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**Research Article**

**The Impact of Remittance Inflows on Human Capital Development: Exploring the Mediating Role of Education and Healthcare Accessibility in African Developing Economies**

**Oluwatoyin Babatunde Omoniyi <sup>a</sup> & Taiwo Owoeye<sup>b</sup>**

**Abstract**

**Introduction:** This study explores how access to education and healthcare influences the relationship between remittance inflows and human capital development in developing Sub-Saharan African (SSA) countries. Given the growing importance of remittances in financing development, understanding their potential to enhance human capital is critical.

**Method:** The study employed the POLS, fixed effect, and random effect models using annual data from 2010 to 2023 for 21 developing SSA countries. Key variables examined include remittance inflows, access to education, healthcare accessibility, government expenditure on education and health, governance quality, labour force participation, and skill levels.

**Results or Findings:** The results reveal that remittance inflows significantly promote human capital development in SSA. Moreover, increased access to education and improved healthcare further amplifies this positive effect. Good governance also enhances the impact of remittances on human capital development. Conversely, public spending on education and health had a negative effect, likely due to corruption, lack of transparency, and poor policy alignment. Additionally, while higher labour force participation supports human capital development, a rise in the proportion of low-skilled individuals hinders it.

**Discussion or Conclusion:** The study concludes that remittances can be a valuable tool for fostering human capital development when complemented by effective governance and improved access to education and healthcare. Policymakers are advised to implement targeted programs to channel remittances into education and health, improve the quality and accessibility of these services, ensure accountability in public spending, and invest in skills development, particularly for youth and women, to harness the full potential of human capital in SSA countries.

*Keywords:* human capital, health, education, governance, labour

*JEL Codes:* O14, F24, I15, I25

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Araştırma Makalesi

**Yurtdışı İşçi Havalelerinin Beşeri Sermaye Gelişimine Etkisi: Afrika'nın Gelişmekte Olan Ekonomilerinde Eğitim ve Sağlık Hizmetlerine Erişimde Aracılık Rolünün Analizi  
Oluwatoyin Babatunde Omoniyi<sup>a</sup> & Taiwo Owwoeye<sup>b</sup>**

**Öz**

**Giriş:** Bu çalışma, yurt dışı işçi havalelerinin insan sermayesi gelişimi üzerindeki etkisini, eğitime ve sağlık hizmetlerine erişimin nasıl şekillendirdiğini, gelişmekte olan Sahra Altı Afrika (SSA) ülkeleri özelinde incelemektedir. Gelişimin finansmanında havalelerin artan önemi göz önüne alındığında, bunların insan sermayesini geliştirme potansiyelini anlamak büyük önem taşımaktadır.

**Yöntem:** Çalışmada, 2010–2023 yılları arasındaki döneme ait 21 gelişmekte olan SSA ülkesinden elde edilen yıllık veriler kullanılarak POLS, sabit etkiler ve rassal etkiler modelleri uygulanmıştır. İncelenen temel değişkenler arasında yurt dışı işçi havaleleri, eğitime erişim, sağlık hizmetlerine erişim, eğitime ve sağlığa yönelik kamu harcamaları, yönetim kalitesi, iş gücüne katılım oranı ve beceri düzeyleri yer almaktadır.

**Sonuçlar ya da Bulgular:** Elde edilen sonuçlar, yurt dışı işçi havalelerinin SSA ülkelerinde insan sermayesi gelişimini anlamlı şekilde teşvik ettiğini göstermektedir. Eğitime ve sağlık hizmetlerine erişimdeki iyileşmeler bu etkiyi güçlendirmektedir. İyi yönetim de havalelerin etkisini artırmaktadır. Ancak, kamu harcamalarının olumsuz etkisi, yolsuzluk ve düşük politika etkinliğiyle ilişkilendirilmiştir. Ayrıca, yüksek iş gücüne katılım olumlu etki yaratırken, düşük vasıflı işgücü oranı olumsuz etki göstermektedir.

