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Capital Account Liberalization and Economic Growth Nexus: The Relevance of Corruption

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Abstract

The paper explores the impacts of capital account liberalization on economic growth in Sub-Saharan African economies. The empirical analysis also includes an interaction effect of corruption and capital account liberalization on growth of the sub-region from 1990 to 2018. The study utilized the autoregressive distributed lag technique. Findings overwhelming reveal that capital account liberalization stimulates economic growth positively, foreign direct investment, corruption, and human development index positively enhances growth. The interaction effect of corruption and capital account liberalization was significant but negatively affecting growth. Policy implication from the findings is that capital account liberalization can only stimulate growth in an economy with less or no corruption. Therefore, institutional reforms must accompany capital account liberalization. Numerous studies have researched the impact of capital account liberalization in Africa. However, none have explored the effect of corruption on the capital account liberalization and growth nexus in Sub-Saharan African countries.

Keywords: Capital account liberalization; Corruption; Sub-Saharan Africa; Economic growth

INTRODUCTION

The 1980s financial reforms saw many countries deregulating their financial system by removing capital account control measures, which

has put restrictions on the free flow of capital between countries. This is based on the neoclassical growth theory of allocative efficiency. The neoclassical argued that liberalizing capital account encourages the efficient allocation of capital internationally, which lead to all kinds of beneficial impacts. The capital scarce economies tend to benefit highly from capital account liberalization due to flow of capital from capital abundant economies (environment where return to capital is low) to capital scarce economies (mostly developing countries) where return on capital is high. The flow of capital resources into capital scarce economies lower their cost of capital, which enhances a temporary rise in investment and economic growth (Fischer, 2003; Henry, 2003, 2006, 2007; Henry & Sasson, 2008; Lee, 2016; Summers, 2000).

The argument on the potentials of openness, promoting economic growth because it enhances efficient capital allocation and investment. The development of the financial market, availability of capital, macroeconomic discipline, and risk diversification are all benefits of capital liberalization. However, capital account liberalization as a deliberate government policy that allows free flow of capital in and out of an economy (Henry, 2006, 2007). The temporary increase in investment, reduction in the cost of capital, and continual rise in GDP per capita are the merits the proponents of capital account openness are arguing that developing economies can benefit in improving their economy. Scholars like Lee (2016) reported that liberalizing capital account can only fosters growth in the short run; a more substantial growth effect is experienced only in a country where government consumption is lower. The benefits of capital account openness on the economy of developing economies have come under massive debate with scholars like Stiglitz arguing that developing countries lack the necessary capital to benefit from capital account openness, that it can results to financial crises and capital flight. Prasad et al. (2003) argued that the benefit a country will get from capital account openness would depend on the macroeconomic stability, financial market development, quality of regulatory institutions and the level of economic growth.

The Makinnon-Shaw (1973) argues that eradication of regulation on capital flow will better promote economic performance. They believe that the free flow of capital and efficient financial system can channel capital from the economy with a lower return to a highly profitable investment or economy. Financial institutions can function

independently when the role of government is minimized. Vibrant stock market can benefit from financial deregulation because it encourages equity investment. Developing economies can benefit from free capital flow in the form of foreign direct investment (FDI), which can serve as an engine for economic growth (Rehman, Atiq, Ur Rehman, & Bashir, 2019).

Corruption is the illegal payment to a public official to benefit from something that may or may not be deserved, or the misuse of public office for personal use (Rose-Ackerman, 2013; Shleifer & Vishny, 1993; Svensson, 2005). Theoretically, corruption impedes economic growth. Firstly, via resource misallocation by diverting capital to unproductive sectors, investments, and projects. Secondly, corruption leads to resource waste, which is considered as the most direct effect, by allowing illegal outflow of capital, funds embezzlement, and theft by corrupt officials. Thirdly, corruption caused a waste of entrepreneurial skill and human talent via rent-seeking and bribing behavior by business and political elites than performing creative and productive activities (Alam, 1989; Mo, 2001; Nye, 1967; Pellegrini & Gerlagh, 2004; Xu, 2016). Based on the "Sand Wheel Hypothesis," corruption retard economic growth. Corruption hampered economic growth by negatively affecting the quality of institutions, which is universally accepted as a determinant of growth. Corruption threatens state institutions such as property rights, business contracts enforcement mechanisms, and the rule of law (Azfar, Lee, & Swamy, 2001). Corruption harm innovators and innovation (Podobnik, Shao, Njavro, Ivanov, & Stanley, 2008). According to Mo (2001), primarily corruption targets innovative entrepreneurs; today, new products and innovative technology are considered as incentives to sustained growth.

In the 1980s, against a bad financial condition and rapidly deteriorating economic situation, SSA economies implemented a far-reaching financial and economic reforms, which were suggested by the World Bank and IMF as a structural Adjustment Programs. These entail restructuring the country's economy to achieve a market-based system, which is a private sector-led growth (Reinhart & Tokatlidis, 2005). Capital account liberalization was a significant component of these reforms, which is the removal or easing restrictions on free flow of capital, which includes portfolio flows, foreign direct investment, and bank borrowing (Henry, 2006). The liberalization of capital flow was expected to promote efficiency in resource allocation. The capital

account liberalization in SSA economies was fully implemented in the mid-1990s (Mughogho & Alagidede, 2019). Today after two decades of liberalizing the capital account, it appears to have affected the SSA economy very little. To attract foreign capital inflow, capital openness must be accompanied by institutional reforms aimed at enhancing regulatory and legal environment, which will create a conducive environment for foreign investors and business operations (Ndikumana, 2003). As shown in Figure1, portfolio investment net (current US dollar) falls for most of the economies, for most of the time covered (2000 to 2018). Except in the case of Kenya, which has experienced a stable trend for (2000 to 2013). The FDI inflow (as a proportion of GDP) falls for most of the countries, for the period covered. The countries experience no significant and stable growth in the countries. While the trends of GDP growth are not stable and there is no significant growth, with recession and decline in GDP growth (in the case of Nigeria 2016, South Africa in 2010 and 2017, Kenya in 2008 and Botswana in 2010 and 2016).

