IS FINANCIAL INCLUSION A DETERMINANT OF LIFE EXPECTANCY? EVIDENCE FROM WEST AFRICAN REGION

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ABSTRACT

This study is a contribution to the debate on the significance of financial inclusion with much emphasis on its impacts on human life span. The sample used for the analyses consisted of 14 West African countries over the period 2010 and 2018. The study employed a dynamic 2-Step System GMM approach, and under different model specifications, control for public and private health expenditure, food production quality, population, access to electricity, and the number of people practicing open defecation. The estimated results, among others, showed considerable evidence of positive feedback of financial inclusion on human life span. As such, substantial improvement in the access to and use of financial services is key to a high life expectancy in the region.

Keyword: Financial inclusion, life expectancy, System GMM

JEL Code: G2, I100, O1

I.   Introduction

Considerable attention in the literature had been on the healthcare financing as a determinant of the longevity of human life (e.g. Jabaa, Balana & Robua, 2014; Ogunsakin & Olonisakin, 2017; Novignon, Olakojo & Nonvignon, 2012). Research is also in abundance in the area of poverty and financial inclusion (Park & Mercado, 2015; Burgess & Pande, 2005), income inequality   and   financial   inclusion (Seshamani & Tounkara, 2018; Garcia-Herrero & Turégano, 2015), and financial inclusion and economic growth (Babajide, Adegboye & Omankhanlen, 2015; Bakar & Sulong, 2018). Yet, very little is understood regarding the link between individuals access to and use of formal financial products or services and life elongation particularly in the West Africa where large numbers of people are still lacking access or unable to use financial services.

Living longer may be desirable. The benefits of such are not limited to individuals but also extend to society at large. Increase in income per capita is related to longer life expectancy. Higher life expectancy facilitates rapid economic growth (Lorentzen *et al*., 2008). An individual who lives longer contributes to the progress of the economy (Mahyar, 2016). Increased productivity of available economic resources is built on the possibility of individual possessing higher life span. Where immortalization of names and leaving behind an inheritance are not presumed, the decision of individual economic agents to embark on long term investments spending hinged on the expected average length of the life cycle of such individual investors.

Consequently, many countries that recognize the importance of higher life span tend to focus more on policies that would facilitate the longevity of lives. In the midst of individual countries efforts, particularly in West Africa, the wave of low life expectancy in this region is still deep and unbearable. This had called the attention of several bodies such as the IMF and World Bank. Virtually all the agendas of sustainable development goals of the United Nations revolve around elongating lives. However, in 2017 for instance, several countries in West Africa have reportedly had an average rate of life expectancy (at birth) that is quite below the average life expectancy for the World as a whole which stood at about 72.23 rates at birth. Some of these Western African countries are not limited to Benin (61.17), Côte D'Ivoire (54.10), Guinea-Bissau (57.81), Nigeria (53.88), Sierra Leone (52.21), Togo (60.48) and Mali (58.46) (World Bank, 2018). According to the data from the World Bank, in 2017, Cape Verde (73.00) appeared to be the only country in West Africa with an average life expectancy at birth above the World average rate.
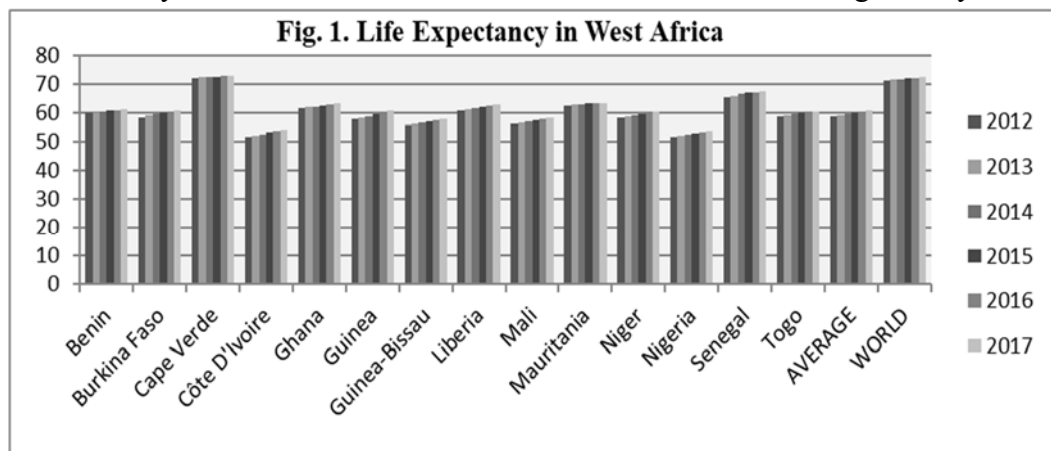
Duvendack and Mader (2019) emphasize on the importance of better financial inclusion as a decisive tool to promote good life or foster human wellbeing. Indeed, individuals with access to financial services like banks loan or micro-credits may be at an advantage of getting timely healthcare services and be healthier compared to counterparts with no such access. People that have access to and able to use financial services can save more funds to safeguard their future health and live longer. With the proliferation of several financial services like POS, Mobile money agents and ATMs,

