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Gender Gaps in Access and Depth of Digital Finance Services in East Africa

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Research Article

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Abstract

Digital financial services have expanded rapidly in developing economies, creating new opportunities for financial inclusion and economic participation. Digital finance transactions, including mobile money and mobile and internet banking, increased from 55 transactions per adult in 2017 to 251 in 2024. This expansion has been particularly noticeable in Africa; particularly East African countries have been at the lead of this transformation. However, the expansion of digital finance does not necessarily ensure equal participation by women and men. This study aimed to examine gender disparities in the access and depth of digital financial inclusion in major economies of East Africa using the World Bank's Global Findex 2025 data. The study therefore distinguishes between access, measured through digital-account and mobile-money ownership, and depth, measured through actual digital payment and digital merchant-payment use. Gender gaps are analyzed using descriptive and econometrics analysis methods. Descriptive methods like participation rates and gender parity indices are used to assess gender gaps, while multivariate regression and Blinder-Oaxaca decomposition were employed to identify the factors associated with observed gender differences. The results from gender gap descriptive analysis revealed that there is 11.89% point gender gap and a gender parity index of 0.83 for digital account access. Mobile-money participation shows a 10.35-percentage-point gap. The disparity persists in actual use: women participate in any digital payment at 60.23%, compared with 71.02% among men, while digital merchant-payment participation is also lower among women. There is also a significant cross-country heterogeneity exists, with Kenya recording the narrowest gaps and Ethiopia the largest. Regression results indicate that internet use, income, education, employment, and urban residence are important determinants of digital financial participation. Most importantly, the Blinder–Oaxaca decomposition shows that observable characteristics account for most of the gender gap, particularly differences in digital-account, mobile-account, financial-account ownership, and internet use. The unexplained coefficient component is generally statistically insignificant. Overall, the findings demonstrate that gender inequality in East Africa's digital financial system is persistent, multidimensional, and primarily associated with differences in socioeconomic and digital endowments.

1. Introduction

1.1 Background

Digital financial services has been rapidly expanding in developing economics and International Monetary Fund's (IMF) 2025 Financial Access Survey shows that digital finance transactions (mobile money and mobile and internet banking) increased from 55 transactions per adult in 2017 to 251 transactions per adult in 2024 (IMF, 2025).The expansion is particularly strong in Africa, where mobile money has brought large numbers of previously underserved individuals into the formal financial system without requiring a conventional bank account (IMF, 2025). Digital finance is emerging as a powerful force for financial inclusion, gender equity and inclusive economic growth in Africa (ADB, 2025). Mobile money, digital accounts, internet connectivity and electronic payments are rapidly expanding and created

ample opportunities to overcome geographic and institutional barriers associated with conventional financial services in Africa (Abdalla et al., 2025).

East African countries are also increasingly transforming financial services through using mobile money as established component of financial system and digital financial service infrastructure is expanding rapidly. IMF reports shows that East African economies constitute some of the largest mobile-money markets in the region (IMF, 2024a). Despite the rapid expansion of financial access, women continue to experience disadvantages in access to and use of digital and financial services as an important continuing challenge (World Bank, 2025a). Shirono et al. (2024) stated that the expansion of digital financial infrastructure does not create equal access or equal use for women and men.

The database provides indicators disaggregated by gender for financial accounts, payments, saving, borrowing, mobile-phone ownership, internet use, and other dimensions of digital inclusion, making it possible to examine whether the expansion of digital finance has benefited women and men equally (World Bank, 2025a).

The IMF's recent assessment of financial access in Sub-Saharan Africa identifies a persistent gender gap in financial access and emphasizes the importance of improving gender-disaggregated information on both traditional and digital financial services.

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Global Findex 2025 database provides indicators disaggregated by gender for financial accounts, payments, saving, borrowing, mobile-phone ownership, internet use, and other dimensions of digital inclusion, making it possible to examine whether the expansion of digital finance has benefited women and men equally (World Bank, 2025a). IMF assessment shows that gender equality in Sub-Saharan Africa emphasizes that financial inclusion remains an important component of women's economic empowerment and that structural gender inequalities can interact with digitalization to constrain women's economic opportunities (Kolovich and Newiak, 2024). It is essential to look at gender inequality in two dimensions: (1) access, which concerns whether individuals possess digital financial instruments and (2) depth, which concerns whether individuals actually use these instruments for a broader range of financial transactions. A woman may therefore possess a digital account while making considerably fewer digital payments than a similarly situated man. Measuring only account ownership can consequently underestimate the magnitude of gender inequality in digital financial inclusion.

The distinction in financial inclusion is very important as mobile money has expanded financial access in countries such as Kenya, Tanzania, and Uganda, but evidence indicates that gender gaps remain. For example, the IMF reports that Uganda has experienced substantial growth in women's financial inclusion, although gender differences in formal financial-service usage remain (IMF, 2024c).

Against this background, this study examines gender gaps in digital financial inclusion across Ethiopia, Kenya, Tanzania, and Uganda. The analysis makes three contributions. First, it distinguishes gender gap in digital finance access and depth. Second, it combines descriptive gender gaps and parity indices with regression evidence. Third, it employs the Blinder-Oaxaca decomposition to identify the extent to which gender disparities are associated with differences in observable characteristics and differences in estimated coefficients. The decomposition framework follows the established approach of Blinder (1973) and Oaxaca (1973), with the detailed implementation following Jann (2008).

The central empirical question is therefore not simply whether women participate less in digital finance, but why the gender gap persists and which observable factors account for the largest share of the disparity.

