1 | Introduction

The historical account of financial integration and cooperation in Africa is somewhat chequered and dates back to the colonial era. The earliest record of efforts towards regionalization was with the establishment of the Southern African Customs Union (SACU) in 1910. Recent trends toward regionalization have now moved beyond trade and customs unions to economic, financial, and monetary integration. To fix ideas, regional financial integration refers to a market- or institutionally-driven process of broadening and deepening the financial interrelationships within a region; whereas, financial development refers to the process by which financial institutions and markets increase in size and influence on the rest of the economy. The process of financial integration involves several activities: the elimination of cross-country investment barriers; equitable treatment of foreign and domestic investors; harmonization of national policies, laws, and institutions; synchronization of operational structures, such as technology and information systems; and very importantly, the convergence of prices, returns, and risk assessments.

Our aim in this brief is twofold: first, to determine the degree and timing of financial integration in selected sub-Saharan African stock markets using an unobserved latent variable; and second, to understand the effect of regional financial integration on economic activity in Africa. Perhaps the pertinent question is: why should markets, especially those in Africa, be regionally integrated? Proponents have often argued that financial integration is the key to Africa's accelerated development and structural transformation (see Aryeetey and Nissanke (2005). Overall, it is expected that financial regionalization would enable the participating regional economies to take advantage of the “systemic scale economies” that accrue to larger financial systems. These scale effects emanate from several angles, including the expansion of the spectrum of opportunities for financial intermediation; the creation of larger markets, which makes it more cost-effective to improve financial infrastructure; the efficiency effects that arise from the increase in the number of financial sector participants, which promotes diversification and healthy competition, and thus, eventually results in lower prices for services; and lastly, the increased capacity to withstand financial crisis (see Wakeman-Linn, and Wagh, 2008).

The problem, however, is that despite the highlighted benefits of financial integration to participating economies—a fact that has been established for other regions using stylized information and empirical analysis (see, for example, Agenor, 2003; and Edison et al., 2002)—it is not obvious that this is also the case for Africa, especially because of the peculiar idiosyncrasies of the existing regional financial architecture, and the fact that there are hardly any studies that examine this relationship beyond a correlation and descriptive statistics based framework.

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Evidence on financial integration in Africa

To provide evidence on financial integration, one could consider different dimensions of price-based indicators such as price convergence, price sensitivity, price co-movements, cycle synchronisation, or return correlations. We use Haldane and Hall’s (1991) framework to measure the level of financial integration in Africa, this method is based on a Kalman filter estimation of a dynamic linear regression. We use two alternative benchmarks: first, we assume that the South African stock market is the dominant regional market in Africa; and second, we construct a weighted regional average as an alternative measure. The dominant market in the rest of the world is proxied by the capitalization of the US equity market.

In Figures 1 and 2, we present the estimated time-varying parameters of the model, which is a measure of the unobserved trajectory of financial integration for the case where we use a weighted regional index as the dominant market (Figure 1) and the case where we use the South African stock market as the dominant regional market (Figure 2).

The interpretation of the time-varying parameter is somewhat intuitive. When there is convergence between a country’s equity market and the regional benchmark, the value of the time-varying parameter \( \beta_{(i,t)} \) would approach zero infinitesimally. Conversely, if country i’s market is rather converging to the global dominant market (here the US market), the time-varying parameter would approach one (unity). Therefore, with this model construction, the tendency for the integration parameter to move towards zero indicates sensitivity of the individual market to the influence of the regional market, which is interpreted as regional integration; whereas, the tendency for the integration parameter to lean towards unity indicates sensitivity to the global market; and hence, can be interpreted as financial globalization. Negative values of \( \beta_{(i,t)} \), on the other hand, indicate that the domestic market diverges from both the regional and global markets.

In Figure 1, we observe that stock markets in six countries: Ghana, Kenya, Namibia, Nigeria, South Africa, and Swaziland are more responsive to the regional stock market benchmark relative to the global (or US) benchmark in the period between 1995 and 2005. This conclusion is informed by the estimated values of the time-varying parameters, which are contained within the range -0.5 to 0.5, a result we interpret as evidence of financial convergence and, hence, integration during the period. The values for the stock markets of Tanzania and Botswana are closer to unity; also, for Nigeria, after 2005, the values begin to lean toward unity. This pattern indicates that these stock markets are increasingly becoming more sensitive to changes in the global stock market relative to the regional market. The negative values obtained for Ghana, especially during the early 1990’s, indicates that the Ghanaian stock market diverged from the regional and global markets during that period. However, the more recent trend for Ghana indicates sensitivity toward the regional benchmark. The impact of the financial crisis of 2007-2010, which is highlighted in the figure, does not seem to change the observed pattern of the integration process in any noteworthy way.

