wave (mobile money, the scarcest indicator, is reported for 80). 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).

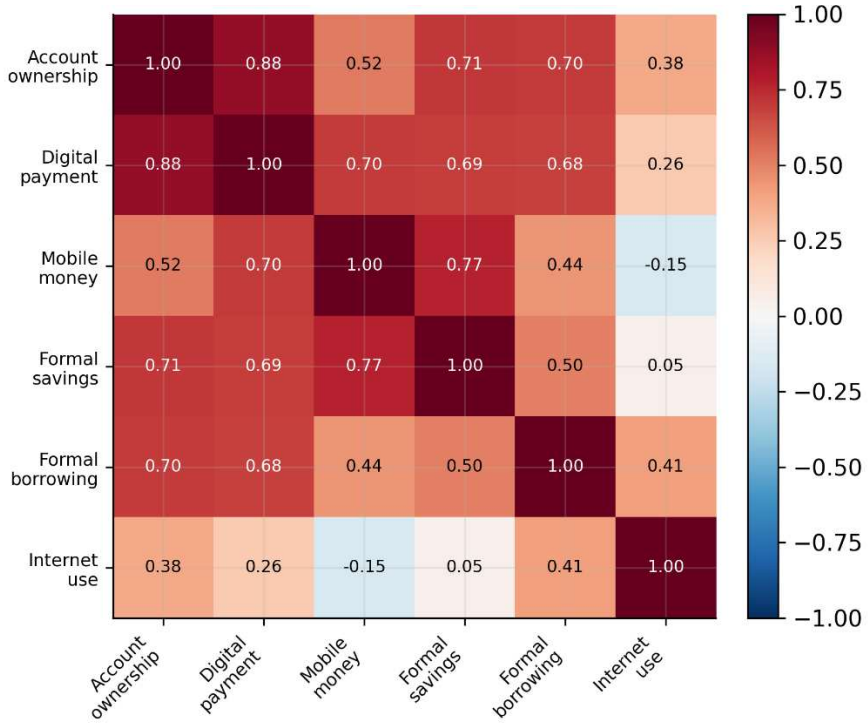


Figure 6. Correlation Matrix of Financial-Inclusion Indicators, 2024 Wave. *Note: Pairwise Pearson correlations across countries with non-missing data for all six indicators (n = 77).*

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 indicates that countries with more mobile money accounts also tend to have more formal savers; these are cross-sectional country-level correlations that do not identify a causal link. By contrast, the correlation of mobile money with account ownership is more moderate (r = 0.52), and, as Section 4.6 shows, its regression coefficient turns negative once the other covariates are held constant, plausibly reflecting its high correlation with digital payment use (r = 0.70) and formal savings (r = 0.77).

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 adults who made or received a digital payment (x-axis) and the percentage of adults with an account (y-axis) in 2024. A red linear regression line is fitted to the data to highlight the overall trend.