1.2 Objectives

General objective of this study to examine gender disparities in access to and depth of digital financial inclusion in East Africa using Global Findex 2025 microdata. Specifically it aims to

- To measure the gender gap in access to digital financial services in East Africa
- To assess gender differences in the depth of digital financial-service use
- To identify the socioeconomic and demographic determinants of access and depth

2. Theoretical and Empirical Literatures

2.1. Theoretical Literatures

2.1.1. Financial Inclusion Theory

This theory gives the primary foundation for this study and it tells us whether individuals can access and use appropriate, affordable, and convenient financial products. It explain the ability of individuals and households to access and effectively use appropriate, affordable, and formal financial services, including payments, savings, credit, and insurance (World Bank, 2014). According to this theory exclusion from financial services can arises from different barriers including economic, geographic, institutional, and informational that prevent individuals from accessing financial products and services (Demirgüç-Kunt et al., 2018). Expansion of digital technologies such as mobile phones, mobile money, internet banking, and digital payment platforms reduces the distance and transaction costs associated with conventional financial services and can therefore extend financial services to previously underserved populations (Evans, 2018; Kouladoum et al., 2022). This theory states that gender differences may emerge when women face greater barriers to obtaining and using formal financial services. Traditional barriers such as geographical distance, transaction costs, limited banking infrastructure, and documentation requirements can interact with newer digital barriers, including limited access to mobile phones, internet connectivity, digital identification, and digital skills. Digital finance can potentially reduce some of these

barriers, but it may not eliminate gender inequalities in access. The theory is particularly relevant to the distinction between digital financial access and digital financial depth. Access represents whether individuals can enter and participate in the digital financial system, whereas depth reflects the extent and range of their participation. Thus, women and men may differ not only in whether they have access to digital financial services but also in how extensively they use those services.

2.1.2. Digital Divide Theory

This theory is most relevant for explaining the gender gap in digital financial access. It states that inequalities in access to and use of technologies can generate broader socioeconomic inequalities including digital finance. Digital divide involves not only individuals' disparities in physically access to digital device but also involve differences in connectivity, affordability, digital skills, quality of access, and ability to translate technology into meaningful outcomes (van Dijk, 2005; Warschauer, 2004). This theory is relevant for this study because digital financial inclusion depends on access to mobile phones, internet connectivity, digital platforms, and related technologies. If women have lower access to these enabling technologies than men, they may also have lower access to digital financial services. The theory therefore provides a clear mechanism for understanding the gender digital-finance access gap: Gender inequality → unequal access to digital technologies → unequal ability to access digital financial services → gender gap in digital financial inclusion.

2.1.3. Technology Acceptance Model

This theory is developed by Davis (1989) can provide a complementary explanation of differences in digital financial-service adoption. TAM proposes that individuals' willingness to adopt a technology is influenced principally by perceived usefulness and perceived ease of use. In context to digital finance, individuals are more likely to accept and adopt mobile banking, mobile money, and digital payments if they perceive as useful, convenient, secure and easy to operate. Conversely, limited digital literacy, unfamiliarity with technology, perceived risks, and difficulties in operating digital platforms can reduce adoption. This theory explains gender difference in digital skills, previous exposure to technology and confidence in using digital platforms contributes to difference in digital financial access and depth.

2.2. Empirical Literatures

Many empirical studies stated that digital technologies have become an important determinant of financial inclusion, particularly for developing countries. Using African countries, Evans (2018) shows that internet and mobile-phone connectivity can contribute to financial inclusion by expanding opportunities for individuals to access financial services. The study reveals the importance of digital connectivity in overcoming geographical and infrastructural barriers associated with conventional banking.

In addition, Kouladoum et al. (2022) demonstrated that digital technologies are important for expanding financial inclusion in Sub-Saharan African countries. According to this study, digitalization improves access to financial services by reducing some of the costs and constraints associated with traditional

financial institutions. However, their analysis also implies that digital infrastructure and technological capability remain important conditions for realizing these benefits. Ofosu-Mensah et al. (2024) also find that digital financial inclusion is positively associated with inclusive development in lower-middle-income countries.

Elouardighi and Oubejja (2023) examine the relationship between digital financial inclusion and women's labor-force participation in Africa and demonstrate the importance of digital financial services in improving women's economic opportunities. Nevertheless, the existence of gender-specific barriers means that the expansion of digital finance does not automatically eliminate gender inequalities. Recent study by Elouaourti and Ezzahid (2026) examine the mechanisms underlying digital financial exclusion in Africa and emphasize the importance of factors such as digital skills, connectivity, affordability, and socioeconomic characteristics. Their findings reinforce the argument that digital financial inclusion should be understood as a multidimensional process rather than simply as ownership of a digital financial account. Women have historically been less likely than men to own formal financial accounts and to use a range of financial services. Digital finance has the potential to narrow this gap because mobile-based services can reduce travel requirements, transaction costs, and dependence on physical bank branches. Nevertheless, gender inequalities may persist because women frequently face constraints in access to mobile phones, internet services, identification, income, financial literacy, and digital skills. The empirical literature therefore suggests that gender differences should be examined at multiple stages of financial participation. The first stage concerns access, such as whether an individual has a digital financial account or can obtain digital financial services. The second concerns usage, including whether the individual makes digital payments or receives wages and other payments digitally. The third concerns depth, reflecting the breadth and intensity of digital financial-service use.

This distinction is particularly important for East Africa. The region has experienced substantial growth in mobile-money and digital financial services, but the expansion of digital finance has occurred alongside considerable socioeconomic and gender heterogeneity. Consequently, aggregate measures of digital financial inclusion may conceal important differences between women and men and between individual countries.

Although the existing literature provides substantial evidence that digital technologies can promote financial inclusion, three important gaps remain. First, much of the literature examines overall financial inclusion rather than specifically distinguishing digital financial inclusion from conventional financial inclusion. Second, existing studies frequently emphasize whether individuals have access to an account, while giving comparatively less attention to the depth and breadth of digital financial-service use. Third, relatively limited comparative evidence focuses specifically on gender differences in digital financial access and depth across East African countries.

