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Article

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FINANCIAL ECONOMICS | RESEARCH ARTICLE

Foreign capital flow, institutional quality and human capital development in sub-Saharan Africa

Peter Nderitu Githaiga^{1*} and Andrew Wenani Kilong'i²

Abstract: This study investigates the moderating effect of institutional quality on the relationship between foreign capital flow and human capital development in sub-Saharan Africa. The study uses a sample of 34 countries in sub-Saharan Africa and data for 2009 to 2019. Human capital development is measured using the Human Development Index (HDI). To control for endogeneity, the study uses the system generalized method of moments (GMM) estimator. The results demonstrate a positive relationship between remittances, foreign direct investment (FDI), institutional quality and human capital development. Official development assistance (ODA), on the other hand, has a negative and significant effect on human capital development. The findings further reveal that the effect of remittances and FDI on the human capital development is moderated by the institution's quality. However, the effect of ODA on the development of human capital is not influenced by institutional quality. Findings from the study provide valuable insights to policy-makers. This study highlights the importance of remittances and FDI in stimulating human capital development in sub-Saharan Africa. Additionally, the study reveals the harmful impact of official development on human capital development that necessitates policy interventions. Drawing on these findings, policymakers should undertake policy reforms to improve the quality of institutions and enhance the impact of foreign capital flows on human development. This study offers two contributions. First, the study fills a vacuum in the literature by focusing on the relationship between foreign capital flow, institutional quality, and the development of human capital in sub-Saharan Africa. Second, the SSA is one of the developing nations that has seen a significant brain drain because of widespread migration to industrialized nations. Therefore, it is necessary to investigate how much foreign capital flows through the development of human capital contribute to the socio-economic change of the region.

Subjects: Culture & Development; Economics and Development; Economics; Finance; Business, Management and Accounting

Keywords: foreign capital flow; human capital development; Sub-Saharan Africa; panel data

1. Introduction

According to theory (Lucas, 1988; Romer, 1990a), building human capital is essential to fostering economic progress. Many developing nations have exploited foreign capital flows to boost human

capital, which ultimately leads to economic growth and all-around development. The most pervasive idea among researchers and policymakers is that foreign capital flow enhances growth in diverse ways by increasing the capital base of receiving countries and providing employment opportunities. Foreign capital, such as FDI, further brings technological development to local firms, which improves the productivity of host countries and stimulates economic growth. Therefore, foreign capital flows have been instrumental in fostering socio-economic development and complementing national development initiatives in the recipient countries. Sub-Saharan Africa, like other developing regions, depends on foreign funding to finance projects and achieve socio-economic growth (Adams et al., 2017).

The main components of foreign capital flows are remittances, foreign direct investment and official development assistance (Musibau et al., 2019). Remittances are the second-largest source of external finance after foreign direct investment in the developing economies (Bhattacharya et al., 2018). As of 2021, the estimated amount of remittance flow to developing countries was \$589 billion in 2021 (World Bank, 2021). Remittances are goods and money sent by individuals working outside of their country of origin to their family members back home (Kulkarni, 2014). These transfers are made informally by hand as cash or in-kind, through the financial system, through money transfer services or through the banking system. Remittances are often intended for use by families back home and are not intended for investment (Heyse et al., 2015). Altruism, self-interest, asset accumulation, and insurance are a few of the reasons Lucas and Stark (1985) provide for sending remittances. Migrants have an altruistic concern for the welfare of those who are left behind. The self-interest incentive is centered on migrants' desire to purchase real estate at home. Remittances and migration are regarded as a type of risk-sharing or risk-diversification for insurance purposes (Lucas & Stark, 1985).

The OECD defines FDI as an investment that "reflects the objective of obtaining a lasting interest by a resident entity in one economy ('direct investor') in an entity resident in an economy other than that of the investor ('direct investment enterprise')" (OECD, 2005). FDI is the largest component of foreign capital flow available to developing nations (Katoka & Kwon, 2018). By 2021, the estimated amount of FDI flow to developing countries is \$616 billion, accounting for over 75% of total global private capital flow (UNCTAD, 2021). FDI is in two forms, horizontal and vertical. Horizontal FDI is characterized by duplicating production capacity in the host country, being practically every market served by its power. Vertical FDI involves transferring production capacity from the country of origin to the host country to increase efficiency (Munteanu, 2015). Additionally, FDI is the most significant method for transferring foreign technology across nations, along with international trade (Zamani & Tayebi, 2022).

Foreign grant-in aid generally flows in the form of official development assistance (ODA) from developed countries to developing countries (OECD, 2012). The estimated amount of development assistance to developing countries is USD 161.2 billion (OECD, 2021). Official development assistance aims to promote the provision of public goods and services among the least developed and developing countries. ODA supplements other local or foreign sources of finance that support infrastructural development. ODA can also be in the form of technical assistance and capacity building of institutions. Therefore, aid to the developing countries is tailored to bring forth economic growth, reduce poverty and better living standards.

