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Can Remittances Drive Inclusive Human Development in Sub-Saharan Africa?

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Abstract

This paper analyses the effect of remittances on inclusive human development in sub-Saharan Africa. It considers the conditional effects of ICT, dual nationality, and financial development within this relationship. Estimates were derived using Population-Averaged Generalised Estimating Equations (PA-GEE), Fixed Effects Instrumental Variable (FEIV), and Method of Moments-Quantile Regression (MM-QR) on a panel of 31 countries over the period 2010–2017. The findings indicate that remittances positively contribute to inclusive human development. The interaction between remittances, financial development, and ICT further enhances this impact, as does dual citizenship. These results are robust and suggest that ICT through collaboration between migrants and their country of origin, laws favouring multiple citizenship, an efficient financial system and a business-friendly institutional environment, optimises the effect of remittances on inclusive development in sub-Saharan Africa.

Keywords: Remittances, Inclusive Development, Human Development, Transnationalism, Sub-Saharan Africa

JEL classification: F24, O15, O33, O55, K37

1. Introduction

International migration and remittances are recognised as a key source of financing for the Sustainable Development Goals (SDGs) in developing countries and a social protection strategy for migrants and their families (Cuadros-Meñaca, 2020; De Vasconcelos et al., 2017). In African countries, where access to credit markets remains very limited, remittances account for up to 23.67% of GDP and approximately 60% of the income of poor recipient households (Bahadir et al., 2018; De Vasconcelos et al., 2017; Nguimkeu, 2024; Rapoport and Docquier, 2006; Sobiech, 2019; World Bank WDI, 2024).

Poverty and inequality, however, persist globally, particularly in sub-Saharan Africa, underscoring the failure of socio-economic policies, including capitalism (Alvaredo et al., 2018; Gupta and Courtney, 2016; Piketty, 2015). According to Oxfam's 2019 report, in 2018, the wealth of billionaires increased by 12%, equating to a daily rise of \$2.2 billion. Conversely, the wealth of the world's 3.8 billion poorest people declined by 11% in the same period. This growing disparity between the richest and the poorest threatens efforts to combat poverty (Lawson et al., 2019).

In 2023, the share of national income of the top 10% was 52.80% worldwide (WID, 2024). The situation is more alarming in sub-Saharan Africa. This sub-region is home to more than half of the world's population living below the poverty line. Its poverty rate fell from 54.62% in 1990 to 36.45% in 2022 (World Bank PIP, 2024). Although poverty rates in Sub-Saharan Africa are falling, the number of poor Africans is higher today than it was in 1990 (Beegle et al., 2017; Chen et al., 2018). Sub-Saharan Africa is also the most unequal region globally, with

seven of the ten most unequal countries in the world. Inequality has worsened, as evidenced by the rise in the Gini index from 42.72% in 2008 to 51.26% in 2018 (World Bank PIP, 2024). Furthermore, in 2023, the share of national income of the top 10% was 54.96%. South Africa leads this inequality ranking with 65.39%, followed by Namibia (64.19%), Mozambique and Eswatini (59.86%), Botswana (59.26%), Angola (58.00%), Zambia (56.18%), and the Republic of Congo (55.92%) (WID, 2024).

These figures show that economic growth in sub-Saharan Africa has been pro-poor, even though the decline in the poverty rate remains low but not inclusive, as inequalities have increased. Such inequalities contribute to political instability, social unrest, and increased emigration, as large segments of the population are excluded from meaningful participation in socio-economic activities (Ianchovichina and Lundstrom, 2009; Van Gent, 2017). Migration, however, serves both as a consequence of these challenges and as a potential solution by diversifying livelihoods and fostering more inclusive development. In this paper, we aim to answer the following questions: What is the effect of remittances on inclusive human development in sub-Saharan Africa? And what are the underlying mechanisms that explain this effect?

The main objective of this study is to estimate the effect of remittances on inclusive human development in sub-Saharan Africa. Additionally, it seeks to explore the mechanisms through which remittances influence inclusive development. These mechanisms include institutional and technological factors such as ICT, financial development, and multiple citizenship, which can enhance or facilitate transnational activities and strengthen ties between migrants and their families across borders, fostering more inclusive development.

The rest of the article is structured as follows: Section 2 reviews the relevant literature, Section 3 outlines the methodology, and Section 4 presents the results and discussion. Finally, Section 5 concludes the study.

