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Minireview

Co-movement of Africa's equity markets: Regional and global analysis in the frequency–time domains

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HIGHLIGHTS

- The paper examines regional and global co-movements of African stock markets.
- Main estimation technique is the three-dimensional continuous Morlet Wavelet transform.
- We find evidence of time-varying and non-homogenous co-movement of the equity markets.
- Co-movements are narrowed to short-run fluctuations.
- We report that diversification of international portfolio into African stocks is possible.

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ABSTRACT

This paper examines regional and global co-movement of Africa's stock markets using the three-dimensional continuous Morlet wavelet transform methodology. The analyses which are done in segments investigate co-movements with global markets; bilateral exchange rates expressed in US dollars and euro; and four regional markets in Africa. First, we find evidence of stronger co-movements broadly narrowed to short-run fluctuations. The co-movements are time-varying and commonly non-homogeneous — *with phase difference arrow vectors implying lead–lag relationships*. The presence of lead–lag effects and stronger co-movements at short-run fluctuations may induce arbitrage and diversification opportunities to both local and international investors with long-term investment horizons. The findings also reveal that some African equity markets are, to a degree, segmented from volatilities of the dollar and euro exchange rates. Thus, inferring that, *ceteris paribus*, international investors may diversify their portfolio investments across those markets without worrying about the effects of currency price volatility.

Contents

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1. Introduction

Among other factors, with an anticipated human population growth of about 1.458 billion by 2025—*see the World Bank factsheet on population estimates*,[1] Africa is increasingly becoming a frontier for investment and world economic development.[2] Increases in demographic transitions opens a window of opportunities, as the working age population increases. This presents an opportunity to open up the African market to enhance intra-African trade, as well as the flow of capital across borders and between Africa and the rest of the world over time. Recent trends in African total trade flows—exports and imports, highlight a shift in trade dynamics and increasing competition from China for the African market [2]. From 2010 to 2013, intra-African exports grew by 50% and by another 11.5% in 2014 to USD61.4 billion. Despite Europe's dominance in African trade, Africa's trade with Asia rose by 22% between 2012 and 2013. Moreover, since 2000 official remittances to Africa increased six-fold and were projected to reach USD64.6 billion in 2015 with Egypt and Nigeria receiving the bulk of flows. At the same time, increasing Greenfield investments from China, India, and South Africa are expected to increase foreign investment in the continent. The resultant effects of these are improvements in the overall economic growth and developments in the financial sector. In fact, Ahmed et al. [3] estimates the contribution of Africa's demographic dividend to gross GDP volume growth of 10%–15% by 2030.[3] Standard economic theory postulates that the flow of foreign capital to a recipient country increases its stock of capital and technological knowledge, leading to better economic performance. Capital flows could also enhance local savings, promote capital accumulation, and market efficiency.

To reap the above benefits, African countries ought to establish stronger ties and collaborations with the global economy. However, the degree and extent of both inter- and intra-regional interconnectedness ought to be pegged at certain optimal levels in order to reap benefits from scale economies.[4] In the past three decades, efforts at integrating Africa regionally and globally have been aggressively pursued, albeit with some challenges. For instance, Africa has managed to significantly attain progress in economic integration including progressive development of regional infrastructure and removal of some barriers to intra-regional trade [5]. Despite this, progress in economic convergence, as well as, monetary coordination and financial sector integration remains slothful [5]. At the same time, lessons from the Eurozone suggest that efforts at attaining economic convergence can better be enhanced on the wheels of prior monetary coordination and sufficient levels of financial integration, regionally and globally. In African Development Bank's (AfDB) 2014 policy paper on the continent's Regional Integration, Litse and Mopotola [6] recommend that the Eurozone model of economic convergence should incite African Regional Economic Communities (RECs) to adopt measured and thoughtful approaches towards integration by meeting some basic conditions including financial sector integration.

The call to ensure stronger ties of the African financial sector regionally and globally has attracted various scholars to empirically examine the level and extent of co-movements and integration of African financial markets. In Africa, among the studies that have investigated the linkages between domestic and/or regional and global financial markets, as well as various economic variables are [7–12], etc. These studies highlight the avenues for economic development, risk reduction, markets efficiency and enhancement, portfolio diversification, and financial stability.[5] Whilst the above studies make significant contribution to the literature on African financial markets inter-linkages with the rest of the world, their contribution to exploring regional dynamics in stock markets co-movements, as well as drawing useful and practical inferences for short-term and long-term investors appears lacking. Thus, this paper fills the gap with more flexible and localized co-movements analysis. The method employed also allows for an assessment of the impact of investment horizon. From the point of view of portfolio diversification, short-term or long-term investors are more concerned with the co-movements at higher or lower frequencies to help them formulate their investments strategies. Thus, we are able to make a distinction between the short-term and long term investor, as well as their investments horizons.

Despite considerable efforts by extant studies to examine the nature and/or level of African stock markets' co-movement, some significant gaps still exist to warrant further research attention. First, estimation methods adopted by the cited references fail to capture co-movement within the frequency–time spectrum capable of aiding in the formulation of

[1] https://africacheck.org/factsheets/factsheet-africas-population-projections/.

[2] Bodenhorn and Cuberes [1] establish positive correlation between financial development and city growth robust to controls for city geographical characteristics, percentage of population working in different sectors, and initial population of a city.

[3] Unless otherwise stated, figures are gleaned from AfDB, OECD, UNDP (2015) African Economic Outlook report.

[4] Though highly integrated markets may present fertile grounds for shock spillover, the benefits of integration cannot be overemphasized. An aggressive pursuit of integration will not only help in risk diversification but also help smooth the impact of shocks— [4].

[5] It is important to stress that results from these studies are not uniform.