The present study addresses these gaps by examining gender differences in digital financial inclusion in East Africa, with particular emphasis on digital finance access. It distinguishes access from depth and examines whether socioeconomic characteristics including income, education, employment, age, urban

residence, and internet use help explain observed gender differences. This approach allows the study to move beyond the simple question of whether women have digital financial accounts and instead assess whether women and men have comparable opportunities to participate in the rapidly expanding digital financial ecosystem.

3. Data and Methodology

3.1. Research design and data sources

This study employed a cross-sectional research design for East African countries (Ethiopia, Kenya, Rwanda, Tanzania, and Uganda) and quantitative approaches. Quantitative includes both descriptive research and econometrics method. Econometrics method was used to examine digital financial access and depth gaps across gender and factors affecting the financial access and depth gaps in East Africa. The secondary data was gathered from Global Findex 2025 database.

3.2. Method of Analysis

Predominantly econometric analysis was employed to examine the digital financial access and depth gaps. Two-sample t-tests are used to determine whether the observed female–male differences are statistically significant. Standard errors are reported in parentheses beneath the corresponding t-statistics. This provides a formal test of whether the observed gender gaps are distinguishable from zero. As noted earlier, the primary goal of this study is to investigate digital financial access and depth gaps. Initially, the analysis began with a simple model that includes female dummy and other covariates as follows:

$$y_{ijt} = \alpha + \beta F_i + \Psi_i + \epsilon_i$$

1

Where $y$ij denotes outcome indicator (digital finance access and depth) indicators for individual i, while Fi denotes a female dummy for individual *i*, taking the value one for female workers and zero for male workers, and ψ represents other covariates.

Finally, to explain the observed gender digital finance access and depth gaps, a detailed decomposition was conducted. Such analysis is useful to investigate the contributions of sets of predictors to gender digital finance access and depth gap. In gender gap study the most commonly applied is the one suggested by Mincer (1974). Applying simple regressions to the Mincer model helps to understand the relationship between digital finance access and depth and its determining factors. The simple equation is given by

$$\left\{ \begin{array}{l} \mathrm{DFad}_{if} = \delta\, \mathrm{fX}_{if} + \mathrm{v}_{if}, \;\; if\ individual\ i\ is\ female \\ \mathrm{DFad}_{im} = \delta\, \mathrm{mX}_{im} + \mathrm{v}_{im}, \;\; if\ individual\ i\ is\ male \end{array} \right\}$$

2

This is estimated using ordinary least squares and the variable DFad is the digital finance access and depth period of individual i and the vector of variables X include individual characteristics and other characteristics. The last term is the error term which captures unobserved characteristics and assumed not correlated with the observed variables in the vector X.

4. Results and Discussions

4.1. Digital Finance Access

4.1.1. Gender gaps in digital financial access

Table 1
Gender gaps in digital financial access in East Africa

Country	Indicator	Female (%)	Male (%)	Gap	GPI
Ethiopia	Digital account	15.04	31.18	-16.14	0.48
	Mobile money	8.15	18.93	-10.78	0.43
Kenya	Digital account	87.87	94.30	-6.43	0.93
	Mobile money	86.03	93.20	-7.17	0.92
Tanzania	Digital account	56.15	67.03	-10.88	0.84
	Mobile money	55.05	63.08	-8.03	0.87
Uganda	Digital account	70.82	82.10	–11.28	0.86
	Mobile money	68.48	80.66	-12.18	0.85
East Africa	Digital account	57.12	69.01	-11.89	0.83
	Mobile money	54.06	64.41	-10.35	0.84

Notes: Gap = female- male participation rate, measured in percentage points. GPI = female participation rate divided by male participation rate.

Table shows that females are disadvantaged in digital financial access across four countries; women are less likely than men to own digital accounts and mobile-money accounts. At East Africa countries (Ethiopia, Kenya, Tanzania and Uganda) digital account ownership is 57.12% among women compared with 69.01% among men, with − 11.89 percentage point gap. It also has 0.83 GPI which shows women attain approximately 83% of men's digital-account ownership rate. Similarly, female mobile-money ownership is 54.06%, compared with 64.41% for men. The evidence shows presence of − 10.35 percentage-point gap and a GPI of 0.84.

Country level analysis shows that Ethiopia has the highest digital-account gender disparity with the gap of − 16.14% points corresponds to a GPI of only 0.48. The mobile-money gap is also is high, with female participation at 8.15% compared with 18.93% for men, resulting in a GPI of 0.43. The result is consistent with recent evidence that indicates a significant gender differences in mobile-phone and smartphone ownership in Ethiopia and shows that women constitute a relatively small share of mobile-money and broader digital-financial-service account ownership (World Bank, 2025). The Ethiopian result therefore suggests that the country's digital-finance gender challenge begins at the access stage rather than being limited to differences in intensive use.

Kenya is a successful country in digital financial access and depth for both genders. Digital-account ownership among women reaches 87.87%, compared with 94.30% among men, with only − 6.43 percentage-point gap and a GPI of 0.93. This result shows that female participation in mobile money is 86.03% compared to 93.20% among men. This result reveals that Kenya has highly developed mobile money ecosystem and reduced gender gap but not completely eliminated the gender gap.

Tanzania has an intermediate level compared to Kenya and Ethiopia, where digital-account gap is − 10.88 percentage points, while the mobile-money gap is − 8.03 percentage points. Uganda displays a − 11.28 percentage-point digital-account gap and a − 12.18 percentage-point mobile-money gap. The Ugandan pattern is especially notable because the mobile-money gap is larger than the digital-account gap, suggesting that moving from ownership to digital financial use may involve additional gender-related constraints.

Generally, the evidence shows that the selected East African countries digital finance and access pattern is consistent with Sub-Saharan African pattern. IMF shows persistent gender gaps in financial access and argues that expanding women's access requires attention to both traditional and digital financial services (Shirono et al., 2024). The results also reinforce the finding that digital finance has expanded rapidly across East Africa while gender inequality in usage remains a significant policy concern (IMF, 2024a).

