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Article

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DEVELOPMENT ECONOMICS | RESEARCH ARTICLE

The role of inflation in financial development–economic growth link in sub-Saharan Africa

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Abstract: The impact of financial development (FD) on economic growth (EG) is well documented. However, studies on how inflation mediates the impact of FD on EG produce inconclusive findings. Meanwhile, the tripartite relationship among FD, inflation and EG is particularly crucial for sub-Saharan African countries given that these countries are largely inflationary on the back of under-developed financial sectors and low EG. The inconclusive evidence presented by the existing studies limits policy making. This study therefore re-examines whether inflation mediates the FD–EG nexus by utilizing a panel data obtained from 36 countries in sub-Saharan Africa. The study uses the sample splitting threshold approach to investigate this relationship. The findings identify inflation thresholds of 7.65% and 6.76%

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PUBLIC INTEREST STATEMENT

Improving financial sector development is one of the major policy objectives of African countries. This is based on the evidence that higher financial sector development increases economic growth and therefore supports in achieving the Sustainable Development Goals (SDGs) and Agenda 2063. This notwithstanding, there are concerns that unbridled financial sector development could dampen economic growth given the level of countries' macroeconomic instability. This study therefore examines the precise effects of financial development on economic growth in Africa given countries' inflation rates. The findings presented are important to guide policymaking.

at which the impact of FD on EG changes sign. Specifically, irrespective of the indicator of FD, higher FD significantly increases EG at low inflation rates. However, beyond the estimated thresholds, the impact of FD on EG is insignificant, revealing that higher inflation does not support the growth-enhancing effect of FD. The research recommends that inflation should be kept below the identified thresholds for FD to spur EG.

Subjects: Sustainable Development; Economics; Finance

Keywords: EG; inflation; threshold; financial development

JEL Classification: O47; E44; E31

1. Introduction

The significance of financial development (FD) in countries' EG has been well established in recent research efforts. According to Levine (2005), improved domestic FD is projected to spur EG through risk diversification, efficient resource allocation, reduction in information asymmetry, implementation of sound corporate governance practices and facilitating the exchange of goods and services. Thus, a healthy level of countries' domestic FD promotes EG through its efficient mobilization of resources that support capital formation and ultimately growth (Ehigiamusoe & Lean, 2018). Theoretically, Schumpeter's (1911) study on FD–EG link notes improved financial sector increases growth in technological innovations through the redistribution resources to productive areas. Kuznets (1955) also shows that a country's financial sector only spurs at the intermediate stage of EG trajectory and develops as the economy fully grows.

Increasingly, the importance of inflation in mediating the impact of FD on EG is gaining traction in the literature (see, Ehigiamusoe et al., 2019; Ehigiamusoe & Samsurijan, 2021). This is because, while improved financial sector may drive EG, higher levels of inflation weaken potency of the financial sector in efficiently mobilizing resources by lowering agents' purchasing power and savings (Ehigiamusoe et al., 2020). However, English (1999) argues that increase in inflation leads to higher interest rate on deposits while purchasing power is weakened thereby causing households to shift from purchasing of goods and services to saving with the banks. This stimulates capital accumulation for the financial institutions making more credit available to meet the needs of the deficit unit (Ehigiamusoe et al., 2021).

Given these viewpoints, investigating the extent of inflation that supports the link between FD and EG is the subject matter of this paper. Does higher inflation impedes on the growth-enhancing impact of FD? And what is the optimum inflation rate necessary to promote growth via the financial sector? These questions are the focus of this paper especially in countries with low EG coupled with less sophisticated financial markets and higher levels of inflation. Ibrahim and Alagidede (2018a) observe that, in addition to low per capita income and FD, many economies in sub-Saharan Africa (SSA) also witnessed episodes of sustained hyperinflation in the past few decades.