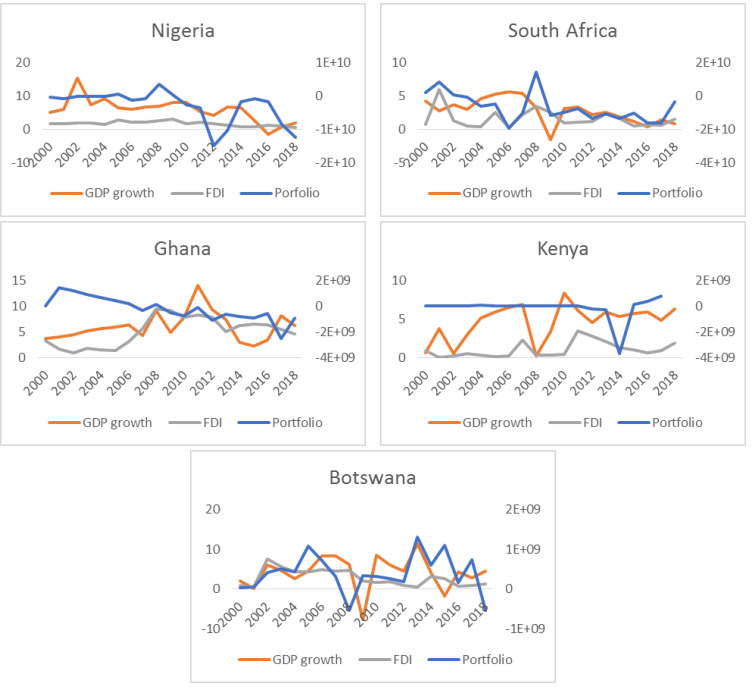

Figure 1: Gross Domestic Product, Foreign Direct Investment and Portfolio Investment

Table 1: ***Performance of Selected Countries on Corruption***

Year	2005	06	07	08	09	10	11	12	13	14	15	16	17	18
Nigeria	1.33	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
South Africa	2.17	2.5	2.5	2.5	2.5	2.88	2.96	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Ghana	1.96	1.5	1.5	1.5	1.5	2.25	2.5	2.5	2.5	2.54	3	3	2.67	2.92
Kenya	0.96	0.5	0.5	0.5	0.75	1.63	2	1.67	1.5	1.5	1.5	1.63	1.67	1.75
Botswana	3	3.17	3.96	3.5	3.5	3.5	3.5	3.5	3.5	3.54	4	4	3.67	3.5

Source: Authors' computation based on World Development Indicators (WDI)

As presented in Table 1, the institutional quality which serves as a complement for economic growth in any given economy. The corruption index in the sub-region is one of the worse in the world, with most countries having lower than 3, except Ghana and Botswana having up to 3. Corruption is considered to have a worse adverse effect on growth in a liberalized economy more than the non-liberalized economy (Blackburn & Forgues-Puccio, 2010)

The study explores the influence of capital account openness on growth in the five chosen SSA economies. The study also investigates the influence of corruption on growth, and it further explores the interaction effect of capital account liberalization with corruption, which is meant to measure the effects of corruption on the implementation of capital openness in an economy with high-level corruption.

2 LITERATURE

2.1 Capital Account Liberalization and Economic Growth

Economic openness uncovers markets to global competition, which influence innovation and investment. Global competition leads to improves TFP, human capital development, and inflow of FDI, which plays a positive impact on growth. The inflow of FDI impact growth by attracting more advanced managerial skills and foreign technology, these makes the domestic market highly competitive by the entering of foreign companies into the domestic market (IDRIS, YUSOP, HABIBULLAH, & CHIN, 2018). Economic openness is considered as an essential element in achieving economic growth. The interaction of a country economy with the global market has proven to be an effective way for a country to achieve reasonable growth (Idris, Yusop, & Habibullah, 2016). In the study carried out by Ur Rehman and Hayat (2017) on the impact of capital account deregulation on growth using secondary data on 17 Emerging countries spanning over 25 years (from 1991), the authors utilize a GMM technique. Findings overwhelming

reveal that FDI as an essential benefit of capital openness, which attract sophisticated technology for production, is significant and positively associated with economic growth. This is similar to the findings of numerous studies such as (Bekaert, Harvey, & Lundblad, 2011; M. W. Klein & Olivei, 2008). Saidi et al. (2016) toed in the same line by empirically investigating the impact of capital account liberalization on economic growth in the long run, spanning over 30 years (from 1983) for 79 countries categories into developed and developing economies, the authors utilize DOLS. The study confirms the positive impact of capital account liberalization on growth. Also, Zenasni and Benhabib (2013), in their analysis on three Maghred countries on capital account openness and economic growth, utilized an annual data between 1970 to 2009, while GMM technique. Their findings reveal capital account openness as a good factor in fostering economic growth. Additionally, the study considers FDI and trade openness as the essential elements in fostering economic growth.

