

Reexamining the effects of Financial Inclusion on Human Development in Sub-Saharan Africa

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Abstract

Unlike the bulk of empirical studies that focused on the effect of financial development, our study investigates rather the impact of direct access and use of formal financial services on human development in sub-Saharan Africa. The paper draws a sample of 28 sub-Saharan African countries from different sources (WDI, GFDD, WGI and UNDP databases) for the period 2004-2017 for the analysis. It adopts a two-stage fixed effect instrumental variables and a system GMM estimations to extract the exogenous effect of financial inclusion on human development. The findings of the baseline model suggest that greater financial inclusion through improved access and usage of formal financial services affects positively and significantly human development in sub-Saharan Africa. The findings are robust to the use of an alternative method of estimation (dynamic panel estimation) and a control for outliers (a different sample). The study suggests that sub-Saharan African countries can leverage financial inclusion to improve human development in the region. Therefore, policymakers and commercial banks should promote access and use of financial services in sub-Saharan Africa.

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1. Introduction

Financial inclusion remains nowadays at the center of international development debates. The Sustainable Development Goals (SDGs) and the Organization for Economic Co-operation and Development (OECD) have placed financing at the center of development policies. However, a large part of the populations in developing countries are excluded from the conventional banking system because of low-income level, lack of collateral or other constraints. Thus, microfinance has emerged as an alternative for expanding financial services to the poor and people living in remote

areas in order to improve their living conditions. The existing literature supports this assertion at both the macro and micro levels.

Research on the effect of financial inclusion on human development outcomes is scarce. Zhang and Posso (2019) construct a financial inclusion indicator using information on transactions and payments, savings, credit and insurance, and find a significant positive effect on household income in China. Dimova and Adebowale (2018), in the context of Nigeria, find that financial inclusion, measured as bank account ownership, increases per capita expenditure but also increases intra-household inequality. Adebowale and Lawson (2018) find that financial inclusion reduces transient poverty in the same context as Dimova and Olabimtan (2018). De Loach and Smith-Lin (2018), in the context of Indonesia, find that financial inclusion measured in terms of access to savings and credit enables households to borrow or liquidate assets in response to adult health shocks.

Empirical studies have shown that inclusive finance promotes economic and social development by reducing poverty, inequality and supporting economic growth (Galor and Zeira 1993, King and Levine 1993). At the micro level, financial inclusion strengthens the economic potential of the poor (Ashraf et al. 2010, Burgess and Pande 2005, Suri and Jack, 2016). According to Swamy (2019), access to microfinance services reduces poverty and improves the resilience of poor Indian households to demand shocks. The effect is also significant in terms of women's employability and integration into the economic fabric. Thus, financial inclusion enables the poor to invest in human and physical capital, facilitates their participation to the labor market and consequently contributes to social development.

However, rendering financial systems inclusive remains a major challenge facing developing countries in general and sub-Saharan Africa (SSA) in particular. While bank penetration is almost universal in developed countries (94%), only 43% of the population in SSA had a bank account in 2017 (Demirgüç-Kunt et al. 2018). This rate is lower than the rates observed in Latin America & the Caribbean and East Asia & Pacific, 54.4% and 70.6%, respectively. Similarly, low rates are observed in other dimensions of financial inclusion such as savings and credits in SSA, according to the same source. Further, Allen et al. (2014) comparing the performance of financial systems in developing countries show that financial systems in Africa are less developed and less inclusive even by the standard of developing countries.

In addition, countries have taken different paths to expand access to financial services, especially for the most vulnerable groups in society. Current alternatives for promoting financial inclusion remain focused on access to mobile banking in SSA in contrast to other developing countries, which have relied on expanding bank branches. For instance, the work of Suri and Jack (2016) on mobile money in Kenya (MPESA) shows a significant contribution of electronic or digital financial services on well-being and human development of households. Ashraf et al. (2010) and Dupas and Robinson (2013) examine the effects of access to savings commitments and show that the provision of savings accounts protects households' resources, increases investments and consumption, and contributes to women's empowerment. However, in the presence of inequality in education and other opportunities, improving human development can be controversial, even in a more inclusive financial system.