Figure 1 Sensitivity and convergence of stock markets to a regional benchmark

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2 See detailed specification of the model in Ekpo and Chuku (2017).
3 Data on average annual market value of outstanding shares for selected countries between 1990 and 2014 are retrieved from the Standard and Poor’s (S & P) database. The selected stock markets include Botswana, Ghana, Kenya, Namibia, Nigeria, South Africa, Swaziland, Tanzania and Zambia. The criteria for including countries in the sample was mainly driven by the availability of stock market data for a reasonable amount of time.
In Figure 2, we repeat the analysis, but this time assuming that the South African stock market is the dominant regional market. We observe that only the Ghanaian and Namibian stock markets are strongly sensitive to the South African regional benchmark relative to the global benchmark. Although it is not obvious why the Ghanaian and Namibian stock markets are more sensitive to the South African stock market, one plausible explanation, at least for Ghana, is the effect of the listing of Ashanti Gold stocks on the South African Stock Exchange.\(^4\) Overall, the results indicate that equity markets in frontier African economies seem to have been moving away from the dominant regional benchmark toward the global benchmark since 2005. Bearing in mind that there is considerable variation in the pattern of the sensitivity by country, the main insight from this exercise is that African stock markets are increasingly becoming more sensitive to the global stock market dynamics than they are to regional dynamics.

### 3 | Methodology and key findings

We use parametric and non-parametric regression analysis to examine the relationship between regional financial integration and economic activity in sub-Saharan Africa.\(^5\) In particular, we use system generalized methods of moments (SGMM) and local-linear least squares nonparametric regressions to uncover the relationship between financial integration and economic activity in sub-Saharan Africa. An unbalanced panel dataset was collected for 17 sub-Saharan African countries from 1980 to 2011.\(^6\) The descriptive statistics show that our measure of financial regionalization has high variability; with a standard deviation of 36.56 and a mean value of 20.91. The between- and within-sample properties (i.e., the standard deviation of 20.52 and 30.62 respectively) suggest that there is significant variability in two dimensions: the extent of financial regionalization between countries, and the progress over time towards financial regionalization within countries.

In Table 1, we report the main results from the SGMM regressions. In Models 2, 3, 4, and 6, the financial regionalization variable is negatively and significantly related to growth.\(^7\) The results generally show evidence that an increase in financial regionalization is associated with higher GDP per capita (GDPpc) growth rates. However, because statistical and economic significance does not always coincide, we measure the economic and quantitative extent of the impact of financial regionalization on per capita GDP growth by multiplying the coefficient on financial regionalization by its standard deviation of 36.56. We do this for the results in Model 2 and obtain 0.88. This result implies that a one standard deviation decline in financial regionalization will, on average, result in an increase in GDP growth by 0.88 of a percentage point. Moreover, given that the coefficient on financial development has a negative sign in all the six regressions, the results on the financial development variable do not support the finance leading hypothesis of growth. To ascertain the quantitative impact of financial development on growth, we multiply the coefficient by the standard deviation (i.e., \(-0.025 \times 25.13\)), and find that a one standard deviation increase in the level of financial development leads to 0.62 of a percentage point decline in the growth rate.

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\(^4\) We thank an anonymous reviewer at the Journal of African Economies for pointing us to this potential explanation for the Ghana case.


\(^6\) The list of countries include Benin, Botswana, Burkina Faso, Cameroon, Cote d’Ivoire, Ethiopia, Gabon, The Gambia, Ghana, Kenya, Malawi, Nigeria, Senegal, Sierra Leone, South Africa, Togo, and Zambia.

\(^7\) Most of the discussion on the results are based on the fully specified Model 2.
As expected, by introducing interaction terms, the results provide more insight. From Model 3 in Table 1, the coefficient of the interaction term between financial regionalization and financial development is positive and statistically significant (0.031). This result can be interpreted from two perspectives depending on which variable we hold constant as the moderating variable. If we moderate the interaction based on the financial development variable, then the result implies that the growth-enhancing effects of financial regionalization are greater in countries with higher levels of financial development. On the other hand, by moderating on the financial regionalization variable, the result implies that the growth-inhibiting effects of financial development are mitigated by financial regionalization. This result supports the theoretical predictions by Boyd and Smith (1997), which predict that international financial integration only has positive effects on economic performance in countries with well-developed financial systems.

Although quite revealing, the results from the SGMM analysis give us reason to suspect that some underlying non-linearities and complementarities may be driving the nature of the relationship between financial integration on economic activity in Africa. To unpack the intricacies of the relationship, we also conduct a non-parametric regression analysis, which helps to deal with potential complementarities, interactions, and trade-offs between financial integration and other identified significant drivers of economic activity in Africa—all of which were previously masked in the parametric analysis. We do this by examining the conditional mean plots of the growth surface charts, along with the financial integration variable and some important covariates.

In Figure 3, we depict the conditional mean surface plot of economic growth along with financial integration and financial development, holding all other variables fixed at their respective means. The plot indicates that the relationship between growth and the financial variables in Africa are clearly non-linear. This is particularly so in the direction of financial development. Further, the partial regression in the direction of each of the regressors does not appear to change very much as the other predictor varies. What we see, however, is that improving financial integration could have mild and monotonically increasing effects on growth.