Also, using the pairwise granger causality test to examine the macroeconomic effect of capital account openness spanning over 20 years (from 1993) in India, Taneja and Ansari (2016), in their findings, overwhelming evidence of unique long-run association of capital account openness and economic growth. Additionally, the study also observed the capital openness must followed by trade openness. This conforms with the results obtained by Khumalo and Kapingura (2014); they utilized the VECM technique to analyze the impact on economic growth as an of capital account liberalization in South Africa from 1994 to 2010. Their findings reveal capital account openness as a fostering factor to the economic growth of South Africa, and a sound macroeconomic policy is pre-requisite for achieving maximum benefits of capital account openness. Furthermore, Coeurdacier et al. (2019) also found some benefits of financial integration between countries. Also, using panel fixed effect and GMM technique to explore the effect of deregulation of the capital account in SSA economies on capital inflow, spanning from 1996 to 2013 Mughogho and Alagidede (2019), found that the liberalization of capital account encouraged capital inflow to SSA countries positively; also the study found evidence of threshold effect of institutional quality and financial sector development. The authors conclude by stating that, maximum benefits of capital account liberalization can only be achieved with higher level of financial sector development and institutional quality.

2.2 Corruption and Economic Growth

Corruption is today considered as a factor or phenomenon that plagues the economies of many developing countries, which is regarded as a factor that deter growth. Recently accumulation of physical capital has been identified as the channel through which corruption affect growth negatively (Mauro, 1995; Wei & Shleifer, 2000). Corruption in an economy increases uncertainty on returns on investment, which reduces the motivation to invest. A sizable share is wasted for each amount of monetary unit invested; these imply less investment. Economic growth is also affected by corruption through its effect on the accumulation of human capital (Mauro, 1995; Tanzi & Davoodi, 2001). In the studies carried out by Hamdi and Hakimi (2019) utilizing the VECM and cointegration technique in exploring the dynamic association between corruption, investment, and growth spanning from 1976 to 2015 in Tunisia. Findings overwhelming reveal that the economic growth in Tunisia is hampered by corruption both in the short and long run. Also, corruption caused low capital inflow and slowdown investment in Tunisia. In the works of d'Agostino et al. (2016), who toed the same line when they explored the effect of corruption growth in Africa, using an endogenous growth model to analyze the effect of corruption interacted with government spending on economic growth. Findings show that the adverse effect of corruption on growth is more in an economy with a higher level of military burdens. Using the fixed effect in exploring the effect of corruption on economic growth for 175 countries spanning from 2012 to 2018, Gründler and Potrafke (2019), found that in autocracies, the effect of corruption is more pronounced and it affect growth by increasing inflation and reducing FDI inflow. The study also found that corruption reduces real per capita GDP by 17%, with CPI rise by one standard deviation.

Cieślik and Goczek (2018) utilized the GMM technique in analyzing the effect of corruption and privatization on economic growth spanning from 1996 to 2014 in former USSR and post-communist countries of Central and Eastern Europe. The study followed the endogenous growth model in arriving on the research hypothesis, findings overwhelming reveal that countries with less corruption, private ownership, and openness experience higher economic growth. While analyzing corruption, social trust, and economic growth association, Serritzlew, Sønderskov, and Svendsen (2014), found evidence that high-level corruption affects social trust and economic

growth negatively. These implies that the absence of corruption leads to high social trust, and it encourages growth. Moreover, Nur-tegin and Jakee (2020) in analyzing the effect of corruption, whether in sand or grease wheels of development. Using OLS model spanning from 2006 to 2012, the study found some little evidence of corruption as a greasing wheel, but more evidence favors the sand wheel hypothesis. These imply that corruption hampered economic development. Farooq et al. (2013) toed the line when they found a negative effect of corruption on economic growth from 1987 to 2009 in Pakistan. The study utilized ARDL bound technique and causality analysis; findings overwhelming reveal that economic growth is hampered by corruption in Pakistan.

Given the numerous past studies on capital account liberalization on economic growth. This study contributes to the body of knowledge as the first to comprehensively examine the impact of capital account liberalization and corruption on economic growth in the selected SSA economies. The study further investigates the interaction effects of capital account openness and corruption on economic growth in the countries under consideration.

3 METHODOLOGY

3.1 Theoretical Methodology

To capture the impact of capital account liberalization on economic growth. The study adopts the frameworks by Law and Azman-Saini (2013), Knight et al. (1993), and Mankiw et al. (1992). The study utilized the Cobb-Douglas production function:

$$Y_t = K_t^{\propto} H_t^{\beta} (A_t L_t)^{1-\alpha-\beta} \ldots\ldots\ldots (1)$$

Where real output is denoted by Y, capital stock is denoted by K, stock of human capital is denoted by H, raw labor is denoted by L, the labor-augmented factor reflecting the level of technology and efficiency is denoted by A, and time is denoted by the subscript t. In assuming that $\propto + \beta < 1$.

These means that there is a decreasing-returns to all capital. Labor-augmenting technology and raw labor are assumed to evolve based on the function:

$$L_t = L_{o^{e^{nt}}} \ldots\ldots\ldots (2)$$

$$A_t = A_{o^{e^{gt+p\theta}}} \ldots (3)$$

Where the exogenous rate of technological progress is denoted by g, the exogenous rate growth of labor force is denoted by n, the vector of capital account openness policies and some factors which can affect the level of efficiency and technology in the economy is denoted by p, and the vector of coefficients associated to the variances and policies is denoted by θ. In the framework (variable A), the state of labor-augmenting technology depends on exogenous technological improvements, which is determined by g and on an economic policy stance on capital account openness such as foreign direct investment and capital inflows. Openness of capital account tends to encourage technological improvements and also enhance the productivity of investment or enhance productive sectors efficiency.

