

Financial development and economic growth in Sub-Saharan Africa: The role of institutions

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Abstract:

The study aims to determine the relationship between financial development and economic growth with respect to the state of institutional quality on 27 Sub-Saharan Africa countries using a five-year averaged dataset over the period 1982-2016. The findings established evidence of a U-shaped relationship between financial development and growth which entails that more (less) finance drives (retards) growth in the region. The turning point beyond which financial development begins to contribute positively on economic growth ranges between 33% and 37%. Even though the connection is not strong, the selected institutional variables also showed both a direct and an indirect positive impact on economic growth. Financial development is positive and significant when embedded in selected well-developed institutions, which implies a complementary relationship of institutions and financial development on growth. It is therefore recommended that policy makers and responsible authorities take stringent measures to ensure the development of institutions and the financial sector for sustainable economic growth in the region.

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Financial development increases the resilience and boosts economic growth, especially those of emerging and developing economies, through savings mobilization, promotion of information sharing, efficient allocation of resources, and the facilitation of diversification and management of risk (Sahay et al., 2015). Moreover, it promotes financial stability to the extent that deep and liquid financial systems with diverse instruments help dampen the impact of shocks. Sahay et al. (2015) categorize financial development into financial institutions and financial markets, which categories were further sub-divided into depth (size and liquidity of markets), access (ability of the individual to access financial services) and efficiency (the ability of institutions to provide financial services at low cost and with sustainable revenues, and the level of activity of capital markets). Due to the unavailability of financial development data for African countries (less industrialized economies) especially that for financial markets, this study pays attention only to the private credit by banks as a share of GDP, which represents

the financial institutions' depth. The proxy is, however, justified by the observation by Sahay et al. (2015) that the indicator is still relevant and significant as a proxy for financial development. To further cement our use of the share of private bank credit to GDP, antecedent literature has shown that financial systems of emerging and developing economies are bank-based as opposed to market-based and, in Africa, within the financial system, banks hold more than 60% of financial assets (Beck et al., 2010; Demirgüç-Kunt et al., 2011; Financial Stability Board, 2011; International Monetary Fund, 2011). Furthermore, it has been shown by Tadesse (2002) and Beck et al. (2012) that the two main types of financial structure, namely bank-based and market-based, have an asymmetric effect on growth, depending on the countries' stage of development. Bank-based systems are more active and efficient in low-income economies, whereas market-based ones are growth-enhancing in developed economies (Demirgüç-Kunt and Levine, 2001; Beck and Cull, 2013). In light of this, a bank-based financial system indicator is more suitable and robust when investigating the transmission mechanism of finance to economic growth.

Cihak et al. (2012) presented a critical regional comparison of financial systems and confirm that Sub-Saharan Africa (SSA) is characterized by relatively low ratings on the bank-based indicators with respect to depth (i.e., private credit over GDP), efficiency (i.e., z-score) and access (i.e., number of accounts per 1000 adults and commercial banks). This exposes the region to external shocks which would otherwise be minimized by better-performing financial systems. According to Rajan and Zingales (1996), financial development reduces the demand for more expensive external financing. The negative effects which are brought about by exchange rate volatilities are also slowed down in an environment with a stronger financial development (Aghion et al., 2009). As such, better financial systems will ensure efficient allocation and accumulation of resources for development purposes.

On the other hand, global disparity is also evidenced in the quality of institutions. For example, in developing countries institutional quality is still poor when compared to advanced economies and hence there is a possible link with financial development (Acemoglu and Robinson, 2010). Besides, it has been acknowledged that the heterogeneity in the existence of growth-enhancing financial systems among nations is strongly linked to differences in the quality of their institutions (Beck and Levine, 2005). As explained in Beck and Levine (2005), the theory of law and finance holds that historically determined differences in legal tradition strongly affect the national approach to private property rights protection, the support of private contractual arrangements, and the enactment and enforcement of investor protection laws. These then influence the level of investment through the willingness of savers to invest in the financial system and the effectiveness of the corporate governance is increased, all of which translates into well-developed financial markets. The institutions are regarded as major determinants of economic outcomes through their provision of incentives (North, 1989). They are defined as the rules of the game in society or the humanly devised constraints that shape human interactions (North, 1990). Besides, Acemoglu and Robinson (2010) showed that the differences in prosperity across countries is closely linked to varying institutional quality. Institutions, financial development and growth linkage can mainly be explained by (i) ensuring property rights enforcement in financial contracts, as well as (ii) effectively designing and implementing macroeconomic and financial policy (Fernandez and Tamayo, 2017). As such, the financial sector development and well-functioning institutions would then facilitate growth, largely by reducing financial constraints, increasing risk-sharing, and providing

adequate liquidity. This would, in turn, translate into higher rates of capital accumulation and more efficient resource allocation.

Strong empirical evidence of a positive intermediating effect or complementary relationship of financial development and institutional quality on economic growth has been observed by Sghaier (2018) in four North African countries (Tunisia, Morocco, Algeria and Egypt), by Law et al. (2013) in 85 countries from around the globe, and by Kacho and Dahmardeh (2017) in OECD countries. Demetriades and Law (2006) also found that the positive impact of financial development is larger within a sounder institutional framework and that the relationship is particularly significant in poor and middle-income countries' economies, where more finance without sound institutions is likely to fail in improving growth. Love (2003) also established that financial development impacts growth by reducing financial constraints and that, in countries of English origin (with better institutional quality), they were even less constrained, which leads to economic growth than otherwise. No evidence of intermediation effect was, however, observed by Effiong (2015) in SSA, using the economic freedom of the world (freedom) index from the Fraser Institute and the polity2 score from the Polity IV Project as institutional quality indicators. This result was attributed to poor institutions that are not able to influence economic growth. On the other hand, a negative intermediation effect was observed by Compton and Giedeman (2011) and Ahlin and Pang (2008) on a sample of countries from around the whole heterogeneous world. They provided evidence of a substitution relationship of financial development and institutions on economic growth. It can be concluded that the impact of financial development on growth is reduced if the levels of institutional quality are low, while the opposite is also true; hence, there is a substitution effect because both the institutions and the financial sector are believed to perform the same role of reducing transaction costs and production costs. Among a number of possible reasons why the results produced a negative interaction term may be the use of GDP growth, unlike most prior studies which utilized a logarithm of real GDP per capita for the measure of economic growth.