Human development, which consists of expanding people's choices, has three main components: longevity, education and standard of living. During the first decade of the millennium, SSA has made significant progress in human development. The region's Human Development Index (HDI) rose from 0.42 to 0.50 between 2000 and 2010, an increase of 8 percentage points (UNDP 2020). However, this rate was curbed by half over the period 2010 to 2018, a reduction explained by a

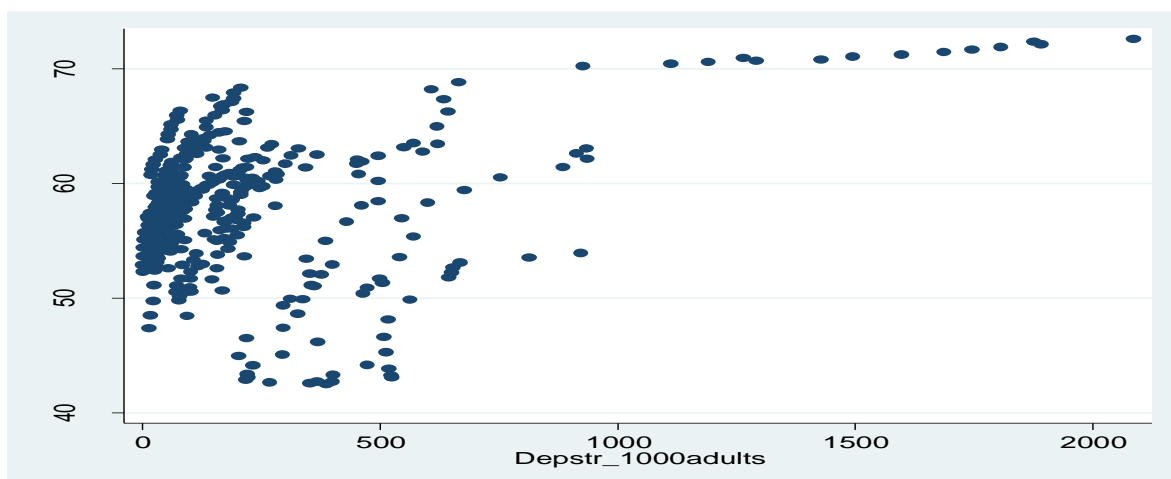
number of reasons, including the region's high inequality (Bhorat et al. 2017) and the recent oil price shocks that drastically affected most SSA countries. Moreover, SSA remains the least humanly developed region of the world. Its HDI stood at 0.54 in 2018 compared to 0.76 in Latin America and the Caribbean and 0.74 in East Asia and the Pacific according to UNDP (2020).

Against this backdrop, it is possible to nuance a priori the concepts of financial inclusion and human development in SSA. Recent visions in development economics show that the ability of individuals to participate in income-generating activities is conditioned by their human resource endowments. Access to finance contributes to social development through improved access to better health, better education and expanded economic opportunities. Thus, the objective of this paper is to analyze the effects of access and use of formal financial services on human development in Sub-Saharan Africa. The remainder of the paper is structured as follows: Section 2 presents a review of theoretical and empirical literature. A presentation of stylized facts in section 3 is followed by the methodological approach (section 4). Section 5 discusses the empirical results, and section 6 concludes the paper.

2. Financial inclusion and the dynamics of human development: stylized facts

Health problems are both a consequence and a cause of poverty. The WHO (World Health Organization) estimates that about 150 million people worldwide are in financial crises each year because of health care spending and that 100 million are pushed below the poverty line. Unless health problems are addressed, the impact of access to financial services will remain limited. Developing solutions that address health problems can be a win-win situation for clients, society and financial services providers. For the latter, helping to keep clients and their families healthy is a business advantage. Yet while there is a strong demand for such solutions, only a handful of providers have attempted to address the challenges associated with health.

The figure 1 (see appendix) shows that the use of financial services evolves over time and remains strongly correlated with life expectancy between 50 and 60 years of age. However, it was marked by a contraction in commercial bank deposits from 2008 onwards, explained by the advent of the subprime crisis in 2007. Life expectancy in general increased to 60 years throughout the period under review. Life expectancy is guaranteed by countries such as Botswana, Rwanda, Senegal and Uganda with an average of at least 63 years. As a corollary to these cases, the number of bank accounts per 1,000 adults remains considerable in Uganda (352 per 1,000) and Kenya (293 per 1,000). However, the correlation may remain questionable or random to some extent. Countries such as Lesotho and Zimbabwe have an average life expectancy of 45 years, while access to financial services reaches 380 and 480 per 1,000 adults, respectively.



Source: Authors using data from WDI database.