Undoubtedly, with the renewed interest of promoting EG in SSA on the back of the countries' level of FD, several studies have been conducted on the impact of FD on EG. Ibrahim and Alagidede (2018a) observe that, while FD promotes EG in SSA, below a certain level of FD, EG and human capital stock, EG does not respond to changes in FD. This notwithstanding, how the sub-region's inflationary level mediate the relationship between FD and EG is yet to receive much attention. The limited rigorous empirical literature on the precise threshold level of inflation that support the FD–EG nexus have left policymakers under quandary regarding policy options in inflation–FD–EG link. Admittedly, a number of the existing literature have been less instructive given their inability to examine the precise effect of FD on EG when countries' inflation rate is below or above the estimated level of threshold (see, Aluko & Ibrahim, 2020; Davies et al., 2021; Ibrahim & Acquah,

2020; Ibrahim & Alagidede, 2018a; Ibrahim et al., 2020; Opoku et al., 2019a). More precisely, such studies have relied on approaches where the threshold is taken *a priori*. This research therefore re-investigates the linkages between FD and EG in SSA when the nexus is mediated by inflation.

The study deviates from the use of approaches that presumes the functional form of the threshold through the use of a sound technique that do not assume an exogenous threshold and allows the optimum thresholds to be determined within an empirically identified confidence intervals. In this endeavour, the study makes the following contributions to the existing literature. Firstly, it relies on a sample splitting and threshold estimation approach that does not necessitates the imposition of exogenous functional form of the thresholds in the FD-EG link. Secondly, apart from identifying the precise inflection point that bifurcate the link between FD and EG, the study is able to determine the exact effect of FD when economies are either below or above the inflation threshold. Thirdly, by recognizing the nascent level of the capital markets, contractual savings institutions and other financial institutions, this research employs a newly developed FD index that, to a large extent, captures significant aspect of the financial systems of countries. This index of FD recently developed by the International Monetary Fund (IMF) has not seen much usage in the literature. The findings from the present study show that, EG responds differently to the impact of FD according to the level of inflation. Specifically, FD spurs EG when inflation falls below the estimated thresholds and does not influence EG when inflation exceeds the thresholds. This evidence on FD-EG relationship is robust to alternative indicators of FD.

The next section of the research presents a review of relevant studies. The theoretical review and hypothesis development area also presented in Section 3. Section 4 outlines the methodology while Section 5 talks about the findings with Section 6 concluding the study.

2. Literature review

Recent research findings have underscored the significance of FD in promoting EG of countries (see, Lenka & Sharma, 2020; Shravani & Sharma, 2020; Zeqiraj et al., 2020). This is because well-developed financial sectors support in the efficient resources allocation. However, a section of the existing studies has argued that the effect of FD on EG is not direct but dependent on the form of shocks to the overall financial sector. For example, Chen et al. (2020) rely on the nonlinear autoregressive distributive lag (NARDL) to examine how FD drives EG in Kenya. The authors observe that EG responds differently to FD conditional on the source of shocks. For instance, a short-run positive shock in FD spurs growth and a long-run negative shock to it dampens overall growth. Consistent with Chen et al. (2020), Ibrahim and Alagidede (2020) also find long-run asymmetric linkage where both positive and negative shocks to FD produce varying impacts on Ghana's EG.

Beyond how the nature of shocks to financial sector affects its effect on EG, Ehigiamusoe and Samsurijan (2021) highlights that institutions, macroeconomic stability and other macroeconomic fundamentals are critical conduits that mediate the FD-EG nexus. Empirically, some existing studies show that the precise impact of FD on growth in SSA is moderated by the previous levels of human capital stock, FD and income (Ibrahim and Alagidede, 2018), information and communication technology development (Abeka et al., 2021) and institutional quality (Aluko & Ibrahim, 2020). Indeed, the role of inflation in moderating the linkage between FD and EG particularly has gained momentum. The existing research efforts have studied how the impact of FD on EG changes based on the attainment of certain inflation threshold. For instance, Huang et al. (2010) have long showed that FD significantly raise EG in countries with inflation rate below 7.69%. However, for economies with inflation rate above this threshold the impact of FD on growth becomes statistically insignificant. Similarly, Yilmazkuday (2011) employs data on 84 developing and developed countries from 1965 to 2004 to investigate the threshold effect of inflation on finance-growth nexus. Findings from the study show that FD positively increase growth when the inflation rate falls below 10% and hurts growth when inflation exceeds this threshold. Ehigiamusoe et al. (2019) focused on West Africa by examining the mediating role of inflation in FD-EG in 16 countries for the period 1980–2014. The authors find 5.62% as the inflation threshold above which

