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Financial inclusion, remittances and household consumption in sub-Saharan Africa: Evidence from the application of an endogenous threshold dynamic panel model

Mahamat Ibrahim Ahmat-Tidjani[1]

Abstract

This paper examines the effect of financial inclusion on per capita household consumption expenditures in sub-Saharan Africa. It uses data from 28 countries over the period 2004–2022 and an endogenous threshold dynamic panel model for econometric estimations. The study finds evidence of the asymmetric effects of financial inclusion on household consumption expenditures in the region. There exists a remittances threshold that varies between 2.6% and 6.5% of an average sub-Saharan African country's GDP below which financial inclusion increases per capita household consumption expenditures. However, above that threshold, financial inclusion does not contribute to improving household welfare in the region. Therefore, given that the effect of financial inclusion increases with liquidity constraints, policies that target a better allocation of remittances received would amplify the effect of financial inclusion on household consumption.

Keywords

- financial inclusion
- remittances
- household consumption expenditures
- sub-Saharan Africa

JEL codes: G2, I32, O11

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Introduction

In lower-income countries, households spend a substantial proportion of their income on meeting basic needs, such as food and non-food consumption items (Regmi & Meade, 2013). However, liquidity constraints often limit the ability of poor households to purchase the desired goods and services. Poverty is a major development challenge, particularly in sub-Saharan Africa (SSA), where the number of poor people has increased from 280 million in 1990 to 413 million in 2015 (World Bank, 2018). Thus, to improve living conditions in the region, mechanisms that stimulate asset accumulation are crucial, along with the ability to generate income and provide financial risks management tools.

Financial systems which serve savings mobilisation, resource allocation and risk management can stimulate economic growth (Beck et al., 2000) and contribute to reducing poverty through both direct and indirect (trickle-down effect) channels (Dollar & Kraay, 2002; Jalilian & Kirkpatrick, 2005). However, the welfare effect of finance can be attenuated or cancelled out in the presence of financial market friction. Jalilian and Kirkpatrick (2005) contend that the indirect effect has more impact because of the prohibitive costs of financial services to poor households. Inoue and Hamori (2012) maintain that the indirect effect may not be effective in developing countries, where elites often monopolise the benefits of economic prosperity.

Alternatively, poor households may seek financial support from families in the form of remittances to smooth consumption, invest in education, set up income generating activities and accumulate assets (Acosta et al., 2008; Demirgüç-Kunt et al., 2011). As remittances relax liquidity constraints, mimicking the role of financial inclusion, they can reduce the demand for formal financial services (Ajefu & Ogebe, 2019). Hence, it is essential to test empirically the substitution / complementarity hypothesis between these sources of finance in terms of their welfare effects.

The objective of this paper is to examine the welfare effect of financial inclusion in sub-Saharan Africa. More specifically, the study aims to: 1) identify the effect of financial inclusion on household consumption expenditures; 2) examine the role of remittances on the financial inclusion-household consumption expenditures nexus.

The study adopts a household welfare indicator, namely per capita household consumption expenditure, which is stable and more reliable than income in developing countries (Quartey, 2008; Ravallion & Datt, 2002). Due to the data availability for a fairly long period, this approach is used to examine the finance-remittances-poverty link from an economic welfare angle instead of the traditional income poverty measure (Abor et al., 2018; Nsiah et al., 2021; Sehrawat & Giri, 2016).

To the best of our knowledge, no previous studies have examined the financial inclusion-remittances-household consumption triangle. This paper makes several contributions to existing literature. Firstly, it provides empirical evidence on the macroeconomic welfare effect of financial inclusion in SSA by linking access to and use of formal financial services' indicators to household consumption expenditures. Secondly, using a novel methodological approach, the dynamic panel with potentially endogenous threshold model, the paper establishes evidence of the asymmetric effects of financial inclusion on household welfare by highlighting the role of received remittances. This facilitates testing for the complementarity / substitution hypothesis between financial inclusion and remittances in their effects on welfare. Thirdly, the paper draws policy recommendations to improve access to and use of formal financial services in SSA and their welfare effects on households.

Two main results emerge from econometric analyses: 1) financial inclusion significantly affects per capita household consumption expenditures; 2) the effect of financial inclusion on per capita household consumption expenditures depends on the ratio of remittances received. There exists a threshold level of remittances varying between 2.6% and 6.5% of an average sub-Saharan African country's GDP, below / above which financial inclusion has a positive / negative effect on per capita household consumption expenditures.

The paper is structured as follows: Section 1 is dedicated to the relevant literature. Section 2 presents some stylised facts concerning the dynamics of finance and households' welfare, while Section 3 describes the methodology. Section 4 analyses empirical results and Section 5 presents a discussion of the results. The paper draws some conclusions in the final section.

1. Literature review

1.1. Concepts of poverty and welfare

The welfare school defines income poverty as the lack of economic well-being. Thus, a person is poor when he or she is unable to attain a certain minimum level of well-being considered standard in his or her society. In this vein, the World Bank defines poverty as the inability of people to reach a particular minimum standard of living defined according to consumption of basic needs (World Bank, 1990).