people can easily engage in transactions that aid well-being. Also, patients need not travel over long distances or queue in banks for several hours to get loans to foot hospital bills and other health expenses. As a result, is financial inclusion linked to life longevity? To this end, this research focuses largely on the effect of financial inclusion on life expectancy in West Africa region. The significant of this research is on the essentialness of financial inclusion in the decision involving raising societal health stock and reducing people's vulnerability to a shortened lifespan in the region of West Africa.

The rest of the paper is as follows: section 2 is the stylized facts, section 3 presents literature review. The methodology and results analyses are in section 4 and 5. Section 6 is the summary.

Indeed, people's ability to enjoy a good health and prolonged life is an essential part of human development (United Nations, 2012). Hence, prolonged life may be said to be economically meaningful. While at the global level, the average life expectancy at birth stood above 72 in 2017, the odds of some countries in West Africa to catch up or falling above is still not too high.

In figure 1, out of the 16 countries in West Africa (excluding St. Helena), only Cape Verde has an average life expectancy slightly above the world average life span; though life expectancy in countries like Burkina Faso, Cote D'lvoire, Guinea-Bissau and Sierra Leone improved between 2013 and 2017, average life expectancy at birth in these countries is below 60, 72 being the world average. Thus, the life span in West Africa countries is generally low.

Fig. 1. Life Expectancy in West Africa

II. Stylized Fact

Lives that live longer are happier lives, longer lives are often an indicator of healthy lives; healthy lives are productive lives. People are highly likely to undertake future investment such as investment in health and education if the prospect of their survival increases. The investment made in education and health could stimulate further good health; although the means of transmitting such impact may be complex.

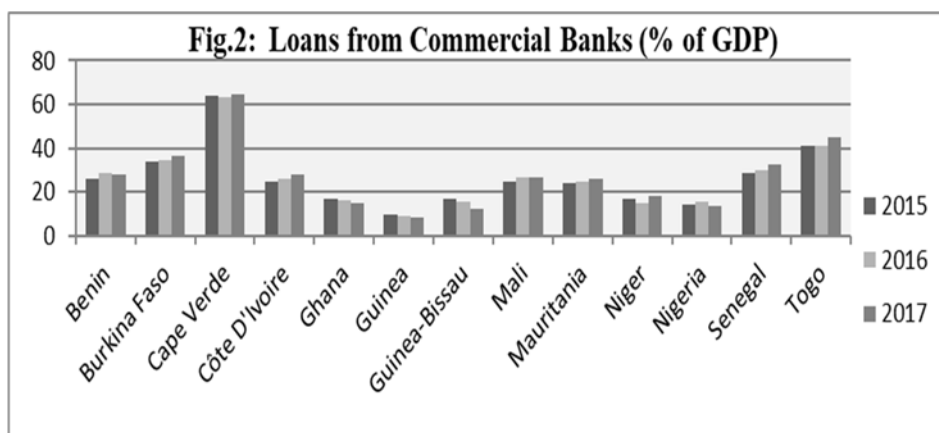*Source: Data from the World Bank Development Indicator.*

Pearce (2011) argued a case of necessity of financial inclusion driving up income and curtailing poverty as well as supporting healthy lives. The spillover effect of the increased income extends beyond increasing the ability of the people to accumulate portfolios of physical assets for future returns, to include motivating people to augment the quantity and quality of

current consumption of healthcare goods and services. Similarly, when poverty is reduced, people are in a better position to increase health care service demand. Forthese reasons, people's ability to access and use financial services at the right time is a means to accelerating communities' health stocks and improving the quality of life.