**Tartışma ya da Yapılan Çıkarımlar:** Çalışma, yurt dışı işçi havalelerinin, etkin yönetim ve eğitim ile sağlık hizmetlerine erişimin iyileştirilmesiyle birlikte, insan sermayesinin geliştirilmesinde önemli bir araç olabileceği sonucuna varmaktadır. Politika yapıcılara, havalelerin eğitim ve sağlık alanlarına yönlendirilmesini sağlayacak hedefli programlar geliştirmeleri, bu hizmetlerin kalitesini ve erişilebilirliğini artırmaları, kamu harcamalarında hesap verebilirliği sağlamaları ve özellikle gençler ile kadınlara yönelik beceri geliştirme yatırımlarını artırmaları tavsiye edilmektedir. Bu şekilde, SSA ülkelerinde insan sermayesinin tam potansiyeli değerlendirilebilir.

**Anahtar Kelimeler:** insan sermayesi, sağlık, eğitim, yönetim, emek

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## Introduction

Education, skills, and health of people are vital components of human capital and are essential for growth and development. The World Bank has created the Human Capital Index (HCI) that estimates the potential productivity of future generations based on current investments in education and health care. Human capital enhances economic performance in aspects such as innovation, increase in earnings, and poverty reduction as noted by the World Bank (2020). However, many developing economies experience major constraints in human capital development because of low investment in education and health, high levels of poverty, and institutional problems (Sianesi & Van Reenen, 2003). These challenges show why there is a need to look for other sources of funding apart from government funding. International migration money transfers, also known as cross-border personal transfers or ‘remittances’ are cross-border payments made by migrants to their home countries to support their households. Cross-border personal transfers hit \$589 billion in 2021, exceeding FDI in numerous low- and medium-income countries (World Bank, 2021). In the case of developing countries, remittances provide an important stream of income that can increase the consumption level of households, finance education and avail better health care facilities. Research has shown that in most cases, remittances help to reduce the volatility of household income especially in areas where employment and investment opportunities are scarce or where social protection mechanisms are weak (Adams & Cuecuecha, 2010). Therefore, remittances have a high potential for contributing to human capital development, especially in underfinanced and unserved regions.

Although the role of remittance is well acknowledged in the literature, its contribution to human capital development has not been given adequate attention, particularly in the context of the HCI. Although earlier research has looked at the overall macroeconomic effects of remittances, little attention has been paid to the impact of remittances on education and health in developing countries. For instance, while remittances are employed to pay for school fees, books, or medical bills, they have a direct impact on education and health outcomes. However, the impact of these investments may differ with socio-economic and institutional factors including governance quality, income disparity and gender (Mohapatra et al., 2009). The ability of remittances to foster human capital development also depends on the way the recipient households use the remittances. Occasionally, remittances are spent on consumption and not on investment in education or health, and this is according to Chami et al. (2005). However, the part played by institutional quality cannot be overlooked. Where governance is poor, corruption rife, or infrastructure insufficient, the positive effects of remittances may be reduced, thus constraining human capital. For example, the spending of the household through remittances may be directed to productive use in countries with good governance structures than in countries with structural problems (Ratha et al., 2018).

Moreover, the impact of remittances on human capital development is also heterogeneous by region and demographic characteristics. For instance, in the rural regions of the developing world, money transfers act as a replacement for state services in the sphere of education and healthcare. However, in urban areas where access to public services is relatively better, remittances may have a different effect on human capital investments. This relationship is further conditioned by gender since women's remittance funds are more likely to be spent on education and health than those controlled by men (Brahma & Paul, 2020). However, there are still some open questions regarding the nature of remittance-driven human capital accumulation and its sustainability. Is there a uniformity in the observed benefits as a cross-section of the different components of the HCI? How do institutions either enhance or limit the effects of remittances on education and health? Is there a possibility of experiencing decreasing returns to remittances in the countries that rely on them? The answers to these questions are important

to determine how remittances can be used as a mechanism for sustainable development. This study seeks to plug these gaps by examining the link between remittance inflows and the Human Capital Index, especially in education and health in developing countries. The study will also examine the impact of household use of remittances on human capital, as well as how institutional factors mediate this process. In answering these questions, the study aims to contribute useful information to policymakers and stakeholders on how to enhance the developmental benefits of remittances in developing countries.