Moreover, Figure 3 also shows that low levels of financial integration (i.e., financial segmentation), when interacted with low levels of financial development is consistent with negative growth rates. The steep slope that characterises initial improvements in the financial sector, especially during the early financial development stages, reveals the strong potential for financial development to spur growth even when there is financial segmentation. The observed inverted-U shape along the financial development axis also implies that there is a threshold level of financial development that is consistent with growth in a financially segmented economy. Furthermore, there is evidence of complementarities, as higher levels of financial development combined with more financial integration return higher levels of growth.

The contour maps are a cross-sectional representation of the three-dimensional (3D) surface plots. They map specific points of the financial integration and financial development variable to the same predicted level of growth; in this case,
they can be referred to as the iso-growth maps. In Figure 4, we plot the iso-growth maps for financial integration and development in SSA. The maps show that there are at least two scenarios consistent with the highest attainable levels of growth—around 9 and 9.5 percent. First is the scenario where growth is high with moderate levels of financial development and integration, and second is the scenario where high growth rates are attainable with some level of regional financial segmentation and moderate financial development.

**Figure 3** Fitted surface plot of GDP growth on financial integration and development

![Figure 3](image1)

**Figure 4** Iso-growth maps for financial integration and development

![Figure 4](image2)

**Figure 5** Fitted surface plot for financial integration and governance

![Figure 5](image3)
In a similar vein, we examine how financial integration and governance interact to drive economic activity in Africa, holding all the other variables constant at their respective means. The results are plotted in Figure 5, which shows that the slope of the plot in the direction of governance is relatively flat, indicating that the positive effect of governance on growth is relatively minuscule. Further, with good governance, we see that the effect of improvements in financial integration has quick and accelerated positive effects on growth. This is inferred from the steep slope of the surface plot in the direction of financial integration. The picture gets clearer when we examine the associated contour maps in Figure 6, where, at the lowest level of negative growth, i.e., around -6.5, governance indicators are low and financial integration is also low; whereas, at the highest level of growth, somewhere around 7 percent on the contour plot, governance indicators are generally higher and financial integration is also high.

The results for the joint effect of trade openness and financial integration on growth when other regressors are held constant at their respective means are plotted in Figures 7 and 8. From the surface plot in Figure 7, we observe that openness is monotonically associated with higher levels of growth, and this association is steep, indicating that even small improvements in the level of openness could potentially result in significant growth improvements. As expected, the highest level of growth is attainable when there is better financial integration and more trade openness, the reason for this conclusion becomes obvious when we examine the contour maps in Figure 8, which indicates that the peaks (mountain) of the surface plot in Figure 7 is around 8.5 percent and is consistent with higher levels of openness and financial integration.
4 | Lessons for reforms

The evidence indicates that the regional financial convergence process seemed to have stagnated around 2005, with more contemporary evidence indicating a tilting towards financial globalisation. Therefore, this can be interpreted as a first-round indicator of the heightening exposure to contagion effects from global financial bubbles and busts. Indeed, the evidence shows that the 2008 global financial crisis had moderate effects on selected African stock markets. Policy reforms that seek to mitigate and cushion contagion effects from global financial markets are necessary now more than ever.

Secondly, because our measure of financial integration is inversely related to economic activity, which implies that tighter interest rate spreads in credit markets enhance growth in the region, it follows that by strengthening competition in regional banking, tighter spreads could be achieved, so that further growth can be realised and sustained in the region. A specific reform action along this line would be to lighten as much as possible restrictions on cross-border banking establishments and operations. Further, an abatement of the restrictions on the requirements for banks from the rest of the world (America and Europe) to operate in Africa might be used to further intensify competition and hence, achieve narrower interest rate spreads in the region. A caveat in this regard is, however, instructive. Because of the opaque nature of the business of deposit money banking, and the fact that an easing of restrictions could lead to an increased tendency for adverse selection and moral hazard in the system. This policy option would have to be corroborated with strengthening the capacity of supervisory authorities to have cross-border oversight functions on banking operations.

It is also important to strengthen monetary policy coordination in the region since interest rate spreads are a function of monetary policy regimes in the different economies. To induce convergence in interest rate spreads, monetary authorities in the region can coordinate policies and perhaps set acceptable bands for monetary policy rates in the region. This could also help to synchronise liquidity positions in the region, so that excess liquidity in some countries could be mopped-up by banks in other countries with deficit liquidity.

5 | Concluding remarks

Over the past three decades, there has been a considerable effort towards regional financial integration in Africa. This brief endeavoured to trace the degree and evolution of stock market integration using time-varying parameters estimated by Kalman filtering techniques, and attempted to answer questions about the growth effects of regional financial integration using parametric and nonparametric regression techniques. Results from the empirical investigation are used to rationalise potential reforms for fast-tracking the integration process in Africa.

Overall, the results show that significant progress was made towards regional financial integration of stock markets during the 1990s and 2000s, but recently the evidence indicates that financial markets in SSA are becoming more sensitive to global benchmarks. Also, the results indicate that improvements in the level of financial integration are associated with higher levels of economic activity. And the growth-enhancing effects of regional financial integration are greater in countries with higher levels of financial development, although there is a threshold beyond which it begins to diminish. When using investment growth as a measure of economic activity, countries that are more regionally integrated enjoy higher levels of capital investments.
References