Fortunately, the scope of financial inclusion (access and use of financial services) is growing and expanding globally. Global Findex statistic reports of 2017 indicated that from 2014 to 2017, the global number of people excluded from the financial services reduced from two (2) billion to about 1.7 billion. Similarly, the number of account ownership with banks or financial institutions had gone up from 62% in 2014 to 69% in 2017, which implies that between 2014 and 2017, the numbers of people financially included have increased by 7% globally. In addition, the reports shown 10% global increase between 2014 and 2017 in the number of adults utilizing the digital platform as a medium to receive and/or send money.
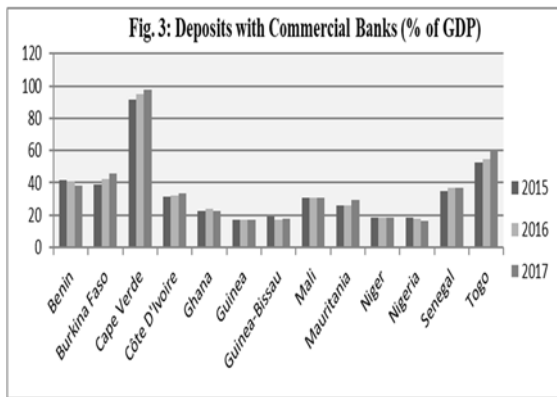
However, focusing on the West African countries, the same situation may not be tenable for the individual countries in the regions or even for the regions as a whole. In other words, there are bound to be some element of disparities in the progress recorded among individual countries in terms of financial inclusion. Figure 2 through 5 illustrate facts about some selected financial inclusion indicators

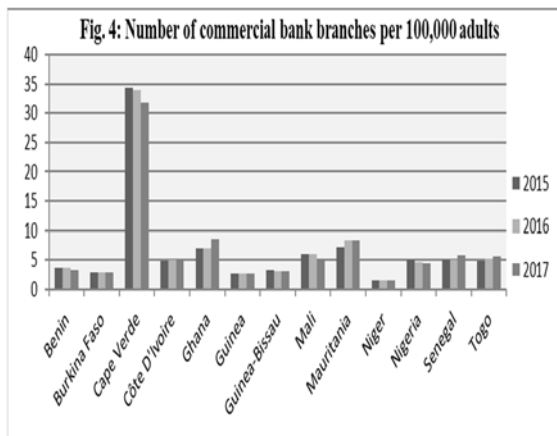based on financial services access and usage across West Africa.

Source: Data from the Financial Access Survey - IMF.

As showed in figure 2, the volume of loan taken from the commercial banks as a ratio of GDP improved between 2015 and 2017 for most of the countries; countries like Senegal, Cote D'lvoire and Burkina Faso recorded a steady increase between 2015 and 2017 in the depth of financial inclusion as measured by loan-income ratio, which implies that more people were being financially included in these countries. Unlike the loan-income ratio indicator, the number of outstanding deposit as a ratio of GDP indicated that there is an improvement in the usage of the financial services in all the countries with the exception of Benin that showed no progress over the period. Nigeria also experiences a decline in the financial inclusion between 2016 and 2017. Cape Verde noticeably recorded the highest Number of financial services usage between 2015 and 2017 as illustrated in figure 3
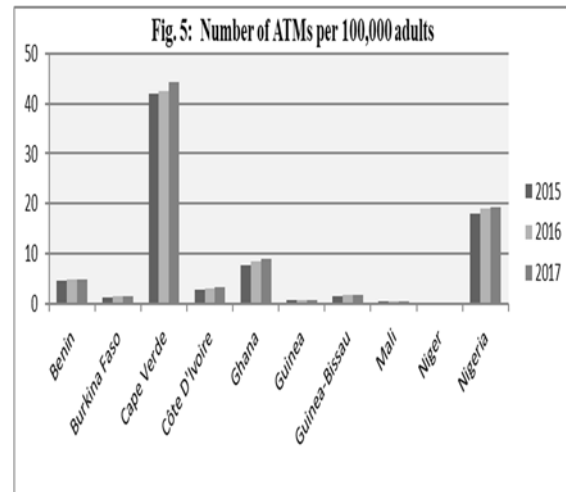
Source: Data from the Financial Access Survey - IMF