At the steady-state, output per worker (Y/L) grows at the exogenous rate g (as the exogenous element of the growth rate of the efficiency variable A). In contrast, output per effective worker (Y/AL) is constant. Generally, output per effective worker terms evolves as follows:

$$\frac{Y_t}{A_t L_t} = (K_t)^{\propto} (h_t)^{\beta},$$

Where h = H/L and K = K/, denotes human capital per works and physical capital per worker. In raw workers terms, output evolves according to:

$$\frac{Y_t}{L_t} = A_t (K_t)^{\propto} (h_t)^{\beta} \ldots\ldots\ldots (4)$$

In Eq (4), we take logs of both sides, which will yield the expression for the steady-state output.

$$In\left(\frac{Y}{L}\right)_t = InA_t + \propto InK_t + \beta Inh_t$$

Where productivity or output per effective worker depends on the state of technology (A), where (h) denotes human capital per worker, (K) denotes physical per worker. Using Eq (3) $A_t = A_{o^{e(gt+p\theta),}}$ then we obtain:

$$In\left(\frac{Y}{L}\right) = InA_o + gt + p\theta + \frac{\alpha}{1-\alpha-\beta} InK + \frac{\beta}{1-\alpha-\beta} Inh - \frac{\alpha+\beta}{1-\alpha-\beta} In(n+g+\delta).. (5)$$

The steady-state output per worker where a vector of capital account liberalization policy proxies exists is explained in Eq (5), the physical capital rate of depreciation is denoted by δ.

3.2 The empirical model

The study adopts the framework by Law and Azman-Saini (2013), Klein (2005), and Mankiw et al. (1992) with little modification. The study specified the model to explore the impact of capital account liberalization spanning from 1990 to 2018 on the five selected SSA countries. The following model is specified as follows:

$$logGDP = f(K, L, HDI, FDI, INFL, KOAPEN, POP)$$
$$logGDP_{it} = \beta_0 + \beta_1 logK_{it} + \beta_2 logL_{it} + \beta_3 HDI_{it} + \beta_4 logFDI_{it} + \beta_5 INFL_{it} + \beta_6 KOAPEN_{it} + \beta_7 POP_{it} + \mu_{it} \quad \text{-----(3.2.1)}$$

Based on the study of Bekaert et al. (2005) who reported higher impact of equity market liberalization in countries with higher institutional quality and Klein (2005) showed that an economy with a high level of institutional quality, usually have a higher steady-state output per effective unit of labor, because quality institutions leads to the efficient allocation of savings to investments with a higher rate of return. Law and Azman-Saini (2013) found that the effect of capital account openness on growth is contingent on the quality of institutions in an economy. Honig (2008) found out that limited evidence exists on the quality of institutions and the effect of capital account openness on growth. Therefore, to verify whether high-level corruption affects the impact of capital account liberalization on economic growth.

$$logGDP = f(K, L, HDI, FDI, INFL, KOAPEN, POP, COR, KOAPEN\_COR)$$
$$logGDP_{it} = \beta_0 + \beta_1 logK_{it} + \beta_2 logL_{it} + \beta_3 HDI_{it} + \beta_4 logFDI_{it} + \beta_5 INFL_{it} + \beta_6 KOAPEN_{it} + \beta_7 POP_{it} + \beta_8 KOAPEN\_COR_{it} + \mu_{it} \quad \text{.....(3.2.2)}$$

Eq (3.2.1) explains the association between the capital account liberalization and economic growth, and Eq (3.2.2) explains the relationship alongside the interaction effect of capital account liberalization and corruption on economic growth on the selected SSA economies.

3.4 Data Source

The study made use of data from five SSA Countries from 1990 - 2018, which is based on the policy implementation policy period. The five countries of Nigeria, South Africa, Ghana, Kenya, and Botswana are selected based on policy implementation and the structure of their

economy. The study adopted the Pool Mean Group and Mean Group (1995) is adopted to examine the relationship between the components of logGDP, logK, logL, logFDI, HDI, INFL, KOAPEN, POP and COR and economic growth. The panel is consisting of (n = 5) pooling the cross-section with (T = 29) dimensions of the time series: This brought about a sample size of 145 observations. GDP is the gross domestic product (at current US dollars) as the dependent variable. K is the gross capital formation (capital), L is the labor force participation (Labor), capital and labor are included to improve the efficiency of capital, which requires human effort. FDI is the foreign direct investment net inflow (as a proportion of GDP). HDI is the human capital index. To control for macroeconomic stability, we include inflation (INFL), as a measure for poor macroeconomic policies since macroeconomic instability affects growth negatively (Boyd, Levine, & Smith, 2001). KOAPEN is the Chinn and Ito capital account liberalization index. COR denotes corruption. POP is population growth. The data on K, L, POP, and GDP are sourced from World Bank's World Development Indicators (WDI), data on HDI is sourced from the Penn World Table, and the data on FDI, INFL are sourced from United Nations Conference on Trade and Development (UNCTAD); while the data on COR is sourced from International Country Risk Guide (ICRG).

3.4 Interaction Effect

Based on the Jaccard and Tarrizi (2003) process, the study interacts capital account liberalization and corruption. This is the estimation of auxiliary regression of the product of two variables against the variables individually, as a dependent variable. The equation is written as:

$$(KOAPEN_{it} * COR_{it}) = \beta_0 + \beta_1 KOAPEN_{it} + \beta_2 COR_{it} + V_{it}$$

Where the noise error term V_{it}: $V_{it} \sim$ iid $(0, \sigma v^2)$

The interaction term is obtained by deriving the residual of the estimated regression. The data for interaction will start from 1990 to 2018.

