Chapter 14
Impact of the Volatility of Macroeconomic Variables on the Volatility of Stock Market Returns: Nigeria’s Experience

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ABSTRACT

This chapter investigates the relationship between volatility of macroeconomic variables and the volatility of Nigeria’s stock market returns using annual data from 1985-2009. The macroeconomic variables used are: inflation rate, government expenditure, foreign exchange rate, index of manufacturing output, broad money supply, and minimum rediscount rate. In pursuance of this, the AR(1)-GARCH-X(1,1) model was used for the analysis. The findings of this study revealed that, Nigeria’s current stock market return is positively influenced by previous returns. Volatility of Nigeria’s stock market returns was affected by past volatility less than the related news from the previous period. Also, the result shows that there is a significantly positive relationship between the volatility of the Nigeria’s stock market returns and the short run deviations of the macroeconomic variables (macroeconomic factors volatility) in the system. The results provide some insight to investors, financial regulators, and policymakers in the Nigeria’s stock market when structuring their portfolios and formulating economic and financial policies.

INTRODUCTION

In last three decades many studies have examined associations between macroeconomic variables and stock returns. These studies include; Fama (1981, 1990), Geske and Roll (1983), and Chen, Roll, and Ross (1986). However, most of these studies focused on developed markets by using the Autoregressive Conditional Heteroscedasticity (ARCH) model and the Generalized ARCH (GARCH) model. For instance, Schwert (1989) and, Flannery and Protopapadakis (2002) tested...
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the effect of domestic macroeconomic variables on stock volatility for the United States. They found weak evidence that such factors could predict stock market returns which are inherently volatile. With these studies, it becomes obvious that a clear understanding of stock market determinants is very important for investors, regulators, policy makers and academic researchers.

With regard to the Nigerian economy, the few empirical evidences that exist produce mixed results. Maku and Atanda (2009), Adaramola (2011), Arodoye (2012) and Osamwonyi and Evbayiro-Osagie (2012) in their respective studies observed that the Nigerian Stock returns are more responsive to changes in macroeconomic variables. Also, Soyode (1993) and Olowe (2007) show that a cointegrating relationship exists between macroeconomic variables and Nigerian stock prices. However, Asaolu and Ogumnuyiwa (2011) and Izedonmi and Abdullahi (2011) reveal that a weak relationship exists between Stock price and macroeconomic variables in Nigeria. It is worthy of note, that all previous studies in Nigeria do not take cognizance of the time varying of financial data. In view of this, the question still remains. Do macroeconomic indicators exert shock on stock returns? It is in an attempt to answer this question that the study aims at using GARCH-X Model as proposed by Lee (1994) to examine the relationship between macroeconomic variable volatility and the volatility of Nigeria stock market returns. This differs in methodology in terms of other studies carried out in Nigeria. The reason for this methodological change is to take care of volatility clustering, leptokurtosis, and the assumption of homoscedasticity that characterize financial time series, such as stock market returns. This is designed to account for a time-varying variance that usually is associated with high frequency financial and economic data. Therefore, ordinary least square models are not adequate to analyze data that exhibit variances that change through time (Rachev et al., 2007) as done by previous studies in Nigeria.

This paper extends the previous research by investigating the reaction of stock returns volatility to short run deviation on the long run equilibrium of cointegrated series (i.e. short-run deviations between stock returns and a set of macroeconomic variables) within the framework of a Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model. Specifically, the paper seeks to investigate the contemporaneous effects of changes in the volatility of the short run deviation of the long run equilibrium of cointegrated macroeconomic variables on volatility of stock market returns in Nigeria. That is, to examine whether macroeconomic factors collectively contribute to the dynamics of the Nigeria’s stock market. This study is inspired by the works of Shiller (1981) and Hansen and Jagannathan (1991), which revealed that the volatility of real activity should be related to stock market volatility.

This paper is divided into five sections. Following section one is section two which deals with a review of related literature. The methodology pursued in the investigation is presented in Section three, while the results of the analysis are presented and discussed in Section four. Section five focuses on summary and conclusion.

LITERATURE REVIEW

A number of literature (theories and empirical) have investigated the impact of macroeconomic variables and on stock returns. Some of these theories are , the Efficient Market Hypothesis (EMH) and Asset Pricing Theory(APT). The EMH posited that stock market prices fully and rationally incorporate all relevant information. However, past information is not particularly relevant in predicting future asset prices. For that reason, new relevant information is only used to explain stock market movements (Fama, 1965). Asset Pricing Theory such as The Capital Asset Pricing Model (CAPM) of Sharpe’s (1964), which assumes that asset price depends only on