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CAPITAL MARKETS AND GROWTH IN SELECTED SUB-SAHARAN AFRICAN COUNTRIES: A SECTORAL ANALYSIS

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ABSTRACT

The paper investigates the effect of stock market development on sector-wide GDP using a sample from Sub-Saharan Africa consisting of Botswana, Kenya, Nigeria and South Africa for the period 1992-2014. The overall results based on the Dynamic OLS estimator provide evidence of both stock market size and liquidity in precipitating economic performance. In particular, from a sectoral perspective, the study finds that the largest effect of each of the stock market indicators, apart from the number of listed companies, happens to be in the manufacturing sector followed by the service and mining sectors. We also document a significant effect of the interaction terms involving investment productivity on the one hand and capital account liberalization on the other with stock market development. This is indicative of the important role that these channels play in determining the influence of capital markets on sector-wide GDP growth. Intuitively, policy makers need to give prior consideration to capital formation as well as capital account liberalization if stock market development is to significantly influence sector-wide GDP growth. Our findings are robust to the use of alternative Fully Modified OLS, and the Canonical Cointegration Regression estimators.

Keywords: Capital markets, sector-specific GDP, financial openness, investment, SSA

JEL Classification: E44, F3, F21, F36, G15, O16

I. INTRODUCTION

In light of theory and evidence that the financial sector plays a key vital role in economic growth, this paper focuses on stock market development to address two important policy questions: To

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what extent does stock market contribute to sectoral growth? Do investment and financial openness matter in this linkage, if any? The rationale for the analysis is embedded in the widely recognized view that a well-functioning financial system is critical in the economic growth of countries (Rousseau and Wachtel, 2000). Both the banking system and the stock market development can potentially enhance growth (Beck and Levine, 2004), although attention has mostly been directed towards the former possibly because many countries especially in Africa rely heavily on it to raise funds for investment. This advantage notwithstanding, the banking sector, often characterized by high concentration in Africa (Demircunt-Kunt and Levine, 2001), does not appear to have succeeded in linking savings to investment, as evident in the poor infrastructure and clear luck of funds in the region. In this respect, Moyo (2009) advocates for market-based schemes, private capital markets and other means of financing such as bond issues and foreign investment. Indeed theory asserts that stock markets are information-generating mechanism for potential investments, capital allocation as well as providing a channel for trading, pooling and diversifying risk (Peres, 2010; Beck and Levine, 2004; Obstfeld, 1994). The latter author for example contends that it is through internationally integrated stock markets that international risk sharing would improve resource allocation since it mitigates the principal agent problem and accelerate growth. All these advantages notwithstanding, it is not unthinkable that stock markets could be deleterious to economic growth especially in countries with weak regulatory institutions and macroeconomic volatility. For example, as Binswanger (1999) puts it, stock market prices may not accurately reflect the underlying fundamentals when speculative bubbles emerge in the market, a scenario that could negatively impact on the real sector of the economy. On the contrary, very liquid stock market may encourage investor myopia and thus discourage investors from having long-term commitment with firms whose shares they own. Under such an environment, corporate governance problems are likely to arise that could eventually lead to disastrous effects on economic growth (Bhide, 1994). Moreover prices on the stock market tend to be highly volatile, resulting into short term and lower rates of long term investment that would adversely affect economic growth. Similarly, as the stock exchange markets open their doors to foreigners bringing in capital, the risk of experiencing global shocks, such as the recent financial global crisis of 2007-2008, increases and could affect growth in these countries. In essence, a detrimental role of stock market development is thus not a far-fetched possibility.

The existence of the aforementioned opposing theoretical arguments therefore creates an incessant need to reexamine the quantitative impact of stock market development to growth. Of course a lot has been written on the topic albeit with little consensus regarding the quantitative impact of stock markets on growth, leaving the debate still open. For example, while the likes of, *inter alia*, Demircunt-Kunt & Levine (2001), Bekaert et al., (2003) and Bonfiglioli and Mendicino, (2004) document a positive relationship, others such as Morck et al. (1990),

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Chandavarkar (1992) and, Eichengreen and Leblang (2003) register conflicting findings, yet previous studies by (e.g. Owusu, 2016) are inconclusive. We note with concern that the majority of these primarily focus not just on developed countries but also on aggregated economic growth despite the well-known disadvantage of an aggregate approach that it normally involves a loss of information as well as an aggregation bias (Lindquist, 1999). Moreover, as indicated in Deidda (2002) and Stolbov (2012), a statistically significant positive linear dependence between stock market development and economic growth appears a characteristic of developed countries rather than for the states with low or lower middle income per capita where financial development involves prohibitively high fixed costs to set up the necessary financial infrastructure such as stock exchanges. As a complement to this argument a seminal study by Beck and Levine (2004) contends that in countries still experiencing low levels of economic development, the general observation is that commercial banks tend to dominate the financial system, while economies at higher levels of economic development, domestic stock markets tend to become more active and efficient relative to domestic banks. An empirical test to support this line of thinking is however still lacking and characterized by incoherencies.

The reasons for the observed incoherencies in regard to the perceived relationship between stock market development and economic growth are not obvious but largely reflect a multitude of issues. The first is that many of the studies have focused mainly on aggregate growth. Moreover, the risks involved in assuming homogeneity of sectors have been known to researchers for some time (Scott, 1986) and the suggestion of reducing aggregation bias need particular attention. Secondly, as noted earlier, the available studies pay little or no concern to the issue of endogeneity. The other concern is the highly aggregated indicators used for stock market development. It appears reasonable to argue that differences in the findings could be because the causal relationship between stock market development and economic growth is sensitive to the proxy used for measuring stock market development (Odhiambo, 2010). At the same time, the adoption of only one of the indicators for the analysis is likely to result into an incomplete picture of the quantitative impact of stock market development, especially given that each of the proxies suggested in literature has its pros and cons.

In light of the above limitations, we contribute to the ongoing debate by using a sectoral approach to shed light on the effects of each of the four literature-based proxies of stock market development on sector-specific GDP of three sectors, viz., mining, manufacturing, and the service sector, in four selected Sub-Saharan countries for the period spanning 1992 through 2014, in a panel environment. As familiar in economics, the three main sectors of the economy are respective indicators of the primary sector, the secondary sector and the tertiary sector.[1] The

[1] The primary sector is sometimes known as the extraction sector – because it involves taking raw materials. These can be renewable resources, such as fish, wool and wind power. Or it can be the use of non-renewable resources,

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use of the sectoral approach is deemed helpful in addressing the high aggregation bias that commonly face several existing studies as earlier stated, in addition to allowing provide a much clearer picture of how stock markets relate to particular sectors of the entire economy. In concurrence with theory and empirics that there is dynamic relationship between stock market development and economic growth, whether aggregate or sectoral, we deal with the endogeneity issue by using the dynamic ordinary least square (DOLS) as well as the fully modified ordinary least squares (FMOLS) estimators which additionally have an advantage of correcting for serial correlation, the elimination of asymptotic sample bias and simultaneity bias (Kao and Chiang, 2000; Phillips and Moon, 1999; Pedroni, 2000; Stock and Watson, 1993; and, Saikkonen, 1991). In the entire analysis, we are cognizant of the studies that have advocated for the reformation of the banking sector rather than the stock markets in capital provision on the basis of a still young inexperienced stock market sector in Africa (e.g. Singh, 2008). The past two decades since such studies were carried out has been a period that has witnessed better quality data and an increase in growth of the stock market to a rate never seen before particularly in South Africa, Nigeria, Kenya and Botswana. Perhaps the two decade-long experience would require new evidence-based policy recommendations. The current study aims to achieve this objective by examining the quantitative impact of stock markets on sectoral growth in the aforementioned countries, the choice of which is not accidental.

For example, the three largest stock markets in sub-Saharan Africa (SSA) are located in the selected sample: The Nigeria stock exchange; Nairobi Securities Exchange in Kenya; and Johannesburg stock exchange in South Africa. It is important to point out though, that with the exception of South Africa most African stock markets are still small, albeit picking at a faster rate. As indicated in Table 1, Nigeria, Kenya and Botswana are some of the countries with relatively small number of listed companies on the stock exchange, low stock market capitalization and low stock market turnover but registering steady growth over the last two decades. The selection of the four stock markets for the sample is mainly based on data completeness but also because they are the top four in Africa as of 2016. Table 1 reports the stock market performance of selected countries from SSA.

such as oil extraction, mining for coal. The manufacturing industry takes raw materials and combines them to produce a higher value added finished product. The service sector is concerned with the intangible aspect of offering services to consumers and business.

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TABLE 1: Stock markets in selected SSA countries, 1992-2012

	SMC (% of GDP)		STRADE		STURN (%)		LIST		INV (% of GDP)		CAL	
	1992	2012	1992	2012	1992	2012	1992	2012	1992	2012	1992	2012
Botswana	6.7	28.5	0.27	0.8	5.4	2.7	750.8	1197.7	29.6	21.1	0.45	1
Kenya	6.4	25.4	0.14	1.9	2.3	7.9	227.7	141	8.3	19.4	0	0.7
Nigeria	4.5	10.3	0.03	0.9	1.1	8.6	152.1	112	28.4	24.7	0	0.3
South Africa	133.4	202.5	5.9	54	4.2	28.2	1749.8	645.8	19.3	18.9	0	0.16

Notes: SMC= stock market capitalization; STRADE=stock market trade; STURN= stock market turnover; LIST= number of listed companies; INV= investment; CAL= capital account liberalization; GDP= gross domestic product.
Source: World Bank World Development Indicators (Various issues)

It is notable here that a country like Botswana had its market capitalization and stock market trade change from a minimal 6.7% and 0.27% of GDP in 1992 respectively to 28.5% and 0.8% in 2012, while stock market turnover witnessed a reduction from 5.4% to 2.7% of GDP respectively. The number of listed companies on the other hand grew from 750.8 in 1992 to 1197.7. The performance is not accidental given that Botswana's financial sector is said to have grown over the years, with a government belief that the sector has potential to be one of the country's growth engines and a building block in the diversification effort. Available facts suggest further that the observed economic development in the country is a result of increased domestic financial provisions rather than foreign capital and aid. The goal of positioning the private sector as a driver of economic growth and economic diversification in Botswana implies that dependence on government spending and the banking sector was insufficient and needed to be complemented by other revenue sources. The Botswana Stock Exchange established in 1995, following the enactment of the Botswana Stock Exchange Act 1994 (originally known as Botswana Share Market) to regulate the equities and fixed interest securities market, has bridged this financial gap in terms of providing liquidity and diversification as well as savings all of which could be avenues that stock exchange market could enhance economic growth.