Human capital development is the key to economic growth and the realization of sustainable development goals (Barua, 2021; Idike et al., 2021; Matousek & Tzeremes, 2021). Extant literature shows that scholars have defined human capital differently. Mincer (1996) views human capital development as an indicator of the proportion of a country's population with sufficient education, skills, and training. Torruam et al. (2014) suggest that human capital development involves developing skills, knowledge, productivity, and inventiveness of human capital formation. However, Romer (1990a) defines human capital development as "skills acquisition through training of workers as well as investment in health-care reforms." Meanwhile, Jhinger (2005) suggests that

expenditure on human capital development necessitates investment in education, health, and social services. Studies also point to health care as an additional dimension of human capital development (Buevich et al., 2019; Romer, 1990b). The United Nations Development Programme (UNDP) models a nation's human capital from three perspectives: school enrolment and literacy, the standard of living, and life expectancy. Similarly, a Human Development Report by the United Nations Development Program (UNDP; 2018) suggests that countries must invest in societies' education, nutrition, health, and employment skills to realize economic growth. Consequently, human capital development is an indicator of a country's investment in education and training, nutrition and health care to improve human productivity and economic growth.

Proponents of the Human Capital Theory posit that a nation's socio-economic development centers on continued investment in the education and health of its population (Affandi et al., 2019; Schultz, 1961). Therefore, no country can overlook the importance of human capital development in socio-economic development. Previous studies have also revealed that a country with a highly educated and healthier population produces more output and ultimately improves economic growth (Bloom et al., 2019; Yao, 2019). Since immemorial educational attainment, nutrition and health have long been hypothesized as key drivers of labour productivity. According to Petty (1769), raising the value of a nation's human capital promotes economic growth. At the same time, Smith (1904) associated national prosperity with an increased division of labour, advocated for higher wages, and enhanced workers' skills. As opposed to the conventional wisdom that physical and tangible assets like factories, capital, machinery, and land are the primary drivers of economic growth, contemporary economists assert that countries accomplish economic growth by investing in the development of their human capital (Penrose, 1959; Weisbrod, 1962).

Because of the vital relationship between human capital development and socio-economic development, there have been numerous research studies on the determinants of human capital development, particularly in developing countries. Although prior studies claim that budgetary constraints explain the low level of human capital development in developing countries (Olopade et al., 2019; Wenzel, 2017), these countries receive a considerable amount of foreign capital inflows; foreign remittances, official development assistance and foreign direct investment (Ahmed et al., 2021; Wang et al., 2022). Several studies have examined the relationship between foreign capital inflows and human development, but the findings are inconclusive (Kheng et al., 2017; Ponce et al., 2008; Kroeger & Anderson, 2014). Besides, none of these studies examined the foreign capital flow and human capital development relationship in sub-Saharan Africa, which is considered among regions with the lowest level of human capital development (Matousek & Tzeremes, 2021). SSA Africa has been of much interest in development studies since many of the countries face a lack of strong legal and political institutions: lack of property rights, weak courts and deficiency in contract enforcement, violence and political instability, hostile regulatory environment and high inflation (Asongu & Nwachukwu, 2016; Sarwar et al., 2015). In addition, despite receiving a fair share of foreign capital flow, countries within SSA fall between the low and medium HDI range (Darley, 2012)

Prior studies show suggest that dimensions of institutional qualities such as corruption, political stability, rule of law, violence and terrorism affect human capital development (Borja, 2020; Ortega et al., 2016). Additionally, previous studies also reveal that foreign capital flows are more effective in countries with sound institutions. In their paper, Collier and Dollar (2002) note that the effectiveness of foreign aid is determined by the quality of policies and institutions. In the same vein, a study by Kosack (2003) found that the effectiveness of foreign aid in improving the quality of life is enhanced by democratization of institutions. Overall, it has been found that aid empowers the poor in a good institutional setting and improves the functioning and capabilities of individuals. A study by Kathavate and Mallik (2012) reports the effect of aid on the growth depends on the quality of recipient country's institutions. Using a sample of 90 developing and transition countries for the period 1970–2012, Larrey and Mengova (2016) find that institutional quality influences the flow of remittances. Therefore, the quality of political institutions may also influence the flow of

foreign capital. Similarly, Ajide and Raheem (2016), report that institutional quality plays a crucial role in attracting remittance inflow to the ECOWAS region. The literature also shows that institutional quality is a key determinant of FDI inflow (Buchanan et al., 2012; Shah et al., 2016). Thus, countries with better governance institutions are likely to attract more foreign capital, which in response will positively influence human capital development. However, empirical links between foreign capital flows, institutional quality and human capital development are still limited. To our knowledge, no other study has addressed this issue. From this background, this study seeks to assess whether institutional quality moderates the relationship between foreign capital inflows and human capital development in sub-Saharan Africa. The rest of the paper proceeds as follows: section 2 presents an overview of sub-Saharan Africa. Section 3 deals with the empirical literature. Section 4 presents the research methodology, sample and data. Section 5 discusses the findings, while section 6 concludes.