### **Empirical Literature**

Several research efforts have been geared toward examining the relationship between remittances and human capital across different contexts and methodologies, however, consensus was reached. For instance, Gao et al. (2021) in Kyrgyz analysed the impact of remittances on human capital of school-age children using a 5-year panel of 8000 households and the result of the fixed effect instrumental variable model showed that human capital investment and educational achievement are negatively impacted by remittances. Similarly, using a panel of 100 developing countries, Bibi and Ali (2022) examined the impact of remittances on human development with 2014 annual data and the panel OLS models results showed an insignificant positive relationship between remittance and human development while governance indicators mostly have positive impact on human capital development. However, using a panel of 30 sub-Saharan African countries, the dynamic panel regression model result of the Umar (2021) study showed that remittance had a significant positive impact on human development in 30 sub-Saharan African countries between 2004-2018. Similarly, Saydaliyev et al. (2022) examined the role of human capital in the relationship between remittance on economic growth in developed and developing countries from 2007 to 2018. The study estimated a GMM-based dynamic panel regression model and found that financial inclusion and human capital positively impact economic growth in remittance-receiving developing countries. Likewise, using a panel of 18 selected African countries, Aregbesola (2022) analysed the relationship between remittances, human capital development, and poverty and found that remittance significantly aids human capital development, particularly access to education in African countries.

Using a panel of 41 sub-Saharan African countries, Ali Bare et al. (2022) examine the mediating role of financial development on the impact of remittances on human capital using the secondary school enrolment rate as a proxy. The static panel models' results consistently showed that remittance has a significant positive impact on human capital and has a more profound effect in the dynamic model when financial development interacts with remittance. Also, Mohammed (2022) examined the relationship between institutions, remittances, and human development using a panel of 22 sub-Saharan African countries from 2004 to 2018. The result of the estimated dynamic panel models showed that remittances positively impact human development in SSA countries. The study further revealed that remittance promotes human development in countries with weak institutions but with a lesser effect in countries with developed institutions. In a similar panel-related study of the Islamic Cooperation member countries, Kamalu et al. (2022) examined the impact of remittance on human development from 1990 to 2018 and the result of the CS-ARDL model showed that remittance had a significant short and long-run impact on human development and the granger causality test result showed that remittance caused human development but not vice versa.

Recently, Orekoya and Tijani (2023) investigated the impact of remittances on human capital development in Nigeria from 1980 to 2021. Employing the ARDL model, they found that remittance inflow increased school enrolment rate and life expectancy but reduced infant

mortality rate. Also, in Sri Lanka, Mohamed-Aslam and Sivarajasingham (2023) tested for the cointegration relationship between workers' remittances and human capital formation from 1975 to 2020. In the ARDL result, remittances had a significant positive impact on human capital in the short and long run and the causality test showed a bidirectional relationship between the two. The innovation accounting further showed that remittance shock significantly contributes to the human capital variation and also raises it above the steady state. In the study conducted by Nasrin et al. (2024) using a panel of 7 southern Asian countries from 1995 to 2020, the result showed that remittance has a significant positive impact on human and gender development. The result also showed that international migration caused human development but hindered gender development. Likewise, in Pakistan, Khan et al. (2024) investigated the impact of remittance and aid on human capital from 1990 to 2021 and the result of the ARDL model showed that remittance had a positive impact on human capital in the short and long run while aid has a significant positive effect in the short run only. In a contrariwise, the study of Williams (2024) using a panel of developing countries showed that an increase in remittance inflow significantly caused a reduction in government educational spending while increasing government health spending.