Similarly, for Nigeria, the stock market is central in the provision of funds for investment. Established in 1960 as the Lagos Stock Exchange and changing its name in 1977, from the Lagos Stock Exchange to the Nigerian Stock Exchange, it is the third largest stock exchange in Africa terms of market capitalization, with about 176 listed companies as of 2017. As reiterated by Olusegun, Oluwatoyin & Fagbeminiyi (2011), the Nigerian Stock exchange is the center point of the Nigerian Capital Market with capacity to provide a mechanism to mobilize private and public savings, making such funds available for productive purposes as well as assisting in the allocation of the nation’s capital resources amongst numerous competitive alternatives. In this regard the Nigerian stock exchange appears to be a channel via which economic development

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might occur with spillover effects to the region and beyond. The records available (see Table 1) show that market capitalization, market trade and market turnover registered significant increase from 4.5% 0.03% and 1.1% in 1992 to 10.3%, 0.9% and 8.6% in 2012 whereas the number of listed companies dropped from 152.1 in 1992 to 112 perhaps due to mergers.

The situation is not dissimilar for South Africa, the Johannesburg Stock Exchange (JSE), established in 1887 and licensed as an exchange under the Securities Act 2004 and Africa's premier exchange for nearly 125 years, is not only the oldest exchange but is also the most developed and, as alluded to earlier, overshadows all the other Southern Africa Development Corporation stock exchanges. Table 1 report an increase in market capitalization stock market trade and market turnover from 133.4%, 5.9% and 4.2% in 1992 to 202.5%, 54% and 28.2% in 2012 respectively.

We examine the impact of stock markets on economic growth in the four countries aforementioned with particular focus on sector-wide growth on the one hand and disaggregated stock market development on the other. In addition, we reexamine the hypothesis advanced earlier that the investment productivity channel facilitates the contribution of stock market development to economic growth (e.g. Caporale et al., 2005) amidst a theoretical assertion that stock markets can accelerate economic growth by mobilizing and boosting domestic savings and improving the quantity and quality of investment. We are motivated by Ezeabisili & Alajekwe (2012) who emphasize that a liquid stock market development offers the potential for investors to quickly and cheaply alter their portfolios thereby reducing the riskiness and enhancing the profitability of their investment. But also as pointed out in Levine (1997), the lowering of international investment barriers would significantly enhance the liquidity of stock markets, with positive effects on economic growth. On the other hand, it is not unimaginable that stock market volatility would in the long run be associated with lower stock return volatility as a result of greater openness to international capital, albeit not detrimental to growth. The question as to whether countries need to ease their restrictions on foreign capital is therefore not ignorable especially given the mixed empirical evidence regarding the indirect impact this would make on economic growth. There is no doubt that in theory, a country with fewer impediments for foreign investors would enhance market integration with world capital markets and therefore affect the pricing of domestic securities. Yet it is equally plausible that opening up domestic stock markets to foreign investors might orchestrate the risk that share prices would become more volatile as cash fluctuates with good or bad economic news. Hence reducing barriers to cross-border capital flows might influence the functioning of emerging stock markets. We reexamine the extent to which capital account liberalization would or would not act as a channel for stock market contribution to sectoral growth. Does the type of stock market development matter in the

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analysis? Do we experience similar effects when we consider growth from a sectoral perspective? The main goal of the current study is to examine this inquisition.

The findings confirm our hypothesis that stock market development influences growth at sectoral level, although the direction of the impact appears to vary from one sector to another as well as conditional on the proxy used to measure stock market development. The investments as well as the capital account liberalization channels appear to differ in their role as drivers of the observed relationship between stock market development and growth.

The rest of the study is organized as follows. An overview of relevant literature in Section 2 follows. In Sections 3 and 4, we present the methodology and results respectively, followed by the discussion and concluding remarks in Sections 5 and 6 in that order.

2. A BRIEF REVIEW OF THE RELEVANT LITERATURE

Among the panel studies is Ngarea et al. (2014) who in their empirical analysis of the role of stock market development on economic growth in Africa uses annual data from a panel of 36 countries, of which 18 have stock markets, over the period 1980–2010, find that while countries with stock markets tend to grow faster compared to countries without stock markets, countries which are relatively developed and have stock markets tend to grow less faster compared to small countries with stock markets. Stock market development, as well as investment, human capital formation and openness are each found to demonstrate a positive effect on economic growth whereas a negative relationship appears for the inflation and government consumption on economic growth. On the other hand, a recent study by Boako and Alagidede (2017) finds the link between stock market development, proxied by turn-over ratios of domestic shares and market capitalizations (%) of domestic listed firms, and economic growth in Africa to be mute. Interestingly the supply-leading and demand-following hypotheses, as well as the mutually causal theories, appear not supported by the results, allowing the authors to conclude that the effect of stock markets on economic growth or the reverse may occur through some other economic and/or financial channels.

A previous study by Enisan and Olufisayo (2009) examines both the longrun and causal relationship between stock markets and economic growth for seven selected countries in sub-Saharan Africa, using the autoregressive distributed lag (ARDL) bounds test reports that the stock market development is cointegrated with economic growth in Egypt and South Africa, suggesting a longrun impact on economic growth. While on the basis of vector error correction model (VECM) stock market development are found to Granger-cause economic growth in Egypt and South Africa, the VAR results provide evidence of bidirectional relationship between stock market development and economic growth for Cote D'Ivoire, Kenya, Morocco and Zimbabwe. Moreover for the case of Nigeria, the authors find weak evidence that stock market,

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proxied by market size, have an impact on economic growth. Earlier on, an econometric investigation of the impact of stock markets on growth in selected African countries carried out by Adjasi & Biekpe (2006), however, finds inconclusive evidence with regard to the effect of stock market capitalization even though stock market value traded seem to be positively and significantly associated with growth. The authors note however that the stock markets have contributed to the financing of the growth of large corporations in certain African countries despite the challenges such stock exchanges face including but not limited to the challenge of integration and need for better technical and institutional development to address the problem of low liquidity.

Still in a panel environment, a study by Lazaro et al. (2016), using fixed and random effects as well as Generalized Method of Moments to examine the influence of stock market development on economic growth for a group of 14 transition economies from the Central and South-East European (CSEE) region in the period 2002-2012, reports a significant positive relationship between stock market development economic growth. Similarly, Caporale, et al. (2005), using the quarterly data for the period 1979Q1 to 1998Q4 in a VAR framework provide evidence that investment productivity is the channel through which stock market development enhances the growth rate in the long run in the four sampled countries viz., Chile, Korea, Malaysia, and Philippines. The current paper focuses on a disaggregated GDP from a sectoral perspective, rather than an aggregated GDP to re-examine the relationship between stock market development and economic growth including the investment channel.

An earlier seminal study by Levine and Zervos (1998) investigates the role of capital account liberalization[2] in stock market development. The authors find that stock markets tend to become larger, more liquid, more volatile, and more integrated following the liberalization. Additionally, countries with firms that widely disseminate comprehensive information are found to exhibit larger, more liquid, and more internationally integrated markets. Still several studies have examined the relationship between capital account liberalization and economic growth (e.g. Quinn and Toyoda, 2008; Eichengreen and Leblang, 2003) but to our knowledge no study has considered the possibility of the former being a channel via which stock markets would influence sectoral growth. Yet, as argued earlier on in theory, this possibility is not farfetched.

Therefore, as evident from the aforementioned review of the existing studies, the debate regarding the perceived influence of stock market development and economic growth is far from settled within both the policymaking realm and academia. We use a rich disaggregated panel data to escape the limitations that characterize cross-sectional approach mainly relied on by the

[2] By Capital account liberalization economists usually mean the removal of capital controls or restrictions that either implicitly or explicitly restrain the international movement of capital.

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majority of studies, especially the well-known empirical limitations, the inability to sort country-specific effects inclusive. A sectoral approach adopted in the current study is a nuance in our analysis rarely, if at all, ever been used in a panel environment. To our knowledge, it is only Sehrawat and Giri (2017) that focuses on individual sectors albeit on a country-specific basis.

3. ESTIMATION STRATEGY AND DATA

3.1. Estimation Strategy

To examine the effect of stock market development on sector-wide GDP, an approach similar to that taken by earlier literature (e.g. Barro, 1991) extending the output model in an endogenous mode is followed and several variations of the following equation are estimated.

$$\ln Sector_{it} = \alpha_0 + \sum_{i=1}^{q} \beta_i \ln \mathrm{SMD}_{it} + \sum_{i=1}^{n} \alpha_1 X_{it} + \alpha_i + u_{it} \qquad (2)$$

Where,

$\ln Sector_{it}$ (sector-wide GDP) stands for $\ln SERV_{it}$ (service sector), or $\ln MAN_{it}$ (manufacturing sector), or $\ln MIN_{it}$ (mining sector), as already earlier on defined; $t = 1,...,T$ and $i = 1,...,N$.

As explained earlier, the most common method for researchers is to enter in a regression a single summary measure of SMD created from a set of proxy variables or select any one proxy to represent SMD. However, as argued by Lubotsky and Wittenberg (2006), a superior method is to enter separately the proxies in the regression. We consider four measures of stock market development (SMD), viz., market capitalization as a % of GDP at constant price (SMC) and number of listed companies (NLC) – both of which broadly indicate stock market size - , and, total value of share traded as a % of GDP at constant price (VTR) as well as stock turnover ratio (TR) - both of which denote stock market liquidity. Deterministic regressors adopted from literature include investment as % of GDP (proxied by gross capital fixed formation as % of GDP), Household consumption, trade openness, inflation, foreign direct investment, government consumption growth and capital account liberalization. Trade openness is included to ensure that capital account openness is not picking up the effect of current account openness, which often go hand-in-hand (Arteta et al., 2001). Again as argued by the same author, inflation is included on the basis of the argument that the coefficient of capital account openness might reflect the growth enhancing effects of sound macroeconomic policy intended to prevent capital flight when liberalization takes place and thereby overstate the impact of liberalization.

Finally, based on our earlier hypotheses that both investment and capital account liberalization are important channels via which stock markets would affect sectoral growth, we interact each of

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the sectoral GDP separately with the individual proxies of stock market development in equations (2), (3) and, (4). The resultant model would then appear as follows:

$$\ln Sector_{it} = \alpha_0 + \sum_{i=1}^{q} \beta_i \ln \mathrm{SMD}_{it} + \sum_{i=1}^{q} \phi_i (\ln \mathrm{SMD}_{it} * \ln \mathrm{INVES}_{it}) + \sum_{i=1}^{n} \alpha_i X_{it} + \alpha_i + u_{it} \quad (3)$$

$$\ln Sector_{it} = \alpha_0 + \sum_{i=1}^{q} \beta_i \ln \mathrm{SMD}_{it} + \sum_{i=1}^{q} \phi_i (\ln \mathrm{SMD}_{it} * CAL_{it}) + \sum_{i=1}^{n} \alpha_i X_{it} + \alpha_i + u_{it} \quad (4)$$

Where CAL_{it} and $\ln \mathrm{INVES}_{it}$ are capital account liberalization and investment productivity respectively; and, $(\ln SMD_{it} * CAL_{it})$ is an interaction term between SMD and capital account liberalization whereas $\ln \mathrm{SMD}_{it} * \ln \mathrm{INVES}_{it}$ captures the interaction term between SMD and investment productivity. While the significance of the first interaction term implies that open financial countries are more likely to benefit from SMD; the significance of the second suggests that the marginal effect of SMD on sectoral GDP depends on the productivity of investment in the host countries.