Panel Unit Root Test

It is essential to check for the order of the series for an appropriate panel model. Many tests have utilized by the literature in testing the presence of unit root in the data. The study adopts Im-Pesaran-Shin

(1997), which is a procedure based on the Dickey-Fuller system, and as an advancement on Levine, Lin, and Chu test by permitting for the heterogeneity coefficient $Y_{i,t-1}$ of and also propose an alternative procedure of testing based on the average individual unit test. The IPS test gives different estimations for i section, permitting separate specification in the values of parametric, the lag length, and residual variance. Model is given as:

$$\Delta Y_{it} = \alpha_i + \rho Y_{i,t-1} + \sum_{k=1}^{n} \phi_k \Delta Y_{i,t-k} + \delta_i t + \theta_t + \varepsilon_{it}$$

Where: Y denotes the variable in question (logGDP, logK, logL, HDI, logFDI, INFL, POP, KOAPEN) whose stationarity test is required to determine whether there is a unit root. The Im, Pesaran and Shin test *t-statistic* and mean of the *t-statistic* used in testing for unit roots in panel analysis is given by:

$$t_{IPS} = \frac{\sqrt{N}\left(\bar{t} - \frac{1}{N}\sum_{i=1}^{N} E[t_{iT}|\rho_i = 0]\right)}{\sqrt{\frac{1}{N}\sum_{i=1}^{N} Var[t_{iT}|\rho_i = 0]}} \Rightarrow N(0,1)$$

$$\bar{t} = \frac{1}{N}\sum_{i=1}^{N} t_{\rho_i}$$

The Im, Pesaran, and Shin test show that under specific assumptions, t_{pi} converge to statistic denoted as $t_{tT,}$ which assume that is iid and has finite variance and mean.

The study also utilized the Levin et al. (2002). In LLC, it suggests a more powerful panel unit root test. Under the null hypothesis, each time series contains a unit root against the alternative, which states each time series is stationary. The main hypothesis is written as:

$$\Delta Y_t = \alpha + \lambda t + \gamma Y_{t-1} + \sum_{i=1}^{k} \beta_i \Delta Y_{t-i} + \varepsilon_{t,}$$

Where Y denotes each (logGDP, logK, logL, HDI, logFDI, INFL, POP, KOAPEN, and COR).

Panel Autoregressive Distributed Lag (PARDL)

In determining the long-run relationship between the variables in the model. The study follows Shittu and Abdullah (2019), Al-Mamun, and Sohag (2015); among others, Pesaran and Smith (1995) put forward the error correction model (ECM), is a model where exogeneity is inferred from the statistical test. Panel ARDL procedures are of two forms,

which are Mean Group (MG) and Pooled Mean Group (PMG). The study adopts the PMG estimator, which considers its parameters to vary across cross-sections in the short run and the long run, restrict homogeneity of the parameters. The unrestricted specification for the autoregressive distributed lags (ARDL) equations, for i = 1,2, 3,…,T, time interval and i = 1,2,3,…,N cross-sections for the explained variable. The ARDL equation in the long run is as written as:

$$\Delta InGDP *_{it} = \propto_{1i} + \propto_{11} \sum_{1=1}^{q} \Delta InGDP_{it-i} + \alpha_{12} \sum_{1=0}^{q} \Delta InK_{it-i} + \alpha_{13} \sum_{1=0}^{q} \Delta InL_{it-i} + \alpha_{14} \sum_{1=0}^{q} \Delta InFDI_{it-i} + \alpha_{15} \sum_{1=0}^{q} \Delta In\ POP_{it-i} + \alpha_{16} \sum_{1=0}^{q} \Delta In\ INFL_{it-i} + \alpha_{17} \sum_{1=0}^{q} \Delta In\ KOAPEN_{it-i} + \alpha_{18} \sum_{1=0}^{q} \Delta InHDI_{it-i} + U_{1it}$$

$$\Delta InK *_{it} = \propto_{2i} + \alpha_{21} \sum_{1=0}^{q} \Delta InK_{it-i} + \propto_{22} \sum_{1=1}^{q} \Delta InGDP_{it-i} + \alpha_{23} \sum_{1=0}^{q} \Delta InL_{it-i} + \alpha_{24} \sum_{1=0}^{q} \Delta InFDI_{it-i} + \alpha_{25} \sum_{1=0}^{q} \Delta In\ POP_{it-i} + \alpha_{26} \sum_{1=0}^{q} \Delta In\ INFL_{it-i} + \alpha_{27} \sum_{1=0}^{q} \Delta In\ KOAPEN_{it-i} + \alpha_{28} \sum_{1=0}^{q} \Delta InHDI_{it-i} + U_{2it}$$

$$\Delta InL *_{it} = \propto_{3i} + \alpha_{31} \sum_{1=0}^{q} \Delta InL_{it-i} \alpha_{32} \sum_{1=0}^{q} \Delta InK_{it-i} + \propto_{33} \sum_{1=1}^{q} \Delta InGDP_{it-i} + \alpha_{34} \sum_{1=0}^{q} \Delta InFDI_{it-i} + \alpha_{35} \sum_{1=0}^{q} \Delta In\ POP_{it-i} + \alpha_{36} \sum_{1=0}^{q} \Delta In\ INFL_{it-i} + \alpha_{37} \sum_{1=0}^{q} \Delta In\ KOAPEN_{it-i} + \alpha_{38} \sum_{1=0}^{q} \Delta InHDI_{it-i} + U_{3it}$$