## Methodology and Data

### Model Specification

In this study, two models are employed to analyse the relationship between remittances inflow and human capital development and the mediating role of education and health factors in Sub-Saharan Africa developing countries and are specified in the equations below:

$$HC_{it} = \beta_0 + \beta_1 Rem_{it} + \beta_2 Edu_{it} + \beta_3 Health_{it} + \beta_4 Gov_{it} + \beta_5 \ln GDPk_{it} + \beta_6 GexEdu_{it} + \beta_7 GexHlt_{it} + \beta_8 LPR_{it} + u_{it} \dots \dots \dots (1)$$

$$HC_{it} = \beta_0 + \beta_1 Rem_{it} + \beta_2 Edu_{it} + \beta_3 Health_{it} + \beta_4 Gov_{it} + \beta_5 (Rem_{it} * Gov_{it}) + \beta_6 \ln GDPk_{it} + \beta_7 GexEdu_{it} + \beta_8 GexHlt_{it} + \beta_9 LPR_{it} + u_{it} \dots \dots \dots (2)$$

Where HC is the human capital, Rem is the remittance inflow, Edu is the education level, Health is the health indicator, Gov is the governance quality, GDPk is the per capita GDP, GexEdu is the government expenditure on education, GexHlt is the government expenditure on health, and LPR is the labour force participation rate respectively. The first model in Equation 1 highlights the mediating roles of education level and health in the relationship between remittance inflows and human capital development. The second model in Equation 2, a modified version of the first, incorporates the interaction between remittance and governance to examine the moderating effect of governance on the impact of remittance on human capital development.

In the model, remittance inflows (Rem) enhance household income, enabling investments in education and healthcare, which directly contribute to human capital development. Education level (Edu) is one of the most basic components of human capital since it prepares people for productivity and development. Likewise, Health is important, since healthy people work more efficiently and are capable of learning and applying skills. Governance quality (Gov) has a central role in facilitating proper resource allocation and efficient delivery of public services and in providing a favourable environment for human capital development. Per capita GDP (GDPk) is used as an indicator of economic resources since it measures a country's ability to finance education and health services. Government

expenditure on education (GexEdu) and health (GexHlt) shows that human capital is valued by financing services that enhance the availability and quality of education and health services. Finally, the labour force participation rate (LPR) reflects the workforce activity, which shows how many people are involved in economic activities and gaining experience, which is important for human capital formation.

## Method of Analysis

This study employed the pooled Ordinary Least Squares (OLS), Fixed Effects (F-E) model, and Random Effects (R-E) model to examine the impact of remittance inflows on human capital development, with a focus on the mediating role of education and health in developing African economies. These econometric techniques were chosen due to the relatively short period of the dataset after adjustments were made for the included countries. The F-E and R-E models are particularly suitable for handling unobserved heterogeneity across countries, which is critical for capturing the unique characteristics of each nation while analyzing panel data. The results from the F-E and R-E models are given greater priority over the OLS estimates, as the former account for heterogeneity and provide more robust insights into the relationships under study. Additionally, diagnostics such as the redundant fixed effect test and the Hausman test were conducted to determine the suitability of the F-E or R-E model in specific cases, ensuring the reliability of the results.

## Data

**Table 1**

### *Data Description*

| <b>Variable</b>           | <b>Description</b>  | <b>Source</b>                     |
|---------------------------|---|-----------------------------------|
| Human Capital             | Human Capital Index   | Penn World Table version 10.1     |
| Remittance                | Remittances inflow as a % of GDP  | World Bank Development Indication |
| Education level           | The average enrolment rate for pre-primary, primary, secondary, and tertiary. | World Bank Development Indication |
| Health                    | Life expectancy at birth  | World Bank Development Indication |
| Governance                | Governance indices  | World Bank Development Indication |
| GDP per capital           | GDP per capita in current USD   | World Bank Development Indication |
| Education expenditure     | Government education expenditure (%Total)                                     | World Bank Development Indication |
| Health expenditure        | Government health expenditure (%Total)  | World Bank Development Indication |
| Labour participation rate | Labour force participation rate   | World Bank Development Indication |

Note. Created by the author.

