The Random Walk Theory And Stock Prices: Evidence From Johannesburg Stock Exchange

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ABSTRACT

In this paper, we test the Johannesburg Stock Exchange market for the existence of the random walk hypothesis using monthly time series of the All Share Index (ALSI) covering the period 2000 – 2011. Traditional methods, such as unit root tests and autocorrelation test, were employed first and they all confirmed that during the period under consideration, the JSE price index followed the random walk process. In addition, the ARIMA model was constructed and it was found that the ARIMA (1, 1, 1) was the model that most excellently fitted the data in question. Furthermore, residual tests were performed to determine whether the residuals of the estimated equation followed a random walk process in the series.

The authors found that the ALSI resembles a series that follow random walk hypothesis with strong evidence of a wide variance between forecasted and actual values, indicating little or no forecasting strength in the series. To further validate the findings in this research, the variance ratio test was conducted under heteroscedasticity and resulted in non-rejection of the random walk hypothesis. It was concluded that since the returns follow the random walk hypothesis, it can be said that JSE, in terms of efficiency, is on the weak form level and therefore opportunities of making excess returns based on out-performing the market is ruled out and is merely a game of chance.

Keywords: Random Walk Hypothesis; ARIMA; Johannesburg Stock Exchange (JSE); Variance Ratio Test

INTRODUCTION

The theory of market competence (or efficiency) dominates financial literature due to the scarcity of financial resources. As such, how stock market prices behave plays a very significant part in the share of the scarce monetary resources. Market efficiency explains the relationship that exists amid information and stock price in financial markets; that is, whether or not proceeds in a market pursue a random walk process. Regulators now and again try to improve the condition of the Johannesburg Stock Exchange (JSE) by imposing different rules and regulations because price trends are important to investors and/or companies at the time when they are deciding on spreading their investment funds and risk. Stock prices also provide a benchmark against which profits on investment projects can be evaluated (Green et al., 2005). An informationally efficient market implies that capital and risks are appropriately priced without any distortions.

Following the developments in the JSE, it is necessary to add to the existing literature concerning the randomness of the All Share Index (ALSI) using current information and see if the results have changed or not. Over the years, it has become a major interest to financial analysts to come up with theories and models that explain how stock market prices behave or how they can be determined. One such model is the Random Walk Hypothesis (RWH), which is an economic theory that stipulates that prices of stocks move in accordance to a random procedure and, consequently, the prices of the stocks in the market cannot be foretold. Viney (2007; 309) defines random walk