$$\Delta InFDI *_{it} = \propto_{4i} + \alpha_{41} \sum_{1=0}^{q} \Delta InFDI_{it-i} + \alpha_{42} \sum_{1=0}^{q} \Delta InL_{it-i} \alpha_{43} \sum_{1=0}^{q} \Delta InK_{it-i} + \propto_{44} \sum_{1=1}^{q} \Delta InGDP_{it-i} + \alpha_{45} \sum_{1=0}^{q} \Delta In\ POP_{it-i} + \alpha_{46} \sum_{1=0}^{q} \Delta In\ INFL_{it-i} + \alpha_{47} \sum_{1=0}^{q} \Delta In\ KOAPEN_{it-i} + \alpha_{48} \sum_{1=0}^{q} \Delta InHDI_{it-i} + U_{4it}$$

$$\Delta InPOP *_{it} = \propto_{5i} + \alpha_{51} \sum_{1=0}^{q} \Delta In\ POP_{it-i} + \alpha_{52} \sum_{1=0}^{q} \Delta InFDI_{it-i} + \alpha_{53} \sum_{1=0}^{q} \Delta InL_{it-i} \alpha_{53} \sum_{1=0}^{q} \Delta InK_{it-i} + \propto_{54} \sum_{1=1}^{q} \Delta InGDP_{it-i} + \alpha_{56} \sum_{1=0}^{q} \Delta In\ INFL_{it-i} + \alpha_{57} \sum_{1=0}^{q} \Delta In\ KOAPEN_{it-i} + \alpha_{58} \sum_{1=0}^{q} \Delta InHDI_{it-i} + U_{5it}$$

$$\Delta InINFL *_{it} = \propto_{6i} + \alpha_{61} \sum_{1=0}^{q} \Delta In\ INFL_{it-i} + \alpha_{62} \sum_{1=0}^{q} \Delta In\ POP_{it-i} + \alpha_{63} \sum_{1=0}^{q} \Delta InFDI_{it-i} + \alpha_{64} \sum_{1=0}^{q} \Delta InL_{it-i} \alpha_{65} \sum_{1=0}^{q} \Delta InK_{it-i} + \propto_{66} \sum_{1=1}^{q} \Delta InGDP_{it-i} + \alpha_{67} \sum_{1=0}^{q} \Delta In\ KOAPEN_{it-i} + \alpha_{68} \sum_{1=0}^{q} \Delta InHDI_{it-i} + U_{7it}$$

$$\Delta InKOAPEN *_{it} = \propto_{7i} + \alpha_{71} \sum_{1=0}^{q} \Delta In\ KOAPEN_{it-i} \alpha_{72} \sum_{1=0}^{q} \Delta In\ INFL_{it-i} + \alpha_{73} \sum_{1=0}^{q} \Delta In\ POP_{it-i} + \alpha_{73} \sum_{1=0}^{q} \Delta InFDI_{it-i} + \alpha_{74} \sum_{1=0}^{q} \Delta InL_{it-i} \alpha_{75} \sum_{1=0}^{q} \Delta InK_{it-i} + \propto_{76} \sum_{1=1}^{q} \Delta InGDP_{it-i} + \alpha_{77} \sum_{1=0}^{q} \Delta InHDI_{it-i} + U_{7it}$$

$$\Delta InHDI *_{it} = \propto_{8i} + \alpha_{81} \sum_{1=0}^{q} \Delta InHDI_{it-i} + \alpha_{82} \sum_{1=0}^{q} \Delta In\ KOAPEN_{it-i} \alpha_{83} \sum_{1=0}^{q} \Delta In\ INFL_{it-i} + \alpha_{84} \sum_{1=0}^{q} \Delta In\ POP_{it-i} + \alpha_{85} \sum_{1=0}^{q} \Delta InFDI_{it-i} + \alpha_{86} \sum_{1=0}^{q} \Delta InL_{it-i} \alpha_{87} \sum_{1=0}^{q} \Delta InK_{it-i} + \propto_{88} \sum_{1=1}^{q} \Delta InGDP_{it-i} + U_{8it}$$

Where U_1, U_2, U_3, U_4, U_5, U_6, and U_7 are serially uncorrelated. $ß_{is}$ show the long-run parameters, and σ_{is} are the error corrections. The model selects the appropriate lag lengths for each cross-section by utilizing the Akaike Information Criterion (AIC) (Mahmood, Musibua, AdeelL-Farooq, & Raheem, 2017; Musibau, Yusuf, & Gold, 2019; Pesaran & Smith, 1995).

Measuring Capital Account Liberalization

To measure the economic effect of capital account liberalization accurately, a study must utilize an excellent and efficient measurement. The most widely used measure is the IMF annual report, "Exchange Arrangement and Exchange Restriction" (M. Klein & Olivei, 2001; Lee, 2016; Rodrik, 1998). However, the intensity of the control is not captured by the IMF index. Quinn (1997) presented an index to overcome the limitations of the IMF index, where he constructed a comprehensive cross-country indicators of capital openness based on 0 to 4 with 8 degree. The Quinn index is the most popular and reliant indicator (Edison, Klein, Ricci, & Sløk, 2002; Edwards, 2001). However, the index has only a limited-periods, and it only covers 70 countries. Lee and Jayadev (2005) using the IMF information in extending the coverage of the countries and periods by utilizing the Quinn technique. Recently Chinn and Ito (2002) presented a new index by calculating the principal component of capital account restriction, foreign exchange restriction, current account restriction, and surrender of export proceeds variables. It covers many countries and more extended periods. The study utilized the KAOPEN index developed by Chinn and Ito (2002). The KAOPEN index measures the intensity of capital controls, which serves as one of its merits, in which the intensity is correlated with the existence of other restrictions on international transactions. The Chin-Ito index measures the economy degree of capital account openness, which is based on a binary dummy variable which codify the tabulation of the restrictions on cross-border financial transactions, which is published by the International Monetary Fund (IMF). The value of 1 indicates a fully liberalized or unrestricted economy and 0 indicates a fully restricted economy.