From an empirical standpoint, indicators such as income share of the lowest quintile, headcount ratio and poverty gaps are used to measure poverty. However, by focusing on actual resources used by households to meet their

needs, consumption expenditures provide a better measure of economic well-being and indirectly for poverty. This is relevant to developing countries, where consumption expenditures among the poor are more reliable and stable than their incomes, and data on poverty are scarce because of limited surveys of households (Dhrifi, 2015; Sehrawat & Giri, 2016; Uddin et al., 2014).

1.2. Theoretical framework for the finance, remittances and economic welfare nexuses

Early theories show that finance affects poverty through direct and indirect channels. Whereas the indirect effect could come from shared economic prosperity (Dollar & Kraay, 2002, 2004), the direct effect could be the result of financial development that reduces costs and information asymmetry (Stiglitz, 1998), or improved access to financial services by poorer citizens (World Bank, 1990). Two theoretical predictions emerge from the direct effect of finance: McKinnon's conduct effect (McKinnon, 1973), which states that financial development can provide profitable savings opportunities for poor people to accumulate higher-yielding assets; and Shaw's intermediation effect (Shaw, 1973), which postulates that financial development improves access to credit.

However, the beneficial effect of finance can be reaped if financial development improves access to and use of financial services by tackling the causes of market failures. Improved access and use can lead to increased asset accumulation by poorer people, productivity, income and the potential for sustainable livelihoods (Banerjee et al., 2017; Cole et al., 2017; Dupas et al., 2018; Dupas & Robinson, 2013). Therefore, by providing access to savings, credits and financial risks management, financial inclusion reduces liquidity constraints, and increases disposable income and consumer spending, hence improving economic well-being.

However, in developing countries, where financial sectors are less developed and access to finance is highly asymmetric (Beck et al., 2007), financial development can further widen inequalities by strengthening the economic position of the rich (Demirgüç-Kunt & Levine, 2009; Greenwood & Jovanovic, 1990), perpetuating poverty. Thus, limited access to credits and savings tools would restrict household consumption expenditures.

As with financial inclusion, remittances, a substantial alternative source of financing, provide recipient households with an additional income that can be used to purchase goods and services, thus boosting consumption (Combes & Ebeke, 2011; Ramcharran, 2020). Furthermore, remittances may have a stabilising effect on consumption (Combes & Ebeke, 2011) in countries where most households draw their income from volatile economic sectors, such as agriculture in developing countries.

Two theoretical predictions on the remittances-financial inclusion nexus emerge in the literature: the complementarity hypothesis and the substitutability hypothesis. The complementarity hypothesis postulates that remittance flows improve access to and use of formal financial services through the demand for deposit accounts (Aggarwal et al., 2011; Anzoategui et al., 2011; Demirgüç-Kunt et al., 2011) and bank branch expansion (Demirgüç-Kunt et al., 2011). Conversely, the substitutability hypothesis postulates that remittances may not act as a catalyst for financial inclusion. In imperfect credit markets, remittances may substitute for financial inclusion by alleviating households' liquidity constraints (Ambrosius & Cuecuecha, 2013; Anzoategui et al., 2011; Brown & Carmignani, 2015).

1.3. Empirical literature

Several studies have examined the effect of finance on poverty and households' welfare. In a pioneering study, Burgess and Pande (2005) reveal that the expansion of rural bank branches reduced poverty in India. Similarly, Dhrifi (2015) finds financial development to increase per capita household consumption expenditures in middle- and high-income countries. The lack of appropriate access to finance was cited as the main reason for the absence of such an effect in low-income countries. In a study of long-term relationships, Sehrawat and Giri (2016) find that financial development increases per capita household consumption expenditures.

Investigating the role of financial inclusion on inclusive growth in Ghana, Abor et al. (2018) show that inclusive finance reduces the probability of households falling into poverty and increases per capita consumption expenditures. Using repeated household Financial Access datasets over the period 2009–2016, Mwangi and Atieno (2018) show that financial inclusion increases Kenyan households' welfare. Likewise, Chakrabarty and Mukherjee (2022) demonstrate a positive impact of financial inclusion on rural and urban households' welfare (diversification in consumption expenditure) in Inda.

Nsiah et al. (2021) adopt a financial inclusion index to examine the poverty-alleviating effect of financial inclusion, using data for 15 SSA countries. The study findings from the Static Threshold Effect Panel show that financial inclusion reduces poverty above the index threshold level of 0.365. Bari et al. (2024) examine the effect of financial inclusion on slum households' expenditure patterns in Bangladesh. Their findings show that financial inclusion increases expenditure on education, but it has no significant effect on food, non-food and health expenditures.

Other studies have examined the beneficial effects of remittances and the ramifications for financial development / inclusion. Findings by Combes and

Ebeke (2011) indicate that remittances reduce households' consumption instability, with this effect being more pronounced in less financially developed countries. Inoue (2018) show that remittances negatively transform the effect of financial development on poverty in favour of the substitutability hypothesis. Quantifying the effect of remittances on investment, Askarov and Doucouliagos (2020) find that remittances increase households' expenditure on education, with larger effects for international remittances. Similarly, using data from some selected SSA countries, Ajefu and Ogebe (2021) find a positive effect of remittances on expenditures on durable goods, food, health and education.

