How are Africa's emerging stock markets related to advanced markets? Evidence from copulas

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This paper focuses on two key questions: How are Africa's emerging stock markets related to advance stock markets? Do extreme price movement in advanced stock markets have an impact on African stock markets? The importance of this work stems from the fact that the nature of dependence across stock returns plays a crucial role in asset pricing, portfolio allocation and policy formulation. Investment practitioners pay close attention to the co-movement between equity markets, as a proper grasp of its nature and measurement affects the risk-return trade-off from international diversification; typically, international portfolio diversification becomes less effective when markets are in turmoil. Policy makers, on the other hand, are more interested in how strong linkage across stock markets influences the transmission of shocks, its consequences as well as implications for risk management.

The paper applies copula models to investigate the time-varying dependence pattern between advanced and African stock returns. We characterize the bivariate dependence structure between African and other international stock returns through copulas. To model the dynamic dependence, we use the Generalized Autoregressve Score (GAS) model proposed by Creal et al. (2013), which uses the standardized score of the copula log-likelihood function to update parameters over time. There are three key advantages of using this method. First, copula-based models provides much flexibility in modelling multivariate distributions by making it possible to fit models for the marginal distributions separately from the dependence structure (copula) that connects them to form a joint distribution. Second, copula functions allow us to model dependence in extreme market conditions and they signify both the degree and structure of the dependence. Third, unlike linear correlation, copula functions are invariant to non-linear strictly increasing transformations of the data. Thus, copula functions provide a realistic description of the dependence in financial assets.

In our empirical analysis, we find that dependence structure between African and international stocks varies overtime, but generally weak. There is asymmetric and weak tail dependence for all the countries, implying stock return co-movement varies in bearish and bullish markets and that the dependence is generally not strong in extreme market conditions. The paper then investigates African stock market quantiles conditional on advanced stock price movements, with the aim of uncovering shock spillovers. We find that extreme downward stock price movements in the advanced markets do not have significant spillover effects on Africa's emerging stock markets.

The evidence presented has important implications for market participants and policy makers in diverse ways. First, the presence of weak dependence between African and advanced stock markets points to the potential gains for international investors holding African stocks. Our

finding should regenerate interest amongst practitioners to reassess how assets are allocated for effective diversification. Second, our results imply that African markets are immune to risk spillovers from the more advanced markets and the tendency to boom or crash together is minimal. In light of recent volatility in global stock markets with the associated spread of contagious shocks from advanced to emerging markets, as well as the broad macroeconomic implications, our findings might be useful to policy makers and regulators, particularly in African countries, in designing and implementing appropriate intervention policies.