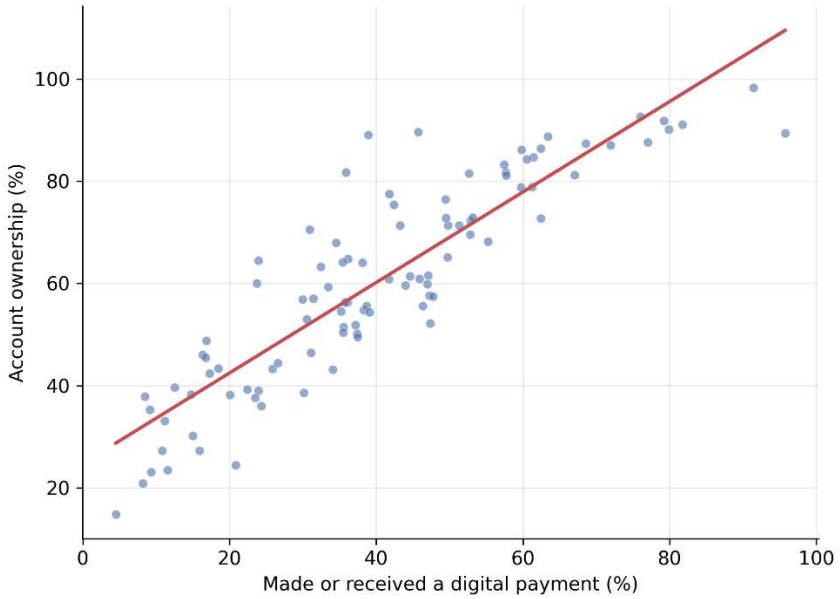


Figure 7. Account Ownership and Digital Payment Use, 2024. *Note: Each point is a country. Red line is the ordinary least-squares fit. The linear fit exceeds 100% at the highest payment rates, an artefact of linear extrapolation.*

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 the 17 countries where fewer than 20% of adults made or received a digital payment, account ownership is below 50% in every case and below 25% in four.

Conversely, in countries with high levels of digital payment activity, account ownership rates are consistently high. In the eight countries where digital payment use exceeds 70%, account ownership is at least 87%, reaching 98% in the highest case.

While the general upward trend is clear, there is noticeable dispersion in the middle of the distribution. For the 43 countries with digital payment rates between 30% and 50%, account ownership varies widely, from about 39% to about 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 **Figure 8** report the panel-regression results. In the pooled OLS specification (column 1), all four covariates are statistically significant correlates of account ownership (mobile money with a negative sign), 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. The negative mobile money coefficient in columns (1) and (2) should not be read as a negative effect: mobile money has a positive bivariate correlation with account ownership ($r = 0.52$; Section 4.4) and is highly correlated with digital payment use and formal savings, so the sign is a conditional (partial) association rather than a marginal one; variance inflation factors are modest (2.0 to 3.1), so it is not a severe multicollinearity artefact. Once country fixed effects are added, the mobile money coefficient is indistinguishable from zero and the formal borrowing coefficient falls from 0.242–0.264 to 0.048. This pattern suggests that the cross-sectional associations of mobile money and formal borrowing with account ownership largely reflect stable country-level factors, for example overall financial-sector development, rather than within-country relationships over time, whereas the association between digital payment use and account ownership is more robust to this distinction. Standard errors in column (1) do not account for repeated observations of the same country and should be interpreted with caution.

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*** (0.046)	0.818*** (0.058)	0.552*** (0.111)
Mobile money account (%)	-0.197*** (0.047)	-0.226*** (0.071)	-0.012 (0.106)
Formal savings (%)	0.491*** (0.069)	0.501*** (0.105)	0.418*** (0.129)
Formal borrowing (%)	0.242*** (0.068)	0.264*** (0.085)	0.048 (0.177)
Country fixed effects	No	No	Yes
Year fixed effects	No	Yes	Yes
Standard errors	Robust (HC1)	Clustered (country)	Clustered (country)

Dependent variable: Account ownership (%)	(1) Pooled OLS	(2) + Year FE	(3) + Country & Year FE
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, 95 economies). All variables are measured as percentages of adults, so coefficients are percentage-point changes in account ownership per percentage-point change in the covariate. The high R^2 in column (3) reflects the large number of country fixed effects (95) relative to the sample size and should not be read as indicating strong out-of-sample predictive power; see Section 5.2 for discussion. The within-country R^2 of column (3) is 0.842.*