2. Background of Sub-Saharan Africa

Sub-Saharan Africa (SSA) is geographically the area of the Africa continent that lies south of the Sahara and consists of all African countries and territories. As of 2018, SSA had a GDP per capita (Current US\$) that stood at 1,574.2 compared with 1,905.0 in South Asia, 11,132.2 in developing East Asia and Pacific, 8,057.0 in developing the Middle East and North Africa, 9,023.5 in developing Latin America and the Caribbean, 25,078.0 in developing Europe and Central Asia, and 36,546.4 European Union (World Bank, 2019). By 2019, about 41.4.0% of the sub-Saharan Africa population lived on less than \$1.90 a day, compared to 16.1% South Asia, 4.2% Middle East & North Africa, and 3.9% for Latin America & the Caribbean. It has the highest annual population growth rate of 2.7% for all regions in the world; 1.7% in South Asia, 0.6% East Asia and the Pacific, 1.7% in the Middle East & North Africa, and 0.2% in Europe & Central Asia (World Bank, 2019). Additionally, UNCTAD (2018) classifies 32 SSA countries as least developed. In line with the Human Development Index (HDI) of 2018, the sub-Saharan African region is ranked the lowest with an HDI of 0.537, compared to 0.733 in East Asia, 0.771 in Europe and Central Asia, 0.758 in Latin America and the Caribbean, and 0.638 in South Asia (United Nations Development Program (UNDP), 2018). In addition, the region again records the highest prevalence of undernourishment in the world, reaching as high as 23% undernourished population (FAO and ECA, 2018). The report further shows that out of the 821 million malnourished people globally, 236 million are from sub-Saharan Africa.

A report by the World Health Organization (2006) shows that 72% of the sub-Saharan African population still lacks access to essential sanitation services. Besides, the region is home to 53% of the world's people living with HIV and AIDs (UNAIDS, 2018). In 2019, SSA had a life expectancy of fewer than 61 years, compared to 69 years in South Asia, 78 years in Europe & Central Asia, and 76 in East Asia & the Pacific (World Bank, 2019). Sub-Saharan Africa also faces the lowest literacy level (% of people ages 15 and above) of 66% compared with 72% in South Asia, 98% in Europe & Central Asia and 96% in East Asia & the Pacific. According to the statistics provided above, sub-Saharan Africa is one of the regions with the lowest levels of human capital development. The region does, however, receive a substantial amount of foreign capital transfers in the form of foreign direct investment, migrant remittances, and official development assistance (foreign aid). SSA got almost 88% of the 32.4% of official development assistance allocated to Africa in 2019 (OECD, 2019). Additionally, the region receives 10.2% of worldwide remittances or 2.18% of the region's GDP (World Bank, 2019). Additionally, according to UNCTAD (2018), SSA receives nearly 2.9% of all foreign direct investment in the world (FDI). However, it is still unclear how foreign capital flow and the growth of human capital in sub-Saharan Africa are related.

3. Review of previous studies

3.1. Remittance and human capital development

Empirically, a large part of the literature has focused on how remittance influences development through economic growth. Remittances may spur economic growth by increasing entrepreneurial

activity and investment by alleviating credit constraints, especially in developing countries with less efficient credit markets. A study by Azam and Raza (2016) examined the influence of workers' remittances on human capital development and employed a sample of 17 countries and panel data from 1996 to 2013. The results indicate that workers' remittances positively and significantly affect human capital development. Borja (2020) assessed the relationship between remittances and human development. The study used a sample of 26 Latin American and Caribbean countries. 1985–2016. The findings show a positive relationship between remittances and human capital development. Additionally, the study suggests that corruption constrains the effectiveness of remittances in improving human capital development. Similarly, Umar (2022) examined the relationship between remittances, institutions and human development (HD) in sub-Saharan African (SSA) countries using data from 2004 to 2018. The findings indicate a positive and significant impact of remittances on HD in SSA. The results further reveal a substitutional relationship between institutions and remittances in stimulating HD. The estimations mean that remittances promote HD in countries with a weak institutional environment. The findings also establish that the marginal significance of remittances as a source of capital for HD falls in countries with well-developed institutions. Using data for the period between 2007 and 2010, Salas (2014) also report a positive relationship between remittances and human capital formation in Peru. Hassan et al. (2013) assessed the relationship between remittances and human capital formation in Pakistan for the period between 1981 and 2011. The authors found that worker's remittances had a negative effect on human capital formation. Based on the literature, this study hypothesizes that,

H1. Remittances positively affects human capital development

3.2. Foreign direct investment and human capital development

Many academics have shown solid evidence that FDI stimulates socio-economic development, particularly in developing countries with sound institutional and political environments (Burnside & Dollar, 1997; Sethi et al., 2019; Acemoglu et al., 2005; La Porta et al., 1997). Studies also confirm that foreign investment may advance human capital in poor and emerging economies (Suliman & Mollick, 2009; Zhuang, 2017). For instance, a study by Kar (2013) that sought to examine the relationship between foreign direct investment (FDI) and human capital development (expenditure on higher education) in India reported a weak unidirectional causality between FDI and human capital development. Kaulihowa and Adjasi (2019) assessed the non-linear effect of FDI and the different levels of human capital development. The study used a sample of nine African countries over 2000–2017. The study found mixed findings. While the effect of FDI on primary education was an inverted U-shaped relationship, tertiary education showed a U-shaped pattern. However, the FDI and secondary education association is insignificant. Henok and Kaulihowa (2021) investigated the impact of FDI on human capital development in Southern African Customs Union (SACU) countries. The study used a sample of five countries and data from 1990 to 2018. The findings indicate that FDI improves human capital development when the primary school enrolment rate is used. Conversely, the FDI and secondary education relationship is negative. Zhuang (2017) examined the effect of inward FDI on human capital accumulation. The study employed a panel of sample data from 16 East Asian countries from 1985 to 2010. The findings show that an increase in foreign presence is associated with an increase in secondary schooling. However, the relationship between FDI and tertiary schooling was negative. Kheng et al. (2017) assessed the human capital and foreign direct investment (FDI) relationship using panel data from 55 developing countries from 1980 to 2011. The results show a significant bi-directional causality between human capital and FDI. Fagbemi and Osinubi (2020) investigated the interconnections between FDI and human capital development in Nigeria. The study used data for the period 1981–2018 and was analyzed through non-linear autoregressive distributed lag (NARDL) and linear ARDL. The results confirm that the effect of FDI on human capital development was insignificant in the long run but significant in the short run. Prior studies report that the recipient country's level of human capital development determines the amount of FDI received and its absorptive capacity. Kheng et al. (2017) examined the relationship between human capital and foreign direct investment. The authors used panel data from 55 developing countries