Women have a lower access to digital financial services than men across all four East African countries and Ethiopia has largest disparity with GPI about 0.48 for digital accounts and 0.43 for mobile money. The result implies that access to digital finance service does not guarantee to achieve digital finance use or depth and gender equality; policies need to specifically address the barriers limiting women’s access to digital finance, particularly in countries with large gender gaps such as Ethiopia.

4.1.2. Statistical significance of digital finance access gaps

Table 2
Statistical tests of gender gaps in digital financial access

Country	Indicator	Female (%)	Male (%)	Gap (pp)	t-statistic (SE)	GPI
Ethiopia	Digital account	15.04	31.18	-16.14	-6.216*** (0.0260)	0.48
	Mobile money	8.15	18.93	-10.78	-5.106*** (0.0211)	0.43
Kenya	Digital account	87.87	94.30	-6.43	-3.522*** (0.0183)	0.93
	Mobile money	86.03	93.20	-7.17	-3.675*** (0.0195)	0.92
Tanzania	Digital account	56.15	67.03	-10.89	-3.535*** (0.0308)	0.84
	Mobile money	55.05	63.08	-8.03	-2.575** (0.0312)	0.87
Uganda	Digital account	70.82	82.10	-11.28	-4.226*** (0.0267)	0.86
	Mobile money	68.48	80.66	-12.18	-4.449*** (0.0274)	0.85
East Africa	Digital account	57.12	69.01	-11.89	-7.806* (0.0152)	0.83
	Mobile money	54.06	64.41	-10.35	-6.666* (0.0155)	0.84

Notes: Standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The t-tests confirm that the observed disparities are statistically significant. At the East African level, the digital-account gap has a t-statistic of − 7.806, while the mobile-money gap has a t-statistic of − 6.666. Both are significant at the 1% level. Hence, the regional gender differences are not attributable to random sampling variation.

Gender gap in Ethiopia is particularly strong at 1% significance level, with a t-statistic of -6.216 for digital account, while the mobile-money gap is also highly significant, with a t-statistic of -5.106. These findings provide strong statistical evidence that Ethiopian women are substantially less likely than men to participate in digital financial systems.

Relatively Kenya's gap is smaller and also statistically significant with GPI of 0.93 for digital accounts and 0.92 for mobile-money indicates. While Tanzania's and Uganda's results are at the intermediate level and all digital-account gaps are significant at the 1% level, while the mobile-money gap in Tanzania is significant at the 5% level. The evidence therefore suggests a structural regional pattern rather than a country-specific anomaly.

4.1.3. Determinants of digital financial access

Table 3
Determinants of digital financial access

Variables	Mobile-Account	Mobile-Account	Digital Account	Digital Account
	Model 1	Model 2	Model 1	Model 2
Income quintile	0.0129** (0.0051)	0.0116** (0.0052)	0.0125**(0.0049)	0.0103** (0.0051)
Internet use	0.3600*** (0.0165)	0.3546*** (0.0171)	0.3316*** (0.0161)	0.3238*** (0.0166)
Education	0.1287*** (0.0141)	0.1128*** (0.0147)	0.1616*** (0.0138)	0.1454*** (0.0143)
Age	0.0030*** (0.0005)	0.0016*** (0.0006)	0.0034*** (0.0005)	0.0018*** (0.0005)
Female	-0.0117 (0.0139)	-0.0065 (0.0144)	0.0041 (0.0136)	0.0107 (0.0140)
Urban city	0.0527*** (0.0175)	0.0524*** (0.0178)	0.0427** (0.0171)	0.0436** (0.0173)
Employment	0.1959*** (0.0152)	0.1821*** (0.0159)	0.1950*** (0.0148)	0.1807*** (0.0154)
ID ownership	-	-0.0204 (0.0184)	-	-0.0502*** (0.0178)
Constant	0.3086*** (0.0462)	0.3983*** (0.0564)	0.2823*** (0.0451)	0.4148*** (0.0547)
Observations	3,998	3,788	3,998	3,788
R^2	0.2578	0.2420	0.2676	0.2546
Adjusted R^2	0.2565	0.2404	0.2664	0.2530
F-statistic	197.96***	150.85***	208.31***	161.37***

Notes: Standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

The regression results show that internet use is the most powerful determinants of digital financial access with the coefficient of 0.3600 for mobile account and 0.3316 for digital-account at the 1% significance level. The coefficients remain very large and statistically significant after controlling for identity document ownership. The result implies that digital connectivity cannot be separated from digital financial inclusion; particularly women are disadvantaged in internet access and have a double disadvantage: they are excluded from the digital economy and simultaneously face digitally delivered financial services. Recent evidence from Africa similarly demonstrates that mobile internet can affect access to financial services by relaxing information and transaction constraints (D'Andrea et al., 2024).

Education also found as important determinant of digital financial access with its coefficient 0.1287 for mobile-based accounts and 0.1616 for digital accounts. Although the coefficients decline when ID ownership is introduced, they remain positive and statistically significant. Education therefore appears to enhance individuals' ability to understand, access, and use digital financial technologies. Similarly, income is positively associated with digital financial access and the coefficient on income quintile remains significant in all four specifications, although its magnitude is considerably smaller than that of internet use and education. This suggests that economic resources matter, but connectivity and human capital may be more major constraints on digital financial participation.

Urban residency is found positively associated with digital financial access. This is because urban areas have greater availability of telecommunications infrastructure, financial-service providers, and digital networks in urban areas. The result implies that gender gaps may interact with spatial inequality, particularly where women are disproportionately located in areas with weaker digital infrastructure.

Age has a positive and statistically significant association with digital financial access, although its magnitude is relatively small. This suggests that participation increases with age within the observed sample, but age alone cannot explain the large gender differences observed in Table 1.