Taking the first derivative of Equation (3) and (4) with respect to SMD we obtain the marginal effects as composite coefficient estimates:

$$\frac{\partial \ln Sector_{it}}{\partial \ln SMD_{it}} = \beta_i + \phi_i \overline{\ln INVES_{it}} \quad (5)$$

And,

$$\frac{\partial \ln Sector_{it}}{\partial \ln SMD_{it}} = \beta_i + \phi_i \overline{\ln CAL_{it}} \quad (6)$$

According to Tsai and Gill (2013), given the above relationship in equations (5) and (6), either the high levels of investment productivity have an accelerating effect on the SMD (i.e. ϕ_i has the same sign as β_i) or high levels of one variable have a dampening effect on the other (i.e. ϕ_i has the opposite sign as β_i). In either case, a significant interaction effect would indicate that the influence of one variable on the dependent variable depends on the value of another variable. However where the interaction effect is not significant, but the two main effects are significant, we conclude that there is an independent relationship between each of the dependent variable on one hand and the independent variable on the other. That is, one independent variable does not influence the relationship between the other independent variable and the dependent variable. For the sake of demonstration, when a first-order interaction coefficient is significantly negative, then the association between one of the predictors (say, stock market capitalization) and the

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dependent variable decreases if the other predictor (say, investment productivity) increases. In other words, a negative interaction coefficient would essentially mean that the effect of the combined action of the predictors is less than the sum of the individual effects.

In the presence of panel unit roots and cointegration, it is required to estimate the equations (3) and (4) by panel co-integration techniques. Since we have a data set of four countries (N=4) and 23 year periods (T=23) and all variables are I(1) and are co-integrated, estimating the equations by ordinary least squares would produce t-statistics that are biased. An alternative approach would be the fully modified OLS estimator (FMOLS) proposed by Phillips and Hansen (1990) or the canonical cointegration regression (CCR) proposed by Park (1992). Both FMOLS and CCR estimators use a semi-parametric correction, but they are also asymptotically unbiased and have fully efficient as they use asymptotic chi-squared statistical inference. However, the FMOLS estimator is generally found not to improve the OLS estimator, despite its advantage of correcting for endogeneity, serial correlation and the elimination of asymptotic sample bias. On the other hand, the CCR estimation procedure is closely related to FMOLS but removes long run correlation between the cointegrating equations and performs regressions using stationary transformations to the data and thereby effectively removes the longrun endogeneity and the serial correlation effects in the errors. The CCR estimator has been found to exhibit smaller bias than the OLS and the fully modified (Montalvo, 1995). This advantage notwithstanding, the panel dynamic ordinary least squares (DOLS) estimator suggested by Kao and Chiang (2000) and developed by Stock and Watson (1993) and Saikkonen (1991) has been found to perform systematically better than the CCR estimator and OLS (Montalvo,1995). Kao and Chiang (2000) also show that the DOLS estimator outperforms the FMOLS estimator in the estimation of co-integrated panel regressions. Moreover this parametric technique takes into account the potential endogeneity of the variables as well as the presence of serial correlation by including leads and lags of the differenced explanatory variables as additional regressors (Fidrmuc**,** 2009). Based on the aforementioned arguments the current study uses the DOLS estimator. However we also present results from FMOLS and CCR estimators for robustness purposes.

Two panel unit root tests are applied to verify that all variables are integrated and to check the stationarity of the variables under study. Specifically, the Im Pesaran and Shin (IPS) (1997, 2003), and the Maddala and Wu (1999) and Choi (2001) (MWC) test. The selected tests allow for individual unit root processes, so that the Autocorrelation coefficient may vary across cross sections. Thus, while the IPS assumes cross-sectional dependence, MWC, also known as a Fisher type test, assume cross-sectional independence. For both tests, the null hypothesis is that all series in the panel are non-stationary against the alternative that some of the individual series in the panel are stationary. In addition, after testing for panel unit root, the study uses Kao's ADF (Kao, 1999) panel co-integration test to establish long-term equilibrium relationship among the

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stock market development indices and sectoral growth variables. As suggested by Kao (1999), the test is suitable for panels with small time interval for each cross section (T) and small number of cross sections (N). In our case, N is 4 countries while T is 23, making the test appropriate.

3.2. Data

As mentioned earlier, the history of stock market development in sub-Saharan Africa is relatively short compared to advanced countries. We therefore rely on a panel of countries with complete datasets during the period from 1992 through 2014. The selected countries are: South Africa, Botswana, Nigeria and Kenya, which, in addition to Namibia are on top in SSA on the 2015 Global Entrepreneurship Index. Following standard practice in literature, we use GDP in levels as a measure for economic growth. The four sectoral-GDP considered in our analysis include agriculture, mining, manufacturing and service sectors.

Following Demirguc et al. (1996) we employ a variety of SMD indicators viz., Market Capitalization Ratio (SMC), the Number of Listed Companies (NLC), Total Value of Shares Traded Ratio (VTR), the Turnover Ratio (TR), since, as earlier argued, no single indicator can fully capture the complex and multifaceted stock market development index. While SMC and NLC represent stock market size, VTR and TR capture liquidity. Moreover since each measure has its own limitations, a study that captures each would offer a more comprehensive picture of stock market development (Yang, 2011).

In line with Caporale, et al. (2005), investment productivity appears in our model, measured by the ratio of GDP to gross fixed capital formation. We expect that investment productivity should positively be associated with sector-wide GDP especially from the Keynesian perspective. We use the Chinn-Ito (2007) measure to proxy capital account liberalization since it provides the required data for the period under study in addition to being a rule-based indicator that captures both the magnitude of capital controls as well as intensity as it incorporates other types of restrictions.[3] The index is scaled in the range between −2.5 and 2.5 but normalized to 0 and 1 respectively, with higher values standing for higher degrees of financial openness. We would expect either a positive relationship between capital account liberalization and sector-wide GDP although the opposite effect is not indismissible.

[3] The authors of CAL construct a measure based on principal component analysis of four binary AREAER indicators: the presence of multiple exchange rates, restrictions on current-account transactions and/or on capital-account transactions, and requirement of the surrender of export proceeds (Bush, 2018).

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Table 2: Variable description and data source

Variable	Description and Source of data
GOV_gro	Government consumption growth; source: World Bank
lnGDP	Log of Gross domestic product; Data: World Bank
lnINVEST_prod	Log of Investment productivity; Data: World Bank
lnagric	Log of agriculture share in GDP; Data: World Bank
lnHHC	Log of Household consumption; Data: World Bank
lnSERV	Log of service share in GDP; Data: World Bank
lnTRADE	Log of trade openness; Data: World Bank
lnMAN	Log of manufacturing share in GDP; Data: World Bank
inf_gdp	Inflation rate – GDP deflator; Data: World Bank
lnst_trade	Log of stock market trade; Data: World Bank
lnfdi	Log of Foreign direct investment as % of GDP; Data: World Bank
lnst_turn	Log of stock market turnover; Data: World Bank
lnoda_aid	Log of Foreign aid; Data: World Bank
lnCAL	Log of Capital account liberalization; Data: Chinn-Ito index
lnSMC	Log of Stock market development; Data: World Bank
lnlist	Log of Number of listed companies; Data: World Bank

In addition control variables drawn from theoretical and empirical literature find their way into our model. We present these in Table 2 together with their definitions, and sources. Note that all the variables in our model with the exception of rates are expressed in log form to take care of outliers in the data, as suggested by the normality test. The descriptive statistics and the pairwise correlation are presented in Tables 3 and 4 respectively.

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Table 3: Descriptive statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
GOV_gro	92	10.48	59.21	-23.93	565.5
inf_gdp	92	14.50	19.13	-4.321	113.1
lnSMC	92	3.446	1.143	1.366	5.547
lnst_trade	92	0.741	1.817	-3.507	4.324
lnst_turn	92	1.965	0.920	0.0583	3.566
lnlist	92	5.943	0.956	4.663	7.467
lnfdi	88	0.373	1.427	-5.993	2.383
lnagric	92	2.277	1.150	0.709	3.883
lnMAN	92	2.167	0.586	0.880	3.089
lnSERV	92	3.852	0.360	2.982	4.220
lnMIN	92	24.17	1.514	21.50	26.28
lnTRADE	92	4.147	0.294	3.430	4.812
lnoda_aid	91	20.47	1.092	17.88	23.29
lnGDP	92	24.59	1.299	22.50	26.79
lnHHC	92	24.41	1.636	21.45	26.39
lnCAL	81	-0.958	0.704	-2.803	0
lnINVEST_prod	92	1.437	1.638	-1.600	4.949

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Table 4: Pairwise correlation matrix

	lnSMC	lnst_trade	lnst_turn	lnlist	lnfdi	lnTRADE	GOV_gro	lnINVEST_prod	lnoda_aid	lnHHC	inf_gdp	lnCAL
lnSMC	1											
lnst_trade	0.912***	1										
lnst_turn	0.568***	0.825***	1									
lnlist	0.601***	0.430***	0.102	1								
lnfdi	0.126	0.141	0.0566	-0.0538	1							
lnTRADE	-0.177	-0.284*	-0.336**	0.346**	-0.147	1						
GOV_gro	-0.0718	-0.0160	0.0606	-0.121	0.0305	-0.0786	1					
lnINVEST_prod	-0.396***	-0.460***	-0.449***	-0.0988	-0.257*	0.316**	-0.142	1				
lnoda_aid	0.0939	0.185	0.259*	-0.00598	-0.141	-0.0265	-0.105	0.136	1			
lnHHC	0.408***	0.599***	0.675***	-0.247*	0.276*	-0.667***	0.115	-0.566***	0.201	1		
inf_gdp	-0.155	-0.228*	-0.268*	0.0605	0.133	0.206	-0.0529	0.151	0.0710	-0.243*	1	
lnCAL	-0.482***	-0.677***	-0.749***	-0.0980	-0.161	0.376***	-0.0370	0.490***	-0.208	-0.772***	0.272*	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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4. RESULTS AND DISCUSSION

4.1 Panel unit root test results

Table 5 reports the results of the IPS and MWC panel unit root tests indicating that while some variables are integrated of order I(0) others are of order I(1). While the T-bar test statistic of the IPS panel unit root test reject the null hypothesis of presence of a unit root at level for aggregate GDP, government final consumption expenditure, investment productivity, inflation rate, foreign direct investment inflows, foreign aid, capital account liberalization, it fails to reject the presence of the null hypothesis of the presence of unit roots for the other variables, viz., agriculture share in GDP, mining sector, manufacturing sector, service sector, household consumption, trade openness, stock market capitalization, stock market value trade, stock market turnover, and the number of listed companies. By implication, the latter variables are non-stationary at level. However when transformed to first difference, they become stationary and thus integrated of order one I(1), i.e. the IPS test then rejects the null hypothesis of the presence of a unit root. For robustness purposes we report the Maddala and Wu (1999) panel unit root test results in the same Table. As evident from the table, the results are similar to those of IPS in terms of our conclusion that some of the variables are stationary at levels I(0) while others are stationary at first difference I(1). By implication, the variables we use for the study are not integrated of the same order, an observation that calls for the employment of a panel regression technique that estimates variables integrated at different orders.