2. Finance and welfare dynamics in sub-Saharan Africa

Although SSA's financial systems developed following liberalisation reforms in the 1980s, tariff and non-tariff barriers deprive a substantial share of the population of access to formal finance systems. Largely dominated by banks, financial systems in SSA are less inclusive even by the standard of developing countries (Allen et al., 2014; Otchere et al., 2017). The 2021 Global Findex report cites having little money to use an account, exorbitant costs and distance from financial institutions are major barriers to financial inclusion (Global Findex, 2021).

Figure 1 breaks down by income level the financial inclusion indicators in SSA in 2021. In panel a, while overall access to formal accounts was around 55%, it was only 44% for the poorest 40% quintile of households, against 63% for the richest 60% quintile. In panel b, 16% and 10% of adults in SSA, respectively, used financial institutions savings and borrowings (including mobile money) with a substantial gap between rich and poor. The gaps stand at 11 and 5 percentage points, respectively, for savings and borrowings for the 60% and 40% quintiles of the richest and poorest households.

In 2021, savings and credit gaps, which had increased compared to their levels in 2017, point to a deterioration in the use of formal financial services, despite improved access. This poses an additional challenge to reaping benefits from financial inclusion in the region. Therefore, bringing previously excluded or marginalised segments into formal financial systems while encouraging the use of its services would improve living conditions of population.

Improving the standard of living is a development challenge facing developing countries in general and those of SSA in particular. World Bank data show that whereas global extreme poverty fell from 36% in 1990 to 10% in 2015, an increasing number of people experience poor living conditions in sub-Saharan Africa (World Bank, 2020). For instance, per capita household

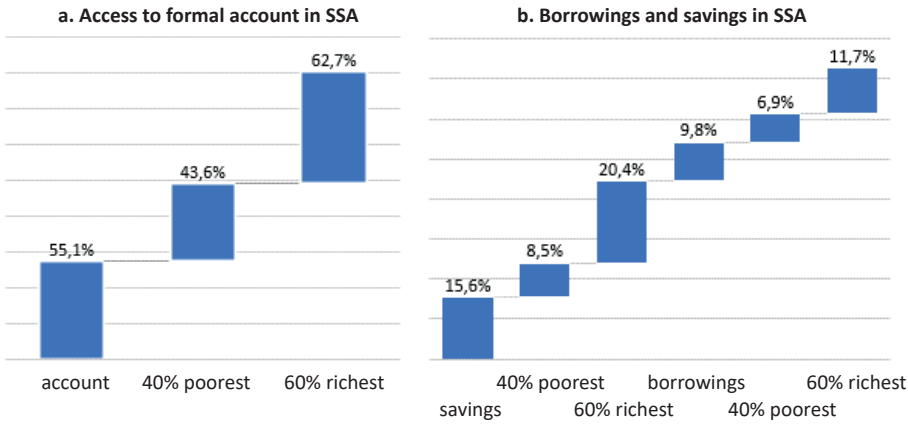

Figure 1. Breakdown of financial inclusion in sub-Saharan Africa by income level in 2021

Source: based on (Global Findex, 2021).

consumption expenditures rose from $ 737 and $ 2334 in 1990 to $ 1079 and $ 4442 in 2015, respectively, in SSA and East Asia and Pacific.

Access to finance is likely to be a discriminating factor in explaining the trajectories of welfare and extreme poverty reduction in developing countries. Alternatively, remittances, which constitute an external source of finance, make up a substantial share of GDP in many SSA countries, such as Liberia (27%), Comoros (21%), Gambia (21%), Lesotho (15%) and Senegal (14%) (Ratha et al., 2018). Empirical studies show that remittances reduce poverty and inequality, and improve investment in human and physical capital and promote economic growth (Acosta et al., 2008; Adams & Cuecuecha, 2013; Cepparulo et al., 2017; Combes et al., 2014).

3. Materials and methods

3.1. Data

The paper uses data from the World Bank (WDI and GFDD) databases for 28 SSA countries over the period 2004–2022. Household consumption (Cons) is measured by per capita final household consumption expenditures (constant 2015 US $). Although household consumption expenditure is an indicator of economic welfare (Beegle et al., 2012), it is also widely used to measure poverty. Moreover, poverty is well depicted by consumption-based measures

than income-based measures (Meyer & Sullivan, 2011) and consumption expenditure data are available for a fairly long period.

Financial inclusion (FI) is measured by bank branch and deposits. Bank branch density indicates the prevalence of commercial banks per 100,000 adults, while deposits per 1,000 adults measure formal savings. Financial inclusion relaxes liquidity constraints, stimulates asset accumulation, and increases productivity, entrepreneurship, income and the potential for sustainable livelihoods (Banerjee et al., 2017; Cole et al., 2017; Dupas et al., 2018; Dupas & Robinson, 2013). It is expected to have a positive effect on household consumption expenditures.