The female coefficient itself is not statistically significant in these multivariate access models. This result is substantively important. The descriptive analysis shows large and significant female-male gaps, but after conditioning on socioeconomic and digital characteristics, the independent female coefficient becomes statistically insignificant. This suggests that a substantial part of the raw gender gap may operate through unequal access to the characteristics that facilitate digital finance, particularly internet connectivity, education, income, and employment.

Employment status is an essential determinant of digital financial access across all specifications, indicating that individuals in employment have considerably higher levels of digital financial access than those out of employment. The employment coefficient is 0.1959 for mobile-account access and 0.1950 for digital-account access in Model 1, indicating an employment advantage of approximately 0.196 and 0.195 points, respectively. After controlling for identity document ownership, the coefficients remain positive and statistically significant at 0.1821 for mobile-account access and 0.1807 for digital-account access and statistically significant at 1 percent. This may reflect regular income positively interact with digital financial services.

4.1.4. Oaxaca–Blinder decomposition of gender gaps in digital finance access

Table 4
Oaxaca–Blinder Decomposition of Gender Gaps in Digital Finance Access

Variables / Components	**Mobile Account**		**Digital Account**	
Dependent variable	Model 1	Model 2	Model 1	Model 2
Female mean	0.540***(0.011)	0.562***(0.011)	0.571***(0.011)	0.592***(0.011)
Male mean	0.644***(0.011)	0.666***(0.011)	0.690***(0.011)	0.713***(0.011)
Overall gender gap	-0.103*(0.016)	-0.104*(0.016)	-0.119*(0.015)	-0.121*(0.015)
Explained component	-0.113*(0.009)	-0.105*(0.010)	-0.110*(0.009)	-0.102*(0.009)
Unexplained component	0.010(0.016)	0.001(0.017)	-0.008(0.016)	-0.020(0.017)
Interaction	-0.002(0.007)	-0.008(0.008)	-0.007(0.007)	-0.014*(0.008)
Explained components				
Income quintile	-0.009*** (0.003)	-0.009*** (0.003)	-0.008*** (0.003)	-0.007*** (0.003)
Internet use	-0.063*** (0.007)	-0.063*** (0.007)	-0.057*** (0.006)	-0.055*** (0.007)
Education	-0.010*** (0.003)	-0.009*** (0.003)	-0.015*** (0.003)	-0.014*** (0.003)
Age	-0.004*** (0.002)	-0.003*(0.002)	-0.005*** (0.002)	-0.003**(0.002)
Urbanicity	0.000(0.000)	0.000(0.000)	0.000(0.000)	0.000(0.000)
Employment	0.026***(0.005)	0.023***(0.005)	0.025***(0.004)	0.021***(0.005)
ID ownership	-	0.001(0.001)	-	-0.001(0.001)
Observations	3,998	3,788	3,998	3,788

Notes: Standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 4 shows Oaxaca-Blinder decomposition of gender gaps in digital finance access indicators (mobile-account ownership and digital-account ownership) in East Africa. The decomposition separates the observed gender gap into explained differences (endowments), unexplained differences (coefficients), and interaction effects. The result shows presence of high gender gap in digital finance access, women continuously less likely to have both mobile and digital accounts. For mobile accounts, there about 10.3–10.4% gap points and 11.9–12% gap points for digital accounts and all gap are statistically significant.

Most importantly, gender disparity is predominately explained by observable socioeconomics and demographic characteristics instead of unobserved variables. The explained component accounts for approximately 0.105–0.113 points of the mobile-account gap and 0.102–0.110 points of the digital-account gap. In contrast, the unexplained component is small and statistically insignificant across the specifications, while the interaction component is generally insignificant, except for digital-account Model 2, where it is marginally significant.

Consistent to Table 3 result internet use is the largest contributor to the explained gender gap in both mobile and digital-account access. Its contribution ranges from approximately − 0.055 to − 0.063, indicating that differences between women and men in internet use account for a substantial share of the observed access disparity. Education is another important contributor, particularly for digital-account access, with contributions ranging from − 0.009 to − 0.015. Differences in income quintile also contribute significantly, although their magnitude is smaller than that of internet use and education. Age makes a smaller but generally significant contribution.

The contribution of employment is also statistically significant and relatively sizeable. Because the decomposition is based on the difference in characteristics between women and men, this result suggests that gender differences in employment status contribute materially to the observed digital finance access gap. Urbanicity makes virtually no contribution, suggesting that differences in urban residence between women and men do not substantially explain the access gap in this sample. Similarly, digital ID ownership contributes little to the overall gender difference in access in Model 2.

These findings have several important implications for the study. These are First, the results suggest that gender inequality in digital financial inclusion is largely an inequality of opportunities and endowments. Since most of the observed gap is explained by differences in internet use, education, income, and employment, policies aimed at reducing the gender gap should focus on improving women's access to the underlying socioeconomic and digital resources required to participate in the digital financial ecosystem.

Second, the particularly large contribution of internet use indicates that digital connectivity is a critical pathway through which gender inequality translates into financial exclusion. Expanding affordable and reliable internet access for women, improving digital literacy, and reducing gender disparities in smartphone and internet use could therefore substantially narrow the digital finance access gap.

Third, the contribution of education suggests that financial inclusion policies should be complemented by digital and financial capability programmes. Improving women's ability to understand and use digital technologies may increase their capacity to adopt digital financial services.

Fourth, the contribution of income and employment highlights the importance of women's economic empowerment. Women with weaker labor-market participation and lower economic resources may have fewer opportunities or incentives to open and use digital financial accounts. Thus, gender-sensitive

employment, entrepreneurship, income-generation, and financial inclusion policies should be implemented jointly rather than in isolation.

Finally, the relatively small and statistically insignificant unexplained components suggest that the evidence does not provide strong support for systematic gender differences in digital financial access.

4.2. Gender Gaps in the Digital Financial Depth

Access alone provides an incomplete picture of gender inequality. The next stage examines whether women and men use digital financial services differently.