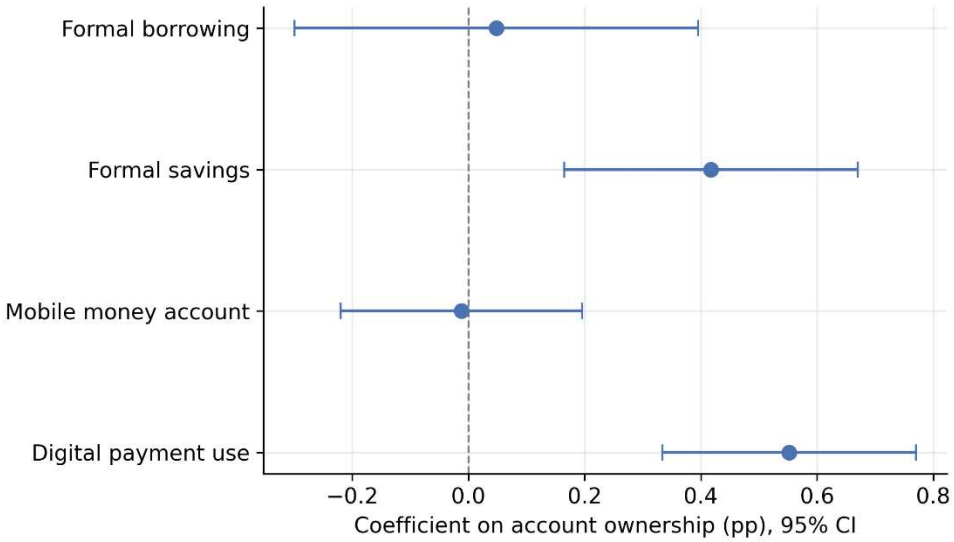


Figure 8. Determinants of Account Ownership: Coefficient Plot (Model 3). *Note: Point estimates and 95% confidence intervals from the two-way fixed-effects specification in Table 6, column (3).*

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 signs, statistical significance, and relative magnitudes of the coefficients closely match the wave-fixed-effects OLS specification, suggesting that the pooled and wave-fixed-effects results are not driven by outlier countries with unusually high or low account-ownership rates. Because this median regression contains no country fixed effects, it is comparable with column (2), not column (3). A median regression that adds country fixed effects, with standard errors from a cluster bootstrap over countries (300 replications), gives coefficients of 0.594 (SE 0.085) for digital payment use, −0.017 (0.091) for mobile money, 0.326 (0.109) for formal savings, and −0.045 (0.171) for formal borrowing. This reproduces the within-country pattern of column (3), which suggests that this pattern is not driven by outlier countries either.

Table 7. Robustness Check: Median (Quantile) Regression

Covariate	Coefficient	p-value
Digital payment use (%)	0.864	<0.001
Mobile money account (%)	-0.192	<0.001
Formal savings (%)	0.461	<0.001
Formal borrowing (%)	0.275	<0.001

Note: Median regression (q=0.5) with survey-wave fixed effects and no country fixed effects. Coefficient signs and relative magnitudes are consistent with column (2) of Table 6, not column (3); the country-fixed-effects median regression is reported in the text.

5. Discussion

5.1 Key Findings

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 has progressed only slowly since 2017 (39.3% to 43.4%), including a reversal between 2017 and 2021, underscoring that expansion has not been monotonic everywhere. Second, the gender gap in account ownership has proven more persistent than the income gap over the same period (about 6 percentage points in both 2011 and 2024, versus a fall in the income gap from 14.1 to 11.7 points). This is consistent with evidence that observable country and individual characteristics explain only part of the gender gap in fintech use, with differences in willingness to adopt new technology accounting for much of the remainder (Chen et al., 2023), and that women lag behind men in digital finance use (Chatterjee, 2024). The descriptive gaps reported here cannot, however, identify why the income gap narrowed while the gender gap did not. Third, the panel-regression results suggest 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 earlier evidence that credit access tends to lag behind account ownership in developing economies (Demirgüç-Kunt et al., 2008; Ozili, 2021). The mobile money result is harder to reconcile with this expectation, since mobile money is also a low-friction technology; however, mobile-money accounts are counted within the account-ownership outcome itself and the coefficient is a conditional association given digital payment use. 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. That formal savings is a robust within-country correlate of account ownership, whereas mobile money and credit are not, is compatible with Sabbaghi's (2025) evidence that mobile money access is

positively related to saving (somewhat more strongly than to borrowing), although that study uses cross-sectional regressions with saving and borrowing as outcomes and is not directly comparable. The importance that reviews of digital banking and evidence from Sub-Saharan Africa attach to the surrounding regulatory and institutional environment (Mohammed & Japee, 2025; Chinoda & Kapingura, 2024) is likewise compatible with the weakening of cross-country associations once country effects are included. The weakening of the mobile-money coefficient once country fixed effects are included is compatible with reviews that stress the role of country-level infrastructure, regulation, and consumer protection in mobile fintech adoption (Hornuf et al., 2025; Akenzua, 2025), although the present global sample cannot test these mechanisms. 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 mixed, 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.