Meanwhile, a comprehensive account of financial development and economic growth in the literature is imperative. Despite diverging contributions, especially from the recent past, the pioneering works by Greenwood and Smith (1997), King and Levine (1993) and Schumpeter (1942) that financial development is a prerequisite for an effective economic growth to be present, have remained dominant in the long-run. They believed in the need for the provision of financial resources to investment activities. Aghion et al. (2010) also supported the critical role of financial development through its provision of optimum levels of investment by minimizing liquidity challenges. Besides, Patrick (1966) establishes a framework in which a mutual relationship can be deduced on the level of economic activities and financial development. Arrow and Debreu (1954), however, defined financial development as not crucial for development in their study within a competitive market. The analysis in an incomplete market, however, supported the need for a developed financial sector for meaningful production to be realized (Modigliani and Miller, 1958, 1963; Miller and Modigliani, 1961). It is, however, shown that the defining feature of various securities is the rights that they bring to their owners which point to the quality of the institutions (Hart, 1995). This diverges from the idea that securities are recognized by their cash flows; thus, for example, debt has a fixed promised stream of interest payments while equity entitles its owner to receive dividends, as implied by Modigliani and Miller (1958, 1961 and 1963). As such, in an

incomplete market like the SSA region, we find it critical to analyse the significance of financial development and institutions on economic growth over the recent sample period.

On the other hand, Rousseau and Wachtel (2011) maintained that the long-held positive finance-growth nexus has been weakened post-1990 as a result of episodes of financial crisis. The emergence of such banking crises has been proved to pose a negative finance-growth nexus by Breitenlechner et al. (2015). Again, a negative interaction of private credit with low income and Middle Eastern and North African (MENA) countries on growth has been observed by Barajas et al. (2016). This is largely attributed to the poor quality of the financial services, uneven distribution of credit, and lack of effective bank supervision. These results concur with the conclusion drawn by Mehl and Winkler (2003). Ductor and Grechyna (2015) also justify the negative association by showing that the finance-growth nexus can be positive only when there is a proportionate growth in real output. Arcand et al. (2015) also established a threshold on financial development such that, when private credit exceeds 110% of GDP, the marginal effect of additional financial deepening on economic development becomes negative. An inverted U-shaped relationship was also observed in middle-income countries by Samargandi et al. (2015). Sahay et al. (2015) also provided evidence that rapid financial development, if it is poorly regulated and supervised, leads to economic and financial instability by encouraging greater risk-taking and high leverage.

Having understood the dynamics or evolution on the finance-growth nexus, the authors of this study seek to incorporate the institutional factor in the analysis of this relationship in SSA. The research seeks to determine if the long-stretching evidence of a strong positive finance-growth nexus is spared in the region with special consideration to how institutional quality would contribute to it. Unlike previous studies within the region, this study would also consider the non-linear relationship of financial development and economic growth which is motivated by the general observation that the relationship is likely more complex than can be effectively analysed by common linear regressions. As such, the numeric value of the turning point beyond which the influence of financial development on growth changes is established. Besides, for the robustness of the findings, individual institution indicators and indices from the same indicators as collected from the International Country Risk Guide (ICRG) are considered. This would determine the possible channels or sources through which institutions would influence financial development and economic growth.

The contribution of this study is three-fold. First, given the huge financial asset holdings of banks across African financial systems, there is a paucity of African studies that examine the finance-growth nexus using a more appropriate financial structure measure (a bank-based one). Second, there is scant and inconclusive literature on whether institutional factors and financial development indicators are complements or substitutes and whether their combined transmission path to growth is positive or negative. Third, the anecdotal contribution from this study is that, as opposed to current evidence in antecedent extant literature mainly inclined towards advanced economies of finance having an inverted U-shaped effect on growth, in the case of the SSA region we find it to be U-shaped. This result challenges the view abundant in the literature that too much finance is detrimental to economic prosperity in a country. Thus, after strengthening their institutions, SSA countries will accelerate their growth prospects from more finance in excess of 33-37% of GDP.

In summary, the study established that financial development positively influences economic growth only in non-linear model specification with squared values as well as when the institutional element has been factored in. As such, through complementarity, higher levels

of financial development and institutional quality are required to ensure a positive and significant finance-growth nexus in SSA. Section 1 of this paper considers the channels linking institutions, financial development and economic growth. Section 2 reviews empirical literature and section 3 addresses the methodologies and data. Sections 4 and 5 discuss results and conclusion, respectively.

1. Channels linking institutions, financial development and economic growth

Institutions are viewed as legal and social rules/norms that govern economic systems as well as reward the markets and growth enhancing activities (Williamson, 1985; Williamson, 1987; North, 1990; Acemoglu et al., 2005). It is acknowledged that institutions are a cornerstone for sustainable development through a host of channels. Financial markets and institutions emerge as an optimal response to technological and informational constraints within a given set of rules-of-the-game or institutions. As such, financial market imperfections through financial constraints, incomplete risk sharing, liquidity shortages, and poor market discipline influences the accumulation and allocation of factors or capital (Acemoglu and Robinson, 2010). This is largely linked to asymmetric information and transaction costs in which well-developed institutions can go a long way in ensuring a better operating environment.