Based on the outreach or accessibility dimension of financial inclusion, while the number of commercial banks remains fairly stable for some of the countries, Mauritania Ghana, Senegal, and Togo recorded an improvement in the number of commercial banks branches (see figure 4)

Source: Data from the Financial Access Survey - IMF

In addition, although a vast number of the countries, as depicted in figure 5, are still far behind in terms of the access to financial services as measured by the number of the ATMs per 100,000 adults, Seychelles recorded tremendous growth in the number of people accessing financial services vis-à-vis ATMs between 2015 and 2017.

Source: Data from the Financial Access Survey - IMF

Some salient points worth noting, most of the countries with low life span as shown in Figure 1 are virtually the same set of countries, as suggested in figure 2 through 5, with least access to and use of financial products in West Africa. More so, countries like Cape Verde with the most improved financial services accessibility and usage had the highest rate of life expectancy: high above the World average life span. Together, these two scenarios may, therefore, be taken to imply that financial inclusion influences life expectancy in West African. However, such rush decision tends to be misleading. For example, Guinea is one of the countries with the lowest rate of accessibility and usage of financial services, yet, among the countries with improving rate of life expectancy at birth in the region, which could mean that longevity of life must have been driving by other factors in these countries. In such a case, financial inclusion may not be a relevant influencer of life expectancy as earlier expected.

III.   Literature Review

The longevity of life has vast implications; to some people, living longer is something to treasure (Cull and Ehrbeck, 2014); yet, the longer the people live, the more the costs or burdens on the neighbors or society as others may argue. However, what matters here may not necessarily be on whether living longer also has an unwanted side along with the benefits it confers on the individual and society at large, but perhaps the benefits of such longevity are large enough to outweigh its costs on the society. Should it is, then, policies or issues relating to living longevity must be conscientiously approached by the decision-makers. A necessity to actualize this must starts with the recognition of the possible factors determining the longevity of lives.

While discussing the causes of longer life span, Kirkwood (2002) in his theoretical argument relates the longevity of lives and ageing to the pattern and composition of nutrition and diets upon which the body feeds. Accordingly, a certain amount of food must be made available for the body's regeneration, maintenance and balance. On the contrary, when insufficient food allocation is made to the body, it begins to grow weak and harbor diseases which could result to death; absence of food increases the number of people vulnerable to premature death. This clearly indicated that restrictions of dietary could have an adverse effect on the lifetime of individual economic agents.

United Nations (2012) noted that the western Africa couple with the Eastern, Middle and Southern Africa would benefit up to an extra of 22 years of life expectancy by cutting back nutritional-related death and diseases. Diseases are spreading for the reason that people find it hard to satisfy their essential health needs, thus, death results (Kpolovie, Oshodi & Iwuchukwu, 2016). Most people tend to encounter health challenges or having problems meeting their health-related needs that probably shorten their lives on the ground of financial exclusion or lack of accessibility and usage of financial services such as savings, pension scheme, credit, payment services, and insurance. This aligns with Chamboko and Makuvaza (2018) assertion that financial inclusion is a key contrivance that facilitates life improvement and human development in the society.

Popoola (2019) affirmed this relationship by arguing that financial inclusion, measured by the number of commercial banks depositors, positively determines improved longevity of life. Financial inclusion which guarantees savings available for the individual with access to financial products help to strengthens the capabilities of an individual to absorb imminent health shocks (Love & Peria, 2012; Popoola, 2019). In a different fashion, financial inclusion, from the point of view of firms and industries, is a workhorse to capital consumption or investment creation and undertaking (CBN, 2017), and this equally applies to the individual household that produces and consumes economic goods and services in the economy. Human capital investment is argued to enhance health and longer lives; knowledge and health are the core sources of human capital (Grossman, 2005).