2. Literature review

2.1. The impact of remittances on development

The concept of inclusive development emerged from the realisation that the economic growth and capitalism trickle-down theses are not working properly. Indeed, the poverty reduction strategy induced by growth and industrialisation as suggested by trickle-down theory remains problematic (Gupta and Courtney, 2016; Kanbur and Stiglitz, 2015; Kuznets, 1955, 1973). Consequently, economic growth should not be viewed as an end in itself but rather as a means of achieving shared prosperity (Chakrabarti and Dhar, 2012). Also, according to the theory of the New Economy of Labour Migration (NELM), migration and remittances, by lifting credit constraints, stabilise the economy even in times of crisis, stimulate investment and human capital and offer social protection to migrants and their families (Atake, 2018; Azizi, 2018; Combes and Ebeke, 2011; OCDE/CIRES, 2017; Rapoport and Docquier, 2006; Stark and Bloom, 1985; Stark and Levhari, 1982).

In addition, Khraiche and Boudreau (2020) show, in eight African countries, that reducing remittance costs influences household decisions by reducing the desire to migrate and increasing investment in human capital. Cuadros-Meñaca (2020) uses instrumental variable estimates to show that remittances increase participation in contributory health and pension schemes. Furthermore, the relationship between migration, remittances and inequality follows an inverted-U curve, with their effects varying based on the characteristics of recipients and the development of migration networks (Bang et al., 2016; Ebeke and Le Goff, 2011; Jones, 1998). In Kenya, Bang et al. (2016) use quantile regressions to show that remittances increase household expenditure across all income levels, with a more pronounced effect on the poorest households. This contributes to poverty reduction and improved income distribution.

2.2. Transnationalism: a means of increasing the impact of remittances

Transnationalism refers to the cross-border flows of people, goods, information and ideas, facilitated by technological advances in transport and telecommunications, as well as by capital movements and political institutions (Katigbak, 2020). In this context, financial development plays a key role in the impact of remittances on recipients. Technological innovations reduce transaction costs and information asymmetry, while the financial system promotes the productive use of remittances (Bettin and Zazzaro, 2012; Giuliano and Ruiz-Arranz, 2009). Moreover, remittances can complement an efficient financial system or substitute for an inefficient credit market, helping local entrepreneurs to overcome the constraints related to collateral requirements and high interest rates (Bettin and Zazzaro, 2012; Giuliano and Ruiz-Arranz, 2009; Mundaca, 2009; Nyamongo et al., 2012; Sobiech, 2019).

In addition, new technologies enable migrants to transfer funds via digital, mobile, fast and low-cost financial systems, while maintaining links with their society of origin thanks to various communication tools (De Haas, 2010). They also provide migrants control over the use of transferred funds in relation to the objectives of the transfers. In sub-Saharan Africa, the high penetration of ICTs is underpinning a financial revolution that could open up financial opportunities for often poor rural populations (Asongu et al., 2019; Kedir and Kouame, 2022; Kouame and Kedir, 2020; Kumar, 2012; Murinde et al., 2022).

As atypical as the life cycle of migrants is, it requires specific public policies to safeguard their rights, particularly in ensuring the portability of social rights and facilitating the cross-border mobility of goods and people (Avato et al., 2010). Moreover, the quality of political institutions plays a decisive role in determining the impact of remittances on economic growth. Improved political institutions maximise the benefits of remittances, particularly by increasing their use for investment purposes (Ajide and Raheem, 2016; Catrinescu et al., 2009). In sub-Saharan Africa, Williams (2017) shows that democratic institutions enhance the positive effects of remittances, especially in terms of increasing school enrolment and reducing poverty.

3. Methodology

To achieve our objectives, it is essential to draw upon theoretical and empirical studies that examine the effects of remittances on various aspects of inclusive development, including Income, education, health and inequalities in these domains. This research also explores the mechanisms through which remittances influence inclusive human development (Asongu and Odhiambo, 2019; Azizi, 2018; Doumbia, 2018; Hussein et al., 2018; Ianchovichina and Lundstrom, 2009; Pouw et al., 2020; Rauniyar and Kanbur, 2010; Sen, 1993, 1999; Stark and Bloom, 1985; Van Gent, 2017). The methodological framework encompasses the theoretical underpinnings of inclusive human development, the presentation of the study data, the associated hypothesis tests, the specification of empirical models, and the estimation methods employed.

3.1 Theoretical approach to inclusive human development

The concept of inclusive development emerged as a critique of the ideas that economic growth and capitalism alone are sufficient to reduce poverty and inequality. The hypotheses of Kuznets (1955), which emphasise growth driven by industrialisation and self-correcting markets, are considered problematic, as markets do not always operate efficiently or equitably (Kanbur and Stiglitz, 2015; Piketty, 2015). Nevertheless, economic growth should serve as a means to promote shared prosperity (Chakrabarti and Dhar, 2012). Also, the theory of the New Economics of Labour Migration (NELM) further demonstrates that by alleviating credit constraints, migration and remittances can stimulate entrepreneurship and human capital development. These dynamics strengthen the capabilities of beneficiaries, improve their well-

being, and guide the economy towards a sustainable and efficient regime in the long term (Rapoport and Docquier, 2006; Stark and Bloom, 1985; Stark and Levhari, 1982; Taylor, 1999).