Remittances (Rem) measured by the ratio of remittances received to GDP would increase household final consumption expenditures by providing recipient households with additional income for consumption as well as for investment (Acosta et al., 2008; Adams & Cuecuecha, 2013; Combes & Ebeke, 2011). GDP per capita (GDPpc) at constant 2015 US $ measures the level of economic development and is expected to improve household welfare. Economically more developed countries tend to have a lower level of poverty.

Inflation (Inf), measured by the consumer prices index (annual %), reduces household consumption, as high and unpredictable inflation erodes the income of the poor, which is often not indexed to inflation (Easterly & Fischer, 2001). Trade openness (Open), measured by the sum of exports and imports of goods and services as a share of GDP, can have a positive effect on welfare (Anetor et al., 2020) through a number of channels, including increased government revenue, which can be used to finance social policies, faster growth, lower prices for imported products, etc. However, trade openness may increase vulnerability as a result of integration into the globalised world, or its effectiveness may depend on other factors (Le Goff & Singh, 2014).

Government expenditure (Exp), which include expenditures on education, health and public subsidies, is used to control for public redistribution policies. The expected effect of Government expenditure is ambiguous, as it depends on the effectiveness of such policies (Anderson et al., 2018). Effective redistribution policies increase consumption, while the absence of such policies reduces it. Similarly, the unemployment level (Unem) diminishes household welfare (Corcoran & Hill, 1980).

3.2. Econometric model specification

While financial inclusion enables people to invest in income-generating activities and accumulate assets, poor households are often excluded from formal financial systems because of prohibitive costs and non-tariff barriers.

Although funds received from remittances ease liquidity constraints and improve welfare, it is usually households with poor living conditions who are more likely to receive remittances.

To examine the interrelationships between financial inclusion, remittances and household consumption, this study adopts Seo and Shin's (2016) Endogenous Threshold Dynamic Panel (ETDP) model. The model captures asymmetric effects (in the presence of heterogeneity) and dynamics of adjustment and also accommodates for both regressors and the threshold variable to be endogenous.

The starting point of the ETDP is the static threshold panel model developed by (Hansen, 1999), in which regressors and the threshold variable are all assumed to be exogenous. Caner and Hansen (2004) extended the model to accommodate endogenous regressors adapted for cross-sectional data. González et al. (2004) developed the Panel Threshold Smooth Transition Regression (PTSR) model, which allows coefficients to change gradually from one regime to another. Although Kremer et al. (2013) generalised Caner and Hansen's model to panel data, this model captures the dynamic nature associated with the persistence of the phenomena under study only within an exogenous threshold variable framework.

To address the limitations of these models, Seo and Shin (2016) proposed the Endogenous Threshold Dynamic Panel model, which can be written as follows:

$$y_{it} = (1, x'_{it})\phi_1 1(q_{it} \leq \gamma) + (1, x'_{it})\phi_2 1(q_{it} > \gamma) + \varepsilon_{it} \tag{1}$$

where y_{it} is the dependent variable, x_{it} a vector $(k1 \cdot 1)$ of time-varying regressors that can include a lagged value of the dependent variable (y_{it-1}), $1(-)$ is an indicator function, q_{it} is the transition variable, γ is the threshold parameter, $\phi 1$ and $\phi 2$ are coefficients of different regimes dictated by the threshold variable, and ε_{it} are the error terms defined by $\varepsilon_{it} = \alpha_i + \nu_{it}$.

The model developed by Seo and Shin (2016) draws inferences by estimating parameter conditioning on a threshold variable, which might be endogenous (affected by other variables in the model). Therefore, the estimated slope coefficients that measure the effect of variables on the outcome may differ depending on the value of the estimated threshold.

To address the critical issue of endogeneity, the authors proposed estimation techniques based on first-differenced Generalised Method of Moments (FD-GMM) or first-differenced two-stage least squares (FD-2SLS). While the latter is used in the case of strict exogeneity of the threshold variable, the former allows for both regressors and the threshold variable to be endogenous and uses lagged dependent variables as instruments.

Moreover, Seo and Shin (2016) propose a linearity testing procedure (following a Wald statistic) and a Hausman type test, which postulate the absence

of a threshold effect and the exogeneity of the threshold variable under a null hypothesis, respectively.

The ETDP model has recently attracted considerable attention in literature for its ability to analyse dynamic effects in a framework where both regressors and the transition variable can be endogenous (Bolarinwa & Simatele, 2023; Ochi et al., 2023; Okunade, 2022). The empirical specification of the model is given by:

$$\begin{aligned} Cons_{it} = & (\varphi_1 Cons_{it-1} + \beta_{11} FI_{it} + \beta_{21} \mathrm{Re}m_{it} + \beta_{31} GDPpc_{it} + \beta_{41} Exp_{it} + \\ & + \beta_{51} Inf_{it} + \beta_{61} Unem_{it} + \beta_{71} Open_{it}) \cdot I(\mathrm{Re}m_{it} \le \gamma) + \\ & + (\varphi_2 Cons_{it-1} + \beta_{12} FI_{it} + \beta_{22} \mathrm{Re}m_{it} + \beta_{32} GDPpc_{it} + \beta_{42} Exp_{it} + \beta_{52} Inf_{it} + \\ & + \beta_{62} Unem_{it} + \beta_{72} Open_{it}) I(\mathrm{Re}m_{it} > \gamma) + \mu_i + \varepsilon_{it} \end{aligned} \quad (2)$$