for the period 1980–2011. The results reveal a significant bi-directional causality between human capital and FDI. Therefore, this study postulates that,

H2. Foreign direct investment positively affects human capital development

3.3. Official development assistance and human capital development

Asiama and Quartey (2009) assessed the impact of foreign aid on human development. The study used data drawn from 39 SSA countries for the year 2005. The study shows no relationship between foreign aid and human development indicators. Yiheyis and Woldemariam (2020) investigated the association between remittance, official development assistance and human development. The study used a sample of 35 African countries. The study findings reveal a positive relationship between official development assistance, remittances and human capital development. Shirazi et al. (2009) assessed the relationship between foreign aid and human capital development using time-series data for 5 years. The findings show a positive relationship between foreign aid and human development. Moe (2008) investigated the relationship between official development assistance (ODA) and human and educational developments among Southeast Asian countries and data from 1990 to 2004. The study found that foreign direct investment and official development assistance positively and significantly influenced human development. Using data for the period 2006 to 2016 and a sample of 15 Asian countries, Lee et al. (2019), found a positive association between ODA and human capital development. S. A. Asongu and Tchamyou (2019) assessed the relationship between foreign aid, education and lifelong learning. The study considered a sample of 53 African countries and data for the period 1996–2010. The findings reveal that foreign aid positively affected primary school enrolment and lifelong learning. In addition, the study found that the effect of aid dynamics on secondary and tertiary school enrolments is not significant. Yogo (2017) assessed aid effectiveness and its efficient use in achieving universal primary education in sub-Saharan Africa. A sample of 35 sub-Saharan countries over the period 2000 to 2010. The results of this study show that foreign aid significantly increased the primary school completion rate. Conversely, some studies have reported a negative association between ODA and human capital development. Lohani (2004) who considered a sample of 120 developing countries reports a negative relationship between foreign aid and human development. Using data from a sample of 22 African countries for the period 1996–2009, Asongu (2014) found a negative association between foreign aid and human capital development. Based on the empirical literature, this study hypothesizes that,

H3. Official development assistance positively affects human capital development

3.4. Foreign capital flow, institutional quality, human capital development

Low quality of institutions of governance deters human capital development as vital resources are diverted toward less efficient uses. The institutional theory put forward by North (1990) offers an important theoretical insight into the significance of institutions in attracting foreign capital flows and fostering socioeconomic development. North (1990) argues that while strong institutions increase economic activity by lowering transaction costs and output costs, weak and deficient institutions impede productivity and increase uncertainty. Effective political and legal structures, particularly the protection of property rights and the rule of law, are reportedly necessary for resource allocation (Rodrik et al., 2004). Investment costs are typically high in unfavorable institutional environments with intellectual property theft, bad governance, and corruption (Daniele & Marani, 2011). Investors and donors, in particular, are hesitant to transfer capital to such economies. Therefore, institutional stability is essential for attracting foreign capital and ultimately fostering the development of human capital. Although there are conflicting and inconclusive findings in the empirical literature, the link between institutional quality and the development of human capital is well documented.

Fagbemi et al. (2022) assessed the effect of corruption on the growth of the human capital in Nigeria from 1996 – 2019. According to the authors, corruption had a significant effect on the growth of human capital. Ouedraogo et al. (2022) studied the association between institutional quality and human capital development. The authors considered 49 African countries and data for the period be 1996–2018, and they found that government effectiveness, the level of corruption, political stability and the violence are key determinants of human capital development. In Brazil, Koppensteiner and Menezes (2021) reported that violence has a negative effect on school attendance, standardized test scores and that it increases the dropout rates of students. In the same line of research, Bertoni et al. (2019) assessed the effect of the Boko Haram conflict on educational outcomes of persons residing in north-eastern Nigeria for the period between 2009 and 2016. The authors found that the conflict reduced school enrollment. Di Maio and Nandi (2013) looked studied how the Israeli-Palestinian conflict affected Palestinian children's access to education and child labor in the West Bank. The finding revealed that the violence reduced the number of students attending school in the area.