The main channels through which institutions can influence the relationship between financial development and economic growth are property rights and contract enforcement, property rights and protection from the powerful elite, costly enforcement of contracts and economic policy, among other channels (Acemoglu and Robinson, 2010). The disadvantaged are protected by well-developed institutions through property rights and enforcement of the previously agreed contract terms (Glaeser et al., 2001; Acemoglu and Johnson, 2005). Institutions can also protect the disadvantaged parties by protecting minority shareholders against better informed shareholder/managers, that is, through property rights and protection from the powerful elite. This can also apply to the protection of creditors against asymmetric information and the risk of expropriation and to the protection of depositors and/or borrowers against the power of monopolists (Modigliani and Perotti, 1997; Ewert and Wagenhofer, 2011). Better institutions can also prevent individuals from defaulting or renegeing on pre-specified contractual terms through commitment mechanisms and through third-party arbitrators. These services can be costly because of the complexity of financial contracts or inefficient operation of courts and regulators; hence, quality institutions would reduce this challenge for sustainable development to reign (Acemoglu and Johnson, 2005).

Another critical channel through which institutions affect the finance-growth nexus is economic policy. Institutions can shape macroeconomic and financial policy mainly through the government budgeting process and through the degree of independence and accountability of central banks and financial supervisors. This then calls for a policy mix that includes macroeconomic policy, regulation, competition policy and financial openness that can be associated with macroeconomic instability and regulatory failures, which consequently affect financial development and economic growth (Mishkin, 1999; Boyd and De Nicolo, 2005). Thus, well-developed institutions would ensure better performing financial systems and growth prospects by encouraging sound economic policies.

La Porta et al. (1997, 1998, 2000) investigated the link between investor protection (legal rules and quality of law enforcement), capital markets (equity and debt markets) and concentration of ownership of publicly traded firms and concluded that the legal approach is a more fruitful way to understand corporate governance and its reform. Beck et al. (2003) advanced the work by establishing a rigid/flexible channel by which legal origins may matter for financial development; thus countries of French legal origin are more likely to develop an inefficient rigid legal system than those whose origins are Britain common law or German civil law. This was later empirically validated by Acemoglu et al. (2006) and Anderlini et al. (2013), who showed that a more rigid legal environment can impede economic development through its negative effect on financial development.

2. Empirical literature review

Starting with studies which paid attention to African economies, Sghaier (2018) examined the association between financial development, institutions and economic growth with five-year averaged data over the period 1996-2015 for a panel of four North African countries (Tunisia, Morocco, Algeria and Egypt). The study utilized the GMM (generalized method of moments) approach. After observing a positive link between the finance-growth nexus, they showed that institutions work as a complement to financial development and that a more pronounced finance-growth nexus is found in the presence of quality institutions. The economic freedom indicator was used to measure the institutional quality as constructed by the Fraser Institute with major areas of: (i) government size, taxes and enterprise; (ii) legal structure and security of property rights; (iii) access to sound money; (iv) freedom to trade internally; and (v) the regulation of credit, labour and business. The data was obtained from Miller and Kim (2017).

However, Effiong (2015), utilizing the system GMM method with five-year, non-overlapping averaged data over the period 1986-2010 on 21 SSA countries, established that there is no intermediation effect of institutions on finance-growth nexus. He also observed that there is no significant impact of financial development on growth. However, he observed that there is a positive impact of institutional quality on economic growth. The financial development indicators used in the study were private credit by deposit money banks as a share of GDP and liquid liabilities as a ratio of GDP. The economic freedom of the world (freedom) index from the Fraser Institute as well as the polity2 score from the Polity IV Project were the institutional quality indicators used.

On the studies which include countries from beyond Africa, Law et al. (2013) utilized a threshold estimation technique and found that the relationship between finance and growth is positive and significant only after a certain level of institutional development has been reached. They support the idea that “financial markets embedded within a sound institutional framework” are potent in ensuring long-run economic growth. They utilized the Hansen (1999) threshold approach and the Caner and Hansen (2004) instrumental variable threshold technique. They used private ratio, liquid liabilities and commercial bank assets as financial development indicators while using control of corruption, rule of law and government effectiveness as institutional variables. The study covered 85 countries during the period 1980-2008.

Demetriades and Law (2006) also investigated the relationship between financial development and growth with respect to institutions using data from 72 countries from around the globe over the period 1978-2000. They found that the positive impact of financial development is larger within a sounder institutional framework. They provide evidence that the aforementioned relationship is particularly significant in the economies of poor and middle-income countries, where more finance without sound institutions is unlikely to achieve growth. The financial development indicators used were the ratios of liquid liabilities, private sector credit, and domestic credit provided by banks. Institutions were measured by rule of law, corruption, bureaucratic quality, government repudiation of contracts, and risk of expropriation. The combination of OLS cross-country estimation, fixed effect, pooled mean group estimator, and mean group estimator approaches were employed.

A study by Law et al. (2018), which determined the influence of institutions on the finance-growth nexus in a panel analysis of 87 countries from around the world, established that institutions reduce the finance curse phenomenon as they mediate the positive association between banking sector development and economic growth. The authors concluded that the marginal impact of financial development on economic growth depends on the quality of the financial institutions. The study used non-overlapping four-year averaged data from 1984 to 2011 with the help of the GMM methodological approach. The measures for institutions followed the four classifications by Rodrik (2005) of market regulating (regulations), market stabilizing (sound money), market creating (law), and market legitimizing (democracy). The study made use of Gwartney and Lawson's (2006) composite index for the institutions.

Claessens and Laeven (2003) showed that, in countries with more secure property rights, firms might be able to allocate resources effectively, which would consequently lead to faster growth. Faster growth would result since returns from assets are protected against the competitor's action. Private sector credit ratio was the financial development indicator used, while property rights, intellectual property, law and order, and legal origin of the company law or commercial code of each country were the institutional indicators considered. Averaged data for 45 countries over the period 1980-1989 for a particular sector in a particular country was considered while utilizing the OLS and instrumental Variable (IV) regression.

For OECD countries over the period 2002-2014, Kacho and Dahmardeh (2017) found that both institutions and financial development positively contributed to economic growth. It was also observed that there is an intermediation effect of institutions on the finance growth nexus. The study utilized the panel GMM dynamic method. The measure of financial development used was the private credit by deposit money banks and other financial institutions to GDP. The index for institutional quality encompassed the variables of voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and corruption, as developed by Kaufmann et al. (2011) based on collected data from questionnaires completed by people and experts in different countries.