Furthermore, as part of this broader reflection on development issues, the Human Development Index (HDI) was introduced by Amartya Sen in 1989 on behalf of the UNDP to measure social well-being. The goal was to move beyond gross domestic product (GDP) as the sole metric of progress (Bendaoud, 2011). Accordingly, the HDI incorporates elements that enhance capabilities, encompassing both actions (e.g., eating, reading, writing, maintaining good health) and states (e.g., experiencing happiness, possessing self-esteem, participating politically in one's community) (Beegle et al., 2017). Here, capabilities refer not merely to goods, wealth, or rights themselves, but to the ways in which they enable individuals to act or achieve particular outcomes. Within this framework, development is understood as a qualitative and irreversible process observed over a longer timeframe (Bendaoud, 2011).

Human development is also an extension of real freedoms that enable people to lead the lives they value for their own reasons (Sen, 1999). However, the HDI is not without its critics. The criticism is not directed at the concept itself but rather at the transition from the concept to its measurement. While the HDI has evolved from an arithmetic mean to a geometric mean, this adjustment remains inadequate for fully capturing the complexities of development. For instance, the 20th Human Development Report by the UNDP (2010) introduced the Inequality-adjusted Human Development Index (IHDI), which seeks to refine the HDI by accounting for inequalities across its three original dimensions. The IHDI addresses human development deficits stemming from disparities in health, education, and income (PNUD, 2010).

Drawing on recent literature on inclusive development, the Inequality-adjusted Human Development Index (IHDI) is employed to measure inclusive development (Asongu and Le Roux, 2017; Asongu and Nwachukwu, 2017; Asongu and Odhiambo, 2019; Ianchovichina and Lundstrom, 2009; Rauniyar and Kanbur, 2010; Syrovátka and Schlossarek, 2019). The IHDI adjusts the HDI by considering how national achievements in health, education, and income are distributed across the population. In this context, the IHDI is regarded as a superior measure of inclusive development because it integrates the concepts of "relative pro-poor" and "absolute pro-poor" development addressing inequality and poverty, respectively (Dollar and Kraay, 2002; Ravallion and Chen, 2003). Poverty is incorporated because it reflects the three core elements of human development, while inequality is accounted for by adjusting the HDI dimensions to reflect inclusiveness. Furthermore, the measurement of inclusive human development extends beyond monetary aspects, which have been criticised in parts of the literature (Klasen, 2005; Lopez and Servén, 2004). Essentially, inclusive development encompasses equitable access to employment opportunities and improved social outcomes for disadvantaged groups, particularly the poor (Van Gent, 2017).

The Inequality-adjusted Human Development Index (IHDI), also referred to as Inclusive Human Development, provides a means of understanding inequalities within countries in key areas of human development. The IHDI adjusts the HDI by accounting for disparities in health, education, and income. The difference between the IHDI and the HDI represents the loss due to inequalities in the distribution of the HDI across the population. The IHDI is grounded in Atkinson's (1970) family of inequality measures, with the aversion parameter set at 1. In this context, the inequality measure is defined as $A = 1 - g / \mu$, where g is the geometric mean and μ is the arithmetic mean of the distribution. This can be expressed mathematically as follows:

$$A_x = 1 - \frac{\sqrt[n]{X_1 \dots X_n}}{\bar{X}} \quad (1)$$

Where $\{X_1, \dots, X_n\}$ represents the underlying distribution in the dimension of interest. The axis is calculated for each variable, including life expectancy, average years of schooling, and

household disposable income or per capita consumption. The geometric mean in equation (1) does not permit zero values.

Inequality-adjusted dimension indices are derived from the HDI dimension indices, I_x , by multiplying them by $(1 - A_x)$, where A_x , as defined in equation (1), is the corresponding Atkinson measure:

$$I_x^* = (1 - A_x) \cdot I_x \quad (2)$$

The Inequality-adjusted Income Index, I_{revenu}^* , is calculated using the recorded income index values, I_{revenu} , and the inequality of income distribution determined from income levels. This adjustment enables the IHDI to comprehensively account for income inequality.