the impact of FD on EG is negative. Ehigiamusoe et al. (2019) conclude that, in the case of West Africa, improvement in FD and lower rate of inflation have leads to better growth outcomes. Bandura (2020) also investigated how inflation moderates the link between FD and EG in sub-Saharan Africa. The findings show varying impact of FD on EG where the exact effect is contingent on the inflation rate identified to be 31% beyond which FD drags EG. However, for inflation level below 31%, higher FD spurs EG.

Farahania et al. (2021) also recently examine the tripartite link among FD, EG and inflation using data from eight Islamic developing countries spanning 1990–2017. Findings from their study show threshold effects of FD on EG given the different inflation rates. Specifically, FD reduces EG when inflation surpasses a threshold of 11.88%. According to the authors, inflation dampens EG by reducing investment profits and incentives to save. Khalilnejad and Gharraie (2021) investigate potential threshold impact of inflation in FD-EG nexus for MENA countries using threshold auto-regression (TAR) model. Findings from their study reveal that relative to countries with low rates of inflation, FD insignificantly affects EG in countries with high rates of inflation. A key implication is that, for economies that have relatively high inflation, changes in FD does not influence EG. This finding is not consistent with Farahania et al. (2021). Batayneh et al. (2021) examine the impact of FD on inflation by using Jordan as a case study. Results from their ARDL approach show that, irrespective of the period, inflation is negatively associated with FD suggesting high inflation impedes the country's financial sector development. By using large dataset for 125 countries, Ehigiamusoe et al. (2021) do not find support for threshold impact of inflation on FD in the pooled regression. However, at the country-specific level, inflation non-linearly affects FD in 66 countries.

Indeed, from the foregoing, studies on finance-inflation-growth linkages continue to grow even though the findings are largely inconclusive. In this endeavor, this research re-examines the tripartite link in the case of SSA. This is because financial sector in the continent is under-developed relative to other emerging markets developing economies and overall EG is also sluggish, making it a good case to examine how efforts at improving EG via FD in the continent is mediated by the state of the continent's inflation. The World Banks' Operating Directive on financial sector does not propose to economies to reform their financial sectors when their levels of inflation are high. This is because the extent of countries' inflation could negatively influence the operations of their financial systems in a way that alters the link between FD and EG. The aim of this paper is to empirically examine whether the effect of FD on EG in SSA is conditioned on inflation rate and also to uncover the optimum inflation rate that changes the nexus between FD and EG.

3. Theoretical underpinnings and hypothesis development

Undoubtedly, countries' levels of macroeconomic stability have a crucial role to play in influencing EG and financial sector development. Early theoretical studies opine that persistently high inflation inhibits EG via financial sector given of its deleterious impact on financial intermediaries and long-term contracts (see, Bruno & Easterly, 1998; Rousseau & Wachtel, 2002). Azariadis and Smith (1996) theoretically advanced a model which has different financial market friction. In their model, the severity and operations of the frictions in the financial market is influenced by inflation. For economies with macroeconomic instability, the persistently high inflation constricts incentive constraints leading to higher credit rationing by increasing the tax on all financial assets including bank deposits. In this case, high rates of inflation lower yields on assets and investment, which significantly damages capital accumulation and EG.

Schreft and Smith (1997) develop a monetary growth model inspired by Diamond (1965) while introducing the role of financial institutions (banks) as the provider of liquidity. Under their model, sustained high inflation inhibits an economy's ability to reach higher steady state where capital stock is high. Here, high rates of inflation raise interest rates thereby distorting the allocative function of the financial markets in such economy. Similar to Diamond's (1965) neoclassical growth model, Huybens and Smith (1999) also relied on an overlapping generations' model with

production. Huybens and Smith's (1999) theoretical model produced steady-state equilibria where countries' financial sector is exposed to costly state verification problem. Under different conditions, Huybens and Smith's (1999) framework produces steady-state equilibria where inflation and real activity are inversely correlated. The authors find that increase in money creation (inflation) lowers economic activities through its impact on assets returns including equity. The main thrust of Huybens and Smith's (1999) model is that how the economy behaves crucially conditioned on whether or not inflation exceeds a certain threshold.