4.2.1. Gender gaps in digital financial depth

Table 5
Gender gaps in the depth of digital financial inclusion

Country	Indicator	Female (%)	Male (%)	Gap	t-statistic (SE)	GPI
Ethiopia	Any digital payment	24.82	36.53	-11.71	-4.046*** (0.0289)	0.68
	Digital merchant payment	5.98	8.91	-2.93	-1.774* (0.0165)	0.67
Kenya	Any digital payment	87.68	94.30	-6.62	-3.607*** (0.0183)	0.93
	Digital merchant payment	55.33	65.79	-10.46	-3.380*** (0.0309)	0.84
Tanzania	Any digital payment	57.80	69.23	-11.43	-3.751*** (0.0305)	0.84
	Digital merchant payment	4.22	6.15	-1.93	-1.384 (0.0140)	0.69
Uganda	Any digital payment	71.79	82.72	-10.93	-4.141*** (0.0264)	0.87
	Digital merchant payment	11.87	19.96	-8.09	-3.524*** (0.0230)	0.59
East Africa	Any digital payment	60.23	71.02	-10.79	*-7.185**** *(0.0150)*	0.85
	Digital merchant payment	19.40	25.19	-5.79	*-4.414**** *(0.0131)*	0.77

Notes: Gap = female-male participation rate. Standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 5 indicates that the gender gap remains substantial after individuals enter the digital financial system. At the East African level, 60.23% of women report making or receiving any digital payment

compared with 71.02% of men. The resulting gap is − 10.79 percentage points and the GPI is 0.85. Thus, women's digital-payment participation is approximately 85% of men's participation. The gap is even more when merchant payments are considered with female participation is only 19.40%, compared with 25.19% for men, yielding a gap of − 5.79 percentage points and a GPI of 0.77. Women therefore engage in digital merchant payments at approximately 77% of the male rate.

This result tells us that digital financial inclusion is not merely an issue of whether women possess accounts. The gender gap continues into actual transactions. This is a crucial distinction for policy: increasing the number of accounts held by women does not necessarily guarantee equivalent utilization. In depth also Ethiopia lags behind from other East African countries with high gaps with only 24.82% of women participate in any digital payment compared with 36.53% of men, producing a -11.71 percentage-point gap. The merchant-payment GPI is only 0.67, meaning women's participation is approximately two-thirds of men's participation. This indicates that Ethiopia's gender challenge extends from access to effective use.

Similar to access Kenya performs better than other East African countries included in this study in overall digital-payment participation, with women reaching 87.68% compared with 94.30% among men. However, the merchant-payment gap remains considerable at − 10.46 percentage points. This distinction is important because Kenya's highly developed mobile-money environment appears to have narrowed the general digital-payment gap more successfully than the gender gap in merchant-payment usage. Uganda presents a similar pattern, with relatively high participation in any digital payment but a much lower GPI for merchant payments. Women's merchant-payment participation is 11.87%, compared with 19.96% for men, generating a GPI of only 0.59. Tanzania records a relatively small merchant-payment gap in percentage-point terms, although the low overall participation rates indicate that digital merchant payments remain underdeveloped for both groups.

Generally, the finding shows that the gender divide has at least two layers. The first concerns entry into digital finance, while the second concerns intensity and type of use. The second layer is especially important for economic empowerment because digital payments can facilitate participation in markets, employment, entrepreneurship, remittances, and formal financial transactions.

4.2.2. Determinants of digital financial depth

Table 6
Determinants of digital financial depth

Variables	Any Digital Payment		Digital Merchant Payment	
	Model 1	Model 2	Model 1	Model 2
Income quintile	0.005** (0.002)	-0.000 (0.003)	-0.001 (0.004)	0.008 (0.008)
Internet use	0.009 (0.008)	0.023*** (0.008)	0.190*** (0.015)	0.092*** (0.027)
Education	0.029*** (0.006)	0.004 (0.008)	0.079*** (0.013)	0.025 (0.026)
Age	0.001*** (0.000)	-0.000 (0.000)	-0.001** (0.001)	0.000 (0.001)
Female	-0.013** (0.006)	-0.013* (0.007)	-0.007 (0.012)	0.038* (0.023)
Urban	0.006 (0.008)	-0.005 (0.010)	0.033** (0.015)	0.061** (0.031)
Employment	0.013* (0.007)	0.019** (0.009)	-0.007 (0.014)	0.004 (0.028)
ID ownership	0.024*** (0.008)	-	-0.138*** (0.016)	-
Online digital ID	-	0.014 (0.015)	-	-0.230*** (0.046)
Digital account	0.276*** (0.018)	0.210*** (0.032)	0.133*** (0.035)	0.309*** (0.101)
Financial account	0.361*** (0.011)	0.467*** (0.021)	-0.056** (0.022)	-0.019 (0.068)
Mobile account	0.345*** (0.016)	0.313*** (0.025)	0.135*** (0.032)	-0.165** (0.080)
Notes: Standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.				

Similar to access, Table 6 shows that internet use becomes especially important for merchant payments. Its coefficient is 0.190 in Model 1 and remains strongly significant in Model 2 at 0.092. This indicates that connectivity is particularly relevant for moving from digital financial access to active commercial use. Digital account ownership as one of the indicator of digital financial access also strongly associated with digital-payment use. The coefficient is 0.276 in the Model 1 any-payment specification and 0.133 in the merchant-payment specification. This suggests that account ownership is an important gateway to subsequent digital financial activity.

Financial-account ownership and mobile-account ownership are also strongly associated with any digital payment. The high coefficients indicate that digital payment behavior is closely connected to broader financial-system participation. However, their effects differ in the merchant-payment models, suggesting that different types of digital financial services may facilitate different forms of financial activity.

The female coefficient is negative and statistically significant in the any-digital-payment models. This provides multivariate evidence that women's disadvantage persists even after controlling for several socioeconomic and financial characteristics. The persistence of the female coefficient in the depth models contrasts with its lack of statistical significance in the access models and suggests that gender inequality becomes more pronounced at the usage stage.