4.2 Panel cointegration test

In order to determine whether a stable long-run relationship exists in the variables, we now present test results for the presence of cointegration in the panel data. Table 6 displays the relevant test outcomes. Based on ADF test, the value of t-statistics is larger than critical value at 10% significance level resulting in rejection of the null of no cointegration.

4.3 Panel cointegration regressions

4.3.1 The direct effect of stock market development and sectoral GDP

As evident in Table 7, specifications without control variables replicate the results that stock markets affect economic growth significantly depending on the proxy considered. Of the two alternative size indicators, however, none appears to have any significant influence on economic growth, although the relevant coefficient sign is expectedly positive as presented in Column (4) for the case of the SMC. When control variables are included in Table 8, Column (1), stock market capitalization exhibits a highly significant effect on aggregate GDP just as it is the case for the number of listed companies in Column (4). Specifically, if we change SMC by one percent, we would expect GDP to change by about 0.168 percent. On the other hand, an in

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increase in the number of listed companies by one percent is expected to result into a 0.16 percent in GDP, almost equivalent to the effect produced by SMC. Intuitively, an increase in the number of companies listed tells us that there are more companies that make use of capital markets for financing purposes the result of which is a boost in productivity in the economy that translates into economic growth (Ly, 2011). Similarly, liquidity proxies, viz., stock market turnover ratio and total values of shares traded, are significantly helpful in enhancing economic growth in the selected countries, although the significance levels differ.

Table 5: Panel Unit Root Tests

Variables	Maddala and Wu Stat	P-value	Im Persaran Shin W-stat	P-value	Order of integration
lnGDP	-8.3320***	0.0000	-5.7103***	0.0000	I(0)
lnagric	-1.3607	0.0868	-2.7327	0.0149	I(1)
D.lnagric	-7.4793***	0.0000	-5.2578***	0.0000	
lnMIN	1.7903	0.9633	-1.4257	0.6746	I(1)
D.lnMIN	-4.1896***	0.0000	-3.7709***	0.0000	
lnMAN	3.3341	0.9996	-0.9350	0.8944	I(1)
D.lnMAN	-3.5385***	0.0002	-4.6711***	0.0000	
lnSERV	0.8710	0.8081	-1.8717	0.1833	I(1)
D.lnSERV	-6.0951***	0.0000	-4.5763***	0.0000	
GOV_gro	-6.3056	0.0000	-4.6662***	0.0000	I(0)
lnINVEST_prod	7.9115***	0.0000	-5.4812***	0.0000	I(0)
inf_gdp	-5.0522	0.0000	-4.1475***	0.0000	I(0)
lnfdi	-12.0359***	0.0000	-7.6343***	0.0000	I(0)
lnoda_aid	-6.2709	0.0000	-4.6566***	0.0000	I(0)
lnCAL	4.0800***	0.0000	-4.0483***	0.0034	I(0)
lnHHC	-0.7115	0.2384	-2.4529	0.0242	I(1)
D.lnHHC	-9.3115***	0.0000	-6.1196***	0.0000	

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lnTRADE	1.1260	0.1301	-2.6556	0.0211	I(1)
D.lnTRADE	-9.4561***	0.0000	-6.3006***	0.0000	
lnSMC	0.6030	0.2733	-2.4066	0.0297	I(1)
D.lnSMC	-5.5848***	0.0000	-4.3710***	0.0000	
lnst_trade	0.5153	0.6968	-1.9924	0.1399	I(1)
D. lnst_trade	3.4785***	0.0003	-3.5174***	0.0002	
lnst_turn	0.1028	0.5409	-2.1381	0.0912	I(1)
D. lnst_turn	-8.1504***	0.0000	-5.5142***	0.0000	
lnlist	-0.8924	0.1861	-2.5256	0.0253	I(1)
D.lnlist	7.3891***	0.0000	-5.1881***	0.0000	

Note:

*p<0.10; **p<0.05; ***p<0.01: indicates rejection of the null hypothesis of no-cointegration at 1%, 5%, and 10% levels of significance respectively.

Table 6: Kao, Pedroni, and Westerland Panel Cointegration Tests Results

	A) Kao Panel Co-integration Test Results					
	ADF-test	AGRIC	MIN	MAN	SERV	GDP
		(1)	(2)	(3)	(4)	(5)
SMC	Statistic	-1.659**	-2.482***	-1.619*	-1.412*	-1.492*
	p-value	(0.0485)	(0.0065)	0.0527	0.0789	0.0678
LIST	Statistic	-3.765***	-1.6010*	-1.737**	-1.611*	-1.963**
	p-value	(0.0001)	(0.0547)	(0.0412)	(0.0536)	(0.0248)
STRADE	Statistic	-1.854**	-2.046**	-1.821**	-1.427*	-1.556*
	p-value	(0.0318)	(0.0204)	(0.0343)	(0.0768)	(0.0599)
STURN	Statistic	-1.561*	-1.451*	-1.873**	-1.387*	-0.858
	p-value	(0.0593)	(0.0733)	(0.0305)	(0.0827)	(0.1954)
	B) Pedroni Panel Co-integration Test Results					
SMC	Statistic	2.945***	4.086***	3.075***	3.378***	3.495***
	p-value	(0.0016)	(0.0000)	(0.0011)	(0.0004)	(0.0002)
LIST	Statistic	-2.158**	5.009***	3.684***	2.022**	5.033***
	p-value	(0.0155)	(0.0000)	(0.0001)	(0.0216)	(0.0000)
STRADE	Statistic	1.449**	4.469***	3.821***	3.693	4.303***
	p-value	(0.0737)	(0.0000)	(0.0001)	(0.0001)	(0.0000)

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STURN	Statistic	1.570*	2.064**	3.486***	2.362**	2.324*
	p-value	(0.0582)	(0.0195)	(0.0002)	(0.0091)	(0.0101)
	C) Westerland Panel Cointegration Test Results					
	Variance ratio					
SMC	Statistic	1.5124*	4.7983***	0.5773	2.3522***	4.0572***
	p-value	(0.0652)	(0.0000)	(0.2819)	(0.0093)	(0.0000)
LIST	Statistic	-0.2004	2.7492***	1.2806	0.3542	2.5379***
	p-value	(0.4206)	(0.0030)	(0.1002)	(0.3616)	(0.0056)
STRADE	Statistic	1.8731**	4.2814***	1.5185*	2.0678**	3.9264***
	p-value	(0.0305)	(0.0000)	(0.0644)	(0.0193)	(0.0000)
STURN	Statistic	1.1535	3.7351***	1.0150	1.4550*	3.9502***
	p-value	(0.1244)	(0.0001)	(0.1550)	(0.0728)	(0.0000)

Source: Authors' estimations.

Note: *p<0.10; **p<0.05; ***p<0.01. The dependent variables for models (1)-(5) are lnSMD, GOV_gro, lnINVEST_prod, lnTRADE, inf_gdp, lnCAL and lnfdi. H0: No cointegration; H1: All panels are cointegrated.

As observed in Table 7, without control variables, while the coefficient on stock turnover is positive and highly significant at one percent conventional level, the one on the stock trade is also positive and still highly significance at 1 percent. Comparing the two liquidity variables, the effect of the former (0.261) appears to almost double that of the former (0.096) on average. The inclusion of the control variables, viz., government final consumption expenditure annual growth, investment productivity, household consumption, trade openness, inflation, and capital account liberalization in the model (Tables 9, Column (1)) appears to suggest that while an increase in stock trade by one percent would effectively produce about 0.113 percent in GDP, a coefficient that is significant at one percent, increasing stock turnover by one percent would result into a 0.214 percent increase in GDP , a value significant at 1 percent. Overall the results suggest that each of the four indicators of stock market development (SMC, LIST, stock trade and stock turnover) enhances aggregate GDP positively and significantly at one percent. However in terms of magnitude, while the impact of turnover is observed to be the highest, followed by market capitalization and number of listed companies, stock trade has the lowest effect. Our results are in line with previous studies inter alia Enisan and Olufisayo (2009) and Nieuwerburgh et al. (2006). Now we direct out attention to the main focus of the current study, i.e. the extent to which different sectors of the economy are influenced by each of the four indicators of stock market development.

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Table 7: SMD and aggregate GDP in SSA

VARIABLES	(1) SMC	(2) LIST	(3) STRADE	(4) STURN
lnSMC	0.142			
	(0.110)			
lnlist		-0.081		
		(0.137)		
lnst_trade			0.096*	
			(0.057)	
lnst_turn				0.261***
				(0.101)
Observations	89	89	89	89
R-squared	0.025	0.039	0.085	0.042

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

The baseline results for the sector-wide GDP models, without control variables, are presented in Table 10. In the manufacturing sector (secondary sector), all the relevant coefficients on market capitalization, listed companies, stock trade and turnover, are positive and significant at 1%, 5%, 1% and 5% percent respectively. Evidence also points listed companies as inhibiting a deleterious influence on the agriculture sector whereas stock market turnover appears beneficial to the mining sector. In the tertiary sector, on the other hand, only the size indicators (market capitalization and listed companies) appear significantly helpful in determining the service sector performance. However, after controlling for other factors identified in literature, several important observations deserve attention. For example there is evidence that market capitalization significantly influences the selected sectors, as unambiguously reported in specifications (1), (7) and (10) in Table 12. In the respective specifications, a one percent change in SMC is likely to lead to 0.475, 0.108, and 0.26 percent change in the manufacturing, mining and service sectors in that order, implying that the influence is most strongly felt in the manufacturing sector. The results are highly significant at one percent conventional level and consistent with previous findings by Kwode (2015) who record a direct relationship between market capitalization and the manufacturing sector share in GDP. On the other hand, we observe a significant adverse effect from market capitalization on the agriculture sector (-0.586). Similarly, the alternative proxy for stock market size, viz., the number of listed companies, appears beneficial only to the mining sector whereas a detrimental role of the same can be observed in the case of agriculture (see Table 13, Columns 1). Specifically, a 100% change in the

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number of listed companies is likely to lead to 15.8% change in the mining sector whereas a similar change would resonate into an adverse effect of 83.5% in the agriculture sector.