Hence, some level of institutional quality is required to leverage foreign financial flows for the development of human capital. For instance, in a nation with a high incidence of corruption, foreign investors might be discouraged from making investments in healthcare and education. Bénassy-Quéré et al. (2007) concluded that the factors that most strongly influence inbound FDI include bureaucracy, corruption, information, the banking industry, and legal institutions using data collected from 52 nations during the years 1985 to 2000. Similarly, Moore and Daday (2010) studied the barriers to human capital development in Swaziland, Cameroon, and Kenya for the period 1990 to 2004. The authors found that the barriers to human capital development were HIV/AIDS, land tenure issues, and political corruption. Using a sample of 88 developing countries, Borja (2014) found that remittances are effective at promoting economic growth when adequate institutions are set in place. Borja (2017) also reports that FDI and remittances have a more positive impact on economic growth if corruption is controlled. Generally, going by the existing literature there may be a relationship between foreign capital flows, institutional quality and human capital development, but there is no empirical evidence to support it. Thus, this research aims at closing this gap. Moreover, previous works are limited because most studies considered each of the foreign capital flow components separately. The study posits that institutional quality influences the relationship between foreign capital flows and human capital development. To investigate the moderating effect of institutional quality for each of the components of foreign capital flow and human capital development, the study hypothesises as follows:

H4. Institutional quality positively affects the human capital development

H5a. Institutional quality moderates the relationship between remittances and human capital development.

H5b. Institutional quality moderates the relationship between foreign direct investment and human capital development.

H5c. Institutional quality moderates the relationship between official development assistance and human capital development.

4. Methodology

4.1. Sample and data

The study targeted sub-Saharan Africa (SSA) countries between 2009 and 2019. This timeframe is ideal because it lies between the Post-Global Financial Crisis (2007–2008) of and the pre-Covid-19 Pandemic periods. The period also witnessed a relatively stable economic and political stability

that is necessary for human capital development. The sampling framework comprised the 54 countries that constitute sub-Saharan Africa. The inclusion and exclusion criteria were based on whether the selected country had complete data for the period. After data collection, the final sample comprised 41 countries. Panel data were extracted from the World Development Indicators (WDI) by the World Bank and the OECD. The dependent variable employed in this study is human capital development, operationalized by the UNDP's Human Development Index (HDI). The predictor variable is foreign capital inflow, which is disintegrated into foreign direct investment, foreign remittances and official development assistance. Data on the predictor variables are available on the World Bank database, while the definition and source of data for the control variables are shown in Table A1 Appendix.

4.2. Econometric model

This study examines the moderating impact of institutional quality on the relationship between foreign capital flow and human capital development using the system generalized method of moments (GMM) estimator developed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The ability of S-GMM to handle potential endogeneity justifies the choice. The consistency of the S-GMM estimator relies on two specification tests: (i) a test of the joint validity of all instruments and (ii) the absence of second-order autocorrelation AR(2). The first test is referred to as the Sargan/Hansen's J-test of over-identification and the null hypothesis test, which suggests that instruments are uncorrelated with the error term. The second test examines the hypothesis of no second-order autocorrelation in the error term of the difference equation (Arellano & Bond, 1991). Human capital development is the study's dependent variable, and it is measured by the Human Development Index (HDI). Remittances, official development assistance, and foreign direct investment are the exogenous variables (ODA). Institutional quality is a moderator and is measured by the Country Policy and Institutional Assessment (CPIA). Based on previous empirical studies, the study controls for two macroeconomic factors: population growth rate (Boucekkine et al., 2013; Fertig et al., 2009), as well as government expenditure on health and education (Dissou et al., 2016; Yang, 2020). The regression models for the research are shown below.

Model 1. Testing the direct effect

$$HDI_{it} = \beta_0 + \beta_1 GEEH_{it} + \beta_2 PGR_{it} + \beta_3 REM_{it} + \beta_4 FDI_{it} + \beta_5 ODA_{it} + \epsilon_{it}$$

Model 2. Testing the effect of the moderator on the outcome variable

$$HDI_{it} = \beta_0 + \beta_1 GEEH_{it} + \beta_2 PGR_{it} + \beta_3 REM_{it} + \beta_4 FDI_{it} + \beta_5 ODA_{it} + \beta_6 CPIA_{it} + \epsilon_{it}$$

Model 3–5. Testing the effect of the interaction terms on the outcome variable (stepwise).

$$HDI_{it} = \beta_0 + \beta_1 GEEH_{it} + \beta_2 PGR_{it} + \beta_3 REM_{it} + \beta_4 FDI_{it} + \beta_5 ODA_{it} + \beta_6 CPIA_{it} + \beta_7 REM * CPIA_{it} + \beta_8 FDI * CPIA_{it} + \beta_9 ODA * CPIA_{it} + \epsilon_{it}$$

Where;

HDI_{it} is Human Development Index, FDI_{it} is foreign direct investment, REM_{it} is remittances, PG_{it} is the population growth rate, CPIA_{it} is a proxy for institutional quality, GEEH_{it} is government expenditure on education and health. The interaction terms for remittances, foreign direct investment, official development assistance, and institutional quality are REM*CPIA, FDI*CPIA and ODA*CPIA, respectively (All interaction terms were created by mean-centered variables to minimize multicollinearity). u_i is a time invariant country-specific fixed effect term, ϵ_{it} is error term; β_0 is the intercept, $\beta_1 \dots, \beta_n$ are beta-coefficients, "i" is cross-section units (countries) and "t" is the study period (2009 to 2019). The definition and measurement of the variables are shown in Appendix I.