5.2 Policy Implications

The findings point to several priorities for policymakers seeking to deepen financial inclusion. They show which behaviors move together with account ownership within countries over time. They do not show that changing one behavior would change the other. The implications below are therefore areas for policy attention and evaluation, not proven levers.

First, digital payment use is the strongest within-country correlate of account ownership ($\beta = 0.552$, $p < 0.01$), and this holds in the median regression with country effects. Continued investment in digital payment infrastructure, including the digitization of government-to-person transfers and wages, wider merchant payment acceptance, and low-cost interoperable payment systems, may therefore complement account-opening efforts. The case is strongest where digital payment use remains low: in the 17 countries where fewer than 20% of adults made or received a digital payment, account ownership is below 50% in every case (Figure 7). A correlational design cannot establish that raising digital payment use would raise account ownership, and the direction of influence may run both ways, since Chatterjee (2024) finds formal saving and borrowing to be prerequisites for digital payment use. Rollouts should therefore be evaluated as they happen.

Second, formal savings is the other robust within-country correlate ($\beta = 0.418$, $p < 0.01$). This is consistent with the access–usage distinction in Sarma (2008) and with concern that account growth has outpaced sustained use (Ozili, 2021). Account designs that support saving, such as low-cost savings products and simple withdrawal terms, may help new accounts become used accounts. This is a hypothesis for pilot testing, not a finding of this study.

Third, mobile money should not be treated as a stand-alone inclusion strategy. Its coefficient is negative in the pooled models and indistinguishable from zero once country effects are added. This does not mean that mobile money is unimportant, because mobile-money accounts are counted within the account-ownership indicator itself. It does suggest that its cross-country association with account ownership largely reflects stable national conditions. Reviews identify regulation, infrastructure, consumer protection, and institutional quality as such conditions (Hornuf et al., 2025; Akenzua, 2025; Mohammed & Japee, 2025; Chinoda & Kapingura, 2024). Mobile money programs may work best when paired with clear regulation, agent networks, and consumer-protection rules, although the present global sample cannot test these mechanisms.

Fourth, the persistence of the gender gap despite broad-based growth in account ownership (about 6 percentage points in both 2011 and 2024, while the income gap fell from 14.1 to 11.7 points; Table 4) suggests that generic expansions in access are not sufficient to close gender disparities. The literature points to differences in willingness to adopt new financial technology and to barriers in digital finance use (Chen

et al., 2023; Chatterjee, 2024). Chatterjee (2024) also finds that digital wage payments encourage women to transact digitally. Targeted interventions may therefore include digitized wages and transfers paid to women, gender-disaggregated inclusion targets, and routine reporting of the gender gap. Because our unweighted gap is larger than the population-weighted gap of 4 percentage points in Klapper et al. (2025), countries should track the gap with their own national data.

Fifth, the weaker and less robust association between formal borrowing and account ownership, once country fixed effects are included ($\beta = 0.048$), is compatible with the view that credit-market development requires distinct policy instruments, such as credit information infrastructure, collateral registries, and creditor-rights reforms, rather than relying on account-ownership expansion alone to translate into greater credit access. This is consistent with earlier evidence that credit access lags account ownership in developing economies (Demirgüç-Kunt et al., 2008; Ozili, 2021) and with the access–usage distinction in Sarma (2008).

Sixth, progress is uneven across regions, and priorities should reflect this. Sub-Saharan Africa reached 58.2% in 2024, and the Middle East, North Africa, Afghanistan, and Pakistan aggregate reached only 43.4% after a fall between 2017 and 2021 (Table 3). Because inclusion indices tend to blur access and use (Pesqué-Cela et al., 2021), national targets should also track usage indicators, such as digital payments and savings, alongside account ownership, together with within-country income and urban–rural gaps. The urban–rural gap is observable only for 2024 in our data, so its trend cannot yet be assessed.