To illustrate the theoretical tripartite nexus among inflation, FD and EG, Hung (2003) developed a theoretical model that allows the existence of informational imperfections in the financial sector stemming from adverse selection and expensive state financial intermediation costs. In Hung's (2003) theoretical model, both FD and inflation determine the extent of credit rationing which also influences EG through its effect of capital investment as such investments are financed by the financial markets. Based on this, Hung's (2003) findings show the existence of multiple equilibria characterizing (i) low inflation and (ii) high inflation. In this essence, how FD influences EG is contingent on inflation. More specifically, FD spurs EG when inflation is low and for countries with relatively high inflation, FD raises the equilibrium rate of inflation, which lowers EG.

The foregoing theoretical studies underscore the significance of inflation in shaping the effect of FD on EG. Indeed, high inflation largely distorts efficient resource allocation including the delay in the execution of investment projects and lengthening contract periods (Huang et al., 2010). For many African economies with sustained high inflation, the prime goal of their central banks to ensure price stability. However, ensuring such price stability and controlling the inflationary process generates financial repression traits notably interest rate ceilings, credit and capital allocations, which results in inefficient resource allocation with a knock-on effect on EG. Adusei (2019) notes that financial liberalization that eliminates the interest rate restrictions and permitting the financial markets to adequately price risk positively drive EG. In this endeavor, it becomes imperative for governments to recognize their inherent inflation in order to reap the benefits of EG through financial reforms. This research therefore tests the hypothesis that under high rates of inflation, FD does spur countries' level of EG relative to countries with low rates of inflation. Specifically, the study considers the possibility of unbridled inflation impeding the efficient functions of financial markets and changing how improved FD spurs EG. Here, the research hypothesizes that the precise impact of FD on EG is not linear but conditioned on whether countries' level of inflation is above or below a certain threshold. When inflation rate of an economy is high in a way that outstrips the threshold, FD drags EG and vice versa.

4. Methodology

4.1. Empirical model

The empirical model specifies EG as a function of FD and some additional conditioning factors. The conditioning variables represent factors that have been suggested by EG theories as covariates in a standard EG regression model. The empirical model is expressed as:

$$EG_i = \alpha + \beta FIN_i + \gamma X'_i + \varepsilon_i \quad (1)$$

where EG_i and FIN_i denote EG and finance in country i , respectively; X' denotes the control variables; and ε_i is the error term. The conditioning variables are initial income, population growth, investment rate, and human capital.

Eq. (1) can potentially be estimated by relying on the ordinary least squares (OLS). However, estimating it in this form does not produce the inflation thresholds below or above which the impact of FD on EG changes sign. The study's focus is on the identification of the thresholds. To account for the potential threshold of inflation for the link between FD and EG, the study

transforms Eq. (1) into a threshold regression model based on Hansen (2000). Relative to the traditional linear regression approach, this sample splitting threshold regression model permits the assumption of nonlinear link between FD and EG by detecting optimum inflation rate at which the FD-EG nexus would deviate from its normal course. The threshold regression model can be written as:

$$EG_i = \begin{cases} \beta_1 FIN_i + \gamma_1 X_i + \varepsilon_i & \text{if } INF \leq \pi \\ \beta_2 FIN_i + \gamma_2 X_i + \varepsilon_i & \text{if } INF > \pi \end{cases} \quad (2)$$

where INF denotes inflation which is the threshold variable, and π is the threshold parameter. Eq. (2) can be re-written as:

$$EG_i = (\beta_1 FIN_i + \gamma_1 X_i) I(INF \leq \pi) + (\beta_2 FIN_i + \gamma_2 X_i) I(INF > \pi) + \varepsilon_i \quad (3)$$

where $I(\cdot)$ denotes the indicator function representing 1 if the argument in the indicator function holds and 0 if otherwise.