Cons is the dependent variable and given the dynamic nature, its one-period lagged value ($Cons_{it-1}$) is introduced into the model. *FI* is financial inclusion, remittances (*Rem*) is the threshold variable and γ is the threshold coefficient. Control variables are per capita GDP (*GDPpc*), government expenditures (*Exp*), inflation (*Inf*), unemployment (*Unem*) and trade openness (*Open*). Coefficients βs and ϕs are parameters to be estimated; μ represents specific fixed effects and ε is the error term.

4. Empirical results

4.1. Descriptive statistics

Table 1 shows that over the period 2004–2022, per capita household consumption expenditures reached an average of $1,468, with a minimum of $202 and a maximum of $1,789. The overall level of financial inclusion is very low. On average, there are 7 commercial bank branches per 100,000 adults and 321 commercial bank depositors per 1,000 adults in the region. While remittances constituted a substantial share of GDP in some countries, up to 42%, in others they represented an insignificant share (0%).

On average, remittances represented 4.11% of the GDP of SSA countries. GDP per capita was $2,312 on average, with some variability between countries (standard deviation equals $3072). Public spending in areas of interest averaged 16.13% of GDP, with a minimum of 2.1% and a maximum of 44%. The average inflation rate was 7.4%, while the average unemployment rate among SSA populations over the period was around 8%.

Table 1. Descriptive statistics

Variable	Obs.	Mean	SD	Min	Max
Cons	532	1468.02	2010.06	201.96	13789.27
Branch	532	6.67	9.67	0.04	54.45
Deposit	532	321.44	474.47	0	2070.74
Rem	532	4.11	5.84	0	41.50
GDPpc	532	2312.29	3072.36	128.54	19141.51
Open	532	74.80	36.26	22.24	222.18
Exp	532	16.13	7.59	2.05	43.48
Unem	532	7.68	7.36	0	37.85
Inf	532	7.42	27.61	-16.86	557.20

Source: based on WDI and GFDD (2022).

4.2. Estimating the effect of financial inclusion on household consumption

The endogenous threshold dynamic panel model requires two conditions: data series contain no missing values, and variables are stationary. To test for stationarity, a battery of first-generation tests is employed (Levin–Lin–Chu, Breitung, Im–Pesaran–Shin and Fisher Phillips–Perron tests), as these tests provide more reliable results for data with a relatively short time period (as in the case of this study, 2004–2022). The results of stationarity tests are shown in Table 2. The null hypothesis is the presence of a unit root (non-stationary variables). In the table, probabilities associated with variables are smaller than standard significance levels (1%, 5% and 10%), rejecting the null hypothesis; all variables are stationary.

Table 3 presents the effect of bank branch expansion on household consumption expenditures. The results show that the one-period lagged value of the dependant variable is significant at 1%, confirming the validity of the dynamic specification of the model. Moreover, the threshold coefficient is significant at 1%, rejecting the null hypothesis and validating the ETDP specification. Thus, there is a remittances threshold, estimated at 6.5% of an average SSA country's GDP, which modulates the effect of bank branch on household consumption expenditures.

Below the threshold (regime 1), commercial bank branch expansion increases per capita household consumption expenditures in SSA. Thus, better access to formal financial services enables households to accumulate human

Table 2. Unit root tests

Variable	Levin–Lin–Chu		Breitung		Im-Pesaran-Shin		Fisher (PP)	
	statistic	*P*	statistic	*P*	statistic	*P*	statistic	*P*
Cons	–4.1614	0.0000	–2.0346	0.0209	–4.9697	0.0000	82.9429	0.0112
Branch	–4.0765	0.0000	–3.5882	0.0002	–3.0066	0.0013	82.6995	0.0117
Deposit	–5.0232	0.0000	–1.8615	0.0313	–4.8383	0.0000	77.0028	0.0328
Rem	– 3.3965	0.0003	–1.7202	0.0427	–6.6160	0.0000	180.2298	0.0000
Rem_vol	–1.9444	0.0259	–2.5194	0.0059	–5.4867	0.0000	86.1225	0.0060
Open	–4.2509	0.0000	–1.3363	0.0907	–2.7932	0.0026	99.2613	0.0003
GDPpc	–5.4774	0.0000	–1.9918	0.0232	–5.0281	0.0000	81.8499	0.0137
Exp	–5.3391	0.0000	–2.3479	0.0094	–4.2952	0.0000	75.3563	0.0433
Unem	–5.8246	0.0000	–2.2854	0.0111	–1.5144	0.0650	80.9431	0.0102
Inf	–3.2576	0.0006	–1.5861	0.0564	–8.1680	0.0000	267.7922	0.0000

Source: based on WDI and GFDD (2022).

and physical capital and undertake profitable activities, thereby increasing their income-generating capacity, incomes and consumption expenditures. Moreover, the ratio of remittances to GDP acts as a catalyst for the effect of bank branch expansion on improving welfare. Remittances would increase the rate of accumulation of human and physical capital (Barajas et al., 2009), income for consumption, and enable people to escape poverty (Acosta et al., 2008; Combes & Ebeke, 2011).