Table 1 presents detailed information on the data sources employed in this study. Utilizing data from the World Development Indicators (WDI) of the World Bank (2012) and the Penn World Table (PWT) Version 10.1 over the period 2010 to 2023, a dataset was constructed encompassing 21 developing Sub-Saharan African countries including Angola, Benin, Burundi, Cameroon, Ethiopia, Gambia, The, Ghana, Lesotho, Madagascar, Mauritius, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zambia. Data on human capital were primarily sourced from the PWT 10.1; however, for the years 2019 to 2023, missing data were interpolated by the authors using a panel

autoregressive prediction model to ensure continuity and accuracy. Educational level data were computed as the average enrollment rates across pre-primary, primary, secondary, and tertiary education levels. All other variables were sourced from the WDI.

### Data Analysis

Table 2 presents the descriptive statistics showing the socioeconomic status and development status of the SSA countries. The Human Capital Index with an average of 1.8374 and a minimum of 1.1673 and a maximum of 3.0967 indicates moderate human capital formation in the region. The variation, with a standard deviation of 0.4578, shows that education and healthcare investments differ across countries and have a direct effect on productivity and economic development. Certain countries have significantly improved their human capital, while others continue to face the problem of resource scarcity.

**Table 2**

*Descriptive Statistics of Variables in Developing SSA Countries*

| Variable                        | Mean    | Std. Dev. | Max    | Min     |
|---------------------------------|---------|-----------|--------|---------|
| Human Capital Index             | 1.8374  | 0.4578    | 3.0967 | 1.1673  |
| Remittances (%GDP)              | 4.1299  | 5.4630    | 27.302 | 0.0002  |
| Education level                 | 63.294  | 11.707    | 89.507 | 29.124  |
| Life expectancy                 | 61.513  | 4.9648    | 74.515 | 45.596  |
| Governance                      | -0.5190 | 0.4752    | 0.8767 | -1.4447 |
| GDP per capita (\$)             | 4274.8  | 4831.5    | 29499  | 630.45  |
| Education expenditure (%Total)  | 16.403  | 5.6047    | 35.010 | 2.8774  |
| Health expenditure (%Total)     | 7.0179  | 3.1862    | 17.511 | 0.7344  |
| Labour force participation rate | 67.512  | 10.413    | 86.507 | 45.490  |

Note. Author's computation

The average share of remittance in SSA economies is 4.1299% of the GDP, but the standard deviation is 5.4630. This ranges from 0.0002% to a maximum of 27.302% which indicates that although remittances are important for some countries, others depend little on them. This variability is explained by the differences in migration and the role of foreign financial remittances for households' income and economic growth. The education level is also varied with the average education level being 63.294 % and the minimum being 29.124 % and the maximum being 89.507%. The standard deviation of 11.707 shows that the level of education and the quality of education in the region are not equal. In the same way, life expectancy with a mean of 61.513 and the range of 45.596 – 74.515 indicates the inequalities in health and living standards. The standard deviation of 4.9648 is still relatively low, which means that the differences in life expectancy are not as significant as the differences in other indicators. The governance quality, as captured by the governance index is not very encouraging. The average value of -0.5190 and minimum and maximum values of -1.4447 and 0.8767 respectively indicate that most of the countries have poor governance, weak institutions, and inefficiencies. The negative mean and a smaller standard deviation of 0.4752 underscore the need to undertake institutional changes to enhance accountability and policy efficiency.

The economic factors also reveal similar differences. GDP per capita with a mean of \$4274.8 and a range of \$630.45 to \$29499 underlines the income difference. The large standard deviation of 4,831.5 shows that while some countries in SSA have relatively high levels of

economic output many have low income levels that demonstrate structural vulnerabilities in their economies. The expenditure of the government is not the same. Education expenditure is on average 16.403 % of total expenditure; it varies from 2.8774 % to 35.010 %. Health expenditure is also on average 7.0179 % of total expenditure; it varies from 0.7344 % to 17.511 %. These statistics show variations in the amount of resources that different countries are willing to invest in development through education and health sectors compared to the amount of resources that are channelled to other sectors. The labour participation rate, which is on average 67.512%, with the lowest value of 45.490% and the highest value of 86.507%, shows the level of workforce participation. The coefficient of variation of 10.413 indicates that the nature and changes in the labour market vary from one SSA country to another due to demographic factors, economic status, and cultural beliefs.