Similar to Ibrahim and Alagidede (2018a) and Alagidede et al. (2018), this research follows the threshold regression estimation method by Hansen (2000) to estimate Eq. (3). This method relies on the OLS estimator to provide the threshold estimate (π) as well as estimates for the regression parameters. Indeed, π is obtained through the concentration approach which minimizes the sum of the squared residuals (SSE) through the least squares estimator and it is given as:

$$\hat{\pi} = \underset{\pi}{\operatorname{argmin}} SSE_n(\pi) \quad (4)$$

Given the estimated threshold value ($\hat{\pi}$), the sample is divided into regimes of high and low inflation. When $\hat{\pi}$ is obtained, β and γ become $\hat{\beta}(\hat{\pi})$ and $\hat{\gamma}(\hat{\pi})$, respectively. The statistical significance of $\hat{\pi}$ confirms the presence of a threshold effect. Hansen (2000) proposes the application of a likelihood ratio (LR) test to check for the statistical significance of π :

$$LR_n(\pi) = n \frac{SSE_n(\pi) - SSE_n(\hat{\pi})}{SSE_n(\hat{\pi})} \quad (5)$$

Following Hansen (2000), the bootstrapping procedure is used to allow the asymptotic distribution of the LR test. The next section presents the empirical results.

4.2. Data

This study relies on panel dataset of 36 SSA countries spanning over the period 1996–2016.¹ EG is proxied by real per capita GDP growth. This research uses the 1996 real per capita (2010 US\$ constant prices) in its logarithm form proxy for initial income. Finance is measured by the Svirydzienka's (2016) composite index of FD. This index, which has been recently used by Aluko (2020), Aluko and Ibrahim (2020, 2021), Ajayi and Aluko (2019), and Opoku et al. (2019a), is nuanced and takes into account information on the depth, efficiency and accessibility of financial institutions and markets. Higher (lower) values indicate higher (lower) levels of FD. As a robustness check, the study uses private credit to measure finance.² Private credit is the ratio of financial resources provided by domestic deposit money banks to GDP. Inflation is represented by the annual growth of consumer price index. Population growth is computed as the annual percentage change in mid-year population. This research uses the ratio of gross fixed capital formation as a proportion of GDP to measure investment rate. The study relies on the human capital index dataset provided by Feenstra et al. (2015) to capture human capital.³

Table 1. Summary statistics

	Source	Mean	Standard deviation	CV	Skewness	Kurtosis
Real per capita GDP growth (%)	World Development Indicators (WDI)	1.93	1.61	0.83	0.24	4.70
FD index	International Monetary Fund (IMF)	0.14	0.10	0.71	2.49	9.14
Private credit (% of GDP)	Global Financial Development Database (GFDD)	23.44	41.69	1.78	2.58	25.70
Inflation (%)	WDI	17.74	46.58	2.63	4.71	24.88
1996 real per capita GDP (\$)	WDI	1,493.60	2,191.48	1.47	3.04	13.24
Population growth (%)	WDI	2.61	0.71	0.27	-1.06	3.96
Investment rate (%)	WDI	21.45	6.36	0.30	0.22	2.64
Human capital index	Penn World Table (PWT) Version 9.0	1.68	0.39	0.23	0.58	2.40

Figure 1. Scatter plot of FD and EG in SSA.