Figure 1 - Life Expectancy and Bank Deposits in SSA

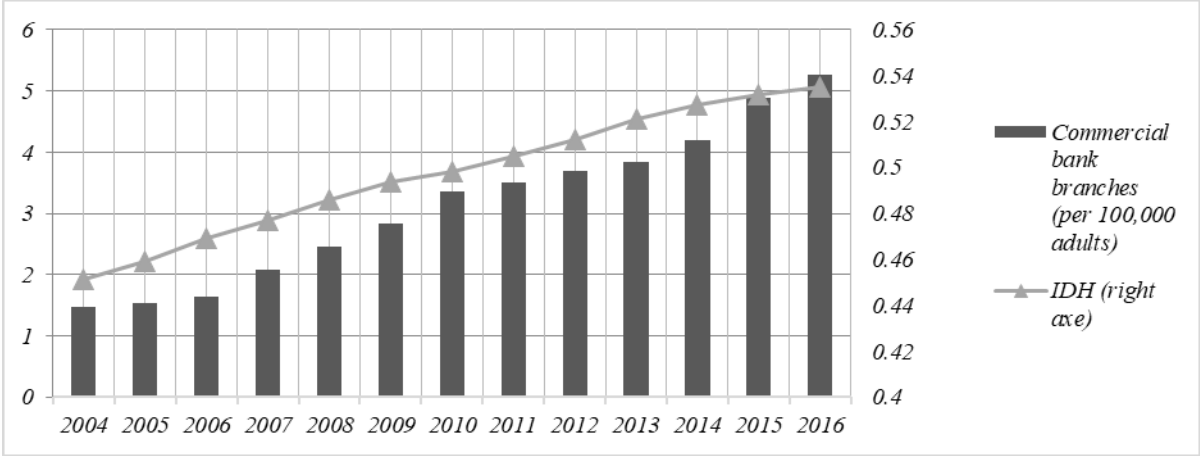
Although financial inclusion has increased since the first World Bank questionnaire in 2011 (Global Findex Database 2011), financial inclusion indicators are all lower in Africa than the global average. Thirty-five (35%) of the African population has a bank account compared to 61.5% globally. While 27.4 percent of the world's population has formal savings, only 15.4 percent of Africans deposit funds at a financial institution. Finally, 6.7% of the African population has taken out a loan from a financial institution in the last 12 months compared to 10.7% globally.

Seeing this figure, a question arises: are the savings and credit figures related to a cultural tendency to save less and borrow less on the continent? It would appear not. Still according to World Bank figures, 56.3% of the African population responded that they had saved in the last 12 months compared to 56.5% globally. The African continent follows the global trajectory in terms of savings. As for recourse to credit, the African continent seems even more inclined to borrow, with 51.4% of the African population having taken out a loan in the last 12 months against 42.4% at the global level. Such figures further demonstrate the importance of the informal sector for savings and credits in Africa. A growing phenomenon on the continent, mobile banking or mobile money is an exception: Only 2% of the world population has a mobile account compared to 13% of the African population.

On the other side to the notable progress of financial inclusion in the region, there is the Human Development Index (HDI) published since 1990, which assess human development, from various dimensions. It is a composite measure of material wealth, through gross income per capita, life expectancy at birth and access to education, understood as the average schooling rate. Although some sub-Saharan African countries have moved up in the ranking of HDI since the beginning of the decade, most countries show a low level of development. However, the HDI hides a diversity of situations within the continent that defeats the reductive idea of a homogeneous Africa condemned to stagnate at the bottom of the pack. Thus Gabon, the only sub-Saharan African country along with Botswana and Mauritius (ranked 1st in the region and 65th in the world), belongs to the group of countries whose level of human development is considered high, loses 40 points in ranking when income inequality was taken into consideration.

The gap between Niger, last in the ranking, and Norway, first place, is nonetheless staggering: at birth, a Nigerien child has a life expectancy that is nearly 22 years lower. On average, he or she can

expect to attend school for two years, compared to more than twelve years for a child born in the Scandinavian kingdom. His parents live with less than \$1,000 a year, 68 times less than if his parents had lived in Norway. On the continent, the poorest countries are also the most unequal and those where women have the least rights and choices. In Chad, two-thirds (2/3) of women aged 15 to 24 are illiterate, compared to less than two out of ten (2/10) in Rwanda, where gender equality goal is advanced. In Namibia, women stay in school longer than men and the gender-gap in income is much smaller than elsewhere. Despite all this, SSA was the region where the most rapid progress observed during the 2000s, before the slowdown caused by the financial crisis and falling commodity prices.



Source: Authors using data from WDI database.

Figure 2 - Evolution of the HDI and commercial bank branches in SSA

Human development indicators in general have improved significantly in sub-Saharan Africa from 2008 onwards, compared to the minimum and maximum average in the world. Despite economic constraints and instability (the vast majority having experienced political instability), SSA countries constitute the group with the highest level of human development slightly above the low level of the global HDI. Improvement in the level of human development can be attributed to reduction in poverty and gender disparity in access to education (Economic Commission for Africa Report 2017). Between 1990 and 2013, poverty fell by 15%, while educational disparities in the primary and secondary sectors decreased by 10% and 19% respectively. The graph below shows a clear improvement in human development thanks to updated data. The Economic Commission for Africa states in a 2017 report that the absence of microeconomic data related to indicators of well-being may bias the stylized facts about the interactions between access to finance and the human development indicators. Besides reducing infrastructural deficits that could improve the development index, the report states that a significant increase in access to telephone services helps to strengthen financial inclusion and thus the well-being of SSA households.