Descriptive Analysis

As presented by Table 2, the summary of descriptive statistics in terms of standard deviation, maximum and minimum values, and mean value. It also presents a summary of cross-sectional (between), time-series (within), and panel (overall) dimensions, with L and K having the highest mean values. Also, the KOAPEN indicator is having a negative mean value, in which all the other variables have a positive mean value. Also, a more comprehensive and accurate estimates is given by the standard deviation of the variables (overall, between and within), because the range of observations can largely be overstated by

an outlier. While the K and L have the highest deviation, and KOAPEN and GDP have the lowest deviation from the mean value. Finally, each variable is described as it appears by maximum and minimum, based on the highest and lowest values in each series. The range of the observation is compared with minimum observation for each of the variables in the analysis.

Table 2: ***Description of variables and Summary Statistics***

Variable	Description	A'priori expectation		Mean	Std. Dev	Min	Max
GDP	This reflects the sum of gross value added by all domestic producers plus all taxes on product and minus all subsidies, which is not included in the product value.		Overall	1.03e+11	1.37e+11	3.79e+09	5.68e+11
			between		1.12e+11	9.38e+09	2.35e+11
			within		9.20e+10	-8.56e+10	4.55e+11
K	This reflects the Gross capital formation, which comprises of outlays on additions to the fixed assets of plus net changes of inventories.	Positive	Overall	2.09e+10	2.66e+10	-8.00e+09	9.00e+10
			between		2.48e+10	1.69e+09	5.71e+10
			within		1.45e+10	-9.17e+09	5.93e+10
L	The labor force consists of workers between the ages 15 and above who supply labor for manufacturing goods and services for a particular period.	Positive	Overall	1.68e+07	1.50e+07	430556	6.07e+07
			between		1.59e+07	713179.5	4.29e+07
			within		4669053	3190305	3.46e+07
FDI	This reflects the net inflow of "new investment minor disinvestment" arriving economy for foreign investors, which is divided by GDP.	Positive	Overall	1.67e+09	0.3944601	-2.87e+08	9.89e+09
			between		0.3535762	2.60e+08	3.37e+09
			within		0.234289	-1.47e+09	8.49e+09
HDI	Human capital index, constructed based on years of schooling and returns to education.	Positive	Overall	2.121526	2.28e+09	1.222592	2.911158
			between		1.47e+09	1.58233	2.52788
			within		1.86e+09	1.585815	2.678411
INFL	Inflation reflects the annual percentage change to the cost of average consumer buying of goods and services, which can be changed or fixed yearly. Based on consumer price index	Negative	Overall	13.08436	11.614	-.6920301	72.8355
			between		5.801562	6.921197	19.70347
			within		10.3813	0.00661	67.45989
KOAPEN	The Chinn and Ito capital account liberalization index	Positive or Negative	Overall	-0.4214286	1.297856	-2	2
			between		1.117292	-1.321429	1.107143
			within		0.823754	-3.528571	0.9
POP	Population is calculated using the de facto definition of population, which includes all residents no matter the citizenship or legal status	Positive	Overall	48.62078	48.93159	1.377912	190.8863
			between		52.35444	1.826408	137.178
			within		13.62846	6.712774	102.3291
COR	This reflects the corruption inside the political system. Which distorts the business environment, by negatively affecting business efficiency and government. ICRG political risk sub-component (6% weight).	Negative	Overall	2.554069	1.038033	0.5	5
			between		0.8128478	1.528621	3.425517
			within		0.7384198	1.058897	4.279241

Empirical Analysis

Cross-section Dependence (CD)

Pesaran (2004) proposed a CD test to test the likelihood of CD in the dataset, which is due to a shock or unobserved but uncorrelated with the included regressors (Baltagi, 2008; Pesaran, 2004). CD test is essential in fitting the panel data model; the presence or otherwise of cross-section dependence in a model will determine the appropriate unit root test, cointegration test, and estimation method to be utilized. The null hypothesis of no CD, CD→ N (0, 1) for T sufficiently large and N ---∞.

Table 3: ***Cross-sectional Dependence and Heteroscedasticity Test***

Cross-Sectional Dependence Test	P-Value
Pesaran Test	0.1709
Frees' Test	0.421

***, **, * denotes the level of significance at 1%, 5% & 10% respectively

Source Authors' computation

Table 3 reveals insignificant value for the CD test by Frees and Pesaran. The non-existence of CD in the series permits the use of first-generation unit root test and panel ARDL. The Breusch-Pagan test shows that there is no heteroscedasticity in the data series.

Table 4: ***Panel unit root test***

	LLC Test			IPS Test		
	Level	First Difference		Level	First Difference	
Variable	Zt-bar	Zt-bar	Order of integration 0 or I	Zt-bar	Zt-bar	Order of integration 0 or I
logGDP	0.4252	-4.4999***	I(1)	2.7635	-4.5007***	I(1)
logK	-1.3243*		I(0)	1.3777	-5.9607***	I(1)
logL	1.0796	-2.4043***	I(1)	3.0477	-2.5670***	I(1)
HDI	-1.5223*		I(0)	2.2535	-1.8703**	I(1)
logFDI	-1.5851*		I(0)	-1.3061*		I(0)
KOAPEN	-2.8367***		I(0)	-2.2197**		I(0)
INFL	-2.5352***		I(0)	-2.5555***		I(0)
POP	5.4641	-5.0641***	I(1)	6.4114	-5.9178***	I(1)
COR	-2.8162***		I(0)	-3.0117***		I(0)

***, **, * denotes the level of significance at 1%, 5% & 10% respectively

The stationarity test was performed at constant, and constant & trend conditions

Source Authors' computation

Table 4 reports the unit root results, namely LLC and IPS tests. The results reveal that GDP, L, and POP is of order 0 or I(0), and all other are of order 1 or I(1) based on the LLC test. While FDI, KOAPEN, INFL, and COR are of order 0 or I(0), and all other are of order 1 or I(1) based on IPS.