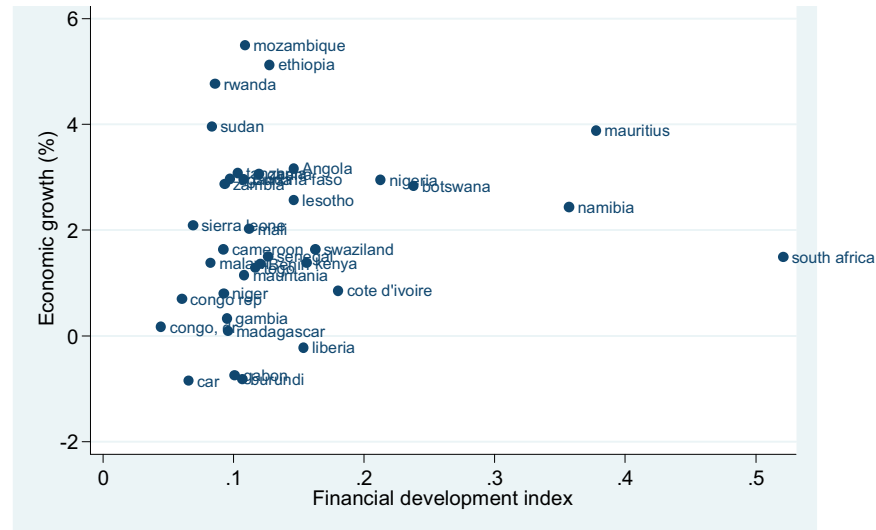


Table 1 presents the descriptive statistics of the cross-sectional data employed. Real per capita GDP growth is averaged at 1.93% and this re-affirms that majority of SSA countries under consideration experience low growth rates. The FD index and private credit have a relatively low mean value of 0.14 and 23.44%. Both measures of finance indicate that lower levels of FD predominates in the SSA region.⁴ This anecdotal evidence re-affirms the assertion of Aluko et al. (2020), and Ibrahim and Alagidede (2018b) that most SSA countries have weak financial sectors. Among the sampled countries, inflation stands at an average value of 17.74% and this suggests that most of the sampled countries, on the average, experience relatively high inflation periods. The coefficient of variation (CV) defined as the ratio of standard deviation to mean is calculated to reveal the extent to which the data vary. The study shows that inflation has the highest CV value, indicating that inflation has the highest level of variation relative to the other variables in the sampled countries while human capital is least volatile. Apart from population growth, all the variables are positively skewed. The kurtosis values reveal the variable have a leptokurtic distribution except for investment rate and human capital index, which have a platykurtic distribution.

In Figure 1, the research provides a cursory look at the link between FD and EG in SSA by depicting this relationship in a scatterplot. For most part, majority of the countries are clustered around low levels of FD and low growth rates. Indeed, the under-developed financial markets and low EG over the past decades make this sub-region the subject matter of this study. This study focuses on SSA in order to provide nuanced insights regarding how countries' inflationary process matter for improved growth on the back of their FD. It can be deduced from Figure 1 that the FD-EG relationship in SSA is apparently nonlinear. Indeed, assuming a linear nexus between FD and EG in SSA is likely to result in

Table 2. Threshold tests

	Measure of finance	
	FD index	Private credit
LM test for no threshold	12.31	12.37
Bootstrap <i>p</i> -value	0.060*	0.055*
Threshold estimate	7.65	6.76
95% confidence interval	[5.26, 10.05]	[5.48, 6.76]

Notes: * denotes rejection of null hypothesis of no threshold effect at 10% level of statistical significance. 10,000 bootstrap replications are used and a 15% trimming percentage.

Table 3. Threshold regression results

	Measure of finance			
	FD index		Private credit	
	Regime 1 (Inflation ≤ 7.65%)	Regime 2 (Inflation > 7.65%)	Regime 1 (Inflation ≤ 6.76%)	Regime 2 (Inflation > 6.76%)
Constant	4.79* (2.46)	13.23** (5.07)	4.60* (2.26)	11.15** (4.54)
Finance	6.67* (3.23)	6.35 (7.36)	0.05** (0.02)	−0.01 (0.00)
Initial income	−1.15*** (0.37)	−0.49 (0.39)	−1.38*** (0.36)	−0.74* (0.37)
Population growth	−0.02 (0.49)	−3.05*** (0.74)	0.30 (0.49)	−1.82** (0.59)
Investment rate	0.07 (0.05)	0.18*** (0.04)	0.05 (0.06)	0.19*** (0.04)
Human capital	1.38 (1.01)	−2.30** (0.84)	2.25* (1.19)	−1.91** (0.73)
R ²	0.40	0.52	0.47	0.47
Number of countries	21	15	19	17

Notes: *, ** and *** indicate significance at 10%, 5% and 1% level, respectively. Standard errors are in () which are White corrected for heteroskedasticity.

spurious outcomes. A critical issue of concern is whether high inflation rates of the countries magnify or dampen the effect of FD on growth. In the next section, the study presents an empirical discussion on the nonlinear results on the mediation role of inflation in FD-EG nexus.