Table 8: SMD, CAL and aggregate GDP in SSA

	(1) SMC	(2) SMC*INV	(3) SMC*CAL	(4) LIST	(5) LIST*INV	(6) LIST*CAL
GOV_gro	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
lnINVEST_prod	0.430***	0.456***	0.415***	0.462***	0.468***	0.497***
	(0.020)	(0.019)	(0.012)	(0.010)	(0.036)	(0.074)
lnHHC	0.460***	0.458***	0.458***	0.554***	0.524***	0.652***
	(0.020)	(0.012)	(0.012)	(0.012)	(0.020)	(0.087)
lnTRADE	0.582***	0.678***	0.576***	0.562***	0.593***	0.794***
	(0.061)	(0.038)	(0.036)	(0.023)	(0.033)	(0.222)
inf_gdp	-0.006***	-0.008***	-0.006***	-0.007***	-0.007***	-0.004
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.004)
lnfdi	-0.167***	-0.154***	-0.151***	-0.146***	-0.119***	-0.110
	(0.027)	(0.016)	(0.016)	(0.011)	(0.015)	(0.073)
lnoda_aid	0.418***	0.465***	0.455***	0.441***	0.450***	0.380***
	(0.024)	(0.017)	(0.015)	(0.010)	(0.014)	(0.070)
lnCAL	0.221***	0.227***	0.451***	0.269***	0.229***	1.134***
	(0.034)	(0.022)	(0.058)	(0.018)	(0.027)	(0.433)
lnSMC	0.168***	0.171***	0.080***			
	(0.010)	(0.007)	(0.021)			
lninvprod_smc		-0.002				
		(0.006)				
smckao			-0.057***			
			(0.013)			
lnlist				0.160***	0.147***	0.094
				(0.008)	(0.013)	(0.098)
lninvprod_list					-0.002	
					(0.007)	
slistkao						-0.124*
						(0.068)
Observations	73	73	73	73	73	73
R-squared	0.991	0.993	0.992	0.987	0.987	0.990

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

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Table 9: SMD, CAL and aggregate GDP in SSA

	(1) STRADE	(2) STRADE*INV	(3) STRADE*CAL	(4) STURN	(5) STURN*INV	(6) STRADE*CAL
GOV_gro	-0.002***	-0.004***	-0.003***	-0.003***	-0.004***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
lnINVEST_prod	0.407***	0.430***	0.413***	0.366***	0.665***	0.444***
	(0.019)	(0.023)	(0.022)	(0.036)	(0.050)	(0.032)
lnHHC	0.413***	0.417***	0.426***	0.338***	0.355***	0.421***
	(0.017)	(0.021)	(0.022)	(0.035)	(0.030)	(0.029)
lnTRADE	0.506***	0.615***	0.500***	0.506***	0.406***	0.389***
	(0.054)	(0.067)	(0.065)	(0.105)	(0.094)	(0.083)
inf_gdp	-0.003***	-0.006***	-0.003**	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
lnfdi	-0.174***	-0.110***	-0.103***	-0.144***	-0.046	-0.063
	(0.024)	(0.030)	(0.034)	(0.046)	(0.041)	(0.040)
lnoda_aid	0.386***	0.564***	0.496***	0.370***	0.606***	0.479***
	(0.026)	(0.041)	(0.041)	(0.049)	(0.051)	(0.048)
lnCAL	0.213***	0.292***	0.304***	0.119*	0.220***	0.698***
	(0.032)	(0.041)	(0.046)	(0.064)	(0.055)	(0.090)
lnst_trade	0.113***	0.122***	-0.023			
	(0.007)	(0.009)	(0.033)			
lninvprod_trade		-0.034***				
		(0.007)				
stradekao			-0.082***			
			(0.020)			
lnst_turn				0.214***	0.299***	-0.106*
				(0.035)	(0.032)	(0.060)
lninvprod_turn					-0.137***	
					(0.019)	
sturnkao						-0.243***
						(0.036)
Observations	73	73	73	73	73	73
R-squared	0.991	0.993	0.992	0.989	0.992	0.992

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

From a stock liquidity perspective, we still find additional proof that stock market development plays a positive contributory role in sector-wide GDP. In Specifications (1), (7) and (10) of Table 14, all the relevant coefficients are positive and highly significant at one percent conventional

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level. A 100% change in the Total Value of Shares Traded Ratio would enhance the mining sector by a change of about 7.1%, just a similar change is likely to generate an increase of 35.7% and 19.6% on average in the manufacturing and service sectors respectively. All relevant coefficients are significant at one percent conventional level. Implicitly, the manufacturing sector appears to take the biggest share in terms of magnitude of the coefficients relative to the other two sectors. However, the results indicate that once stock market trade changes by 100%, the agriculture sector suffers a significant reduction of about 37.3%. When it comes to the stock turnover, Table 15 reports that while a 100% change in the turnover ratio would result into a 13.% positive change in mining, 65.7% positive change in manufacturing, and about 37.3% positive changes in the service sector, the relevant effect emanating from the turnover on the agriculture sector is significantly negative at 10% level. The quantitative impact is thus apparently much stronger in the manufacturing sector. It is however important to note that the positive relationship we observe between sector-wide GDP and stock market development is in line with previous findings in Sehrawat and Giri (2017). As suggested by Odhiambo (2010) it appears that the relationship between stock markets and economic growth is sensitive to the proxy used for measuring stock market development.

Table 10: SMD and sectoral performance in SSA - no controls

	(1) MAN	(2) AGRIC	(3) MIN	(4) SERV	(5) MAN	(6) AGRIC	(7) MIN	(8) SERV
lnSMC	0.368***	-0.623	0.831	0.191***				
	(0.051)	(0.450)	(1.625)	(0.053)				
lnlist					0.225**	-1.167***	-0.127	0.234***
					(0.089)	(0.092)	(0.330)	(0.054)
Observations	89	89	89	89	89	89	89	89
R-squared	0.434	0.337	0.345	0.311	0.132	0.895	0.022	0.347

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

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Table 11: SMD and sectoral performance in SSA - no controls

	(1) MAN	(2) AGRIC	(3) MIN	(4) SERV	(5) MAN	(6) AGRIC	(7) MIN	(8) SERV
lnst_trade	0.187***	-0.344	0.597	0.105				
	(0.043)	(0.328)	(0.512)	(0.072)				
lnst_turn					0.196**	-0.412	1.139***	0.115
					(0.083)	(0.810)	(0.392)	(0.261)
Observations	89	89	89	89	89	89	89	89
R-squared	0.293	0.257	0.476	0.259	0.080	0.096	0.437	0.086

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Could the aforementioned results have been driven by some other factors? We address this question by focusing on investment productivity and capital account liberalization, the basis of which has already been explained earlier on. The results accruing from the investigation appear in the following subsections 4.2 and 4.3 respectively.

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Table 12: Interactive role of investment and financial openness in the link between market capitalization and sectoral GDP

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	MINING	MINING	MINING	AGRIC	AGRIC	AGRIC	MAN	MAN	MAN	SERV	SERV	SERV
GOV_gro	-0.000	-0.000	-0.001	-0.004**	-0.003**	-0.003	-0.002***	-0.002***	-0.003***	-0.001	-0.001***	-0.002***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
lnINVEST_prod	-0.408***	-0.352***	-0.398***	0.805***	0.635***	0.708***	0.060**	0.181***	0.057***	-0.167***	-0.063*	-0.188***
	(0.055)	(0.078)	(0.062)	(0.105)	(0.144)	(0.113)	(0.028)	(0.031)	(0.017)	(0.049)	(0.034)	(0.013)
lnHHC	0.596***	0.578***	0.611***	0.969***	1.015***	0.940***	-0.260***	-0.261***	-0.212***	-0.153***	-0.161***	-0.128***
	(0.053)	(0.049)	(0.060)	(0.103)	(0.090)	(0.109)	(0.028)	(0.020)	(0.016)	(0.048)	(0.021)	(0.013)
lnTRADE	0.086	0.093	0.149	-0.729**	-0.845***	-0.974***	-2.078***	-2.114***	-1.972***	-0.513***	-0.509***	-0.470***
	(0.166)	(0.151)	(0.187)	(0.320)	(0.278)	(0.341)	(0.086)	(0.061)	(0.051)	(0.148)	(0.065)	(0.041)
inf_gdp	-0.004	-0.005**	-0.003	-0.006	-0.001	-0.007	0.003**	0.004***	0.004***	-0.004	-0.005***	-0.003***
	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)
lnfdi	-0.232***	-0.224***	-0.221***	0.677***	0.622***	0.773***	-0.009	0.006	0.088***	-0.222***	-0.210***	-0.145***
	(0.074)	(0.066)	(0.081)	(0.143)	(0.122)	(0.147)	(0.038)	(0.027)	(0.022)	(0.066)	(0.029)	(0.017)
lnoda_aid	0.045	0.100	0.074	0.238*	0.083	0.303**	-0.308***	-0.263***	-0.191***	-	-0.129***	-

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										0.198***		0.092***
	(0.064)	(0.069)	(0.077)	(0.124)	(0.127)	(0.140)	(0.033)	(0.028)	(0.021)	(0.057)	(0.030)	(0.017)
lnCAL	-0.190**	-0.159*	0.014	0.983***	0.926***	1.428***	-0.129***	-0.073**	0.652***	0.149*	0.203***	0.845***
	(0.091)	(0.087)	(0.300)	(0.176)	(0.161)	(0.545)	(0.047)	(0.035)	(0.081)	(0.081)	(0.038)	(0.065)
lnSMC	0.108**	0.120***	0.015	-0.586***	-0.619***	-0.625***	0.475***	0.502***	0.212***	0.260***	0.282***	0.023
	(0.027)	(0.028)	(0.108)	(0.053)	(0.051)	(0.197)	(0.014)	(0.011)	(0.029)	(0.024)	(0.012)	(0.023)
lninvprod_smc		-0.023			0.057			-0.043***			-0.037***	
		(0.022)			(0.041)			(0.009)			(0.010)	
smckao			-0.056			-0.064			-0.181***			-0.163***
			(0.070)			(0.127)			(0.019)			(0.015)
Observations	73	73	73	73	73	73	73	73	73	73	73	73
R-squared	0.998	0.998	0.998	0.960	0.967	0.972	0.910	0.915	0.917	0.927	0.932	0.942