However, Ahlin and Pang (2008) provided contrasting evidence to the positive interaction of financial development and institutions by showing that the marginal impact of improving financial development is greater when a country has higher levels of corruption while the opposite is also true. The benefit of dealing with corruption is high in countries with a less developed financial sector as compared to countries with well-developed ones because the burden of corruption is higher in nations with little financial development. This is contrary to the findings by Demetriades and Law (2006) and Law et al. (2013, 2018), that financial development embedded in institutional quality is more potent in promoting economic growth

than the effect more finance has on facilitating economic growth. The study used cross-section and panel data methods with both bank-based and market-based financial indicators, while it also focused on corruption for institutional quality.

Compton and Giedeman (2011) provided evidence of a substitution relationship of bank-based financial development and institutions in economic growth. The evidence was, however, not present in stock market financial indicators. The study concluded that the impact of financial development on growth is reduced if the levels of institutional quality (corruption) are low, while the opposite is also true and hence the substitution effect applies. Both the institutions and the financial sector are believed to perform the same role of reducing transaction costs and production costs. Among a number of possible reasons why the results produced a negative interaction term may include the use of GDP growth, unlike most prior studies which utilized a logarithm of real GDP per capita to measure economic growth. The research took a cross-section and panel data analysis approach with the help of OLS, IV regressions, and system GMM methods. The five-year averaged data over the period 1970-2004 for countries around the world was considered. The institutional indicators used were corruption, rule of law, bureaucratic quality, contract intensive money, and an aggregated measure of institutions based on rule of law, corruption, and quality of the bureaucracy.

3. Methodology and data

3.1. Methodology

The general linear model specification of the model following the work by Law (2018) and Brambor et al. (2006) takes the form:

$$y_{it} = y_{it-1} + \beta_1 FD_{it} + \beta_2 INS_{it} + \beta_3 x_{it} + year + \theta_i + \mu_{it} \quad (1)$$

where y_{it} represents the dependent variable which is GDP growth as measured by the logarithm of GDP per capita (constant 2010 US\$), y_{it-1} represents the lag of the dependent variable, FD_{it} is the financial development indicator which is private credit by deposit money banks, INS_{it} represents the institutional indicator, x_{it} is the vector of control variables, year is the time dummy, θ_i is the unobserved country-specific effect, and μ_{it} represents the error term (random disturbance). The model specification would tell the linear relationship of all the explanatory variables which includes financial development, institutional indicators and control variables with economic growth.

Taking cognisance of the complexities in the relationship between financial development and economic growth, which has called for a non-linear approach by many researchers, the non-linear model specification would take the form:

$$y_{it} = y_{it-1} + \beta_1 FD_{it} + \beta_2 FD_{it}^2 + \beta_3 INS_{it} + \beta_4 x_{it} + year + \theta_i + \mu_{it} \quad (2)$$

where FD_{it}^2 is the financial development squared and the other variables are as previously defined.

Besides giving us the individual impact of financial development and financial development squared when the institutional quality is zero, the model also tells us whether the non-linearity of the relationship between financial development and economic growth is a U-shaped or an inverted U-shaped relationship. The financial development squared will capture the non-linear nature of the relationship. The finance curse hypothesis is supported by the

inverted U-shaped relationship. The institutional effect on economic growth is also detected in this model.

Given that the coefficients of financial development and financial development squared are positive and negative, respectively, and both are significant, it implies an inverted U-shaped relationship between finance and growth, which also supports the finance curse hypothesis. However, the U-shaped relationship is supported by the presence of significant negative and positive coefficients of the same variables.

The turning point of financial development is determined by first identifying the partial derivative of the non-linear equation of economic growth with respect to financial development, to produce the following expression:

$$\frac{\partial y_{it}}{\partial FD_{it}} = \beta_1 + 2\beta_3 FD_{it} = 0 \quad (3)$$

The tuning point is therefore determined by finding the value of the level of financial development at which the marginal impact would be zero.

The econometric approach used to determine the institutions mediating effect of financial development on economic growth also follows Law et al. (2018) and Brambor et al. (2006). It incorporates the financial development and institutions interaction as well as the financial development squared and institutions interaction which detects the nonlinearity natures of the relationship. The model specification, therefore, takes the form:

$$y_{it} = y_{it-1} + \beta_1 FD_{it} + \beta_2 FD_{it}^2 + \beta_3 INS_{it} + \beta_4 INS \times FD_{it} + \beta_5 INS \times FD_{it}^2 + \beta_6 x_{it} + year + \theta_i + \mu_{it} \quad (4)$$

where $INS \times FD_{it}$ represents the financial development and institutions interaction, $INS \times FD_{it}^2$ shows the financial development squared and institutions interaction, and the other variables are as defined before. This model specification investigates the hypothesis that institutions and financial development are complementary towards ensuring an enhanced economic growth in the region. It should be noted that it is not possible to interpret the impact of individual financial development and institutions on economic growth from the above model specification with interaction terms as suggested by Brambor et al. (2006).

Given that the interaction of financial development and institutions is positive and significantly related to economic growth and that financial development on its own is negative and significant, it implies that financial development has a positive impact on growth only if a certain minimum level of institutional development has been reached. However, if the interaction of financial development squared and institutions is negative and significant and financial development alone is significantly positive toward economic growth, it supports the view that financial development has a negative impact on growth only if the development of institutional quality has achieved a certain maximum threshold.

To deal with issues which are associated with static methods, the dynamic methods are used under the GMM framework, as suggested by Arellano and Bond (1991) and Blundell and Bond (1998, 2000), which removes the country specific effect by transforming into first difference and eliminating the simultaneity bias by including a lagged dependent variable in the model. The system GMM combines both the level and difference equations to control inferences, especially when the explanatory variables are persistent, and hence it is more consistent in parameters. The system GMM used also handles the endogeneity issues. The study made use of Roodman (2009b) Stata commands, which are flexible in instrumenting the model. To avoid too many instruments in relation to the number of cross sections as suggested by Roodman (2009a), the study used only the second lag of the instruments, which then

reduces a weak Sargan test of over-identification of instruments. The first lag is avoided as instrument, as it could be correlated with the error term, which gives biased and inconsistent parameters.