5. Empirical results

This section begins by checking whether inflation has a threshold impact on the FD-EG linkage in SSA. This is done by performing the threshold test which produces the threshold estimate. The presence of threshold effect is adjudged by the statistical significance of the estimated threshold value. Table 2 presents the result of the threshold tests.

The LM test rejects the null hypothesis of no threshold effect at 10% level of statistical significance for both measures of finance. This indicates that inflation has a threshold impact on the link between FD and EG in SSA, irrespective of whether FD index or private credit is used as the measure of finance. Thus, inflation allows for splitting of the sampled countries into regimes 1 and 2. The identification of the threshold in FD-EG nexus based on the rate of inflation is consistent with Ehigiamusoe and Lean (2018). Countries classified into regime 1 are those having their inflation rate below the estimated threshold and are regarded as low-inflation countries while those in regime 2 are countries whose inflation rate over the sample period is higher than the estimated threshold values and are classified as high-inflation countries. When finance is measured by FD index, the estimated threshold value is 7.65% with a corresponding 95% confidence interval of [5.26%, 10.05%]. On the other hand, the estimated threshold value is 6.76% with a corresponding 95% confidence interval of [5.48%, 6.76%] when private credit measures finance. These estimated threshold values indicate the point at which inflation distorts the presumed linear finance- growth relationship in SSA.

Beyond identifying the threshold value that bifurcate the relationship, the study examines the impact of FD on EG below and above the estimated threshold value of inflation. The threshold regression results are presented in Table 3. Using the FD index as a proxy for finance, the present

research finds that finance has a positive and statistically significant effect on EG in regime 1 where inflation is below its estimated threshold value of 7.65%. In this regression, EG is expected to increase 6.67% in response to a 1-percentage-point rise in FD. Conversely, in regime 2 where inflation is greater than 7.65%, the coefficient of the effect of FD on EG is positive albeit insignificantly. This evidence is akin to Ehigiamusoe et al. (2021).

The alternative measure of finance produces similar findings. For instance, in regime 1, below the estimated inflation threshold value of 6.76%, finance measured by FD (private credit) records a positive and statistically significant effect on EG suggesting that, a 1% increase in private credit spurs growth by 0.05%. However, in regime 2 where inflation exceeds the threshold, the coefficient of finance turns negative albeit insignificant. Thus, at higher inflation rate, the effect of FD on growth is mute. The research further observes disproportion growth-effects of finance at low levels of inflation. For instance, irrespective of the indicator of finance, while FD promotes EG in regime 1, the positive growth effect is huge when finance is proxied by FD index. Consistent with Huang et al. (2010), the evidence largely indicates that, while finance promotes EG when inflation is below its threshold, the growth-enhancing effect of finance vanishes when inflation exceeds its threshold. In other words, finance stimulates EG in only low-inflation countries. The findings suggest that high level of macroeconomic instability stifles the growth-promoting role of finance in EG in SSA. Rousseau and Wachtel (2002), and Ehigiamusoe et al. (2019) underscore the need for macroeconomic stability for the sound operation of the financial sector. This is because high inflation cripples the ability of financial institutions and markets to perform their functions effectively. Thus, although the financial sector mobilizes and efficiently allocates capital for productive investment necessary to spur overall EG, this growth-enhancing effect is weakened by higher levels of inflation. Overall, the study shows that inflation is capable of replicating the nonlinear relationship between finance and EG in SSA. The evidence accentuates the mediating role of inflation in the link between finance and EG. This conclusion is akin with Ehigiamusoe and Lean (2018) and Ehigiamusoe et al. (2019).