**Table 3**

*Regression Estimates of Model 1*

| IV                              | DV: Human Capital Index |                        |                        |
|---------------------------------|-------------------------|------------------------|------------------------|
|                                 | POLS                    | F-E                    | R-E                    |
| Remittance                      | 0.0060<br>(0.0052)      | 0.0104***<br>(0.0027)  | 0.0113***<br>(0.0027)  |
| Education level                 | 0.0054**<br>(0.0026)    | 0.0003<br>(0.0012)     | 0.0004<br>(0.0012)     |
| Life expectancy                 | -0.0012<br>(0.0064)     | 0.0189***<br>(0.0038)  | 0.0185***<br>(0.0037)  |
| Governance                      | -0.1057<br>(0.0875)     | 0.1143**<br>(0.0520)   | 0.0875*<br>(0.0507)    |
| ln(GDP per capita)              | -0.2326***<br>(0.0500)  | 0.3052***<br>(0.0394)  | 0.2861***<br>(0.0385)  |
| Education expenditure           | -0.0274***<br>(0.0052)  | 0.0006<br>(0.0016)     | 0.0003<br>(0.0016)     |
| Health expenditure              | 0.0048<br>(0.0088)      | -0.0055*<br>(0.0029)   | -0.0058**<br>(0.0029)  |
| Labour force participation rate | -0.0100***<br>(0.0030)  | 0.0096***<br>(0.0034)  | 0.0090***<br>(0.0033)  |
| Constant                        | 4.4377***<br>(0.6242)   | -2.3865***<br>(0.4146) | -2.1816***<br>(0.4158) |
| $R^2$                           | 0.18                    | 0.97                   | 0.49                   |
| Breusch-Pagan Test              | 1468.4***               |                        |                        |
| Likelihood Ratio Test           |                         | 1010.2***              |                        |
| Hausman test                    |                         |                        | 17.286**               |

\*\*\*  $p < 1\%$ , \*\*  $p < 5\%$ , \*  $p < 10\%$

Note. Created by the author.

Table 3 presents the regression estimates of the model in Equation 1. The result showed that remittance has a significant positive impact on human capital. Specifically, the result shows that an increase in remittance inflow raises the level of human capital by approximately 0.01 units. This finding underscores the critical role of remittances as a source of financial support for households towards human capital development in developing Sub-Saharan African (SSA) countries, where public funding for education and health is often insufficient. This result does not stand alone but finds its root in the New Economics of Labor Migration (NELM) theory (Stark & Bloom, 1985), which posits that remittances act as a risk-sharing mechanism, enabling households to improve their socioeconomic conditions. Empirically, this finding is supported by studies such as Umar (2021), Aregbesola (2022), Orekoya and Tijani (2023), Mohamed-Aslam and Sivarajasingham (2023), and Khan et al. (2024) but contrary with the studies such

as Gao et al. (2021) and Bibi and Ali (2022). In alignment with the human capital theory (Becker, 1964), which emphasizes that education is a critical investment in human capital that yields economic and social returns, the pooled OLS estimate showed that an increase in access to education results in an increase in human capital level by about 0.005 units. This result highlights the pivotal role of education accessibility in enhancing human capital development in developing Sub-Saharan African (SSA) countries. Studies such as Psacharopoulos and Patrinos (2018) demonstrated that higher levels of education significantly boost individual earnings and contribute to national economic growth. However, Glewwe et al. (2014) noted that while access to education has expanded in many developing regions, the quality of education often remains suboptimal, limiting its impact on human capital.