Table 5: ***Panel Coefficient Estimation***

Variable	MG	PMG Model 1	PMG Model 2
DV=logGDP	Long-run Coefficient		
logK	-0.4423	-0.3899**	-0.1758
logL	-5.5760	-3.1557**	0.1474
HDI	8.5720***	4.0676***	3.8505***
logFDI	0.1358	0.0878***	0.0006
KOAPEN	-0.1660	0.1439***	0.6742***
INFL	-0.2257***	-0.2075***	-0.2155***
POP	1.1875	0.0727***	-0.0833***
COR	-	-	0.2001***
KOAPEN_COR	-	-	-0.1944***
	Short-run Coefficient		
logK	0.2088**	0.1815	0.2456
logL	6.0329	0.4527	-8.5607
HDI	7.4326*	7.1380	1.4263
logFDI	0.0152	-0.0082	0.0286
KOAPEN	0.1548	-0.0670***	-0.2433
INFL	0.0603**	0.0132	0.0378
POP	11.5785	9.8037	0.9686
COR	-	-	0.1577
KOAPEN_COR	-	-	0.0768
ECT	-0.9115***	-0.4510**	-0.4678**
VIF-Mean Value		3.38	4.44

Source Authors' computation

As shown in Table 5, the coefficient of K indicates a negative and significant at 5% in the long run. These suggest that 1% increase in capital formation into SSA countries results in a 0.38% decrease in growth. The finding is in agreement with the studies by Owusu and Odhiambo (2015), who found capital to have a negative influence on growth. Moreover, the coefficient of L is negative and statistically significant in SSA economies at 5% significant. This means that a % increase in labor force total results in a 3.15% decrease in growth in SSA economies in the long run. The finding is similar to the study by Naveed and Mahmood (2019), who reported a negative influence of labor force on growth. Also, our estimate indicates a positive association between HDI and GDP, such that a % increase in the human development index caused growth SSA economy by an average of 60.31%. These imply a positive association between HDI and growth. The finding is consistent with the study by Law and Azman-Saini (2013). Also, FDI indicates positive and significant at 1%. These suggest that a % rise in FDI into SSA economies results in a 0.08% increase in growth. This finding is similar to the studies by Opoku, Ibrahim, and Sare (2019), Juma (2012), and Yucel (2014). It runs contrary to studies by Agbloyor et al. (2014) and Adams and Opoku (2015). Also, the coefficient of KOAPEN is found to be significant and positively associated with GDP at 1% level of significance. These imply that a unit rise in KOAPEN results in 14.3% increase in GDP. This indicates that a unit increase in KOAPEN index spur growth in SSA economy in the long run. The findings seem to be consistent with the studies by Lee (2016) and Bekaert et al. (2005) who reported positive influence of capital account openness; it runs in contrast with the studies by Law and Azman-Saini (2013) who found negative influence of capital account liberalization. The coefficient of INFL indicates negative and significant at 1 % level of significant, this suggests that a unit increase in inflation results in 20% decrease in growth. Our estimate suggests a significant and positive association between POP and GDP, such that a unit increase in population growth results in a 0.07% increase in economic growth.

Furthermore, in Model 2, the coefficient of corruption indicates positive and significant at 1%. These suggest that a unit rise in corruption results to 20% rise in GDP. These imply that corruption is positively linked with growth. The coefficient of COR goes contrary to the expectation; this finding is in agreement with the greasing wheel

hypothesis, where corruption helps in reducing bureaucratic and administrative bottleneck by simplifying project approval. This finding is consistent with the studies by Shittu et al. (2018), Dreher and Gassebnor (2013) and Bologna and Ross (2015) who found a positive influence of corruption on growth, and it runs contrary to studies by Lambsdorff (2005) and Ugur (2014) who all reports negative influence of corruption on growth. Also, the interaction term of KOAPEN with COR is found to be negative and significant at 1%. These imply a negative association of corruption with growth. These suggest that a unit increase in the interaction term results in a 19.4% decrease in growth. These indicate how high-level corruption is eroding the gains of capital account liberalization on growth in the SSA economies in the long run.

CONCLUSION

The study fits into the growing research area, which investigated the association between capital account openness and growth. We then investigate the role of corruption in the capital account openness and growth nexus in five selected SSA countries. These countries were chosen based on policy implementation and the structure of their economy. Utilizing a secondary source of data from the Penn World Table, World Bank, UNCTAD, and ICRG. The empirical findings reveal that capital account liberalization can foster growth in SSA economies. The interaction term, which measures the significance of a pleasant and conducive environment that serves as a complement to capital account liberalization in fostering growth, is negative. These imply that the positive influence of capital account openness is negatively affected by high-level corruption in SSA economies. The findings are consistent with studies that found a positive effect of capital account liberalization on growth but only in an economy with quality institutions. The study, therefore, recommends that. Firstly, SSA countries eradicate corruption by pursuing deliberate policies in achieving a low level of corruption. Secondly, the study further recommends other SSA countries to also liberalize their capital account and accompany it with institutional reforms.

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