Note: lninvprod_smc and smckao are investment and capital account liberalization interacted with stock market capitalization respectively. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

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Table 13: Interactive role of investment and financial openness in the link between the number of listed companies and sectoral GDP

	(1) MINING	(2) MINING	(3) MINING	(4) AGRIC	(5) AGRIC	(6) AGRIC	(7) MAN	(8) MAN	(9) MAN	(10) SERV	(11) SERV	(12) SERV
GOV_gro	-0.001	-0.001	-0.001**	0.002	0.001	0.001	-0.005	-0.004***	-0.004***	-0.003	-0.002***	-0.002***
	(0.001)	(0.001)	(0.000)	(0.004)	(0.002)	(0.002)	(0.006)	(0.001)	(0.000)	(0.003)	(0.001)	(0.001)
lnINVEST_prod	-0.342***	-0.321**	-0.304***	0.492	-0.293	0.502***	0.003	1.787***	-0.169***	-0.215	0.655***	-0.268***
	(0.055)	(0.135)	(0.042)	(0.322)	(0.520)	(0.157)	(0.511)	(0.124)	(0.031)	(0.267)	(0.148)	(0.069)
lnHHC	0.722***	0.690***	0.777***	0.279	0.431	0.220	-0.150	-0.292***	-0.100***	-0.118	-0.242***	-0.053
	(0.065)	(0.077)	(0.049)	(0.383)	(0.296)	(0.185)	(0.608)	(0.071)	(0.036)	(0.317)	(0.084)	(0.081)
lnTRADE	0.022	0.016	0.061	-0.647	-0.840*	-1.552***	-1.949	-1.523***	-0.330***	-0.480	-0.277**	0.282
	(0.129)	(0.125)	(0.126)	(0.755)	(0.480)	(0.474)	(1.198)	(0.114)	(0.092)	(0.625)	(0.136)	(0.208)
inf_gdp	-0.003	-0.004	-0.001	0.002	0.007	-0.001	0.009	0.003	0.005***	-0.000	-0.004	-0.001
	(0.003)	(0.003)	(0.002)	(0.016)	(0.010)	(0.008)	(0.025)	(0.002)	(0.001)	(0.013)	(0.003)	(0.003)
lnfdi	-0.194***	-0.192***	-0.175***	0.447	0.471**	0.455***	-0.074	-0.202***	-0.063**	-0.268	-0.315***	-0.249***
	(0.059)	(0.057)	(0.042)	(0.349)	(0.221)	(0.157)	(0.553)	(0.053)	(0.030)	(0.289)	(0.063)	(0.069)
lnoda_aid	0.087	0.093*	0.042	-0.007	-0.088	0.115	-0.196	-0.041	-0.226***	-0.148	-0.067	-0.192***
	(0.055)	(0.052)	(0.040)	(0.323)	(0.201)	(0.150)	(0.513)	(0.048)	(0.029)	(0.268)	(0.057)	(0.066)
lnCAL	-0.060	-0.081	0.096	0.221	0.255	-1.869**	-0.218	-0.098	4.703***	0.072	0.080	2.452***
	(0.101)	(0.102)	(0.245)	(0.591)	(0.392)	(0.923)	(0.938)	(0.094)	(0.179)	(0.489)	(0.111)	(0.404)
lnlist	0.158***	0.153***	0.172***	-0.835***	-0.977***	-0.475**	0.241	0.633***	-0.536***	0.122	0.296***	-0.222**
	(0.043)	(0.049)	(0.056)	(0.253)	(0.190)	(0.210)	(0.401)	(0.045)	(0.041)	(0.209)	(0.054)	(0.092)
lninvprod_list		-0.008			0.159*			-0.344***			-0.173***	
		(0.025)			(0.096)			(0.023)			(0.027)	
slistkao			-0.019			0.348**			-0.776***			-0.370***
			(0.038)			(0.145)			(0.028)			(0.063)
Observations	73	73	73	73	73	73	73	73	73	73	73	73
R-squared	0.997	0.997	0.998	0.953	0.958	0.967	0.801	0.892	0.922	0.818	0.886	0.928

Note: lninvprod_list and slistkao are investment and capital account liberalization interacted with number of listed companies respectively. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

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Table 14: Interactive role of investment and financial openness in the link between stock trade and sectoral GDP

	(1) MIN	(2) MIN	(3) MIN	(4) AGRIC	(5) AGRIC	(6) AGRIC	(7) MAN	(8) MAN	(9) MAN	(10) SERV	(11) SERV	(12) AGRIC
GOV_gro	-0.000	-0.001***	-0.001*	-0.002	-0.000	0.001	-0.002***	-0.000	-0.002***	-0.001***	-0.001***	-0.001***
	(0.001)	(0.000)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
lnINVEST_prod	-0.428***	-0.430***	-0.408***	0.844***	0.829***	0.735***	0.098***	0.074***	0.122***	-0.158***	-0.164***	-0.152***
	(0.056)	(0.018)	(0.041)	(0.179)	(0.069)	(0.066)	(0.031)	(0.020)	(0.029)	(0.003)	(0.009)	(0.009)
lnHHC	0.555***	0.543***	0.592***	1.092***	1.121***	0.919***	-0.290***	-0.306***	-0.263***	-0.180***	-0.188***	-0.168***
	(0.052)	(0.017)	(0.042)	(0.168)	(0.065)	(0.068)	(0.029)	(0.019)	(0.030)	(0.003)	(0.008)	(0.009)
lnTRADE	0.023	0.036	0.065	-0.756	-0.859***	-1.069***	-2.073***	-2.198***	-1.992***	-0.578***	-0.605***	-0.571***
	(0.162)	(0.054)	(0.122)	(0.521)	(0.205)	(0.198)	(0.090)	(0.061)	(0.088)	(0.009)	(0.027)	(0.026)
inf_gdp	-0.002	-0.004***	-0.001	-0.012	-0.005	-0.015***	0.011***	0.014***	0.011***	0.001***	0.001*	0.001***
	(0.003)	(0.001)	(0.002)	(0.009)	(0.004)	(0.003)	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
lnfdi	-0.220***	-0.169***	-0.141**	0.630***	0.497***	0.489***	-0.006	-0.050*	-0.029	-0.249***	-0.235***	-0.207***
	(0.072)	(0.024)	(0.063)	(0.232)	(0.092)	(0.102)	(0.040)	(0.027)	(0.045)	(0.004)	(0.012)	(0.013)
lnoda_aid	0.043	0.182***	0.164**	0.266	-0.047	0.029	-0.429***	-0.587***	-0.460***	-0.295***	-0.262***	-0.231***
	(0.077)	(0.033)	(0.076)	(0.247)	(0.124)	(0.124)	(0.043)	(0.037)	(0.055)	(0.004)	(0.016)	(0.016)
lnCAL	-0.197**	-0.126***	-0.076	1.017***	0.887***	0.735***	-0.082	-0.159***	-0.095	0.161***	0.181***	0.218***
	(0.095)	(0.033)	(0.085)	(0.305)	(0.125)	(0.138)	(0.053)	(0.037)	(0.061)	(0.005)	(0.016)	(0.018)
lnst_trade	0.071***	0.081***	-0.095	-0.373***	-0.394***	0.092	0.357***	0.353***	0.362***	0.196***	0.201***	0.115***
	(0.021)	(0.007)	(0.061)	(0.066)	(0.027)	(0.100)	(0.011)	(0.008)	(0.044)	(0.001)	(0.003)	(0.013)
lninvprod_trade		-0.032***			0.071***			0.024***			-0.011***	
		(0.006)			(0.021)			(0.006)			(0.003)	
stradekao			-0.100***			0.275***			0.004			-0.049***
			(0.036)			(0.059)			(0.026)			(0.008)
Observations	73	73	73	73	73	73	73	73	73	73	73	73
R-squared	0.997	0.998	0.998	0.939	0.947	0.966	0.922	0.930	0.923	0.947	0.948	0.950

Note: lninvprod_trade and stradekao are investment and capital account liberalization interacted with stock market trade respectively. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

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Table 15: Interactive role of investment and financial openness in the link between stock turnover and sectoral GDP

	(1) MIN	(2) MIN	(3) MIN	(4) AGRIC	(5) AGRIC	(6) AGRIC	(7) MAN	(8) MAN	(9) MAN	(10) SERV	(11) SERV	(12) AGRIC
GOV_gro	-0.000	-0.001	-0.001	-0.000	0.002	0.001	-0.005***	-0.005***	-0.006***	-0.002***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
lnINVEST_prod	-0.453***	-0.274***	-0.383***	1.061***	0.411	0.694***	-0.085*	0.004	0.129**	-0.248***	-0.089*	-0.130***
	(0.062)	(0.076)	(0.044)	(0.280)	(0.426)	(0.092)	(0.047)	(0.074)	(0.056)	(0.051)	(0.052)	(0.038)
lnHHC	0.503***	0.504***	0.567***	1.330***	1.316***	0.966***	-0.484***	-0.500***	-0.290***	-0.286***	-0.292***	-0.174***
	(0.060)	(0.046)	(0.040)	(0.271)	(0.256)	(0.084)	(0.046)	(0.045)	(0.051)	(0.049)	(0.031)	(0.035)
lnTRADE	0.006	-0.088	-0.095	-0.845	-0.597	-0.334	-1.899***	-1.958***	-2.160***	-0.474***	-0.562***	-0.632***
	(0.183)	(0.144)	(0.114)	(0.824)	(0.809)	(0.240)	(0.139)	(0.141)	(0.146)	(0.149)	(0.099)	(0.100)
inf_gdp	0.000	-0.000	0.000	-0.014	-0.011	-0.015***	0.013***	0.012***	0.013***	0.003	0.002	0.003
	(0.003)	(0.002)	(0.002)	(0.015)	(0.014)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
lnfdi	-0.205***	-0.139**	-0.129**	0.663*	0.418	0.292**	0.018	0.074	0.245***	-0.218***	-0.149***	-0.096**
	(0.079)	(0.062)	(0.055)	(0.356)	(0.349)	(0.115)	(0.060)	(0.061)	(0.070)	(0.064)	(0.043)	(0.048)
lnoda_aid	0.019	0.162**	0.117*	0.250	-0.265	-0.181	-0.367***	-0.305***	-0.070	-0.286***	-0.161***	-0.133**
	(0.085)	(0.079)	(0.066)	(0.383)	(0.440)	(0.138)	(0.065)	(0.077)	(0.084)	(0.069)	(0.054)	(0.057)
lnCAL	-0.274**	-0.213**	0.196	1.375***	1.159**	-1.107***	-0.218***	-0.196**	1.158***	0.071	0.122**	0.855***
	(0.111)	(0.084)	(0.123)	(0.497)	(0.470)	(0.259)	(0.084)	(0.082)	(0.158)	(0.090)	(0.058)	(0.107)
lnst_turn	0.130**	0.186***	-0.152*	-0.509*	-0.703**	0.916***	0.657***	0.694***	-0.146	0.373***	0.426***	-0.082
	(0.061)	(0.049)	(0.082)	(0.274)	(0.275)	(0.172)	(0.046)	(0.048)	(0.105)	(0.050)	(0.034)	(0.071)
lninvprod_turn		-0.087***			0.305*			-0.046			-0.078***	
		(0.029)			(0.164)			(0.029)			(0.020)	
sturnkao			-0.207***			1.071***			-0.598***			-0.340***
			(0.049)			(0.103)			(0.063)			(0.043)
Observations	73	73	73	73	73	73	73	73	73	73	73	73
R-squared	0.996	0.997	0.998	0.886	0.908	0.952	0.808	0.813	0.878	0.845	0.863	0.917