The IHDI is the geometric mean of the three-dimensional indices adjusted for inequalities:

$$IDHI = (I_{Income}^* \cdot I_{Education}^* \cdot I_{Health}^*)^{\frac{1}{3}} = \left[(1 - A_{Income}) \cdot (1 - A_{Education}) \cdot (1 - A_{Health}) \right]^{\frac{1}{3}} \cdot IDH \quad (3)$$

The IHDI is grounded in the Atkinson index, which adheres to the principle of subgroup consistency. This property ensures that improvements (or deteriorations) in the distribution of human development within a specific subgroup of society directly translate into improvements (or deteriorations) in the distribution across society as a whole (PNUD, 2010). The function of inclusive human development concerning remittances can be expressed as follows:

$$IDHI = (Income, Education, Health, Inequalities, Remittances) \quad (4)$$

Thus, inclusive human development depends on income, education, health, and the associated inequalities, while also incorporating remittances to evaluate their impact.

3.2. Study data and tests

The data used in this research covers 31 countries from 2010 to 2017. These data are sourced from the World Bank databases (WDI, WGI, POVCALNET), UNDP, IMF Financial Development Index Database and MACIMIDE Global Expatriate Dual Citizenship Dataset.

The dependent variable: IHDI

Recent literature on inclusive development identifies the Inequality-adjusted Human Development Index (IHDI) as a suitable measure for evaluating inclusive development (Asongu, 2016; Asongu and Le Roux, 2017; Asongu and Nwachukwu, 2017; Asongu and Odhiambo, 2019; Ianchovichina and Lundstrom, 2009; Rauniyar and Kanbur, 2010; Syrovátka and Schlossarek, 2019; Van Gent, 2017). The IHDI adjusts the HDI to take account of inequalities in health, education and income. The IHDI integrates both the "relative poor" and "absolute poor" dimensions of inclusive development, reflecting inequality and poverty, respectively (Dollar and Kraay, 2002; Ravallion and Chen, 2003). Furthermore, the measurement of inclusive human development is not limited exclusively to monetary aspects, which have been criticised in parts of the literature (Klasen, 2005; Lopez and Serven, 2004). The IHDI promotes equal access to social and economic opportunities for all.

Explanatory variables: remittances

Remittances are expected to enhance inclusive human development, as they are predominantly sent to poorer households and often used for small-scale investments or immediate consumption. Such consumption expenditure is directly linked with improvements in human capital. By increasing the income of recipient families who are typically less advantaged; remittances contribute to their overall well-being (Adams and Page, 2005;

Boussichas, 2009). A positive effect of remittances on the IHDI indicates that remittances improve human development and reduce inequalities in income, education and health.

Explanatory variables: control variables

The control variables, selected based on the economic literature, are factors likely to influence inclusive development. GDP growth can reduce or exacerbate inequality; while increasing life expectancy at birth should improve the IHDI because it increases people's capabilities. Political stability and foreign aid can either support or hinder inclusive development, depending on their implementation and effectiveness (Asongu, 2016; Asongu and Le Roux, 2017; Asongu and Nwachukwu, 2017). The effect of FDI depends on its sectoral focus and social inclusivity, potentially influencing the IHDI accordingly. In sub-Saharan Africa, high poverty levels are anticipated to lower the IHDI, whereas employment opportunities, ICT penetration such as mobile phones, financial development, and policies supporting multiple citizenship are likely to improve it (Asongu and De Moor, 2015; Asongu and Le Roux, 2017; De Haas, 2010). Inflation would be detrimental to the IHDI, as it disproportionately affects the poor. The effect of the exchange rate remains uncertain.

Pre-estimation diagnostics

To assess sample heterogeneity, we conducted Hausman and Mundlak tests to determine the appropriate model specification between fixed-effects and random-effects. The results indicated that the fixed-effects model was most suitable for our analysis. We also performed tests for heteroscedasticity and serial autocorrelation, both of which were present in the data. These issues require corrections to ensure robust estimation. In addition, we interact some variables with remittances to capture their conditional effect. To address concerns about the potential endogeneity of remittances, we applied the Wu-Hausman exogeneity test (Wooldridge, 2010), which confirmed the endogeneity of remittances. In short, diagnostic tests highlighted the need for individual fixed-effects models, while also revealing heteroscedasticity, autocorrelation, and endogeneity. The subsequent analysis employs appropriate techniques to address these issues.