Grossman (1972) in his theory of health care demand identified investment in human capital as a propellant and paddler

of varieties of health outcomes such as life expectancy. According to the health care demand theory, demand for health is simply a derived demand, and since individuals health depreciates over certain time period, individuals (also a producer of health), would, therefore, spend money to produce and reproduce health. That is, people demand health by investing in health because they want to be healthier and to participate in non-market and market activities. According to Popoola (2019), such health investment, among others, depends on the level of quality, accessibility, usage and efficiency of financial services provided.

It, therefore, follows that a negative shock in the stock of the health of individual could set in if individuals are excluded from accessing and the use of quality formal financial services optimally. Such financial excludability mostly occurs owing to the imperfection of the financial market. Financial market imperfection could form from high transaction cost, asymmetric or lopsided information among agents or between the principal and the agents, and poor legal institutional setup to encourage apt enforcement of contract (Beck *et al*. 2007). In the absence of imperfection of the financial market, then, people are expected to unlimitedly and adequately have good access to and be able to use financial services to promote their well-being and live longer. Indeed, people live healthily, according to Leivea and Xub (2008), as a result of having access to loans or credits from relatives, financial institutions or even friends.

Unfortunately, there is a scarcity of empirical evidence in the literature on this; adequate research has not been done particularly on the impact of financial inclusion on life expectancy. Nevertheless, Popoola (2019) empirically assesses the impact of financial inclusion on health shock in 36 selected African countries between 2004 and 2016. The study adopted a Fixed Effect Model and proxy life expectancy for health shock and the numbers of the depositor with the commercial banks for financial inclusion. The study confirms that life expectancy is positively related to financial inclusion.

Lederle (2009) explore the effect of financial inclusion on the lives of the disadvantaged individual vis-à-vis an interview-based research strategy. The study highlighted the need to remove barriers to financial inclusion to impact live meaningfully. Gyasi, Adam and Phillips (2019) explored the relationship between health-seeking behaviour, financial inclusion and health-related outcomes in Ghana using logistic and Poisson regression models. The research concluded that financial services inclusion appears to contribute to the reduction of health-related problems. On the contrary, the study of Sahay *et al.* (2015) finds that although financial inclusion can achieve multi-macroeconomic objectives, the multiple macroeconomic objectives or gains achieved get smaller and fading as financial inclusion increases in scope. The study, thus, sent a powerful signal of cautiousness and moderation in the quest for the policy of financial inclusion to drive macroeconomic goals.

The study of Sahay et al (2015) appears to be encompassing, nonetheless, its focus is on financial instability and economic growth as determined by financial inclusion, and therefore overlooked the

linkage between the financial inclusion and life expectancy. However, Popoola (2019) took this into consideration; unfortunately, not too far. In other words, the study of Popoola (2019) is too narrow in scope as it considers only the outreach/access with no attention to the usage dimension of financial inclusion. The study further strictly restricts the indicator of outreach dimension to numbers of the depositor with the commercial banks only. The paucity of research on this subject is not helping to reach a definite decision or conclusion regarding the impact of financial inclusion on life expectancy. This research will build on this using a wider array of financial inclusion indicators.

IV.   Methodology and Data

4.1   Specification of Model

This research leans on Grossman (1972) health stock demand model to specify life expectancy as an increasing function of financial inclusion in West Africa; thus

$$LXB_{it} = L(\textbf{\textit{FII}}_{it}) \quad (1)$$

Note that LXB implies life expectancy and FII represents a vector of financial inclusion indicators. Expanding equation (1) and adding a vector of other control variables, equation (1) is re-expressed as

$$
\begin{aligned}
LXB_{it} = {}& \boldsymbol{\delta} + \omega LXB_{it-i} + \boldsymbol{\alpha ACC}_{it} \\
& + \boldsymbol{\beta USG}_{it} + \boldsymbol{\gamma X}_{it} + \boldsymbol{\Omega_i} \\
& + \boldsymbol{\epsilon}_{it} \qquad (2)
\end{aligned}
$$

Where **ACC** stands for financial services accessibility, captured by numbers of deposits with commercial banks (% of GDP) and Outstanding loans from commercial banks (% of GDP); **USG** means financial services usage, measured

by Number of ATMs per 1,000 km2, Number of ATMs per 100,000 adults and Number of commercial bank branches per 100,000 adults; $\boldsymbol{\Omega_i}$ means the time-invariant country-specific effect and **X** stands for government health expenditure (% of GDP), population, food production quality, number of people practicing open defecation (% of the population), access to electricity (% of the population), people using basic drinking water services (% of the population), and private health expenditure(% of GDP). ω and δ as well as $\boldsymbol{\alpha, \beta}$ and $\boldsymbol{\gamma}$ are the respective (vectors of) parameters to be estimated.