Turning to the control variables, the study considers the effects of initial income, population growth, investment rate, and human capital on EG in both regimes. The research finds that when finance is proxied by FD index, in regime 1, only initial income has a statistically significant effect on EG, although the coefficient is negative. Interestingly, initial income becomes statistically insignificant in regime 2 whilst population growth, investment rate, and human capital gain significance. Here, it is observed that, at higher levels of inflation, population growth and human capital inhibits overall EG while higher investment rate increases growth. With regard to private credit, only initial income and human capital have statistically significant effect on EG in regime 1. However, while the coefficient of initial income is negative, improved human capital raises EG with a coefficient of 2.25%. In regime 2, the effects of all the control variables are negative except investment which significantly spurs overall growth.

6. Conclusion, policy implication, and recommendation

Countries' domestic FD is expected to promote EG given the functions of the financial sector. Indeed, a well-developed financial sector increases EG through its efficient mobilization of resources that support capital formation and ultimately growth. However, there exist potential discontinuities in FD-EG linkage given countries level of macroeconomic instability. For instance, while improve FD increases EG, higher inflation rate may weaken the ability of the financial sector to mobilize productive resources in such a way that EG is jeopardized. Conversely, the extent to which inflation mediate the relationship between FD and EG is an empirical matter. More particularly, existing studies in this regard have produced mixed evidence regarding the precise threshold level at which the effect of finance on growth switches sign. Indeed, the varying finding regarding the threshold level and the effect of finance on growth at low and high inflation regimes puts policymakers in a dilemma.

Relying on a sample of 36 SSA countries over the 1996–2016, this study examines the impact of finance on EG given countries' inflation rates. More specifically, the study determines the threshold level of inflation and the impact of finance on growth when inflation is below and above the threshold. Findings show an optimum inflation threshold of 7.65% and 6.76% when FD is respectively measured by FD index and private credit. The research finds that, FD enhances EG when inflation rate is below the threshold. Further evidence suggests that, the growth-enhancing effect of FD is huge when finance is measured by FD index relative to the private credit. However, above the estimated threshold, the effect of FD on EG is not significant.

The evidence presented in this study has important implications for policy. It is imperative for SSA countries to pursue prudent macroeconomic policies that lower inflation and at the same time, develops domestic FD. To ensure higher EG on the back of improved financial sector, SSA countries should pursue appropriate fiscal and monetary policies aimed at reducing inflation to levels below the estimated thresholds while employing financial reform policies necessary to improve overall financial systems. Policy makers should consider a more balanced approach where financial sector policies aimed at improving EG should be taken while considering the state of countries' inflation rate, in a way that does not jeopardize overall long-term EG agenda. The study recommends that inflation should be kept below the identified thresholds in order for countries to benefit from higher EG as a result of FD. With regard to future research efforts, it would be interesting to examine how human capital mediates the finance-growth nexus throughout the conditional distribution of EG using quantile regression techniques. This is because countries' level of human capital stock potentially influences FD, which also drives growth. Therefore, establishing the conditional distribution impact of how human capital impacts on the nexus between FD and EG would also add depth to policy making. This is crucial for Africa given the low human capital stock and EG. In addition, future studies can extend the work using more recent data given the data challenges the study encountered.

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Notes

1. The selection of these countries is contingent on data availability and they include Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Congo Republic, Cote d'Ivoire, Democratic Republic of Congo, Ethiopia, Gabon, Gambia, Ghana,

Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda and Zambia.

- Private credit is by far the most widely used single measure of finance in recent empirical literature (see, Adeusi & Aluko, 2015; Aluko & Ajayi, 2018; Sare et al., 2019; Ajayi & Aluko, 2019; Opoku et al., 2019b; Ibrahim et al., 2019; Ibrahim & Sare, 2018; Ibrahim, 2018; Ibrahim & Alagidede, 2017).
- The data is only available up to year 2014, hence it is averaged over the period 1996–2014.
- The average value of the financial development index for 25 countries included in the sample is below 0.14.

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