3.3. Empirical specifications and estimation techniques

Population-Averaged Generalized Estimating Equations (PA-GEE) model

The Generalized Estimating Equations (GEE) approach, developed by Liang and Zege (1986), is a robust econometric method commonly employed for panel data analysis. The PA-GEE is a semiparametric method. It controls for correlation and heteroscedasticity using the Huber/White/Sandwich estimator without requiring knowledge of the error distribution. PA indicates that the coefficients have an interpretation in terms of the average response over the population. The greatest advantage of GEE is that it does not necessitate specifying the full distribution of the dependent variable; only the conditional mean function needs to be correctly specified (Campanella et al., 2021). PA-GEE is applicable to a wide variety of models (logit, probit, Poisson, etc.) adapted in our case, where one of the independent variables is binary (dual citizenship).

Our model can be specified as follows:

$$IHDI_{it} = \beta_1 Remittances_{it} + \beta_2 Z_{it} + \varepsilon_{it} \quad (5)$$

$$IHDI_{it} = \beta_1 Remittances_{it} + \beta_2 X_{it} + \beta_3 (Remittances_{it} * \Psi_{it}) + \varepsilon_{it} \quad (6)$$

Where IHDI is the Inequality-adjusted Human Development Index; Z, the matrix of control variables including conditional variables; X, the matrix of control variables; Ψ the matrix of conditional variables which interact with Remittances such as ICTs and Financial Development.

Fixed Effects Instrumental Variable (FEIV) model

Here, we adopt a fixed effects model with endogenous regressors, consistent with the results of previous diagnostic tests. Endogeneity in the context of remittances arises due to several factors. First, low-income countries or households are more likely to receive remittances, introducing reverse causality. Second, simultaneity biases may occur if the determinants and outcomes of remittances influence each other. Finally, measurement errors are common, as a significant portion of remittances is transferred through informal channels, making accurate quantification challenging (Azizi, 2018; Catrinescu et al., 2009).

$$IHDI_{it} = \beta_1 Remittances_{it} + \beta_2 Z_{it} + \alpha_i + \nu_t + \varepsilon_{it} \quad (7)$$

Where: α and ν : represent individual fixed effects and time fixed effects. Here the time fixed effect is not necessary as we are in the context of a short panel. In addition to the rank condition, the key condition for the FEIV to be consistent is that the instruments are strictly exogenous with respect to $\{\varepsilon_{it}\}$. With $T \geq 3$ time periods, endogeneity can be tested easily. To this end, as it is often difficult to find or construct valid instruments and its search is not part of our objectives; we instrument remittances using its lagged values (Anzoategui et al., 2014).

The FEIV approach effectively addresses these issues by controlling for unobserved heterogeneity while simultaneously using instrumental variables to correct for endogeneity. This ensures that the estimated effects of remittances on inclusive human development are robust and unbiased.

Method of Moments-Quantile Regression (MM-QR)

Quantile regressions are suitable for analysing the determinants of inequality, particularly in non-linear models, with extreme or censored data (Chen et al., 2024; Keho, 2016). In this paper, we apply the Method of Moments-Quantile Regression (MM-QR) developed by Machado and Silva (2019). Their method has several advantages over traditional quantile estimation methods, such as the high-order method of moments and the maximum likelihood method.

The MM-QR allows quantiles to be estimated without having to specify the underlying probability density function. This flexibility makes it robust against model misspecifications, skewed distributions, and outliers. In addition, their approach uses only methods that are valid only for estimating conditional means. These include the differentiation of individual effects, while providing information on how the regressors affect the conditional distribution as a whole. This approach also leads to estimates of regression quantiles that do not cross, a major condition often ignored in empirical applications. This estimator builds upon the work of Chernozhukov and Hansen (2008) and is well-suited for nonlinear models involving multiple endogenous variables (Machado and Silva, 2019).

Quantile regression estimates: $Q_Y(\tau | X)$

$$Q_{Y_{it}}(\tau | X_{it}) = \alpha_i + X'_{it}\beta + (\delta_i + Z'_{it}\gamma)\mu_{it} \quad (8); \quad Q_{\mu(\tau)}(\tau | X) = 0 \quad (9)$$

With $\Pr\{\delta_i + Z'_{it}\gamma > 0\} = 1$. The parameters (α_i, δ_i) , $i = 1, \dots, n$, capture the individual fixed effects i and Z is a k -vector of known differentiable transformations of the components of X . The sequence $\{X_{it}\}$ is strictly exogenous, i.i.d. for any fixed i , and independent across i . μ_{it} are i.i.d. (across i and t), statistically independent of X_{it} , and normalised to satisfy the moment conditions. The model implies that:

$$Q_Y(\tau | X_{it}) = (\alpha_i + \delta_i q(\tau)) + X'_{it} \beta + Z'_{it} \gamma q(\tau) \quad (10)$$

The scalar $\alpha_i(\tau) \equiv \alpha_i + \delta_i q(\tau)$ is the quantile- τ fixed effect for individual i , or the distributional effect at τ . The distributional effect represents the effect of time-invariant individual characteristics which, like other variables, are allowed to have different impacts on different regions of the conditional distribution of Y . For model (10), the moment conditions have a convenient triangular structure with respect to the model parameters that allow the one-step GMM estimator to be computed sequentially (Machado and Silva, 2019).