3. Eclectic review of the literature

Three (3) major views have animated the theoretical debate on the finance-growth nexus. On the one hand, the works of Schumpeter (1934), Hicks (1969) and McKinnon (1973) conclude that financial systems promote economic development. In this view, it is accepted that banks act as the engine of economic growth. The contribution of Robinson (1952), on the other hand, remains controversial. He states that financial development is led by firms in a context where economic growth creates a certain demand that constrains financial development. Yet, a second literature

finds that finance "hurts" growth. In the sense of Beck et al. (2003), banks have done more harm to the morality, tranquility and even the wealth of nations. Although financial institutions facilitate risk management and efficient allocation of resources, they may not amplify growth because better finance mean greater risks in the economy that can lower economic growth. Finally, there are those who think that finance does not matter. According to Lucas (1988), the role of finance in economic growth has been exaggerated.

From an empirical ground, Outreville's (1999) work examining the relationship between the level of financial development and socio-economic variables reflects different levels of development in light of the recent literature on the role of human capital in economic development. The empirical results, based on a cross-sectional analysis of 57 developing countries, indicate that human capital and socio-political stability are important factors explaining the level of financial development. Evans et al. (2002) assess the contributions of human capital and financial development to economic growth using a sample of 82 countries over the period 1972 to 1992. The results show that financial development is at least as important as human capital in the growth process.

Hakeem and Oluitan (2012) highlighted the causality between human capital and financial development in South Africa for the period 1965-2005. The results suggest two possible directions of causality, one from human capital to financial development and a reverse causality for different measures of human capital. More simply, the results suggest evidence of two-way causality. Giri (2014) studies the causal relationship between financial development and human development in India and finds a causality running from financial development to human development. Similarly, Ozcan and Kiliç's (2018) analysis shows a positive link between financial development and human capital in emerging economies.

Datta and Singh (2019) study the relationship between financial inclusion and human development in a sample of 102 developed and developing countries. The authors used cross-section data for the period 2011 and 2014. The results show that financial inclusion is positively correlated with human development. However, this study provides only a simple correlation test between a financial inclusion index and a human development index. Similar results are reported in the work of Peria and Shin (2020).

The concept of human capital was developed in the 1960s by a group of economists at the University of Chicago (Becker 1964, Teixeira 2014). Although the idea that investment in education has a long-run economic and social benefits for individuals and society as a whole. Rangarajan's Committee on Financial Inclusion (2008) defines financial inclusion as a process of ensuring access to timely, proportionate and affordable financial services by weaker sections and low-income groups. According to Chakraborty (2010), financial inclusion is a strategy for economic development because of the growing concerns that the benefits of economic growth have not been equitably shared. Chin and Chou (2001) presented human capital as a key factor for financial development that alternatively leads to the creation of human capital.

According to Beck et al. (2007), financial inclusion reduces income inequality and alleviates poverty. The lower the level of poverty, the higher the level of human development. Thus, financial development may lead to human development. The process of financial inclusion strengthens the process of human development. There is, in fact, a two-way causality between financial inclusion and human development; one induces the other and vice versa. Financial inclusion is an attempt to bring the weaker and vulnerable groups in society into the middle of the organized financial system. An inclusive financial system would certainly increase efficiency and well-being by providing venues for secure savings practices and access to a full range of efficient

financial services. Thus, financial inclusion cannot be limited simply to savings accounts or providing credits for consumers, but rather must focus more on how to increase the capacity of the poor while using these services. In addition, it must design and deliver financial products that can help the poor manage risks and vulnerability to the nasty cycle of poverty, often caused by structural weaknesses and other factors (Arunachala, 2011).