5. Findings and discussion

5.1. Diagnostic tests

Considering that different panel unit root tests make different assumptions regarding the cross correlation among the errors in the panel, the empirical study started with the test for cross-sectional independence. Unit root tests may yield false results if there is a substantial amount of cross-section dependence and it is ignored. Three cross-sectional independence tests were used in the study: the Friedman (1937) statistic, the test statistic proposed by Frees (1995) and Pesaran's (2004) cross-sectional dependence (CD) test. The general null hypothesis H_0 : cross-sectional independence and the alternative hypothesis H_1 : cross-sectional dependence are both applied to the three tests. We fail to reject the null hypothesis at a 1% level based on the results of the three tests provided in Table 1, as all of the p-values are greater than 5%.

To test for stationarity, the study employed the Levin-Lin-Chu (LLC), Im, Pesaran and Shin (IPS), and Fisher-type unit root (Based on augmented Dickey-Fuller tests) (Fisher-ADF) tests. The results reported in Table 2 confirm that the data is stationary. To check for multicollinearity, the study used the variance inflation factor (VIF; Docquier et al., 2007). The stronger the correlation, the higher the VIF value. If the VIF value is greater than 10, then there may be a multicollinearity problem (Enders, 2004; Gujarati, 2004). Given that the maximum VIF value of 1.71, as shown by the results in Table 2, there is no multicollinearity problem with the studied variables.

5.2. Descriptive statistics

The descriptive statistics for the research variable are presented in Table 3. The mean Human Development Index (HDI) was 0.489 (minimum = 0.304 and maximum = 0.796; standard deviation = 0.079). According to the UNDP, HDI of over 0.8 is considered high, while 0.5–0.8 is medium. Conversely, the HDI of 0.0–0.5 is low. Therefore, the mean of 0.489 suggests that the selected SSA countries have low human capital development. Remittances had a mean value of 3.728 (minimum = 0.073 and maximum = 16.285; standard deviation = 3.543). Official Development Assistance (ODA) had a mean value of 7.381 (minimum = 0.073 and maximum = 21.142; standard deviation = 5.127). The mean foreign direct investment (FDI) in the SSA was 3.988 (minimum = 0.238 and maximum = 19.456; standard deviation = 3.421). Furthermore, the mean CPIA

Table 1. Cross sectional Independence

Test	Pesaran		Friedman		Frees	
	CD test	p-value	CD	p-value	CD (Q)	p-value
RE Model	0.467	0.6406	13.738	0.9987	2.629	0.465
FE Model	0.600	0.5487	16.604	0.995	2.958	0.465

FE and RE stand for fixed effects and random effects models, respectively. p-value significance at 1% level.

Table 2. Analysis of unit root and multicollinearity

Variable	LLC	Fisher-ADF	IPS	VIF	1/VIF
HDI	−9.995(0.000)	138.099(0.000)	−3.043(0.000)	-	-
REM	−67.061(0.000)	140.992(0.000)	−2.363(0.001)	1.51	0.661706
FDI	−6.846(0.000)	195.038(0.000)	−2.904(0.002)	1.42	0.706627
ODA	−7.010(0.000)	100.793(0.000)	−2.961(0.000)	1.71	0.585973
CPIA	−6.943(0.000)	101.567(0.000)	−1.893(0.003)	1.07	0.937846
GEEH	−9.299(0.000)	131.168(0.000)	−2.042(0.002)	1.04	0.959957
PGR	−17.524(0.000)	248.964(0.000)	−2.459(0.001)	1.41	0.710816

Note. p-values are in parentheses

Table 3. Summary statistics for the research variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Human development index (HDI)	374	0.489	0.079	0.304	0.796
Remittances(% GDP)	374	3.728	3.543	0.073	16.285
Foreign direct investment(% GDP)	374	4.416	4.082	0.238	20.971
Official development assistance(% GDP)	374	7.381	4.951	0.073	21.142
CPIA	374	2.763	0.578	1.000	4.000
Government expenditure on education and health(%GDP)	374	5.618	1.357	2.762	10.930
Population growth rate (% annual)	374	2.567	0.642	0.182	3.8471

(institutional quality) was 2.763 (minimum = 1.000 and maximum = 4.000; standard deviation = 0.722), while the average government expenditure on education and health care was 5.618 (minimum = 1.357 and maximum = 10.930; standard deviation 1.357). The average population growth rate for the region was 2.567 (minimum = 0.182 and maximum = 3.871; standard deviation = 0.642).

5.3. Regression analysis

The study tested the hypotheses using the regression findings from the system GMM. The Sargan/Hansen test for overidentifying restrictions and the second-order serial correlation test AR (2) test were initially carried out to assess the issue of endogeneity and the validity of the instruments. The GMM system technique was used to apply the Sargan and Hansen test of overidentifying restrictions as suggested by Arellano and Bond (1991) and Hansen (1982). Given that the probability values for the Sagan/Hansen test and the AR (2) test were not significant at 5%, confirm that there was no second-order serial correlation. Table 4 confirms that the instruments are valid.