3.2. Data

The research utilized a five-year averaged data set from the period 1982-2016 for all variables with the exception of initial income, which was invariant. The five-year non-overlapping data for the period 1982-2016 are 1982-1986, 1987-1991, 1992-1996, 1997-2001, 2002-2006, 2007-2011 and 2012-2016. Institutional quality data is also available from 1985 and hence the first observation is the average of only two years (1985 and 1986). The non-overlapping averaged data was utilized so as to observe the long-run dynamics which are not prone to temporary jumps as with annual data. Due to institutional quality data constraints in our selected sample, we included only 27 SSA countries. The countries considered are: Angola; Botswana; Burkina Faso; Cameroon; Congo, Dem. Rep.; Congo, Rep.; Côte d'Ivoire; Ethiopia; Gabon; Gambia; Ghana; Guinea-Bissau; Kenya; Madagascar; Malawi; Mali; Mozambique; Namibia, Niger; Nigeria; Senegal; Sierra Leone; South Africa; Sudan; Togo; Uganda; and Zambia. The institution indicator (*INS50*) was obtained by summing up five International Country Risk Guide (*ICRG*) indicators as published by Political Risk Services (PRS); these are corruption, government stability, law and order, bureaucratic quality, and democratic accountability, following Law et al. (2015). An alternative institutional quality index (*INS30*) is obtained by summing up the rule of law, control of corruption, and bureaucratic quality after rescaling other indicators, following Muye and Muye (2017) with data from ICRG. The institutional indices were constructed after necessary rescaling of individual indicators to a common scale. Democratic accountability (0-6), corruption (0-6), law and order (0-6), bureaucracy quality (0-6) and government stability (0-12) were all rescaled to 0-10 before computing the indices of institutions used. Rescaling from a scale of 0 to 6 was done by multiplying by 5/3 while multiplication by 5/6 was used for rescaling from 0 to 12. The five institutional indicators following Demetriades and Law (2006) and Law et al. (2018) were also used independently for a robustness check of the findings.

Financial development is measured by private credit by deposit money banks and is obtainable from the financial development and structure database. The indicator has been used in the literature by prominent authors including Boyd et al. (2001) and Kim and Lin (2010). The indicator used for economic growth was the logarithm of GDP per capita (constant 2010 US\$). The indicator was also utilized by Law et al. (2018), Kacho and Dahmardeh (2017), and Demetriades and Law (2006).

On control variables, inflation proxied by the Consumer Price Index (CPI, 2010=100) is also a control variable used in the study and is expected to have an inverse relationship with growth. The indicator was also utilized by Raheem and Oyinlola (2015), Almalki and Batayneh (2015), Korkmaz (2015), and Abbey (2012). The data is extracted from the World Development Indicators. Initial income represented by GDP per capita (constant 2010 USD) is included in the study following Ductor and Grechyna (2015), Kim and Lin (2010), and Boyd et al. (2001). The initial per capita GDP averaged over the period 1982-1984 is expected to have a negative coefficient which reflects the catch-up effect. A causal link from the income level is controlled for as the growth rate in low-income countries is expected to grow faster than that for industrialized countries and hence the convergence. The data is obtainable from the World

Development Indicators. General government final consumption expenditure as a percentage of GDP is expected to have a positive impact on economic growth. The indicator was also utilized by Law et al. (2018). The data is available at World Development Indicators. Gross fixed capital formation (% of GDP) obtained from the World Development Indicators is also expected to have a positive coefficient. The variable was also widely used in the literature by studies including Apergis et al. (2007) and Christopoulos and Tsionas (2004). Gross savings as a share of GDP was also taken from World Development Indicators and we expect it to have a positive impact on growth in line with Upreti (2015).

4. Empirical results and discussion

The summary statistics shown in table 1 reveal that the study utilized unbalanced panels with observations ranging from 159 for gross savings as a ratio of GDP to 189 on real GDP per capita in US dollars. The financial development indicator shows a mean value of 16% of GDP, which is relatively lower than the average maximum global level of financial development that is known for having a positive impact on economic growth, which ranges from 90% to 100% (Law et al., 2018).

Table 1 – Summary statistics

	Unit of measurement	Obs	Mean	Std. dev	Min	Max
GDP per capita	Constant 2010 US\$	189	1738.803	2321.436	145.3831	12036.89
<i>FD</i>	Private credit by deposit money banks (% of GDP)	180	15.65336	18.53326	0.4736261	194.0998
Inflation	CPI (2010=100)	171	63.83577	45.28169	2.07e-11	256.9234
<i>GFCF</i>	Gross fixed capital formation (% of GDP)	174	20.12016	8.448989	3.028984	64.39958
Initial income	GDP per capita (constant 2010 US\$)	189	1704.73	2472.092	153.3349	12172.55
Gross savings	% of GDP	174	17.22258	11.72019	-6.00207	64.56589
<i>GOV</i>	General government final consumption expenditure (% of GDP)	188	14.12984	5.466442	1.38835	32.03231
<i>INS30</i>	Scaled from 0 to 30	188	10.93371	3.668636	2.361111	22.30556
<i>INS50</i>	Scaled from 0 to 50	188	21.92635	5.51356	5.833333	35.76389
Democratic accountability	Scaled from 0 to 6	188	2.958599	1.127933	0.333333	5.333333
Bureaucracy quality	Scaled from 0 to 6	188	1.396705	0.9164057	0	4
Government stability	Scaled from 0 to 12	188	7.199508	2.138351	1.7	10.91667
Corruption	Scaled from 0 to 6	188	2.389657	0.9773157	0	6
Law and order	Scaled from 0 to 6	174	2.773862	1.012344	0.75	6

Note: The table is based on five-year averaged data from 1982 to 2016 with the exception of initial income, which is invariant (averaged between 1982 and 1984) for 27 SSA countries.