While financial inclusion can be significantly increased by improving the supply-side or delivery systems, it is also important to note that many regions, segments of the population and sub-sectors of the economy have low or limited demand for financial services. In order to improve financial inclusion, efforts must be undertaken to improve human and physical resource endowments by increasing productivity (Rangarajan, 2008). The above discussion demonstrates a strong correlation between access to financial systems and human development. Therefore, there is a need to analyze the financial inclusion-human development nexus in the context of Sub-Saharan African countries. Recent studies on the effects of financial inclusion on human development agree on a positive link. Whereas Gumede (2017) finds social policies to be important for improving human development, Demirgüç-Kunt et al. (2018) identify savings and credit channels as the drivers to ensuring an acceptable level of human development. Matekenya et al. (2021) using SSA data for the period 2004-2017, draw conclusions from GMM estimations that financial inclusion indicators in a comprehensive manner positively affect human development. However, their study has some shortcomings. It did not mention the number of countries considered for the analysis and did not provide any robustness checks for the baseline results. Ababio et al. (2021) use the same estimator to show that low levels of human development (poverty, poor health and lack of education) cannot guarantee financial inclusion, or the reverse is only possible through the development of the banking sector.

4. Methodology

4.1. Model and estimation technique

The objective of this paper is to examine the contribution of inclusive finance to human development in SSA countries. Endogeneity is the traditional concern hindering reliable analyses of the effects of finance on economic growth and other development outcomes (Randazzo and Piracha 2018). Evans et al. (2002), Outreville (1999) and Ranis (2004) find a reverse causality between access to finance on human development. Financial inclusion and human development are mutually reinforcing. Indeed, access to financial services increases people's income because they can develop income-generating activities or maintain existing ones. Financially unconstrained households are able to meet emergency health expenditures. Better health keeps children in school as long as possible. Education, in turn, develops individuals' financial literacy, i.e. makes them aware of the benefits of access to formal finance. Thus, the general model can be specified as follows:

$$y_{it} = X_{it} + Z_{it} + \varepsilon_{it}, \quad (1)$$

with y_{it} the variable representing the Human Development Index (HDI) of country i at period t . X_{it} and Z_{it} are respectively the groups of variables defined by the financial inclusion indicators and control variables. ε_{it} is the error term. In contrast to the work of Datta and Singh (2019) which adopts inclusive finance and human development indices, our study instead uses the individual components of financial inclusion, namely bank penetration measured by bank account and branch, and usage measured by deposit, and borrowing. This allows us to capture the different

dimensions through which financial inclusion affects human development in SSA. In addition, we go beyond simple correlation analysis to explore the causal relationship between financial inclusion and human development by extracting the exogenous component of financial inclusion. The empirical model is specified as follows:

$$hdi_{ct} = \alpha + \delta FinInc_{ct} + \gamma Z_{ct} + \varepsilon_{ct}, \quad (2)$$

where hdi_{ct} , the dependent variable, represents human development for country c at period t measured by the HDI. $FinInc_{ct}$ represents the financial inclusion of a country c at time t and includes the dimensions access, availability, and utilization. Z_{ct} a vector of control variables defined below and ε_{ct} the error term. Given the possible reverse causality between the variables hdi and financial inclusion, estimation by the instrumental variable method (IV) is used. The financial inclusion variables are instrumented by their lagged values. In addition, a dynamic system generalized method of moments (GMM) is used to test the robustness of the findings. The added value in terms of estimators in this paper is the use of a two-stage fixed effects instrumental variables estimation for the baseline results combined with a system GMM for robustness checks, unlike the recent works of Matekenya et al. (2020) and Ababio et al. (2021) who have use only the GMM estimator to explain the effect of financial inclusion on human development.

Based on the existing literature Datta and Singh (2019) and Peria and Shin (2020) and depending on data availability, the following variables are selected in this study. The dimensions of financial inclusion selected are access measured by the number of bank accounts per 1 000 adults (Account), availability captured by the number of bank branches per 100 000 adults (Branch). Usage captured by the number of depositors at commercial banks (Deposit) and the number of borrowers from commercial banks (Borrowing), both per 1,000 adults. Z_{ct} is a vector of control variables that affect HDI including access to telecommunication systems (Mob_cell), investment (Invest), trade openness (Trade) and the quality of institutions measured by government effectiveness (Gov_Effect).

4.2. Data source

The data used in this study comes from the World Development Indicators (WDI), the Global Financial Development Database (GFDD), the United Nations Development Programme (UNDP) and the World Governance Indicators (WGI) for the period 2004-2017 on a sample of 28 Sub-Saharan African countries.

Table 1 - Definition of variables and expected signs

Variable	Description	Source	Expected Sign
<i>Hdi</i>	Expresses the Human Development Index for each country in the sample at time <i>t</i> .	UNDP	
<i>Account</i>	Bank Account for 1000 adults	GFDD	+
<i>Branch</i>	Bank Account for 1000 adults	GFDD	+
<i>Deposit</i>	Depositors in CB commercial banks per 1000 adults	WDI	+
<i>Borrowing</i>	Borrowers from commercial banks per 1000 adults.	WDI	+
<i>Mob_cell</i>	Mobile cellular subscriptions (per 100 people)	WDI	+
<i>Trade</i>	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product (%gdp).	WDI	+/-
<i>Invest</i>	Gross capital formation consists of outlays in additions to the fixed assets of the economy plus net changes in the level of inventories as a percentage of GDP.	WDI	+
<i>Gov_Effect</i>	Perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	WGI	+

Source: Authors' construction.