The results therefore support a central argument of this study: the gender gap is not simply an access problem. Even after women enter the digital financial ecosystem, they may not use digital financial services as intensively as men.

4.2.3. Oaxaca–Blinder decomposition of gender gaps in digital finance depth

Table 7
Oaxaca–Blinder decomposition of gender gaps in digital finance depth

Variables / Components	Any Digital Payment		Digital Merchant Payment	
	Model 1	Model 2	Model 1	Model 2
Female mean	0.623***	0.717***	0.202***	0.119***
	(0.011)	(0.020)	(0.009)	(0.014)
Male mean	0.734***	0.827***	0.263***	0.200***
	(0.011)	(0.017)	(0.011)	(0.018)
Gender gap	−0.111*	−0.109*	−0.061*	−0.081*
	(0.015)	(0.026)	(0.014)	(0.023)
Endowments (Explained)	−0.118*	−0.118*	−0.079*	−0.054*
	(0.014)	(0.025)	(0.009)	(0.014)
Coefficients (Unexplained)	0.014	0.011	0.021	−0.036
	(0.007)	(0.009)	(0.013)	(0.023)
Interaction	−0.007	−0.003	−0.003	0.008
	(0.004)	(0.005)	(0.008)	(0.014)
Endowments: Contributions				
Income quintile	−0.004***	0.001	−0.001	0.001
	(0.002)	(0.002)	(0.003)	(0.005)
Internet use	0.000	−0.004	−0.033***	−0.027***
	(0.002)	(0.003)	(0.005)	(0.010)
Education	−0.004***	0.002	−0.004	0.008
	(0.001)	(0.002)	(0.002)	(0.007)
Age	−0.002***	−0.001	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.002)
Urban	0.000	−0.001	0.001	−0.008*
	(0.000)	(0.001)	(0.001)	(0.004)
Employment	0.000	−0.004**	0.006	0.005

Variables / Components	Any Digital Payment		Digital Merchant Payment	
	Model 1	Model 2	Model 1	Model 2
	(0.002)	(0.002)	(0.004)	(0.005)
Mobile account	−0.046***	−0.054***	−0.030***	−0.018
	(0.007)	(0.013)	(0.007)	(0.018)
Financial account	−0.015***	−0.004**	−0.021***	−0.018***
	(0.002)	(0.002)	(0.004)	(0.007)
Digital account	−0.047***	−0.054***	0.005	0.001
	(0.007)	(0.014)	(0.006)	(0.017)
Id Ownership	0.001	—	−0.005***	—
	(0.001)		(0.002)	
Online digital Id	—	0.000	—	0.001
		(0.000)		(0.003)
Observations	3,788	998	3,788	998
Female observations	2,045	513	2,045	513
Male observations	1,743	485	1,743	485

Table 7 shows Blinder-Oaxaca decomposition of gender differences in digital finance depth indicators (any digital payment and digital merchant payment). The evidence from this Table reveals substantial and statistically significant gender gap in both digital payment depth or use indicators. For any digital payment indicator, women participation rate is 62.3% compared to 73.4% for men in model 1 with −11.1% points gap. While a smaller participation and gap has been observed for digital merchant payments with 20.2% for women compared with 26.3% for men, giving a statistically significant gap of −6.1% points ($p < 0.01$). Thus, across both specifications and indicators, women are consistently less likely than men to engage in digital payments, with the gender disadvantage particularly pronounced for overall digital payment participation.

The decomposition result indicates that observable characteristics dominantly explain gender gap in digital finance depth. For any digital payment, the explained component is − 0.118 in both models and is statistically significant. This means that differences between women and men in their observable characteristics account for more than the entire raw gender gap. The fact that the explained component is slightly larger in absolute magnitude than the total gap occurs because the unexplained component offsets part of the explained disadvantage.

For digital merchant payments, the explained component is − 0.079 in Model 1 and − 0.054 in Model 2, both statistically significant. Hence, differences in observable characteristics account for a substantial proportion of the gender gap in merchant payments.

The unexplained coefficient component is positive for any digital payment in Model 1 (0.014, $p < 0.05$), but statistically insignificant in Model 2 (0.011). For digital merchant payments, the coefficient component is 0.021 in Model 1 and − 0.036 in Model 2, neither statistically significant. Consequently, the results provide limited evidence that differences in coefficients or returns to characteristics are systematically responsible for the gender gap. Rather, the decomposition points primarily toward differences in endowments and access-related characteristics.

The results suggest that women's lower levels of access to or ownership of digital, mobile, and financial accounts are important mechanisms underlying the gender gap. In particular, the contributions of mobile and digital accounts are substantially larger than those of conventional socioeconomic characteristics, highlighting the importance of digital financial infrastructure in explaining gender inequality in payment use.

The pattern remains broadly similar in Model 2. Digital account (− 0.054***) and mobile account (− 0.054***) make the largest negative contributions, followed by financial account (− 0.004**). Employment also contributes negatively and significantly (− 0.004**).

For digital merchant payments, internet use is particularly important. Its endowment contribution is − 0.033* in Model 1 and − 0.027* in Model 2. This indicates that differences in internet use between women and men substantially contribute to the merchant-payment gap. Financial account ownership also has a significant negative contribution of − 0.021* in Model 1 and − 0.018* in Model 2. Mobile account ownership contributes − 0.030* in Model 1, although its contribution becomes statistically insignificant in Model 2.

The ID ownership variable (Model 1) makes a relatively small contribution to the explained component: 0.001 for any digital payment and − 0.005* for digital merchant payment. Thus, conventional ID ownership appears to play a limited role in explaining the gender gap in overall digital payment use, although it has a statistically significant negative contribution for merchant payments.