Note: lninvprod_turn and sturnkao are investment and capital account liberalization interacted with stock market turnover respectively. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

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4.3.2 Investment productivity, stock markets and sector-wide GDP

The direct as well as the indirect effect of investment productivity on sector-wide GDP is presented in Tables 12 to 15. Table 8 for example, Column (7), suggests that ceteris paribus, a one standard deviation (sd) increase in investment productivity (sd = 1.638, Table 3) might enhance the manufacturing sector by about 0.098 percentage points [∂lnMAN/∂INVEST =0.06*1.638=0.098]. Similarly, a change in investment productivity by one percent is likely to lead to about 1.318 percent in the agriculture sector. These findings are supported by model estimation results where stock trade (Table 14) is included as proxy for SMD instead of market capitalization. In columns (4) and (6) the respective coefficients on investment productivity are 0.844 and 0.098, both significant at one percent conventional level. The interaction effect of investment with stock market development on sector-wide GDP appears to nevertheless provide a mixture of evidence conditional on the proxy adopted in the analysis.

With regard to market size, Table 12 reports interesting findings that suggest an interactive role of investment productivity with market capitalization in the sector-wide GDP. Column (2) for example provides evidence that there is a partial effect of market capitalization on the mining sector via the investment channel equivalent to 0.0869 (i.e. 0.12-0.023[1.437]=0.0869[4], a value less than 0.12 (the coefficient on the market capitalization variable in the same model). On the other hand, we note that in the presence of investment productivity, the partial impact of market capitalization on the manufacturing and service sectors is 0.4402 and 0.2288. In contrast, the partial effect in the case of the agriculture sector turns out to be -0.5371. Note that as observed in Column (4), the agriculture sector does not appear to benefit from market capitalization but investment productivity directly affects the sector. A significant interaction effect in specifications (8) and (10) is therefore an indicator that the effect of market capitalization on manufacturing and services sectors respectively depends on the investment productivity. However, in Columns (2) and (5), where the interaction term is not significant at any conventional level, but the two main effects are significant, we can say that there is certainly a relationship between each of the interacting variables with the sector-wide GDP but the exact nature of the observed relationships do not change based on the value of the other variable. In other words, despite the fact that the two variables affect the probability of observing the event in the sector-wide GDP variable, investment productivity does not affect the relationship between the market capitalization and sector-wide GDP. The results reported in Table 13 consider an alternative to market capitalization, viz. number of listed companies. Still, and consistent with Ly (2011), it is only the direct effect of LIST on mining (0.158) that is positive and highly significant at one percent. The relevant coefficients in the agriculture and service sector are negative and significant at 1% and 5% respectively, suggesting an adverse relationship. The

[4] See Friedrich (1982) for interpretation of interactions.

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inclusion of an interaction term does not appear to suggest any significant impact via the investment channel, although the partial effect, as observed in Column (2) is a minimal 0.035. Unsurprisingly, the manufacturing sector exhibits a partial effect of LIST on the sector via investment productivity equivalent to about 0.3875. The negative coefficient on the interaction term that is observed significant at one percent implies that the association between the number of listed companies and the manufacturing sector decreases if investment productivity increases. This too appears to be the case for the service sector, where the partial effect is 0.1652. In the latter case, 0.296 is greater than 0.173 (Column 11), which intuitively means that the investment channel is critical in explaining the relationship between the number of listed companies and the service sector. Overall it can be said that stock market size influences sector-wide growth via an investment channel, a finding in line with previous authors (e.g. Caporale, et al., 2005; Gelb, 1989; and, Levine, 1991).

The results in Tables 14 and 15 regarding stock market liquidity are likewise informative. Stock market trade for example has a positive effect on the manufacturing, the service and the mining sectors that are highly significant at one percent conventional level (see Table 10). However, the agriculture sector does not appear to benefit from changes in stock market trade. A similar phenomenon can be observed when stock market turnover is taken as the proxy instead of the stock trade. As shown in Columns (1), (7) and (10), Table 11, the estimated coefficients for stock market turnover is significant and positive while in the agriculture sector the relevant coefficient is negative albeit at a lower level of significance of 10%. The effect appears to be strongest in the manufacturing sector.

4.3.3 Capital account liberalization, stock markets and sector-wide GDP

The Results in Table 8 reveal that ceteris paribus, a one standard deviation increase in CAL (sd = 0.704, Table 3) will increase aggregate GDP by about 0.1556 percentage points [∂lnGDP/∂CAL =0.221*0.704=0.1556]. Once CAL is interacted with SMC, the relevant coefficient is negative and significant at one percent. Similarly, all interaction coefficients of other SMD indicators with CAL are throughout highly significant, implying that the relationship between stock market development and aggregate GDP changes based on the value of financial openness. For example, the marginal effect of stock trade on economic performance depends negatively on CAL, i.e. the effect is lesser if CAL increases.

Results for the manufacturing sector model as reported in Table 12, Column (9), show that while the coefficient on SMC is positive and statistically significant at 1% conventional level, the relevant coefficient of the interaction term between SMC and CAL on manufacturing is negative and statistically significant at the 1% level, implying that the effect of SMC on manufacturing depends on the level of CAL. By intuition, the more positive CAL is, the more negative the

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effect of SMC on manufacturing becomes. However, given the size of the coefficient on these variable (0.212>0.181), the results suggest that the effect of SMC is positive albeit much smaller than for countries with less CAL. Moreover the partial effect confirms this analysis as it turns out to be 0.1134 (i.e. 0.212-0.181(-0.958) = 0.3853), a result derived from the marginal effect relationship presented as: $\partial \ln MAN / \partial \ln SMC = 0.212 - 0.181\overline{CAL}$. A similar argument follows for the case of the mining sector as well as the service sector, where the total marginal effect of market capitalization in the presence of removing capital account restrictions is 0.0686 and 0.1791 respectively. In Column (6), both the effect of SMC and CAL are significant, but their interaction effect on manufacturing is not significant, implying that the respective effects of SMC on agriculture and CAL on agriculture are practically independent of each other.

The indirect impact of the number of listed companies on aggregate GDP via the CAL channel is equally pronounced in Table 8, Column (6). Specifically, for every one unit increase in capital account liberalization, the slope of aggregate GDP on logged listed companies reduces by 0.124. Still in the presence of capital account liberalization, the total marginal impact of the number of listed companies on manufacturing, mining and services sectors respectively is 0.256, 0.2351 and 0.197. Similarly in Table 9, the results reveal a significant impact of stock trade (Specification 3) and stock turnover (Specification 6) on GDP via CAL. In essence, the effect of levels of stock market turnover on the aggregate GDP is intrinsically tied to specific levels of CAL, i.e. the marginal contribution of stock turnover is conditional on financial openness.

From a sectoral perspective, the interaction between stock market trade and financial openness exerts a significant effect on the sectoral performance. For example, the relevant interaction term in the service sector model is significant at one percent, suggesting that the role of stock trade in determining the service sector contribution to GDP is dependent on the extent to which a country removes capital account restrictions. The total marginal effect of a change in the stock trade on the sector via CAL is 0.1619. Likewise, in the presence of financial openness, we observe a partial effect of a change in stock trade on manufacturing to be 0.3582 but the coefficient on the interaction term is not significant. On the other hand the effect of stock market turnover via the capital account liberalization channel on sector-wide GDP is observably significant, justifying the importance of this channel in determining the role of stock turnover on the mining, agriculture, manufacturing and service sectors. Table 15 reports the relevant results, particularly in Columns (3), (6), (9) and (12), where, apart from the agriculture sector with a total marginal effect of -0.11, the respective partial effects of the mining, manufacturing and the service sectors are 0.0463 (>-0.152), 0.4269 (>-0.146) and 0.2437 (>-0.082), augmenting the evidence that financial openness enhances the influence of stock turnover on sector-wide GDP.

4.3.4 Additional findings

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Results also reveal that while the estimated coefficient of trade openness is positive and conventionally significant at one percent for aggregate GDP in Table 8 (Columns 1 and 4) and Table 9 (Columns 1 and 4), the effect varies for the different sectors depending on the proxy used for stock market development. On average, however, we observe a negative relationship. For example, the relevant coefficient is consistently negative and significant at one percent in Table 12, 14 and 15 (Columns 7 and 10) when market capitalization, stock trade and stock turnover are separately included in the model for the manufacturing and service sectors respectively. By implication, both the manufacturing and tertiary sectors appear beneficiaries of trade openness. Similarly, just as household consumption is positively related with aggregate GDP at one percent level of significance (see Table 8 and 9), the sector-wide GDP equations exhibit varying effects. For example, while the relevant coefficient is significantly positive for the mining and agriculture sector, we observe a deleterious role of household consumption on the manufacturing and service sectors (Table 12, 14 and 15) when market capitalization, stock trade and stock turnover are separately included in the model.

Likewise, while inflation rate appears to play a beneficial role in the manufacturing and service sectors after controlling inter alia for stock market trade (Table 14), a detrimental impact is observed for the mining and service sectors when stock turnover is controlled for in Table 15, a finding consistent with Rousseau and Watchel (2000) where the authors argue that inflation can repress financial intermediation by eroding the usefulness of money assets and by leading to policy decisions that distort the financial structure. Similarly, in Tables 13 and 14, the coefficients on foreign direct investment inflows are negative and significant at one percent in the mining and service sectors when market capitalization or listed companies proxy stock market development, but positive in the agriculture sector. Still when we instead control for stock trade or stock turnover in Tables 14 and 15, the results are not substantially altered. The impact of foreign aid however is positive in the agriculture sector specification but negative for the manufacturing and service sectors, as evident in Table 12, 14 and 15. For example, a change in FDI inflows by one percent is expected to result into a reduction in the manufacturing and service sectors by 0.308% and 0.198% respectively when we consider market capitalization as proxy for stock market development (Table 12, Columns 7 and 10). These results are augmented in Table 14 when stock trade proxies stock markets. In the latter case, a one percent change in aid would likely result into a decrease of about 0.429% and 0.295% in the respective manufacturing and service sectors. An increase of about 0.677% in the agriculture sector however is observed when there is a one percent increase in foreign aid (Table 12, Column 4). Finally, growth in government consumption expenditure appears to exhibit a significant deleterious effect on the agriculture and manufacturing sectors (see Tables 12, 10, 11).