This evidence is in the favour of the complementarity hypothesis between financial inclusion and remittances. In one hand, bank branch expansion reduces the costs of accessing (opening accounts) and using formal financial services, thereby increasing the likelihood that households demand these services. For instance, Bofondi and Gobbi (2006), Brevoort and Hannan (2006), Degryse and Ongena (2005) and Gobbi and Zizza (2012) find that proximity to bank branches reduces interest rates and default on payment rates, as well as increasing the probability of opening an account and accessing credit. On the other hand, received funds provide recipient households with additional income for consumption (Combes & Ebeke, 2011; Ramcharran, 2020), thus boosting their consumption expenditures.

Above the threshold (regime 2), bank branch expansion reduces per capita household consumption expenditure. Thus, remittances substitute financial

inclusion by relaxing households' liquidity constraints, allowing them to invest in capital accumulation and mitigate the effects of income shocks (Ambrosius & Cuecuecha, 2013; Anzoategui et al., 2011; Brown & Carmignani, 2015), dampening the welfare effect of bank branch expansion. Furthermore, the study results show that the effect of GDP on per capita household consumption expenditures is asymmetric, while trade openness exerts symmetrical effects on per capita household consumption expenditures.

Table 3. Bank branch, remittances ratio and household consumption expenditures

Variables	Coeff.	SD	*Z*	*P*	[CI 95%]	
Regime 1 (below the threshold)						
l.Cons	0.823***	0.039	21.370	0.000	0.748	0.899
Exp	0.001	0.001	0.630	0.529	–0.002	0.004
Unem	–0.023**	0.011	–2.030	0.042	–0.044	–0.001
Inf	0.001**	0.000	2.150	0.031	0.000	0.002
Open	0.063	0.056	1.120	0.265	–0.047	0.172
GDPpc	0.003***	0.001	2.570	0.010	0.001	0.005
Branch	0.075**	0.036	2.100	0.036	0.005	0.146
Regime 2 (above the threshold)						
l.Cons	0.150***	0.050	3.000	0.000	0.129	1.130
Exp	–0.021	0.025	–0.810	0.418	–0.070	0.029
Unem	0.071	0.051	1.400	0.162	–0.028	0.170
Inf	–0.032	0.080	–0.400	0.688	–0.190	0.125
Open	0.505**	0.198	2.550	0.011	0.117	0.893
GDPpc	–0.027**	0.012	–2.230	0.026	–0.051	– 0.003
Branch	–0.443***	0.155	–2.860	0.004	–0.747	–0.139
Constant	–1.994	4.130	–0.480	0.629	–10.089	6.101
Threshold (Rem%GDP)	6.497***	0.542	12.000	0.000	5.435	7.558

Note: significance levels denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: based on WDI and GFDD (2022).

Table 4 presents the effect of bank deposits on household consumption expenditures. In both regimes, coefficients on the one-period lagged value household consumption are significant at 1% and 5%, respectively, validating the dynamic specification of the model. Furthermore, the probability asso-

ciated with the remittances threshold coefficient is less than 1%, thereby rejecting the null hypothesis and validating the ETDP specification. Thus, there is an estimated remittances threshold of 2.5% of an average SSA country's GDP, which modulates the effect of bank deposits on household consumption expenditures.

In regime 1 (below the threshold), the results show that commercial bank deposits increase per capita household consumption expenditures in SSA. This result provides an empirical validation of McKinnon's conduct effect for the financial inclusion-bank deposits nexus. Deposits give households access to profitable savings to accumulate higher-yielding assets that increase productivity, entrepreneurship, income (Dupas et al., 2018; Dupas & Robinson, 2013), and consumption expenditures. Similar to the case of bank branches in regime 1 (Table 3), remittances complement the effect of bank deposits

Table 4. Bank deposit, remittances and household consumption expenditures

Variables	Coeff.	SD	*Z*	*P*	[CI 95%]	
Regime 1 (below the threshold)						
l.Cons	0.473***	0.112	4.220	0.000	0.254	0.693
Exp	–0.023**	0.010	–2.320	0.021	–0.043	–0.004
Unem	0.027	0.022	1.240	0.213	–0.016	0.071
Inf	0.022***	0.004	5.110	0.000	0.013	0.030
Open	–0.005***	0.002	–3.260	0.001	–0.009	–0.002
GDPpc	0.511***	0.116	4.410	0.000	0.284	0.738
Branch	0.039***	0.012	3.210	0.001	0.015	0.063
Regime 2 (above the threshold)						
l.Cons	0.819**	0.377	2.170	0.030	0.079	1.558
Exp	0.024	0.019	1.270	0.203	–0.013	0.062
Unem	–0.060*	0.033	–1.810	0.070	–0.126	0.005
Inf	–0.021***	0.004	–5.650	0.000	–0.028	–0.014
Open	0.004**	0.002	2.520	0.012	0.001	0.008
GDPpc	–0.776***	0.202	–3.840	0.000	–1.172	–0.380
Branch	–0.001***	0.000	–4.050	0.000	–0.001	–0.000
Constant	–0.150	2.091	–0.070	0.943	–4.249	3.949
Threshold (Rem%GDP)	2.597***	0.584	4.450	0.000	1.453	3.742

Note: significance levels denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: based on WDI and GFDD (2022).

on household consumption expenditures. However, Kiendrebeogo and Minea (2013) find instead that it is through Shaw's intermediation effect that financial inclusion reduces the incidence and severity of income poverty.