The results presented in Model I indicate that remittances have a significant and positive effect on human capital development ($\beta = 0.004$, $p < 0.05$); thus, H1 is supported. The findings are consistent with those of Azam and Raza (2016), Borja (2020), and Umar (2022) but contradict Hassan et al. (2013) who reported a negative effect. Remittances alleviate the migrant's household income constraints, hence the receiving household is capable of investing more in education and healthcare. The increased budget for education would also mean more years of schooling at both the secondary and tertiary school levels, which in the long run improves a country's stock of human capital. In addition, migrants are more likely to take children left behind to private schools that offer better education compared to public schools. The findings emphasize the necessity of targeted regulations to lower the cost of foreign money transfers and the necessity of enhancing channels for efficient remittance utilization. The receiving countries must also promote an environment that encourages the investment of this capital flow in areas connected to the advancement of human capital.

The results further show that the association between foreign direct investment and human capital development is significant and positive ($\beta = 0.003$, $p < 0.05$); hence, H2 is supported. The findings are consistent with those of Zhuang (2017) and Henok and Kaulihowa (2021) but differ

Table 4. Regression results

HDI	Model 1.	Model 2.	Model.3	Model 4	Model. 5
L1.	.862(0.018)**	.859(0.018)**	.853(0.018)**	.853(0.018)**	.850(0.018)**
CONSTANT	.025(0.015)	.017(0.015)	.021(0.015)	.020(0.015)	.021(0.015)
GEEH	.002(0.001)**	.002(0.001)**	.002(0.001)**	.002(0.001)**	.002(0.001)**
PGR	-.004(0.002)**	-.004(0.002)**	-.005(0.002)**	-.004(0.002)**	-.004(0.002)**
REM	.004(0.001)**	.004(0.001)**	.003(0.001)**	.003(0.001)**	.003(0.001)**
FDI	.003(0.001)**	.002(0.001)**	.003(0.001)**	.003(0.002)**	.003(0.001)**
ODA	-.007(0.003)**	-.008(0.003)**	-.007(0.003)**	-.006(0.003)**	-.005(0.003)**
CPIA	-	.004(0.002)**	.005(0.002)**	.005(0.002)**	.004(0.002)**
REM*CPIA	-	-	.006(0.003)**	.006(0.003)**	.006(0.002)**
FDI*CPIA	-	-	-	.007(0.002)**	.007(0.002)**
ODA*CPIA	-	-	-	-	.001(0.001)
No.instruments	51	52	53	54	55
No. groups	34	34	34	34	34
<i>Post-estimation analysis</i>					
Arellano-Bond:AR(1)		0.052			
Arellano-Bond:AR(2)		0.128			
Sargan test (p-val)		0.445			
Hansen test (p-val)		0.740			

Notes: system-GMM estimations for dynamic panel-data models. HDI, human development index; GEEH, Government expenditure on education and health; PG, population growth rate; REM, remittances; FDI, foreign direct investment; ODA, official development assistance; CPIA, country policy and institutional assessment; Standard error in the parenthesis; **Significant at 5 per cent level

from those of Checchi et al. (2007) who reported a negative relationship. Meanwhile, Yildirim and Tosuner (2014), Sun and He (2014) found no relationship. FDI may contribute to human capital development through a direct effect of the upgraded skill level of the workforce and indirect effects through improved healthcare and spillover effect. Conversely, official development assistance had a significantly negative effect on human capital development in sub-Saharan Africa ($\beta = -0.007$, $p < 0.05$); thus, hypothesis H3 is rejected. These findings are supported by previous studies (Asongu, 2014; Lohani, 2004). The results conflict with earlier studies that reported a positive relationship (S. A. Asongu & Tchamyou, 2019; Moe, 2008; Yogo, 2017). The effectiveness of foreign aid in human development and economic growth is largely a controversial topic. The negative effect of ODA on human capital development can be attributed to misappropriation of aid meant for education and health programs. Additionally, while foreign aid may broaden access to healthcare and education, an unfavorable governmental environment in the recipient nation may compromise the quality of these services. Furthermore, foreign aid breeds dependency, which could result in lower domestic spending on the health and education sectors.

The regression results shown in Model 3, Table 4, demonstrate that institutional quality positively influences the growth of human capital ($\beta = 0.004$, $p < 0.05$), supporting hypothesis H4. The results support those of prior studies (Bertoni et al., 2019; Fagbemi et al., 2022; Koppensteiner & Menezes, 2021; Ouedraogo et al., 2022). The findings demonstrate that raising institutional quality encourages accessibility to healthcare, education, and other public goods that support human capital development. Therefore, the most crucial factors that promote the development of human capital are the efficacy of the government in preventing corruption, maintaining political stability and upholding the rule of law. The findings imply that promoting institutional quality dimensions is essential to enhancing the development of human capital in sub-Saharan Africa.

From Models 3–5, the interaction terms are added stepwise to the regression model. The moderating hypotheses (H5a–c) are tested using the pooled model (Model 5). Based on Model 5, Table 4, hypotheses H5a and H5b are validated. The coefficients of all interaction terms of remittances and institutional quality (REM *CPIA) have a positive and significant effect on human capital development ($\beta = 0.006$, $p < 0.05$). The results also show the positive and significant impacts of interaction terms of FDI with institutional quality (FDI *CPIA) on human capital development ($\beta = 0.007$, $p < 0.05$). Hence, the study's findings confirm that a high quality of institutions system strengthens the effect of remittances and FDI on the dimensions of human capital developments such as education and health. Prior studies have also reported that the developmental impact of external finance on economic growth is more pronounced for countries with sound economic policies and stronger institutions of governance (Catrinescu et al., 2009; Chitambar, 2019; Le, 2009; Zghidi et al., 2018). Empirical findings of the study suggest that apart from putting appropriate and effective macro-economic policies to attract more international remittances and FDI to promote human capital development, it is important to promote good governance.