4. Results and discussions

We begin by presenting the descriptive statistics for the variables in our study, followed by the econometric estimates that demonstrate the effect of remittances on variations in inclusive human development in sub-Saharan Africa.

Table 1. Descriptive analysis of model variables

Variables	Description of the variables	Mean	SD
IHDI	Inequality-adjusted Human Development Index (IHDI) (%)	32.54305	9.617567
Remittances	Remittances (in log)	19.15595	1.799045
Growth	GDP growth rate (%)	4.691828	3.418545
Credit	Credit provided by the financial sector (%GDP)	30.60025	33.96632
FD	Financial development index (%)	15.45333	11.32156
MobilePhone	Mobile phone subscriptions (% total population)	73.32015	32.93023
GenderInequality	Gender inequality index (%)	57.10448	8.958461
Poverty	Poverty Headcount (%)	42.31024	20.39229
ODA	Official development assistance (%GDP)	7.594092	7.698445
FDI	Foreign direct investment (% GDP)	5.549964	11.60939
Employment	Employment (in log)	15.25586	1.305269
Stability	Political Stability and Absence of Violence [-2.5; 2.5]	-.5090565	.7516945
Change	Official exchange rate	963.7895	1593.272
Inflation	Inflation rate (%)	5.946627	5.704664
LifeExpectancy	Life expectancy at birth	60.01969	4.931067
DualCitizenship	Countries accepting dual citizenship (1=yes, 0=no)	.5887097	.4930628
NoDualCitizenship	Countries refusing dual citizenship (1=yes, 0=no)	.4112903	.4930628

Source: authors, based on study data

The summary statistics show that the variables are in the same order of unity. Some variables are defined in logarithms and others in percentages to facilitate comparisons between means and standard deviations. In this way, reasonable estimated relationships can be expected to emerge.

Table 2. Effects of remittances on inclusive human development: PA-GEE

Dependent variable: IHDI (%)	Population-Average Generalized Estimating Equations (PA-GEE)					
Equations	1	2	3	4	5	6
Remittances	0.245** (0.105)	0.237** (0.106)	0.237** (0.106)			

Growth	-0.185*** (0.0596)	-0.178*** (0.0582)	-0.178*** (0.0582)	-0.200*** (0.0573)	-0.191*** (0.0584)	-0.218*** (0.0588)
GenderInequality	-0.255*** (0.0644)	-0.236*** (0.0633)	-0.236*** (0.0633)	-0.277*** (0.0660)	-0.268*** (0.0622)	-0.305*** (0.0677)
Poverty	-0.189** (0.0801)	-0.180** (0.0798)	-0.180** (0.0798)	-0.200** (0.0785)	-0.194** (0.0829)	-0.212** (0.0834)
ODA	-0.0827* (0.0426)	-0.0897** (0.0451)	-0.0897** (0.0451)	-0.0856* (0.0438)	-0.0838* (0.0438)	-0.0878* (0.0452)
FDI	0.00602 (0.0144)	0.00680 (0.0141)	0.00680 (0.0141)	0.00914 (0.0144)	0.00585 (0.0150)	0.0100 (0.0156)
Credit	0.0994*** (0.0362)	0.102*** (0.0353)	0.102*** (0.0353)		0.102*** (0.0376)	
MobilePhone	0.0620*** (0.0134)	0.0631*** (0.0135)	0.0631*** (0.0135)	0.0612*** (0.0138)		
DualCitizenship		1.587** (0.685)				
NoDualCitizenship			-1.587** (0.685)			
Remittances*Credit				0.00413*** (0.00143)		0.00382** (0.00160)
Remittances*Mobilephone					0.00292*** (0.000569)	0.00251*** (0.000727)
Constant	44.57*** (6.197)	42.24*** (6.524)	43.83*** (6.174)	51.83*** (6.579)	50.64*** (6.626)	55.22*** (6.775)
Observations	201	201	201	201	201	201
Wald chi2	368.25	1001.80	1001.80	295.71	262.35	275.68
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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

This document analyses the effects of remittances on inclusive human development in sub-Saharan Africa. The results of the PA-GEE indicate that remittances exert a significant and positive effect on inclusive human development. This is primarily attributable to their direct contribution to improving living conditions, notably through increased expenditure on education, healthcare, and consumption by poor households. These findings corroborate the existing literature, particularly studies linking remittances to reductions in poverty and inequality (Acosta et al., 2008; Adams and Page, 2005; Agwu et al., 2018; Anyanwu and Erhijakpor, 2010; Atake, 2018; Azizi, 2018; Bang et al., 2016; Gupta et al., 2009; Rapoport and Docquier, 2006).