4.2   Method of Estimation and Data

This research adopted Dynamic System GMM (2-Step) owing to its advantage such as addressing the issue of dynamic endogeneity (omitted variable bias corrected by adding lagged value(s) of life expectancy variable; that is, the lag of dependent variable) or unobserved heterogeneity and simultaneity bias (fixed through appropriate variable instrumentations). These estimation problems are capable to undermine the reliability and efficiency of the estimates obtained. The Dynamic System GMM adopted notably produces good instrument and apposite moment conditions resulting to obtaining consistent and efficient estimates.

The data used for the study were sourced from the World Bank Development Indicator, Financial Access Survey - IMF and Global Financial Development Database - World Bank between 2010 and 2018. The period and the numbers of the countries included in the sample size were based on data availability. Countries

included in the sample estimated are Benin, Burkina Faso, Cape Verde, Côte D'Ivoire, Ghana, Guinea, Guinea-Bissau, Liberia, Mauritania, Mali, Niger, Nigeria, Senegal and Togo.

V. Empirical Findings

The descriptive statistic of the study is reported in Table 1 (in the appendix). It shows a dispersion level of about 20.84 and a mean value of roughly 27.07 for deposit-GDP ratio over the sample period. The loan-GDP ratio has a mean value of 20.40 and a low standard deviation (about 16.10) compared to deposit-GDP ratio. This means that the former is more stable and less volatile than the latter. Additionally, the average number of ATMs per 100,000 adults is 7.60 around a standard deviation value of about 11.59. Similarly, the average numbers of ATM per 1,000 KM is 5.40 with a dispersion level of about 10.88. The mean and standard deviation of Commercial banks branches per 100,000 adults are roughly 6.06 and 7.84 respectively. Life expectancy at birth is dispersed roughly by 19.50 around its mean value of 53.23.

Table 2 (see appendix) summarizes the correlation report. The results give a rudimentary relationship particularly in terms of direction and strength of correlation between financial inclusion and life expectancy in West Africa. The results, among others, suggest a positive correlation between financial inclusion and life expectancy in the region. However, the pairs of financial inclusion indicators: deposit-GDP and Loan-GDP ratios (which represent usage dimension), Commercial banks branches per 100,000 adults and number of ATMs per 100,000 adults,

numbers of ATM per 1,000 KM and Commercial banks branches per 100,000 adults, and number of ATMs per 100,000 adults and numbers of ATM per 1,000 KM (access dimension) are almost perfectly positively correlated. For instance, the result shows up to 98% correlation between the numbers of ATM per 1,000 KM and number of ATMs per 100,000 adults, 97% between bank branches and number of ATMs per 100,000 adults. Technically, this implies that one of the variables of each pair identified with an extremely high degree of correlation must be carefully treated as a substitute for the other.

In Table 3, sets of regression specifications results on the impact of financial inclusion on life expectancy in West Africa are presented. The first regression result (column 2) is the baseline regression while others are mainly for robustness check and to weigh the effects of the various interaction terms introduced in the model on life expectancy. The result in column 2 showed a significant and positive marginal effect of a change in financial inclusion (the numbers of deposit with commercial banks as a fraction of GDP and the commercial banks branches Number of ATMs per 100,000 adults) to the rate of change in life expectancy at a level of 5 per cent. From the estimate, an increase in the deposit-income ratio by 10% can improve life expectancy rate up to 1.1 per live births. Also, a rise in the number of bank branches by 10 means life expectancy rate will improve by 6.1 per live births. Thus, financial inclusion contributes positively to life expectancy in West Africa. For other variables in the model, the private health spending exerts a positive impact on life expectancy. The same thing goes for the lagged value of access to infrastructure. The result in

column 2 also predicts a positive and statistically significant impact of financial inclusion on life expectancy. The effect of food production quality is positive and significant at 5 per cent.