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5. ROBUSTNESS CHECKS

It is conceivable, though less likely, that the results on the effect of stock market development on are driven by the type of estimator applied. For example, a different cointegrating regression method would perhaps lead to varied findings as has been the case in documented literature. Additionally, one might argue that the rule-based measure used to capture capital account liberalization might not only behave differently when de facto measures are utilized to capture financial openness but also there are various measures of capital account liberalization each of which would produce a different effect. Finally, we are aware that choosing the adequate lag length is always of interest when estimating cointegrating regressions.

To eliminate the alternative explanations that would be facilitated by the aforementioned arguments, we check for robustness of our results in various ways. First, we employ alternative cointegrating regression methods earlier referred to, viz., fully-modified OLS (FMOLS) by Phillips and Hansen (1990) and the canonical cointegration regression (CCR)[5] by Park (1992). Results from CCR and FMOLS estimators, not presented here due to space limitations but available on request, confirm the original observation of a significant influence of stock market development in its disaggregated form on sector-wide GDP. Thus, the findings are not substantially altered by using an alternative estimation approach. We also use alternative measures of financial openness, viz., Quinn (1997) and Lane and Milesi-Ferretti (2007). Still we fail to notice any substantial difference in the results. Finally, we increase the number of lags from the recommended two to higher lags but the findings are nevertheless undiluted. Given the high similarity with the original findings and also due to limited space we have not included the robustness results here but they are available on request.

6. CONCLUSIONS

We set out to examine the effect of stock market development on GDP and sector-wide GDP in particular. Our results provide unambiguous evidence that each of the indicators of stock market development has highly significant positive impact on aggregate GDP with market turnover providing the largest influence. Whether it is the market capitalization or the number of listed companies used as proxy for market size, the difference in the observed impact appears on average the same. The largest effect of each of the stock market indicators, apart from the number of listed companies, happens to be in the manufacturing sector followed by the service and mining sectors. By implication an improvement in capital markets development is essential for developing especially the manufacturing as well as the service sectors into engines of economic growth. The finding of the significant effect of the interaction terms involving

[5] CCR employs stationary transformations of the data to eliminate the long-run correlation between the cointegrating equation and stochastic regressors' innovations.

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investment productivity and stock market development on the one hand, and capital account liberalization and stock market development on the other is indicative of the important role that these channels play in determining the influence of stock market development on sector-wide GDP growth. Intuitively, there need to give prior consideration to capital formation as well as capital account liberalization policies if stock market development is to significantly influence sector-wide GDP growth.

There are however several issues that surface in the course of our study but which are beyond the scope of our analysis and would require further study. For example, future work would add value to the field if a comparative analysis is done regarding both stock market development and other forms of financial development. Additionally, once data becomes available an interesting related focus would include other sectors such as insurance, transport, tourism and other detailed sectors likely to attract influence from the development of capital markets. Similarly, we were limited by data to do a similar analysis for all the countries in SSA. Our prediction however is that the difference might not be significant given that we selected countries with apparently largest markets in the region. Given the increasing link between globalization and stock market returns (Lam & Ang, 2006), the likelihood of this affecting global growth is indismissible. This requires a separate study.

REFERENCES

Adjasi, K.D., & Biekpe, N.B. (2006). Stock market development and economic growth: The case of selected African countries. *African Development Review, 18*(1), 144-161. http://dx.doi.org/10.1111/j.1467-8268.2006.00136.x

Arteta, C., Eichengreen, B., Wyplosz, C., 2001. When Does Capital Account Liberalization Help More than it Hurts? NBER Working Paper no. 8414

Barro, R., 1991. "Economic Growth in Cross Section of Countries", Quarterly Journal of Economics, Vol. 106, 407–43

Beck, T. and Levine, R. (2004). Stock Markets, Banks and Growth: Panel Evidence. Journal of Banking and Finance, Vol.28, No.1, pp.432-442. Retrieved from http://dept.ku.edu/~empirics/Courses/Econ915/papers/stock-mkt-bank-growth_jbf04.pdf

Boako, G. & Alagidede P. (2017). The Stock Market Development and Economic Growth Puzzle: Empirical Evidence from Africa. In: Giorgioni G. (eds) Development Finance. Palgrave Studies in Impact Finance. Palgrave Macmillan, London, pp 207-240. https://doi.org/10.1057/978-1-137-58032-0_8

ISSN: 2455-8834

Volume:03, Issue:08 "August 2018"

Bush, G.R. (2018). Financial openness, policy vs. realized outcomes. Documento de Investigación, Banco de MéxicoWorking Paper 2018-04.

Caporale, G. M., Howells, P., Soliman, A.M. (2005). Endogenous Growth Models and Stock Market Development: Evidence from Four Countries. *Review of Development Economics* Vol.9, Issue 2, Pages 166-176. https://doi.org/10.1111/j.1467-9361.2005.00270.x

Chandavarkar, A (1992). Of Finance and Development: Neglected and Unsettled Questions. *World Development*, 20, 133-142.

Chinn, Menzie D. and Hiro Ito (2006). What Matters for Financial Development? Capital Controls, Institutions, and Interactions. Journal of Development Economics, Volume 81, Issue 1, Pages 163-192 (October). Updated 2015.

Deidda, L., Fattouch, B. (2002). "Non-linearity Between Finance and Growth", Economic Letters, Vol. 74(3), 339–45

Eichengreen, B.J. & Leblang, D. (2003). Capital Account Liberalization and Growth:Was Mr. Mahathir Right? International Journal of Finance and Economics 8:205–24.

Enisan, A.A., & Olufisayo, A.O. (2009). Stock market development and economic growth: Evidence from seven Sub-Saharan African countries. Journal of Economics and Business, 61(2), 162–171.

Fidrmuc, J. (2009), "Gravity models in integrated panels", Empir Econ, 37:435–446.

Friedrich, Robert J. (1982). In Defense of Multiplicative Terms in Multiple Regression Equations. American Journal of Political Science, Vol. 26, No. 4. (Nov., 1982), pp. 797-833.

Kao, C. & Chiang, M.H. (2000). "On the estimation and inference of a cointegrated regression in panel data", Advances in Econometrics 15,179-222.

Kwode, I.E. (2015). Capital Market and the Performance of the Manufacturing Industries in Nigeria 1970-2012. European Journal of Business and Management, Vol.7, No.13, 2015.

Lam, Swee Sum & Ang, William Wee-Lian (2006). Globalization and Stock Market Returns. Global Economy Journal, Volume 6, Issue 1, ISSN (Online) 1524-5861, DOI: https://doi.org/10.2202/1524-5861.1118.

Levine, R. (1991) Stock markets, growth, and tax policy. *Journal of Finance* 46(4), 1445-1465.

Levine, R. (1997), "Stock Markets: A Spur to Economic Growth," Finance and Development, 33(1): 7-10.

ISSN: 2455-8834

Volume:03, Issue:08 "August 2018"

Levine, R. and Zervos, S. (1998). 'Stock markets, banks and economic growth', American Economic Review, 88: 537-57.

Lindquist, Kjersti-Gro (1999). The Importance of Disaggregation in Economic Modelling. Documents 99/12 • Statistics Norway, June

Ly, Aminata (2001). "Capital Market-Growth Nexus in Selected SSA Countries: A Panel and Time". Economics Honors Papers. 5. http://digitalcommons.conncoll.edu/econhp/5

Montalvo, Jose G. (1995). Comparing cointegrating regression estimators: Some additional Monte Carlo results. Economics Letters 48(3-4):229-234. DOI: 10.1016/0165-1765(94)00632-C

Morck, R., Shleifer, A. and Vishny, R.W. (1990) The stock market and investment: is the market a sideshow? *Brookings Papers on Economic Activity 2*, 157-215.

Moyo, D. Dead Aid: Why Aid is Not Working and how there is a Better Way for Africa. Farrar Straus & Giroux, 2009. Print.

Nieuwerburgh, S. V., Buelens, F., & Cuyvers, L. (2006). Stock market development and economic growth in Belgium. Explorations in Economic History, 43(1), 13–38. https://doi.org/10.1016/j.eeh.2005.06.002

Ngarea, E., Nyamongo, E.M. & Misatib, R.N. (2014). Stock market development and economic growth in Africa. Journal of Economics and Business, Volume 74, July–August 2014, Pages 24-39. https://doi.org/10.1016/j.jeconbus.2014.03.002

Obstfeld, M. (1994) Risk-taking, global diversification, and growth. *American Economic Review* 84(5), 1310-1329.

Olusegun, Olowe, Oluwatoyin, Matthew, & Fagbeminiyi, Fasina (2011). Nigerian stock exchange and economic development. Knowledge Management, Information Management, Learning Management, No. 14 (2011).

Park, J. Y. 1992. Canonical cointegrating regressions. Econometrica 60: 119–143.

Phillips, P. C. B., and B. E. Hansen. 1990. Statistical inference in instrumental variables regression with I(1) processes. Review of Economics Studies 57: 99–125.

Quinn, D., 1997. The Correlates of Change in International Financial Regulation. American Political Science Review 1997;913; 531-51

Rousseau, P.L. & Wachtel, P. (2000), Equity Markets and Growth: Cross-Country Evidence on Timing and Outcomes. Journal of Banking & Finance, 24, 1933–57.

ISSN: 2455-8834

Volume:03, Issue:08 "August 2018"

Sehrawat, M. & Giri, A.K. (2017). A Sectoral Analysis of the Role of Stock Market Development on Economic Growth: Empirical Evidence from Indian Economy. Global Business Review 18(4) 911–923. DOI: 10.1177/0972150917692242; http://gbr.sagepub.com

Singh, Ajit (2008). Stock Markets in Low and Middle Income Countries. Centre for Business Research, University of Cambridge Working Paper No. 377.

Stolbov, M. (2012). The Finance-Growth Nexus Revisited: From Origins to a Modern Theoretical Landscape. Economics E-journal, Discussion Paper No. 2012-45. http://www.economics-ejournal.org/economics/discussionpapers/2012-45

Tsai, Tsung-han and Gill, Jeff (2013). Interactions in Generalized Linear Models: Theoretical Issues and an Application to Personal Vote-Earning Attributes. Soc. Sci. 2013, 2, 91–113; doi:10.3390/socsci2020091

Yang, B.,(2011). "Does democracy foster financial development? An empirical analysis", Economic Letters, 112, pp.262-265.