Similarly, online digital ID (Model 2) has a negligible contribution: 0.000 for any digital payment and 0.001 for merchant payments, neither of which is statistically significant. This suggests that, conditional on other characteristics, differences in online digital ID do not substantially explain the observed gender gaps in these payment outcomes.

Generally, the decomposition provides evidence that the gender gap in digital payments is primarily an endowment/access gap rather than a coefficient gap. In other words, women appear to participate less in digital payments largely because they have systematically different levels of the characteristics and

digital financial resources associated with payment use particularly digital accounts, mobile accounts, financial accounts, and internet access.

This finding is important for policy because it suggests that simply improving the returns to existing characteristics may not be sufficient to close the gender gap. Policies aimed at expanding women's access to digital accounts, mobile-based financial services, internet connectivity, and broader digital financial infrastructure are likely to be more effective in reducing gender disparities in digital payment participation.

For digital merchant payments, the particularly strong contribution of internet use indicates that digital connectivity may be a critical channel through which gender inequality translates into unequal participation in digitally mediated commerce.

In summary, the central finding is that women face a statistically significant 6.1–11.1 percentage-point disadvantage in digital payment participation, and most of this disadvantage is explained by differences in observable characteristics especially access to digital, mobile, and financial accounts and, for merchant payments, internet use. The relatively weak and mostly insignificant unexplained component provides limited evidence of systematic gender differences in the coefficients once these characteristics are

5. Conclusions and Policy Implications

5.1. Conclusion

This study finding provides the following main conclusions about gender inequality in digital finance access and depth for four East African countries.

First, there high gender gap in digital finance point of access. Women have lower rates of digital-account and mobile-money ownership than men across the countries examined. At the regional level, there is about 11.89% point’s digital-account participation gap while the mobile-money participation gap is 10.35 percentage points. The regional GPI of 0.83 for digital accounts and 0.84 for mobile money indicates that women participate at only about four-fifths of the male rate. The disparity is particularly noticeable in Ethiopia, where female participation is less than half the male rate for both digital-account and mobile-money ownership.

Second, gender inequality persists beyond access and extends to actual digital financial use. Women are less likely than men to make or receive digital payments and to use digital merchant payments. At the regional level, women participate in any digital payment at a rate of 60.23%, compared with 71.02% among men, while the gender gap in digital merchant payments is 5.79 percentage points.

Third, gender gap varies across countries where Kenya exhibits the narrowest gender disparities, while Ethiopia’s gender gap is very high, with female participation in digital accounts and mobile money

substantially below that of men. Tanzania and Uganda are in intermediate positions. This cross-country variation reveals that the expansion of digital financial systems do not automatically generate equal participation across gender groups.

Fourth, social, economic and digital characteristics are the determinants of gender differences in digital financial participation. Internet use, income, education, urban residency and employment are essential determinants of digital financial access, particularly, particularly internet use are associated with digital financial access. Thus, gender inequality in digital finance is closely connected to broader differences in socioeconomic and digital endowments.

Fifth, the explained or endowment component is statistically significant and accounts for the largest part of the observed gender differences across the decomposition specifications. For any digital payment, digital-account and mobile-account ownership make particularly large negative contributions, while income, education, and age also contribute to the explained gap. For digital merchant payments, internet use, mobile-account ownership, and financial-account ownership are among the most important contributors. These results indicate that differences in women's and men's observable socioeconomic and digital characteristics are central to understanding the aggregate gender gap.

Sixth, the unexplained coefficient component is generally statistically insignificant across the decomposition specifications, particularly for digital merchant payments. This suggests that the gender gap is primarily associated with differences in observed characteristics rather than systematic differences in the estimated returns to those characteristics.

Finally, women face disadvantages in digital-account and mobile-money ownership, and these disadvantages persist in digital payment and merchant-payment participation. The results therefore show that digital financial inclusion should be understood not only in terms of whether individuals have access to digital financial services, but also in terms of the extent to which they are able to use those services. The study consequently highlights an access–capability–usage dimension of the gender divide, with substantial cross-country differences and a dominant role for observable socioeconomic and digital characteristics in explaining the observed disparities.

5.2. Policy Implications

The findings have several implications for financial-sector and digital-development policy.

The first priority should be women's digital connectivity. Internet use is one of the strongest predictors of digital financial access and is particularly important for digital merchant payments. Expanding affordable mobile internet coverage, reducing the cost of data, and improving network quality in underserved areas can therefore contribute directly to narrowing the digital financial gender gap. Connectivity policy should explicitly incorporate gender-disaggregated targets rather than assuming that universal infrastructure automatically produces equal usage.

The second priority is digital and financial literacy among women. Education is strongly associated with access and contributes positively in the decomposition. However, conventional schooling and digital financial literacy should be distinguished. Women may have formal education but still lack the practical knowledge required to use mobile applications, digital payments, authentication systems, or financial-security mechanisms. Financial education programs should therefore be combined with hands-on digital training.

The third priority is women's economic participation. Employment and income make substantial contributions to the observed gender gap. Policies that increase women's employment, earnings, entrepreneurship, and participation in formal economic activities can therefore indirectly promote digital financial inclusion. Digital wage payments, women-owned business accounts, digital savings products, and merchant-payment solutions targeted toward female entrepreneurs can create a stronger link between women's economic activity and digital finance.

The fourth priority is to move from account ownership to meaningful use. The results demonstrate that account ownership does not guarantee equivalent digital-payment participation. Financial inclusion strategies should therefore measure women's transaction frequency, merchant-payment use, digital savings, digital transfers, and other dimensions of active use rather than relying solely on ownership indicators.

The fifth priority concerns country-specific strategies. Kenya's relatively small access gap suggests that the policy challenge is increasingly about intensive and productive use rather than basic entry. Ethiopia, in contrast, requires stronger emphasis on foundational access, affordability, connectivity, and digital capability.

Finally, digital-financial policies should be integrated with broader gender-equality policies. Consequently, digital financial inclusion should not be treated as an isolated financial-sector intervention.

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