Analogous results were obtained in column 3, 4 and 5 regarding the impact of the various financial inclusion indicators on life expectancy even with the addition of various interactive terms. In model 4, the interaction term revealed that there is empirical evidence that access to infrastructure improves the impact of basic drinking water service positively on life expectancy. More so, the interaction of private and public health expenditures positively affects life expectancy in West Africa, perhaps because most of the West African countries turn to foreign grants and loans rather than domestically sourced funds to finance health goods consumption. In addition to the significant positive effect of financial inclusion on the longevity of life, model 6 indicates the interaction between loan-GDP and quality of food production negatively affect life expectancy which implies that their joint effect is smaller than the individual effect on life longevity.

Thus, in all the results estimated, the effect of financial inclusion on life expectancy in West Africa is positive and statistically significant. The associated Sargan test results suggest that the instruments used for the estimations are appropriate and valid.

I. Summary and Conclusion

Much research interest had been on financial inclusion as a tool to overcome macroeconomic problems like income inequality, poverty and economic growth instability. In this study, focuses were on its impact on life expectancy in West Africa. Key results of the study using a dynamic 2-Step System GMM suggest a positive relationship between financial inclusion and life expectancy. This implies that, on the average, increase in the coverage of financial inclusion would elongate human life. Thus, an improved life expectancy, ceteris paribus, depends on the level of financial inclusion in the region. Nonetheless, the study also finds enormous evidence that population growth reduces the longevity of life in West Africa. On the contrary, there is a bit clear evidence that practicing open defecation negatively impact life expectancy in West Africa. As well as, the interaction of the quality of food and loan-income ratio has an adverse effect on life expectancy. Lastly, the study found the interaction of government and private health spending to have a positive impact on life expectancy.

In conclusion, the results of the study provide a convincing evidence of a positive impact of financial inclusion on life longevity in West Africa. Better access to and use of financial services would, therefore, increase life expectancy in the region.

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Appendix: Correlation Matrix Report

Table 1: Descriptive Statistic

Variable	Obs	Mean	Std. Dev.	Min	Max
lxb	126	53.22579	19.49747	0	73.004
dep/gdp	126	27.06664	20.84154	0	97.33011
Loan/gdp	126	20.39722	16.0974	0	65.6816
Atmkm	126	5.404316	10.87895	0	47.39454
Atmad	126	7.601496	11.58776	0	50.03327
Bnkbr	126	6.062787	7.837813	0	35.05082
ghx	126	1.09507	.8976869	0	3.587372
phx	126	41.87323	25.46635	0	79.91367
ate	126	36.66517	24.76915	0	92.91364
opd	126	22.52793	21.85863	0	74.9633
bdw	126	44.3391	32.45061	0	86.45935
fpq	126	102.317	57.11935	0	176.35
pop	126	2.39e+07	4.34e+07	492654	1.96e+08

Table 2: Correlation Result

	lxb	dep/gdp	loan/gdp	atmkm	atmad	bnkbr	ghx
lxb	1.0000						
dep/gdp	0.3983	1.0000					
loan/gdp	0.4236	0.9778	1.0000				
atmkm	0.0760	0.7189	0.6812	1.0000			
atmad.	0.108*	0.7479	0.7227	0.9840	1.0000		
bnkbr.	0.1721	0.8057	0.7849	0.9284	0.9658	1.0000	
ghx.	0.5231	0.4370	0.4743	0.2880	0.3405	0.4044	1.0000
phx.	0.4883	-0.0532*	-0.0550*	-0.2012	-0.2081	-0.2036	0.3381
ate	0.5953	0.6164*	0.6177*	0.5026*	0.5321*	0.5451*	0.4498
opd	0.3347	0.0507	0.0835	-0.1226	-0.1339	-0.1004	0.3464
bdw	0.4660	0.1291*	0.1499	0.0423*	0.0696*	0.1176*	0.4935
fpq	0.5853	0.0628*	0.0701*	-0.1892	-0.1692	-0.1287*	0.5883
pop	-0.127*	-0.1548	-0.1668	0.2123	0.1092*	-0.0869*	-0.2331
	phx	ate	opd	bdw	fpq	pop	
phx	1.0000						
ate	0.2086	1.0000					
opd	0.4942	-0.0840*	1.0000				
bdw	0.6331	0.2817	0.5952	1.0000			
fpq	0.8539	0.2026	0.5299	0.6502	1.0000		
pop	0.1663	0.1412*	-0.0969*	-0.0497*	-0.0688*	1.0000	