In the second regime (above the threshold), the results indicate that financial inclusion through bank deposits reduces per capita household consumption expenditures. Thus, in line with the substitution hypothesis, the remittances ratio dampens the welfare effect of bank deposits. In this case, additional funds received from remittances may serve more investment-oriented expenditure than consumption (Bari et al., 2024)

Finally, results in Table 4 show that inflation, trade openness and GDP have asymmetric effects on per capita household consumption expenditures.

4.3. Robustness checks

To assess the robustness of results, an alternative indicator to the remittances ratio, the volume of remittances (in current US dollars) was used in the ETDP model. Estimation results are presented in Tables 5 and 6 for the effect of bank branches and deposits on household consumption expenditures, respectively. In both tables, diagnostic tests confirm the existence of a threshold effect in models and the validity of their dynamic specification.

Table 5 suggests that there is a threshold level for the volume of remittances that modulates the effect of bank branches on per capita household consumption expenditures. This threshold is estimated at 18% of the absolute value of remittances received (in current US dollars) by an average sub-Saharan African country over the period 2004–2022. Below the threshold of 18%, the analyses indicate that the coefficient of bank branches is positive and significant at 1%. Thus, opening new bank branches increases per capita household consumption expenditures in the region. In the second regime, above the threshold of 18%, the coefficient of the bank branch is negative and significant at 5%, suggesting that the expansion of bank branches reduces per capita household consumption expenditures.

Results in Table 6 show that there is a threshold level for the volume of remittances that modifies the effect of bank deposits on per capita household consumption expenditures. This threshold is estimated at 19% of the value in current US dollars of remittances received by an average sub-Saharan African country over the period 2004–2022. Below the threshold of 19%, the bank deposits ratio in SSA positively and significantly affects (at 1%) per capita household consumption expenditures. However, above that threshold, the coefficient of the bank deposits variable is negative and significant at 5%, suggesting that bank deposits exert a negative effect on household consumption.

Table 5. Bank branch, volume of remittances and household consumption expenditures

Variables	Coeff.	SD	Z	$P > z$	[CI 95%]	
Regime 1 (below the threshold)						
l.Cons	0.775***	0.036	21.320	0.000	0.703	0.846
Exp	0.009**	0.003	3.070	0.002	0.003	0.015
Unem	0.033**	0.014	2.380	0.017	0.006	0.060
GDPpc	0.002**	0.001	2.470	0.014	0.0003	0.003
Branch	0.005***	0.001	4.000	0.000	0.002	0.007
Regime 2 (above the threshold)						
l.Cons	0.158**	0.062	2.540	0.011	0.120	0.360
Exp	–0.015***	0.003	–4.630	0.000	–0.021	–0.008
Unem	–0.145***	0.048	–3.020	0.003	–0.239	–0.051
GDPpc	–0.002	0.002	–1.170	0.242	–0.005	0.002
Branch	–0.006**	0.003	–1.960	0.050	–0.011	0.000
Constant	1.924***	0.541	3.550	0.000	0.863	2.985
Threshold (Rem%GDP)	17.953***	0.262	68.410	0.000	17.438	18.467

Note: significance levels denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: based on WDI and GFDD (2022).

Table 6. Bank deposit, volume of remittances and household consumption expenditures

Variables	Coeff.	SD	Z	$P > z$	[CI 95%]	
Regime 1 (below the threshold)						
l.Cons	0.822***	0.049	16.810	0.000	0.726	0.917
Exp	–0.001	0.004	–0.200	0.843	–0.009	0.007
Unem	–0.003	0.029	–0.110	0.915	–0.059	0.053
GDPpc	0.001	0.002	0.610	0.543	–0.002	0.003
Branch	0.015***	0.004	3.670	0.000	0.007	0.023
Regime 2 (above the threshold)						
l.Cons	–0.993***	0.256	–3.880	0.000	–1.494	–0.491
Exp	0.096***	0.024	3.940	0.000	0.048	0.144
Unem	–0.085	0.138	–0.620	0.537	–0.354	0.185
GDPpc	0.021***	0.005	5.930	0.000	0.014	0.027
Branch	–0.009**	0.004	–2.350	0.019	–0.017	–0.002
Constant	5.116***	1.761	2.910	0.004	1.665	8.567
Threshold (Rem%GDP)	19.244***	0.425	45.240	0.000	18.410	20.078

Note: significance levels denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: based on WDI and GFDD (2022).