4.3. Descriptive statistics

Table 2 in appendix shows the descriptive statistics for the study variables. It emerges that on average the human development index in SSA is 0.50 and a maximum level of 0.72 guaranteed by Burkina Faso from the years 2015 onwards. With regard to bank branches, we find that there are on average 5% commercial bank branches per 100000 adults. In terms of the number of borrowing and deposit, on average 50 adults accessed loans from and 244 deposited at commercial banks per 1000 adults. Whereas, on average 241 of adults had a bank account per 1000 adults.

Table 2 - Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
HDI	420	0.497	0.086	0.276	0.724
Account	380	241.19	323.547	1.166	2084.59
Borrowing	282	50.408	66.323	0.018	317.395
Deposit	354	244.136	328.106	0.473	2084.587
Branch	404	4.614	5.462	0.358	35.051
Trade	416	71.93	29.179	20.723	161.894
Mobile_Cell	420	53.021	37.45	1.264	163.875
Investment	404	23.679	9.643	2	79.462
Gov_Effect	420	-0.767	0.547	-1.776	0.65

Sources: Authors using WDI and WGI data.

Access to telephone services (mob_cell) per 100 persons is 53.02% supported by West and East African countries. Trade openness and investment averaged respectively 72% and 24% of GDP of

SSA. Whereas, the estimate for government effectiveness is negative indicating poor quality of institutions in SSA.

5. Results and interpretations

5.1. Financial inclusion and human development

Table (3) in appendix apprehends the various implications of branch density (1), borrowing per capita (3), deposits per capita (5) and bank account penetration (7) for human development in SSA. The results are obtained using two-stage fixed effects instrumental variable estimations. Columns (2), (4), (6), and (8) present the first-stage regression results of the estimations of financial inclusion indicators on their one-lagged values and the control variables. The columns consistently indicate that lagged values of financial inclusion are good instruments as they strongly, positively and significantly predict financial inclusion indicators.

In the second-stage regression results, all specifications pass the overall significance tests indicated by the probabilities associated with F-statistic that are less than 1%. It emerges that branch expansion improves on average the human development index by about 0.0259 points at 5% level of significance, all other things being equal (column 1). Bank penetration (account ownership and bank branch density) makes it possible, a priori, in the case of deposits/credits, to maintain or improve access to education and health (Datta and Singh, 2019).

Column (3) indicates that financial inclusion through borrowing has a positive and significant effect at 1% level on human development in SSA. The results show that at a 1% increase in the share of individuals who borrowed from financial institutions leads to a 0.0257 points improvement in the HDI.

Table 3 - Two-stage fixed effect instrumental variable estimations of the effects of financial inclusion on human development in SSA

Variables	(1) HDI	(2) Branch	(3) HDI	(4) Borrow	(5) HDI	(6) Deposit	(7) HDI	(8) Account
Branch	0.026** (0.013)							
Borrow			0.026*** (0.006)					
Deposit					0.018*** (0.005)			
Account							0.018*** (0.006)	
L.Branch		0.655*** (0.066)						
L.Borrow				0.672*** (0.068)				
L.Deposit						0.732*** (0.055)		
L.Account								0.593*** (0.107)
Trade	-0.043*** (0.010)	0.029 (0.047)	-0.051*** (0.012)	-0.122 (0.176)	-0.047*** (0.010)	-0.073 (0.092)	-0.046*** (0.010)	-0.068 (0.095)
Mob_Cel	0.059*** (0.007)	0.108*** (0.024)	0.049*** (0.006)	0.188*** (0.046)	0.062*** (0.005)	0.129*** (0.032)	0.061*** (0.005)	0.169*** (0.043)
Invest	0.008 (0.007)	0.063 (0.043)	0.002 (0.008)	0.154 (0.107)	0.011 (0.008)	-0.078 (0.083)	0.013 (0.008)	-0.097 (0.097)
Gov_Effect	0.049*** (0.014)	-0.038 (0.046)	0.033** (0.015)	0.190 (0.153)	0.048*** (0.017)	0.064 (0.105)	0.046*** (0.016)	0.170 (0.126)
Observations	361	361	241	241	312	312	338	338
Prob > F	0.000		0.000		0.000		0.000	

Source: Authors' calculations based on data from WDI, GFDD and WGI. Note: Variables are in logarithm except Gov_Effect. First lagged financial inclusion is used as instrument. Heteroskedasticity robust standard errors are in parenthesis. * p < 0.10, ** p < 0.05, *** p < 0.01.