Table 2 – System GMM method – linear relationship

	INS50	INS30	Democratic accountability	Government stability	Bureaucracy quality	Corruption	Law and order
Variables	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita
Lag ln GDP capita	1.0236*** (0.099)	0.9858*** (0.112)	1.0393*** (0.108)	1.0681*** (0.168)	0.9968*** (0.108)	1.0020*** (0.144)	0.9843*** (0.110)
<i>FD</i>	-0.0009 (0.003)	-0.0001 (0.003)	-0.0017 (0.003)	-0.0018 (0.004)	-0.0002 (0.003)	-0.0011 (0.004)	-0.0005 (0.003)
<i>INST</i>	0.0294 (0.005)	0.0045 (0.008)	0.0193* (0.012)	0.0223 (0.016)	0.0047 (0.021)	-0.0036 (0.022)	0.0283 (0.020)
ln inflation	-0.0294* (0.023)	-0.0150 (0.018)	-0.0261* (0.025)	-0.0133 (0.037)	-0.0168 (0.018)	0.0008 (0.020)	-0.0208 (0.023)
ln initial income	-0.0698 (0.055)	-0.0589 (0.068)	-0.0696 (0.060)	-0.0714 (0.108)	-0.0744 (0.066)	-0.0435 (0.087)	-0.0175 (0.070)
ln <i>GFCF</i>	0.0118* (0.100)	-0.0273 (0.105)	0.0593 (0.122)	0.1434* (0.100)	-0.0322 (0.097)	0.0502 (0.122)	0.0352 (0.093)
ln <i>GOV</i>	0.1015*** (0.36)	0.1150** (0.050)	0.1358** (0.066)	0.1906** (0.090)	0.1256*** (0.044)	0.1856** (0.082)	0.1187** (0.058)
Gross savings	0.0061 (0.004)	0.0107*** (0.004)	0.0050 (0.004)	0.0055 (0.006)	0.0105** (0.004)	0.0108** (0.005)	0.0081** (0.003)
Year	0.0363*** (0.013)	0.0316** (0.014)	0.0297** (0.013)	0.0164 (0.018)	0.0304** (0.013)	0.0186 (0.163)	0.0304** (0.014)
AR(1)	0.037	0.036	0.021	0.030	0.037	0.042	0.038
AR(2)	0.139	0.203	0.284	0.055	0.195	0.183	0.133
Countries	27	27	27	27	27	27	27
Obs	131	131	131	131	131	131	131
Number of instruments	19	19	19	19	19	19	19
Hansen test of overid. restrictions	0.164	0.075	0.196	0.327	0.063	0.473	0.295
Difference-in-Hansen tests of exogeneity	0.375	0.100	0.435	0.203	0.066	0.408	0.198
Wald statistic	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: robust standard errors in parentheses; *** indicates significance at 1%, ** significance at 5% and * significance at 10%. Only *p*-values are shown for AR(1), AR(2), Hansen test of over-identified restrictions, difference-in-Hansen tests of exogeneity and Wald Statistic.

The results from the system GMM dynamic method employed in this study are ensured to be significant or valid by paying special attention to the necessary diagnostic conditions. For a model to be significant, there must be a significant Wald statistic with the null hypothesis that all the coefficients excluding the intercept are simultaneously zero, insignificant Sargan/Hansen test of over-identified instruments, insignificant difference-in-Hansen tests of exogeneity, significant serial correlation in the first-differenced errors, and insignificant serial correlation at the higher order. An insignificant Sargan/Hansen test ensures that we are not interpreting an over-identified GMM and henceforth the models included only valid instruments, while insignificant difference-in-Hansen tests of exogeneity ensure that the exogenous instrument is truly determined from outside the model. A serial correlation test informs us if the moments are actually working/holding in the model, that is, we expect serial correlation in the first differenced errors only as the lagged dependent variable and the error

term are correlated. The conditions for a significant GMM model were supported by Arellano and Bond (1991), Blundell and Bond (1998, 2000). The research took advantage of the user friendly and flexible instrumental “xtabond2” command following Roodman (2009b).

Table 3 – System GMM method – non-linear relationship

	INS50	INS30	Democratic accountability	Government stability	Bureaucracy quality	Corruption	Law and order
Variables	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita
Lag in GDP capita	1.0275*** (0.047)	0.9981*** (0.107)	1.0434*** (0.086)	1.0762*** (0.190)	1.0091*** (0.110)	1.0080*** (0.128)	1.0000*** (0.101)
FD	-0.0069* (0.004)	-0.0073* (0.004)	-0.0066* (0.004)	-0.0026 (0.004)	-0.0068* (0.005)	-0.0055 (0.005)	-0.0050 (0.004)
FD ²	0.0001** (0.001)	0.0001** (0.001)	0.0001* (0.001)	0.0001 (0.001)	0.0001** (0.001)	0.0001 (0.001)	0.0001* (0.001)
INST	0.0035 (0.004)	0.0049 (0.008)	0.0152 (0.216)	0.0292 (0.022)	0.0071 (0.020)	0.0026 (0.021)	0.0202 (0.019)
ln inflation	-0.0125 (0.021)	-0.0035 (0.017)	-0.0191 (0.020)	-0.0233 (0.051)	-0.0022 (0.018)	0.0035 (0.018)	-0.0112 (0.021)
ln initial income	-0.1067* (0.040)	-0.0958 (0.075)	-0.1146* (0.068)	-0.0554 (0.119)	-0.0975 (0.074)	-0.0758 (0.095)	-0.0600 (0.071)
ln GFCF	-0.0162 (0.087)	-0.0477 (0.115)	0.0023 (0.126)	0.1606 (0.123)	-0.0228 (0.102)	0.0116 (0.125)	0.0084 (0.091)
ln GOV	0.1026** (0.040)	0.1127** (0.056)	0.1018 (0.067)	0.2054* (0.105)	0.1326*** (0.046)	0.1587** (0.075)	0.1152** (0.056)
Gross savings	0.0091** (0.019)	0.0126*** (0.004)	0.0070* (0.004)	0.0041 (0.007)	0.0116*** (0.004)	0.0120** (0.022)	0.0096*** (0.003)
YEAR	0.0301*** (0.010)	0.0288** (0.013)	0.0297*** (0.011)	0.0168 (0.021)	0.0264** (0.013)	0.0218 (0.015)	0.0278** (0.012)
AR(1)	0.038	0.034	0.026	0.044	0.035	0.040	0.038
AR(2)	0.090	0.137	0.211	0.080	0.141	0.169	0.092
Countries	27	27	27	27	27	27	27
Obs	131	131	131	131	131	131	131
Number of instruments	19	19	19	19	19	19	19
Hansen test of overid. restrictions	0.195	0.200	0.134	0.502	0.081	0.223	0.342
Difference- in-Hansen tests of exogeneity	0.195	0.383	0.134	0.241	0.077	0.402	0.413
Wald statistic	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FD turning point (%)	34.5	36.5	33	-	34	-	-