The robustness analyses presented in Tables 5 and 6 confirm the principal findings established in Tables 3 and 4. Financial inclusion, proxied by bank branches and deposits, significantly affects per capita household consumption expenditures in SSA. The effect of financial inclusion on per capita household consumption expenditures is non-monotonic; it depends on the volume of remittances received. There is an estimated threshold level varying between 18% and 19% of the value of remittances received by an average sub-Saharan African country, below / above which financial inclusion increases / decreases per capita household consumption expenditures.

5. Discussion

This paper examines the effect of financial inclusion on household consumption expenditures and how remittances affect this relationship. Two main results emerge from the study. Firstly, financial inclusion, proxied by bank branches and deposits, significantly affects per capita household final consumption expenditures in sub-Saharan Africa. This result augments the existing literature by providing the first evidence of the welfare effect of access to and use of formal financial systems for households at a macroeconomic level.

At a macro level, the findings of Dhrifi (2015) show that financial development has an enhancing effect on per capita household consumption expenditures but only in middle- and high-income countries. Sehrawat and Giri (2016) find that financial development increases per capita household consumption expenditures in South Asian countries. Although these studies establish a link between financial development and household consumption expenditures, in developing countries, where access to finance is skewed due to several factors, poor households may not reap the benefits of financial development.

However, at the micro level, a growing body of literature uses data from surveys of households to examine the effect of financial inclusion on households' welfare. For instance, Abor et al. (2018) found that financial inclusion via mobile phones boosts household consumption in Ghana. Similarly, Mwangi and Atieno (2018), while Chakrabarty and Mukherjee (2022) find a significant welfare effect for financial inclusion in households in Kenya and in India, respectively.

Secondly, the effect of financial inclusion on household consumption expenditures is asymmetric. There is a threshold level of remittances received varying between 2.6% and 6.5% of GDP that modulates the effect of financial inclusion on household consumption expenditures. Below the threshold, bank branches and deposits generate an increase in household consumption ex-

penditures. However, above the threshold, financial inclusion reduces household consumption in the region.

While the majority of studies in the literature examined the non-linear effect for financial inclusion, to the best of our knowledge, this is the first to establish the role of remittances (as an intermediate variable) on the welfare effect of financial inclusion and quantify the turning point (threshold value) that directs the asymmetric effect. This result has practical policy implications for optimising the effect of financial inclusion in sub-Saharan countries.

For instance, Nsiah et al. (2021) use data for 15 SSA countries from 2010 to 2017 to establish that financial inclusion (measured by a composite index) reduces poverty above a threshold of 0.365. However, the non-linearity assessed by Nsiah et al. (2021) is related to financial inclusion itself to indicate at which point of the index the effect on poverty changes. More importantly, the study does not consider the crucial role played by remittances in sub-Saharan Africa as an alternative source of finance.

Thus, the current study shows that the marginal effectiveness of financial inclusion on household consumption expenditures increases with liquidity constraints. This suggests that when households are financially included, any increases in access to and the use of formal financial services above the remittances threshold level would not increase consumption expenditures, since households would engage in conspicuous consumption, fall into a debt cycle by borrowing more from banks, or inefficiently allocate the funds they receive.

Conclusions

The objective of this paper is to examine the effect of financial inclusion on per capita household consumption expenditures in sub-Saharan Africa. To this end, an Endogenous Threshold Dynamic Panel model was adopted on World Bank data for a sample of 28 countries over the period 2004–2022. The main results emerging from the econometric analysis show how financial inclusion through bank branches and deposits significantly affects per capita household consumption expenditures. There exists a threshold level of remittances varying between 2.6% and 6.5% of an average sub-Saharan African country's GDP that modulates this effect. Below the threshold level, financial inclusion increases per capita household consumption expenditures in sub-Saharan Africa, which is in line with the complementarity hypothesis. Conversely, above the threshold, financial inclusion reduces per capita household consumption expenditures, which supports the substitutability hypothesis. These results are robust to the use of an alternative measure to the remittance ratio, and the volume of remittances received in dollars.

Therefore, expanding bank branches in previously unserved or underserved areas accelerates financial outreach in the region. Moreover, designing appropriate programmes which aim to reduce the costs of financial services would improve the use of formal finance by low-income people. For the case of remittances, given that a significant share of remittances in sub-Saharan Africa are sent through the informal channel, partly because of the high costs of transfers in formal financial systems (Ratha et al., 2019), regulatory frameworks that reduce transaction costs would increase the flow of remittances through the formal channel.

However, the effect of financial inclusion on household consumption increases with liquidity constraints, suggesting potential misallocation problems. Therefore, policies that target better allocation of received funds would bolster the effect of financial inclusion on household consumption. This could be achieved, for instance, through establishing financial investment institutions that guide effective investment decisions.

Although the study revealed that access to and use of financial services affects household consumption expenditures, other financial inclusion indicators such as quality and costs of services were not taken into account, due to lack of data. Thus, future studies may explore the effects of these indicators, depending on data availability, in order to provide a broader view for the relationship between financial inclusion and household consumption in sub-Saharan Africa.

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Aims and Scope

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