Similarly, in columns (5) and (7), an increased in the share of adults who deposit at financial institutions has a positive and significant impact on HDI in SSA with a 0.0182 points magnitude. It also emerges that access to a bank account has a positive and significant effect at the 1% level on HDI. Thus, all other things being equal, having a bank account leads to a 0.0183 points improvement to the human development index. However, it is important to note that guaranteeing these effects requires access and use of financial services by households. These results are similar to the conclusions of RCTs studies by Ashraf et al. (2010), and Dupas and Robinson (2013) that the provision of account via savings (deposits) improves human development.

The results summarized (see appendix) show that financial inclusion improves the level of human development in SSA. It also emerges that branch density and borrowing have similar magnitudes (0.03) on human development in SSA. Whereas, the effect of deposit and account on human development are weaker in magnitudes (0.02).

In all, second-stage regression results, trade openness negatively affects human development in SSA at 1% level of significance. This could be explained by the positive variation of trade materialized by a rapid increase in imports of goods and services that degrade GDP. With reference to the empirical work of Ranis (2004), Asghar (2012) and Teixeira (2014) conducted on

various economies, human development most often responds in a similar way to variations in economic growth. Unlike these authors, Ahmad et al (2012), and Masoud and Hardaker (2012) find that the channel of financial market better explains the interactions between financial development, unlike trade.

In a dynamic of promoting financial inclusion through access to mobile banking, it is obvious that an access to telecommunication services (mobile cellular) allows to improve human development in SSA and particularly in Kenya according to a study by Suri and Jack (2016). The findings of table (3) suggest that an increase in the number of subscribers to telecommunication services (mobile cell) positively and significantly affect human development in SSA at 1% level of significance.

Lastly, the quality of institutions measured in this study by the perception of people on the ability of government to formulate and implement policies positively affects human development in SSA. Indeed, controlling for the effects of branches, deposits and bank accounts on the HDI shows that in the presence of good institutional quality the implications remain very conclusive at most at 5% level of significance. This corroborates the results obtained by Boettke and Subrick (2003) that institutional quality improves human development in developed countries.

6. Robustness checks

To check for robustness, the generalized method of moments in a dynamic panel was used as an alternative method of estimation. In light of the work of Ivanic et al (2012) and Ozcan and Kiliç (2018) human development through human capital accumulation can be considered as a dynamic process. Thus, using internal instruments (lagged and difference variables), the generalized method of moments (MMG) allows to control for endogeneity and to obtain efficient estimates.

The results obtained from the dynamic panel system GMM reported in table (4) confirm the significant effect of financial inclusion on human development in SSA over the study period. Overall, these results confirm the existence of a positive link between financial inclusion, through branch, borrowing, deposit and account, on human development in SSA. With respect to the control variables, it can be noted that the effects of trade shares in GDP are not robust to the GMM estimations. Whereas, mobile cellular penetration has a positive and significant impact on human development in SSA.

The quality of institutions measured by government efficiency shows mixed effects. Indeed, it appears that institutional quality improves human development insofar as banks increase the number of branches and guarantee access to bank accounts. Authors such as Outreville (1999), Ahmad et al (2012) and Datta and Singh (2019) have run comparative analyses between developed and developing economies on the implications of financial inclusion on social, economic and human development variables respectively. For most of the effects obtained from the sample of SSA economies, the subsequent results corroborate with some of the work, albeit subject to a strong consideration of institutional quality.

Table 4 - A two-step system GMM estimation (robustness test)

Variables	(1)	(2)	(3)	(4)
L.HDI	0.86798*** (0.0228)	0.81189*** (0.06429)	0.8666*** (0.03981)	0.088975*** (0.01526)
Trade	-0.000008 (0.00005)	-0.00005 (0.00006)	0.0001* (0.00005)	0.00002 (0.00005)
Mobile Cell	0.00024*** (0.00007)	0.00026** (0.00012)	0.00025*** (0.00004)	0.00014** (0.00006)
Investment	0.00002 (0.00008)	-0.00003 (0.00016)	-0.00022 (0.00018)	-0.00008 (0.00009)
Gov_Effect	0.00405** (0.00183)	0.00179 (0.0032)	0.00139 (0.00281)	0.00458** (0.00189)
Account	4.43e-06** (1.96e-06)			
Deposit		0.00001** (0.00001)		
Borrowing			0.00004** (0.00002)	
Branch				0.00044*** (0.00013)
Constant	0.07962*** (0.01122)	0.09493*** (0.02398)	0.06843*** (0.01901)	0.06715*** (0.00689)
Observation	107	102	84	114
Time dummy	Yes	Yes	Yes	Yes
Number of instruments	28	26	24	29
Number of groups	29	29	24	30
Chi2	69097724	415756.6	2235255.1	1660174.1
AR(1)	0.08148	0.0919	0.08908	0.06189
AR(2)	0.27162	0.35665	0.12749	0.20816
Hansen	0.27805	0.2647	0.18511	0.34364