Furthermore, in support of the demographic transition theory (Thompson, 1929; Notestein, 1945), which posits that improvements in health and reductions in mortality are key drivers of economic and social progress, as they enable more significant investments in education and skill development, the fixed and the random effects estimates showed that a year increase in life expectancy results in an increase in human capital level by approximately 0.019 units. Reinforced by studies such as Vu (2023), this finding emphasized the critical role health and longevity played in fostering human capital development in developing Sub-Saharan African (SSA) countries. In literature, the institutional theory (Veblen, 1899; Commons, 1931; DiMaggio & Powell, 1983) posited that the quality of institutions and governance plays a pivotal role in determining economic and social outcomes and the evidence from the result supports this claim in the context of developing sub-Saharan African countries. Similar to the findings of Bibi and Ali (2022) and Mohammed (2022), the result showed that an improvement in governance increases the level of human capital by approximately between 0.08 to 0.11 units, pointing to the critical role of effective governance in shaping the conditions necessary for human capital development in the sub-Saharan African countries. The presence of effective governance will ensure that public resources are allocated efficiently, public services such as education and healthcare are accessible, and institutions operate transparently, therefore, fostering an environment conducive to human capital growth.

Furthermore, the result showed mixed results on the impact of GDP per capita on human capital accumulation. The pooled ordinary least square estimate has a negative value of -0.233, suggesting that higher GDP per capita does not necessarily translate into improved human capital. This could indicate that economic gains are unevenly distributed or that structural inefficiencies prevent the benefits of GDP growth from being translated into investments in education, healthcare, and other components of human capital. However, the other models provide stronger and more consistent evidence of a positive relationship, with coefficients ranging between 0.286 and 0.305, indicating that increases in GDP per capita are associated with significant improvements in human capital, consistent with the endogenous growth theory, which emphasizes the role of income and productivity in fostering education and health investments (Romer, 1990). Contrary to intuition, government expenditure on education and health was shown to have a negative impact on the human capital level by reducing it by approximately 0.027 units and 0.006 units, respectively, suggesting inefficiencies or mismanagement in the allocation and utilization of government spending in these critical sectors. This result reflects the situation in many developing countries, especially those in Sub-Saharan Africa (SSA), where public expenditure on education and health often suffers from corruption, lack of accountability, and misaligned priorities, which hinder the expected positive outcomes. On the other way round, it could also mean that the funds intended for improving access and quality in schools or healthcare facilities were diverted or poorly allocated, failing to generate the intended benefits for human capital accumulation. This result agreed with the

public choice theory of Buchanan and Tullock (1962) which proposed that government spending does not always align with public interest due to bureaucratic inefficiencies, corruption, and political motivations.

The pooled ordinary least squares (OLS) regression estimate reveals a negative coefficient for the labour participation rate, suggesting the potential presence of diminishing returns to labour. This could imply that as more individuals participate in the labour market without corresponding improvements in productivity or skill levels, the marginal contribution of labour to human capital accumulation decreases. Such scenarios are common in developing economies like those in Sub-Saharan Africa (SSA), where a significant portion of the labour force is engaged in low-skilled, informal employment that offers limited opportunities for human capital growth. Conversely, in line with studies such as Psacharopoulos and Patrinos (2018) and Ridhwan et al. (2022), the Fixed Effects (F-E) and Random Effects (R-E) models provide strong evidence of a positive relationship, showing that an increase in the labour participation rate raises human capital levels by approximately 0.009 units above the average. This positive impact highlights the importance of workforce engagement in fostering human capital when country-specific characteristics and unobserved heterogeneity are considered. This finding aligns with the Learning-by-Doing Hypothesis (Arrow, 1962), which emphasizes that participation in productive activities leads to experiential learning, fostering skill accumulation and efficiency improvements.