The findings further indicate that the interaction of official development assistance and institutional quality (ODA*CPIA) is positive but insignificant ($\beta = 0.001$, $p > 0.05$); therefore, H5c is rejected. These results imply that sound institutions may not avert the adverse effects of foreign aid on human capital development. Foreign aid may deteriorate governance standards of the recipient countries. For instance, prior studies report a positive relationship between foreign aid and corruption (Asongu, 2012; S. Asongu & Jellal, 2013). The collaboration between weak institutions and development assistance that breeds corruption negatively affects human capital development.

6. Conclusions

This study examined whether institutional quality moderates the relationship between foreign capital flows and human capital development in sub-Saharan Africa. A sample of 34 countries and data for 2009 to 2019 was used. The data was extracted from the WDI of the World Bank, UNDP and the OECD. The findings showed that remittances, foreign direct investment and institutional quality are positive drivers of human capital development in SSA. However, ODA has an adverse effect on human capital development. The study's findings further revealed that institutional quality moderated the relationship between remittances, FDI and human capital. However, the interaction between the quality of institutions and aid is insignificant. On the basis of these findings several policy implications can be drawn. First, policymakers interested in enhancing the benefits of foreign capital flow among developing countries can leverage remittances and FDI to increase human capital development. Second, since remittances are usually transferred through informal channels such as friends or family members traveling abroad policy interventions that can encourage the transmission of these capital flows through conventional financial systems are necessary. Therefore, this study argues that sub-Saharan African countries can strategically harness the contributions of remittances and FDI to increase their level of human capital development. To do this, SSA nations should ensure effective and reliable transfers of external capital by lowering the cost of transfers and improving the quality of institutions. At the same time, the government should leverage remittances for human capital development through improved financial literacy and expanded financial inclusion, particularly in rural areas where majorities of households receiving remittances live. Third, the positive interaction effect of institutional quality and foreign direct investment emphasizes the need for friendly policies to encourage foreign investors to invest in priority areas of human capital development. Fourth, ODA functions effectively in nations with sound institutions. However, corruption or improper administration of foreign aid received and poor governance are typical of developing nations (like those that make up SSA). As a result, ODA funds end up being misappropriated instead of carrying out investment initiatives that benefit the general populace. Therefore, to promote socioeconomic development, development partners and international organizations should help developing nations create solid legal and political institutions. Finally, there is a need for improved coordination and management of donor funds for aid to increase the positive externalities.

Despite the contributions of this study, there are several limitations. First, human capital development is measured by HDI that is composite index of life expectancy, education and income. Therefore, future studies can consider other dimensions of human development like poverty, gender disparity, inequality and health status. Second, the data used in this study uses the aggregated amounts of remittances, FDIs and aid. Hence, it would be important for future studies to explore the specific effect of these foreign capitals on human capital development by classifying FDI and aid by purpose and type. In addition, the association between remittances, institutional quality and human capital development may be studied at household level. Third, the study is limited to SSA countries, and it may be difficult to replicate the studies in regions receiving low foreign capital flows and with strong institutions.

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APPENDIX I

Table A1. Description of variables and measurement

Variable	Definition
Human Capital Development	Human capital development is measured using the Human Development Index. The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions UNDP (2021).
Foreign Direct Investment (FDI)	“Foreign direct investment refers to direct investment equity flows in an economy. It is the sum of equity capital, reinvestment of earnings, and other capital. Direct investment is a category of cross border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy. Ownership of 10 percent or more of the ordinary shares of voting stock is the criterion for determining the existence of a direct investment relationship. This series shows net outflows of investment from the reporting economy to the rest of the world. Data are in current U.S. dollar” (Word Bank, 2021).
Remittances	“Personal remittances comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from nonresident households. Personal transfers thus include all current transfers between resident and nonresident individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities. Data are the sum of two items defined in the sixth edition of the IMF's Balance of Payments Manual: personal transfers and compensation of employees” (Word Bank, 2021).
Official Development Assistance	“Net official development assistance (ODA) consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. It includes loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent). Data are in current U.S. dollars” (Word Bank, 2021).
Institutional Quality	“Transparency, accountability, and corruption in the public sector assess the extent to which the executive can be held accountable for its use of funds and for the results of its actions by the electorate and by the legislature and judiciary, and the extent to which public employees within the executive are required to account for administrative decisions, use of resources, and results obtained. The three main dimensions assessed here are the accountability of the executive to oversight institutions and of public employees for their performance, access of civil society to information on public affairs, and state capture by narrow vested interests.” According to World Bank institutional quality is measured by CPIA which is an indicator of transparency, accountability, and corruption in the public sector rating (1 = low to 6 = high; Word Bank, 2021).
Population Growth	“Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship” (Word Bank, 2021).
Government expenditure on education and health	A percentage which represents total expenditure on education and health (current and capital) undertaken by the State, over GDP. It includes government spending on educational institutions (both public and private), education administration, and subsidies for private entities (students/ households and other private entities). Source: (Word Bank, 2021)



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