Source: Authors' calculations based on data obtained from WDI, GFDD and WGI. Note: All regressions are two-step dynamic system GMM. The dependent variable is human development index (HDI). All variables are in level. The lagged dependent variable, explanatory variables and the time dummies are treated respectively as endogenous, weakly exogenous and exogenous variables. Further, government effectiveness, inflation and investment are used as exogenous external instruments. Standard errors are in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ are standard significance levels.

For a second robustness test, a two-stage fixed effect instrumental variable method was used on a sample of SSA countries excluding upper middle-income countries. To do this, the financial inclusion variables branch, deposit, account and borrowing were instrumented by their one-period lagged values and the results are presented in Table 5 (appendix). Despite the isolation of the upper-middle income SSA countries, which can be considered as outliers, from the sample, the results are broadly robust in terms of the significance and effects. The table also replicates the findings in table (3) with respect to the sign and significance of the coefficients of the control variables (trade openness, mobile cellular, and government effectiveness). Overall, table (5) suggests that the effects of financial inclusion on human development remain significant for SSA countries.

Table 5 - fixed effect instrumental variable estimation on an alternative sample

Variables	Branch	Borrowing	Deposit	Account
Trade	-0.046*** (0.010)	-0.065*** (0.013)	-0.047*** (0.010)	-0.051*** (0.010)
Mob_Cell	0.056*** (0.007)	0.045*** (0.006)	0.062*** (0.005)	0.063*** (0.005)
Invest	0.008 (0.007)	-0.010 (0.008)	0.011 (0.008)	0.009 (0.009)
Gov_Effect	0.052*** (0.015)	0.040*** (0.015)	0.053*** (0.017)	0.055*** (0.017)
Branch	0.031** (0.014)			
Borrowing		0.032*** (0.006)		
Deposit			0.015*** (0.005)	
Account				0.014** (0.007)
Observations	315	194	277	292
Prob > F	0.000	0.000	0.000	0.000

Source: Authors' calculations based on data obtained from WDI, GFDD and WGI. Note: All regressions are fixed effect instrumental variable (FE IV) with multicollinearity consistency check. The dependent variable is human development index (HDI). All variables are transformed in logarithm except government effectiveness. First lagged financial inclusion indicators are used as instruments. Heteroskedasticity robust standard errors are in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ are standard significance levels.

7. Conclusion

This paper aimed to examine the effects of access of financial inclusion services on human development in SSA. Two observations helped to refine our problematic. First, the persistence of poverty in Africa. On the other hand, the proliferation of financial inclusion indicators (microfinance institutions) in Africa. The paper has contributed to the literature on the externalities of financial inclusion to the human development process.

We have mobilised theoretical and empirical developments to investigate econometrically several variants of models estimated by the GMM method, a two-stage fixed-effects instrumental variable estimation, using a sample of 28 SSA countries over the period from 2004 to 2017. Overall, the findings from a two stage fixed effects instrumental variables estimation and a dynamic panel system GMM estimation suggest that financial inclusion is a key determinant to human development in sub-Saharan Africa. Indeed, reading the intrinsic indicators to financial inclusion, it can be observed that facilitating the procedure for opening bank accounts and bank deposits are the key elements to promoting human development (Dupas and Robinson 2013, Datta and Singh 2019). However, alongside the validation of these effects, the improvement of human development is only possible within the framework of a good perception of the credibility of the government in formulating and implementing policies.

Similarly, mobile cellular penetration is proved to be important in improving human development in SSA. On the other hand, the share of international exchange measured by the ratio trade to GDP negatively affects human development (Asghar 2012). In view of these findings, Sub-Saharan African countries need to improve the quality of institutions. Based on these results, some non-exhaustive policy suggestions can be made to promote financial inclusion in Africa. First, African

states need to strengthen financial inclusion policies aimed at improving access to financial services for all. Second, the regulatory framework should be strengthened to avoid recurrent failures of financial institutions in Africa. Nevertheless, future studies upon improvement in data availability could examine the channels of transmission of the effect of financial inclusion on human development in the region.

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