Note: robust standard errors in parentheses; *** indicates significance at 1%, ** significance at 5% and * significance at 10%. Only p-values are shown for AR(1), AR(2), Hansen test of over-identified restrictions, difference-in-Hansen tests of exogeneity and Wald statistic.

From the results of the linear regression shown in table 2, financial development showed evidence of a negative and insignificant impact on growth on its own, while institutions largely showed a positive and insignificant impact on growth (with slight exceptions). Democratic accountability is the only institutional indicator with a positive and significant direct impact on growth, whereas corruption is the only institutional indicator with a negative coefficient even though it was insignificant. The findings concur with those of Rachdi et al. (2018) in MENA countries; the authors also observed the same results on the respective institutional indicators. On the non-linear model specification in table 3, there is no evidence of any significant impact from institutional indicators to economic growth even though the relationship is still largely positive. Generally, the overall results support that there is no strong and convincing evidence of a positive and significant direct contribution of institutions on growth in SSA.

On the non-linear relationship, with the inclusion of financial development squared, there is no evidence of finance curse in the region as shown in table 3. Instead, there is evidence of U-shaped relationship between financial development and economic growth. The reason being the existence of a significant and negative (positive) coefficients of financial development and financial development-squared, respectively, in bulky of model specifications reported in table 3. This implies the need for more financing in the SSA region over the period under review. As such, this can be attributed to the low levels of financial development in relation to high productivity potential in the region that still need to be fully exploited for the benefit of the region which could be contrary to the most advanced economies which are experiencing some serious negative marginal productivity checks with respect to more finance. Thus, from a global perspective, the level of financial development is in excess but in relation to the needs of the SSA region, it is very negligible. Therefore, there is need to increase financing especially for infrastructure development coupled with structural reforms especially of institutions responsible for promotion of transparency, accountability, governance, easy of doing business and fighting rent seeking.

From the partial derivative of the growth equation with respect to financial development, we observe that the turning point beyond which financial development begins to contribute positively to economic growth ranges from 33% to 37%, depending on the institutional indicator used in each equation. It can therefore be concluded that average financial development can only be effective on economic development after reaching that threshold and beyond, while financial development below the threshold retards growth. The results are contrary to the extant studies which considered the whole globe with much higher levels of financial development as compared to SSA. An average range between 90% and 100% was observed for the inverted U-shaped relationship observed by Law et al. (2018), Arcand et al. (2015), and Law and Singh (2014) in the extant literature which considered a heterogeneous sample. As such, it can be noted that the dynamics in SSA are strongly different from the rest of the world. The idea is also supported by the mean of 15.5% of financial development (private credit by deposit money banks) as a ratio of GDP, as shown in the summary statistics in table 1. The current level of financial development is too low to start experiencing the finance curse phenomenon. The low positive coefficients for financial development squared, however, indicate a weak contribution to growth which calls for more consideration, since only increasing financial development directly does not drives economic growth moderating factors such as institutions are disregarded.

Table 4 – System GMM method – institutions mediating effect on the finance-growth nexus

	INS50	INS30	Democratic accountability	Government stability	Bureaucracy quality	Corruption	Law and order
Variables	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita	ln GDP capita
Lag in GDP capita	1.0334*** (0.087)	0.9932*** (0.087)	1.0157*** (0.084)	1.0830*** (0.105)	1.0059*** (0.113)	0.9938*** (0.087)	1.0052*** (0.097)
<i>FD</i>	-0.0196 (0.025)	-0.0065 (0.022)	-0.0189** (0.009)	-0.0312* (0.018)	-0.0006 (0.010)	-0.0002 (0.015)	-0.0098 (0.016)
<i>FD</i> ²	0.0002 (0.001)	0.0001 (0.001)	0.0003* (0.001)	0.0003 (0.001)	-0.00003 (0.001)	-0.00001 (0.001)	0.0001 (0.001)
<i>FD</i> * <i>INST</i>	0.0005 (0.001)	0.0003 (0.002)	0.0028* (0.002)	0.0033 (0.003)	-0.0028 (0.003)	-0.0013 (0.004)	0.0011 (0.001)
<i>FD</i> ² * <i>INST</i>	-0.000004 (0.001)	0.000001 (0.001)	-0.00004* (0.001)	-0.00003 (0.001)	0.0001 (0.001)	0.00003 (0.001)	-0.00001 (0.001)
<i>INST</i>	-0.0016 (0.010)	0.0052 (0.018)	-0.0075 (0.020)	-0.0230 (0.027)	0.0271 (0.033)	0.0030 (0.035)	0.0133 (0.034)
ln inflation	-0.0098 (0.020)	-0.0108 (0.015)	-0.0067 (0.018)	0.0020 (0.025)	-0.0031 (0.017)	-0.0016 (0.016)	-0.0174 (0.021)
ln initial income	-0.1052 (0.063)	-0.1047 (0.067)	-0.0814 (0.058)	-0.1037 (0.078)	-0.1022 (0.076)	-0.0974 (0.074)	-0.0604 (0.083)
ln <i>GFCF</i>	-0.0081 (0.093)	-0.1008 (0.102)	0.0352 (0.120)	0.1105* (0.065)	-0.0341 (0.091)	-0.0351 (0.121)	-0.0158 (0.061)
ln <i>GOV</i>	0.0997* (0.042)	0.0887 (0.064)	0.1177* (0.068)	0.1263** (0.056)	0.1366*** (0.049)	0.1126* (0.061)	0.0920* (0.049)
Gross savings	0.0078** (0.004)	0.0123*** (0.004)	0.0067* (0.004)	0.0051 (0.004)	0.0121*** (0.005)	0.0112** (0.005)	0.0083** (0.003)
YEAR	0.0315*** (0.010)	0.0339*** (0.013)	0.0236*** (0.009)	0.0209* (0.012)	0.0272** (0.013)	0.0221 (0.013)	0.0307*** (0.011)
AR(1)	0.035	0.033	0.015	0.041	0.029	0.035	0.044
AR(2)	0.098	0.115	0.350	0.056	0.148	0.126	0.108
Countries	27	27	27	27	27	27	27
Obs	131	131	131	131	131	131	131
Number of instruments	23	23	23	23	23	23	23
Hansen test of overid. restrictions	0.066	0.053	0.071	0.278	0.054	0.073	0.142
Difference- in-Hansen tests of exogeneity	0.335	0.600	0.737	0.538	0.054	0.274	0.142
Wald statistic	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: robust standard errors in parentheses; *** indicates significance at 1%, ** significance at 5% and * significance at 10%. Only p-values are shown for AR(1), AR(2), Hansen test of over-identified Restrictions, difference-in-Hansen tests of exogeneity and Wald Statistic.