Furthermore, the negative sign of the coefficient on economic growth confirms that growth in sub-Saharan Africa remains non-inclusive. This finding aligns with the results of Hussein et al. (2018) and demonstrates that the benefits of growth are not equitably distributed among the population. Moreover, the significant and negative coefficients associated with poverty and gender inequality show that these two factors significantly impede inclusive human development. These findings underscore the urgent need for policies aimed at reducing these structural disparities (Ianchovichina and Lundstrom, 2009; Van Gent, 2017).

In addition to these results, we find that the interaction of remittances with ICTs, in particular mobile phone subscriptions and financial development, has a positive impact on inclusive human development. Furthermore, the positive coefficient associated with the dummy variable for dual nationality (DualCitizenship) and the interaction term between remittances and mobile phone subscriptions indicates that key aspects of globalisation namely the adoption of dual citizenship laws and advancements in telecommunications facilitate communication and the cyclical or permanent return of the diaspora, thereby positively influencing inclusive

development. Conversely, states that reject multiple citizenship have a detrimental effect on inclusive human development. These results are in line with earlier studies (Avato et al., 2010; De Haas, 2010; Katigbak, 2020).

Today, innovations in communication technologies and the adoption of laws promoting dual citizenship have made transnational living significantly easier for migrants. These developments demonstrate that migrants' contributions to development are not necessarily dependent on their permanent return. Migration and economic activity in the country of origin are not mutually exclusive; rather, they are often complementary. The revolution in ICTs, particularly mobile telephony and the internet, has enabled migrants to work remotely, transfer funds instantaneously, and monitor and manage their investments across borders (Asongu et al., 2019; Asongu and Le Roux, 2017; De Haas, 2010; Kedir and Kouame, 2022; Kouame and Kedir, 2020; Kumar, 2012; Uche and Ngepah, 2023).

Table 3. Effects of transfers on inclusive human development: FEIV

Dependent variable: IHDI (%)	Fixed Effect Instrumental Variable (FEIV)		
	7	8	9
Equations			
Remittances	0.758* (0.384)	0.829** (0.362)	0.729** (0.349)
Growth	-0.159*** (0.0406)	-0.0962*** (0.0337)	-0.100*** (0.0335)
GenderInequality	-0.219*** (0.0584)		
Poverty	-0.271*** (0.0446)		
ODA		-0.116*** (0.0412)	-0.111*** (0.0403)
FDI		-0.00422 (0.0138)	-0.00290 (0.0136)
Credit	0.126*** (0.0248)	0.0854*** (0.0227)	0.0827*** (0.0223)
MobilePhone	0.0278* (0.0152)		
Change	0.00350*** (0.000615)	0.000804** (0.000379)	
Inflation	-0.126*** (0.0440)		
LifeExpectancy		0.769*** (0.227)	0.864*** (0.227)
Employment		18.52*** (4.355)	19.30*** (4.224)
Stability			1.032** (0.518)
Observations	175	210	210
R-squared	0.695	0.780	0.787

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

A 1% increase in remittances raises inclusive human development by between 0.73% and 0.83%. Compared to the results in Table 2, the impact of remittances is more pronounced, likely due to the correction for endogeneity bias using the FEIV approach. These findings reinforce the idea that remittances are not merely a form of temporary support but instead make a lasting contribution to reducing inequalities in human development.

As with the results in Table 2, foreign direct investment (FDI) shows no significant effect, while official development assistance (ODA) exhibits a negative and significant effect on

inclusive human development. This is because, firstly, if FDI is concentrated in sectors of activity that do not sufficiently absorb the local workforce and do not benefit the poor, or diverted to other purposes, it may not have the expected effect on development (Andersen et al., 2022). Secondly, the effect of ODA varies depending on its type: for instance, humanitarian aid tends to have a negative impact, whereas aid directed towards infrastructure development has a positive effect. Consequently, the overall impact of ODA depends on the predominance of one type of aid over another (Asongu, 2016; Asongu and Nwachukwu, 2017).

The FEIV results also confirm that economic growth is not inclusive and that inflation adversely affects inclusive human development. Conversely, political stability, employment, life expectancy, and exchange rates have significant positive effects. These institutional and social factors strengthen local capacities to effectively absorb remittances. Furthermore, while both approaches confirm the positive impact of remittances, the FEIV method provides clearer insights into the direct and indirect effects of institutional and structural variables, particularly employment and political stability. Both methods demonstrate that remittances reduce inequalities in human development and inequalities in opportunities.