Finally, the causal evidence linking financial inclusion to development outcomes remains mixed (Duvendack & Mader, 2020). Policies should therefore be introduced in ways that allow evaluation, such as staged rollouts, pilot programs, and national digital-identity or payment-digitization episodes, which could provide the variation needed to test the associations reported here (see Section 5.3). Until then, these results are best used to decide where to look, not to guarantee what will work.

5.3 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; Chatterjee (2024), for example, finds formal saving and borrowing to be prerequisites for digital payment use, so the direction of influence among these indicators may run in more than one direction. Moreover, the covariates are not independent of the outcome: mobile-money accounts are counted in the account-ownership indicator, and digital payments, formal savings, and formal borrowing largely presuppose holding an account, so part of the association is definitional, in line with the high correlation between the access and use dimensions of inclusion indices reported by Pesqué-Cela et al. (2021). The covariates are also strongly correlated with one another (Figure 6), although variance inflation factors are modest (2.0 to 3.1). The regression sample, which covers 95 economies, is an unbalanced panel in which only 48 countries are observed in all four waves and 13 in a single wave (which contribute nothing to the within-country estimates); the large set of country fixed effects mechanically inflates the reported R^2 and limits the precision of country-specific estimates, the pooled specification does not account for repeated observations of the same country, and the cross-country means and gaps are unweighted. 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; Sarma & Pais, 2011), which may confound the within-country associations reported here.

5.4 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 Findex individual-level microdata (which the country-level panel used here cannot support) to separate the portion of the gap explained by observable characteristics from the residual, unexplained component, as Chen et al. (2023) do for fintech use in a cross-country survey.

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 suggests 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 that median regressions with and without country effects suggest is not driven by outlier countries, and that is consistent with the access–usage and technology-adoption frameworks set out in Section 2. The findings are compatible with giving policy attention to digital payment infrastructure and to targeted interventions on the gender gap, while underscoring that closing the remaining gaps in financial inclusion may require instruments beyond simple account-ownership expansion. Whether new account holders go on to save, borrow, and transact through formal channels may also depend on institutional, regulatory, and consumer-protection environments, which this study could not examine.

Declarations

CRediT authorship contribution statement: 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.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflicts of interest.

Ethics approval statement: Not applicable

Data Availability: The dataset and Python script used for data analysis and visualisation are available as supplementary files on the figshare repository at: https://doi.org/10.6084/m9.figshare.33019793

Acknowledgments: The authors would like to thank the Kwame Nkrumah University of Science and Technology, Kumasi (KNUST), University of Skills Training and Entrepreneurial Development (USTED), Kumasi, Faculty of Health Studies, University of Bradford, and the Department of Forest Engineering, Forest Management Planning, and Terrestrial Measurements, Faculty of Silviculture and Forest Engineering, Transilvania University of Brasov, for providing some of the resources needed for this study.

References

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.

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

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

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

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

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

Demirgüç-Kunt, A., Beck, T., & Honohan, P. (2008). *Finance for all? Policies and pitfalls in expanding access*. World Bank.

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

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

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

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

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

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

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

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

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

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

Ozili, P. K. (2021). Financial inclusion research around the world: A review. *Forum for Social Economics*, *50*(4), 457–479. https://doi.org/10.1080/07360932.2020.1715238

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

Pesqué-Cela, V., Tian, L., Luo, D., Tobin, D., & Kling, G. (2021). Defining and measuring financial inclusion: A systematic review and confirmatory factor analysis. *Journal of International Development*, *33*(2), 316–341. https://doi.org/10.1002/jid.3524

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.

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

Sarma, M. (2008). *Index of financial inclusion* (ICRIER Working Paper No. 215). Indian Council for Research on International Economic Relations.

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

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

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425–478. https://doi.org/10.2307/30036540

World Bank. (2024). *Global Findex Database (2011, 2014, 2017, 2021, 2022, and 2024 waves)*. World Bank.