From table 2 and table 3, it can also be seen that the control variables demonstrated more or less the same signs with few variations from insignificant to significant coefficients. Inflation showed a strong negative impact on economic growth in most model specifications as expected from the theory. Initial income also showed an inverse relationship with growth, which is strongly supported by the idea of income convergence as countries with initial high income normally experience reduced production in future while the opposite is true for countries with

low initial income. The results of income convergence are in line with findings by Ductor and Grechyna (2015), Breitenlechner et al. (2015), and Yilmazkuday (2011). Gross savings as a ratio of GDP (gross savings), gross fixed capital formation as a ratio of GDP (*GFCE*), and government final consumption as a share of GDP (*GOV*) provided evidence of a positive relationship with economic growth, which conforms to theoretical expectations.

The results in table 4, however, show that there is evidence of a complementary relationship of institutions and financial development on economic growth even though most of the coefficients are insignificant. The results are particularly strong and vibrant on democratic accountability, as they exhibit a positive and significant interaction between institutions and financial development, while a negative and significant impact is found on financial development alone. In this case, financial development would have a larger positive impact on economic growth only when a certain minimum institutional quality has been reached. This is highly supported by relatively higher positive coefficients on the financial development and institution interaction, while there are relatively lower positive coefficients on financial development squared from all model specifications. The findings are in line with Demetriades and Law (2006) and Law et al. (2013, 2018), that financial development embedded in institutional quality is more potent in promoting economic growth than what exclusively more finance directly does in facilitating economic growth. However, the interaction terms between financial development and institutions are insignificant with respect to all other institutional indicators, which can be attributed to weak institutional indicators that are currently failing to significantly contribute to the finance-growth nexus for a sample associated with less industrialized economies in SSA. Beside lower positive coefficients for intermediation effect, results also show a weak contribution to growth which may imply that the primitive and poor quality institutions in the region have a moderate contribution to growth. Therefore, to have a stronger positive finance-growth nexus of SSA countries, there is a need for structural reforms aimed at strengthening their institutional frameworks.

On the other hand, there is also evidence of a negative and significant impact on democratic accountability and financial development squared, which implies that the contribution of financial development on growth will turn negative when a certain maximum threshold of institutional quality has been reached; this is in line with findings by Law et al. (2018). It should, however, be noted that, when interaction terms are included in the model, we will not be able to interpret individual coefficients according to Brambor et al. (2006).

5. Conclusions

The study determined the relationship between financial development and economic growth with respect to the state of institutional quality in SSA. The five-year averaged data set from the period 1982-2016 for all variables with the exception of initial income, which was non-variant, has been employed. A total of 27 SSA countries was included in our sample and was strongly motivated by the availability of the institutional quality data. The findings established evidence of a U-shaped relationship between financial development and growth, which indicates that more finance drives growth in the region. The turning point beyond which financial development begins to contribute positive results on economic growth ranges from 33% to 37%. Even though the connection is not strong, the selected institutional variables also

showed both a direct and indirect positive impact on economic growth. Financial development is positive and significant when embedded in selected well-developed institutions, which implies a complementarity relationship of institutional factors and financial development on growth. The anecdotal contribution from this study is that, as opposed to current evidence in antecedent extant literature, mainly inclined towards advanced economies, of finance having an inverted U-shaped effect on growth, in the case of the SSA region we find it to be U-shaped. This result challenges the view abundant in the literature that too much finance is detrimental to economic prosperity on a country. Thus, after strengthening their institutions, SSA countries will accelerate their growth prospects from more finance in excess of 33-37% of GDP.

It is therefore recommended that, to strengthen the finance-growth nexus, the authorities should take stringent measures to ensure institutional development as well as financial development for sustainable economic growth in the region. Efforts to increase the development of the financial sector in the region would provide its production needs with the necessary cheap and less risky local financing. Besides, ensuring high quality institutions would also facilitate the productivity of the credit created by the financial sector. As such, the quality of the credit created would drive production to high levels. Quality institutions also positively contribute directly to economic growth. Conclusively, the concept of financial development embedded in quality institutions has a huge positive impact on growth within Sub-Saharan Africa; hence, to reap the returns of finance via growth, the relevant authorities should act accordingly.

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