In short, the findings reaffirm that migration and development are not antagonistic. Migration and remittances, facilitated by technological innovations and institutional frameworks conducive to business, contribute significantly to the development of countries of origin.

Table 4: Effects of remittances on inclusive human development: MM-QR

Dependent variable: IHDI (%)	Method of Moments-Quantile Regression (MM-QR)					
Equations	10	11	12	13	14	15
Quantile	0.25	0.50	0.75	0.25	0.50	0.75
Remittances	0.569** (0.257)	0.607*** (0.183)	0.641*** (0.244)			
Growth	-0.267** (0.108)	- (0.0769)	- (0.102)	-0.219** (0.0898)	-0.235*** (0.0589)	-0.247*** (0.0774)
GenderInequality	- (0.0744)	- (0.0531)	- (0.0706)	-0.347*** (0.0792)	-0.296*** (0.0524)	-0.257*** (0.0683)
Poverty	- (0.0737)	- (0.0526)	- (0.0698)	-0.266*** (0.0707)	-0.263*** (0.0463)	-0.260*** (0.0609)
Remittances*Mobilphone				0.00199** (0.000905)	0.00272*** (0.000603)	0.00328*** (0.000780)
Remittances*FDI				0.0124** (0.00518)	0.0108*** (0.00340)	0.00958** (0.00446)
Observations	201	201	201	201	201	201

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

At this stage, we examine whether there is a non-linear relationship between remittances and the quantiles of inclusive human development. The IHDI in our sample ranges from 15.3% to 69.27%. The analysis reveals that remittances have a positive and significant effect across all quantiles of the conditional distribution of inclusive human development, with the effect being more pronounced at higher quantiles. This can be attributed to the fact that countries with higher levels of development tend to have more efficient institutions, a favourable business

environment, and a robust financial system, all of which amplify the impact of remittances on development.

Moreover, the positive interaction between remittances and the overall financial development index indicates that financial development enhances the contribution of remittances to inclusive human development. This finding indicates that remittances and financial development are complementary in the development process. These results are consistent with the findings of Bettin and Zazzaro (2012), Nyamongo et al. (2012), and the New Economics of Labour Migration (NELM) theory, which views the family or household (not the individual) as the primary decision-making and self-help unit in migration behaviour (Stark and Bloom, 1985). However, increasing poverty and gender inequalities negatively affect inclusive human development, consistent with the findings of previous studies (Alvaredo et al., 2018; Piketty, 2015). Furthermore, the positive coefficients associated with the interaction terms between remittances and mobile phone subscriptions, as well as with financial development, corroborate our earlier results.

Finally, whatever the specifications, the estimates indicate that remittances contribute significantly to inclusive human development in sub-Saharan Africa, thereby reducing inequalities in income, education, and health. This aligns with prior research demonstrating that remittances alleviate poverty and inequality. They enable credit-constrained households to enrol their children in school, prevent school dropouts, and reduce their vulnerability to economic shocks (Acharya and Leon-Gonzalez, 2014; Acosta et al., 2008; Bang et al., 2016; Calero et al., 2009; Rapoport and Docquier, 2006; Sobiech, 2019).

In conclusion, remittances play a pivotal role in fostering inclusive human development in sub-Saharan Africa. Thus, repulsion factors such as poverty and inequality, which are the causes of migration, are negatively affected by remittances.

5. Conclusion

This study analyses the effects of remittances on inclusive human development in sub-Saharan Africa, with a particular focus on the conditional influences of ICT, dual citizenship, and financial development. The empirical analysis employs PA-GEE, FEIV, and the Method of Moments-Quantile Regression on a panel of 31 countries between 2010 and 2017. The findings reveal that migrant remittances contribute positively to inclusive human development. Specifically, remittances enhance all quantiles of inclusive development, with increasingly pronounced effects at the upper quantiles of the IHDI. Furthermore, the interaction between remittances, financial development, and ICT reinforces their impact, as does dual citizenship. These results, which are robust to issues of heteroscedasticity, autocorrelation, endogeneity, and alternative methodological approaches, confirm that remittances strengthen capabilities, reduce inequalities in human development, and foster inclusive development. These results underscore the importance of promoting technology adoption, dual citizenship, a competitive financial system, and a sound institutional and economic environment to maximise the positive effects of remittances.

Conflict of interest

We, the authors, declare that we have no conflict of interest.

Copyright note

We, the authors, certify that we have the right to submit our contribution to the MPRA.

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