**Table 4**  
*Regression Estimates of Model 2*

| IV                              | DV: Human Capital Index |                        |                        |
|---------------------------------|-------------------------|------------------------|------------------------|
|                                 | POLS                    | F-E                    | R-E                    |
| Remittance                      | -0.0092<br>(0.0085)     | 0.0185***<br>(0.0035)  | 0.0195***<br>(0.0035)  |
| Education level                 | 0.0047*<br>(0.0026)     | -0.0002<br>(0.0012)    | -0.0002<br>(0.0012)    |
| Life expectancy                 | -0.0034<br>(0.0065)     | 0.0232***<br>(0.0039)  | 0.0229***<br>(0.0038)  |
| Governance                      | 0.0396<br>(0.1085)      | 0.0327<br>(0.0560)     | 0.0066<br>(0.0547)     |
| Remittance*Governance           | -0.0457**<br>(0.0204)   | 0.0202***<br>(0.0058)  | 0.0209***<br>(0.0058)  |
| ln(GDP per capita)              | -0.2153***<br>(0.0503)  | 0.2709***<br>(0.0398)  | 0.2540***<br>(0.0389)  |
| Education expenditure           | -0.0247***<br>(0.0053)  | 0.0001<br>(0.0016)     | -0.0001<br>(0.0016)    |
| Health expenditure              | 0.0014<br>(0.0089)      | -0.0059**<br>(0.0028)  | -0.0060**<br>(0.0028)  |
| Labour force participation rate | -0.0080**<br>(0.0031)   | 0.0089***<br>(0.0034)  | 0.0082**<br>(0.0032)   |
| Constant                        | 4.3777***<br>(0.6204)   | -2.3243***<br>(0.4065) | -2.1337***<br>(0.4097) |
| $R^2$                           | 0.19                    | 0.97                   | 0.51                   |
| Breusch-Pagan Test              | 1410.9***               |                        |                        |
| Likelihood Ratio Test           |                         | 1018.4***              |                        |
| Hausman test                    |                         |                        | 16.311*                |

\*\*\*  $p < 1\%$ , \*\*  $p < 5\%$ , \*  $p < 10\%$

Note. Created by the author.

Table 4 presents the regression estimate for the second model in Equation 2. Comparing with the result in Table 3, it can be observed that there is consistency in the sign of the parameter estimates with Table 4; however, with insignificance of the governance parameter for any of the models. In Table 4, the interaction term between remittances and governance (Remittance\*Governance) provides critical insights into how governance quality moderates the impact of remittance inflows on human capital development. The results indicate a significant shift in the interaction effect across models. Under the Pooled Ordinary Least Squares (POLS) method, the coefficient is negative ( $-0.0457$ ), suggesting that in the absence of robust governance structures, remittances may have a diminishing impact on human capital. This could be attributed to factors such as poor allocation of remittance resources, corruption, or weak institutional frameworks that fail to channel these inflows toward productive uses like education and healthcare. In contrast, the Fixed Effects (F-E) and Random Effects (R-E) models reveal a positive and highly significant interaction effect ( $0.0202$  and  $0.0209$ , respectively, both at the 1% level). These results emphasize that in contexts where governance quality is strong, remittances contribute significantly to human capital accumulation. Effective governance likely ensures that remittance inflows are used productively, enhancing access to quality education and healthcare, which are critical components of human capital.

### **Conclusion and Recommendations**

Based on the empirical analyses of the study, it can be concluded that remittances are a significant driver of human capital development in Sub-Saharan African (SSA) developing countries. Improvements in education levels and life expectancy play critical mediating roles in fostering human capital development, underscoring the importance of investments in these areas. Additionally, the findings highlight that better governance acts as a significant booster of human capital, moderating the impact of remittances by ensuring their productive utilization. However, government expenditure on health and education shows a countercyclical effect on human capital accumulation, largely due to social factors such as corruption, lack of accountability, and misaligned priorities prevalent in SSA countries. Furthermore, a large proportion of the population with low skill levels impedes the human capital formation process, limiting the region's potential for economic and social development. It is thus recommended that governance structures be strengthened to improve accountability, reduce corruption, and ensure transparency in resource allocation; investments in quality education and healthcare be prioritized, focusing on teacher training, curriculum reforms, and healthcare infrastructure; skill development programs, particularly vocational training for youth and women, be implemented to address low skill levels; remittances be leveraged through initiatives such as incentivizing investments in education and healthcare or matching grant programs; and public expenditures on health and education be made more efficient by strengthening monitoring and evaluation mechanisms to align spending with human capital development goals.

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