

African Emerging Equity Markets Re-examined: Testing the Weak Form Efficiency Theory

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Abstract: This paper examines the weak form of market efficiency of five major stock markets; four African equity markets and one developed market. The weekly market index returns of the EGX 30, NSE 20, NSE All Share Index, FTSE-JSE All Share Index and the S&P 500 Index were analysed for the period 1998–2008. To determine if the stylized fact of stock returns in African markets violate the random walk hypothesis, numerous econometric and statistical techniques are employed. These methods include the autocorrelation test, the unit test, linear and non-linear models. The results indicate that the African markets do not behave in a manner consistent with the weak form of market efficiency. These results provide a contrast between the emerging African markets and the developed markets. It suggests that African emerging markets have higher average returns and volatility than developed markets. We argue that if the market could be made less volatile, it has the potential to attract more investment because of its attractive returns.

1. Introduction

Financial markets have long been recognized as a vital catalyst in the attainment of economic development and growth (Neidhardt, 2009; Andrianaivo and Yartey, 2010; Asiri and Alzeera, 2013; Akber and Muhammad, 2013). Particularly, stock markets play a major role in the allocation of ownership of the economy's capital stock. Thus, the level of success of a stock market in driving development is linked to its efficiency in transferring capital flows from savings to productive investments. This emphasizes the importance of prices in reflecting the true value of financial assets, which provide accurate signals for resource allocations. Since the early 1990s, emerging markets have become a viable asset class for international portfolio investors. Financial flows to emerging markets have increased as investors search for better diversification and higher expected returns. Solnik and McLeavey (2009) opine that foreign investment allows investors to reduce the risk of their total portfolio while enjoying additional profit potentials. Impliedly, international diversification helps to improve risk adjusted performance of a portfolio.

Consequent upon increased globalization and integrations in global financial system, the world equity markets have grown at a phenomenal rate. At the end of 2006, the world capitalization was around \$25 trillion (Solnik and McLeavey, 2009). Interestingly, Tas and Dursonoglu (2005) have also noted that the share of developed stock markets to the world total has declined over time while emerging stock markets have recorded a faster growth rate in terms of trading volume, number of listed companies and market capitalization. Since the early 1990s, emerging markets have become a viable asset class for international portfolio investors.

Recently, Africa as a region has received a lot of attention from the international financial market. The continent has been characterized as globalization's final frontier for investors and a good buy for potential investors (*The Economist*, 2007). Studies suggest that this is due to low and possible negative correlation of most African equity markets with developed markets. Interestingly, available evidence shows that African markets have recorded relatively high returns compared to developed countries (Yartey and Adjasi, 2007). Over the last decade, most African markets have experienced significant growth in investment and institutional infrastructure development. Many African markets now use electronic trading systems that allow market participants access to updated information on a real time basis. Also, strong regulatory frameworks have been established to strengthen market operations and investors' confidence in these markets (Magnusson and Wydick, 2000). African equity markets are also characterized as small and highly illiquid markets, viewed to be vulnerable to insider trading (Magnusson and

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Wydick, 2000). Furthermore, the lack of proper institutional infrastructure provides information asymmetry, which allows some investors to make abnormal profit, thus questioning the level of efficiency in these markets.

In the light of the above discourse, we hereby raise the following research questions: (1) Have these recent developments affected the efficiency of the African stock market? In other words, in the light of the recent global financial developments, is African equity markets weak-form efficient? (2) How does the behaviour of stock returns of African equity markets compare with the United States market? The main objective of this paper is, therefore, to ascertain whether these recent developments and reforms have affected the efficiency of African stock markets, using the four major equity markets in Africa: Egypt, Kenya, Nigeria and South Africa as a case study, between 1998 and 2008. This period 1998–2008 makes an interesting sample as it not only represents the period of the highest occurrence of financial crises in the world in recent times but it also encompasses periods of booms and recessions, regional integration and transition in economies. This paper also compares the behaviour of stock returns of Africa equity markets with one of the largest markets in the world, the United States market. Although USA and the various African equity markets highlighted above share different constraints and institutional background, Beechery *et al.* (2000) assert that US markets are probably the deepest and most competitive financial markets in the world. Therefore they provide a favourable testing ground for the efficient market hypothesis.

The rest of the paper is organized as follows: a review of theoretical and empirical literature is presented in Section 2; Section 3 focuses on the methodological design of the study; Section 4 analyses the empirical findings and Section 5 summarizes and concludes the results of the study.

2. Literature Review

2.1 Theory of Efficient Market Hypothesis

Following Fama (1970), the theoretical foundation of the efficient market hypothesis (EMH) stems from three basic arguments:

1. *Investors' rationality.* Investors are assumed to be rational, which means that they correctly adjust their beliefs about the stock prices in the market based on available new information.
2. *Arbitrage.* This supports the fact that individual investments are based on arbitrage condition. This implies that investors look for possible risk-free profit opportunities.
3. *Collective rationality.* The random errors that investors make cancel out in the market. This implies that the irrational behaviours of individual investors are independent and do not affect the prices.

The EMH assumes a rational investment decision by market participants rationally based on the available information about prices of financial assets. These economic agents are assumed to form their subjective expectation based on the mathematical expectation of the true model of the economy. Thus, the EMH assumes a joint hypothesis of an equilibrium model that defines normal security returns and rational expectation (Cuthbertson, 1996). Muth (1961), as cited in Cuthbertson (1996), who introduces the doctrine of rational expectations, emphasized that this assumption should be consistent with models of behaviour of economic agents. Fama (1970) provided a general notation which described how prices 'fully reflect' available information in an efficient capital market. Similarly, Jensen (1978) observed the EMH theory to be defined with respect to an information set that can be called Ω , and if it is possible to earn abnormal profit by trading on the basis of Ω . Cuthbertson (1996) expressed this mathematically as

$$E(p_{j,t+1}|\Omega_t) = [1 + E(r_{j,t+1}|\Omega_t)]p_{jt} \quad (1)$$

In this formula E is the expected value operator, $p_{j,t+1}$ is the price of financial asset j at time $t+1$, $r_{j,t+1}$ is the return on financial asset j during period t_{t+1} , and Ω_t is the set of information available to investors at time t . Under the EMH, investors can only earn abnormal gains on the available information set Ω_t by chance.

2.2 Empirical Review of Weak Form Efficiency

Numerous empirical works have been devoted to testing the weak form efficiency. Earlier studies are concerned with the predictability power of past returns which focus on the relationship between price changes over time to see if predictability is