* means not statistically significant, p>0.01, p>0.05 and p>0.1

Table 3: System GMM (2-step) Estimated Results
Dependent variable: Life Expectancy

	(1)	(2)	(3)	(4)	(5)
Usage Dimension					
Deposit-GDP Ratio	0.1089 [0.005]		0.1183 [0.001]		0.2841 [0.000]
Loan-GDP Ratio		0.1023 [0.075]		0.0750 [0.000]	
Accessibility Dimension					
No. of ATMs per 1,000 km2			0.732 [0.000]		
No. of ATMs per 100,000 adults		0.5490 [0.000]			0.5503 [0.001]
Bank Branches per 100,000 adults	0.6682 [0.038]			1.9259 [0.001]	
Other Control Variables					
LXB(-1)	0.9825 [0.241]*	0.7056 [0.150]*		-2.8188 [0.002]	-0.0722 [0.708]*
Govt. Health Exp. (%GDP)	-0.2550 [0.835]*	-.9712 [0.420]*			
Private Health Exp. (%GDP)	0.1743 [0.002]				-0.1161 [0.309]*
Access to Infrastructure	-1.2543 [0.000]	-1.1230 [0.000]	-1.1533 [0.000]	-2.0472 [0.000]	-1.4167 [0.000]
Access to Infrastructure (-1)	0.9530 [0.000]	.8713 [0.000]	0.9221 [0.000]	0.382 [0.156]*	1.1344 [0.000]
People using open defecation			-0.0132 [0.386]*	-1.315 [0.011]	
Basic drinking water services		0.0113 [0.256]*			
Food production quality index		0.1187 [0.000]	0.0831 [0.003]		0.0635 [0.200]*
Total population			-5.70e-08 [0.111]		
Basic drinking water services × Acc. to Infras.				0.0117 [0.015]	
(Govt. Health Exp. × Private Health Exp.)				0.2600 [0.072]	
Loan-GDP × food prod. quality					-0.0019 [0.001]
Sargan Test	6.13 [0.190]	3.14 [0.371]	3.17 [0.530]	0.42 [0.936]	5.27 [0.261]
F-Statistic	1242 [0.000]	5412 [0.000]	8530 [0.000]	7237 [0.000]	1516 [0.000]

NB: [ ] contains p-values. The coefficients of the period effects are not reported.

* means not statistically significant, p>0.01, p>0.05 and p>0.1

Source: Researcher's estimates.

Table 4: Data Descriptions and Source

No.	Acronyms	Descriptions	Source
1	LXB	Life Expectancy at birth	World Bank (WDI)
2	DEP/GDP	Outstanding deposits with commercial banks as a percentage of GDP	Financial Access Survey - IMF
3	Loan/GDP	Outstanding loans from commercial banks as a percentage of GDP	Financial Access Survey - IMF
4	BDW	Total number of people using at least basic drinking water services as a fraction of population	World Bank (WDI)
5	ATMKM	Number of ATMs per 1,000 km2	Financial Access Survey - IMF
6	ATMAD	Number of ATMs per 100,000 adults	Financial Access Survey - IMF
7	BNKBR	Number of commercial bank branches per 100,000 adults	Financial Access Survey - IMF
8	GHX	Domestic general government health expenditure as a percentage of GDP	World Bank (WDI)
9	PHX	Domestic private health expenditure (% of current health expenditure)	World Bank (WDI)
10	ATE	Access to Electricity as a percentage of the Population (used to represent level of access to infrastructure)	World Bank (WDI)
11	OPD	People practicing open defecation (% of population)	World Bank (WDI)
12	FPQ	Food production Quality	World Bank (WDI)
13	POP	Population size	World Bank (WDI)

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