

Random Matrix Theory Analysis of Cross-Correlation in the Nigerian Stock Exchange

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Abstract : In this paper we use Random Matrix Theory to analyze the eigen-structure of the empirical correlations of 82 stocks which are consistently traded in the Nigerian Stock Exchange (NSE) over a 4-year study period 3 August 2009 to 26 August 2013. We apply the Marchenko-Pastur distribution of eigenvalues of a purely random matrix to investigate the presence of investment-pertinent information contained in the empirical correlation matrix of the selected stocks. We use hypothesised standard normal distribution of eigenvector components from RMT to assess deviations of the empirical eigenvectors to this distribution for different eigenvalues. We also use the Inverse Participation Ratio to measure the deviation of eigenvectors of the empirical correlation matrix from RMT results. These preliminary results on the dynamics of asset price correlations in the NSE are important for improving risk-return trade-offs associated with Markowitz's portfolio optimization in the stock exchange, which is pursued in future work.

Keywords : correlation matrix, eigenvalue and eigenvector, inverse participation ratio, portfolio optimization, random matrix theory

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