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Modelling Return and Nonlinear Dynamics of Asia-5 Markets

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Abstract

Non-linear dependence in financial time series return perhaps describes the possible predictability of any stock market which is certainly supportive for the investors and the stock traders. Thus the research on such arena also has gained importance in recent times. In the present scenario, the Asian stock markets are deeply influencing and intimidating the world economy. The most essential concern of the study towards ASIA 5 stock markets is to assess the nonlinearity and risks associated with each market. Thus paper investigates the nonlinear dynamics of Asia-5 markets applying BDS test by taking daily returns from the year 1992 to 2015. The study proved that return series of Asian markets are nonlinearly dependent which confirms modelling series with GARCH models. The result of GARCH (1, 1) for all the five markets was highly significant which confirms the presence of internal shocks. The risk of the each market was measured by applying GARCH- M and found that Shanghai stock exchange is the riskiest asset.

I. Introduction

NON-LINEAR DEPENDENCE in financial time series return perhaps describes the possible predictability of any stock market which is certainly supportive for the investors and the stock traders. Thus, the research on such arena also has gained importance in recent times. Hinich and Patterson (1985) were first among other who came up with the evidence of non-linear dependence in NYSE stock returns. The study presented a technique for recognizing the structure of the quadratic model, by using the large sample distribution of the sample bicovariance and determined the quadratic coefficients which were ominously different from zero.

Lima (1998) studied the non-stationarities and nonlinearities in the stock market returns. The study elevated the question from the recent studied, which were reported that the nonlinearities in high-frequency financial

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asset as it recorded the highest standard deviation value among all other markets. The result in turn also approves the result of descriptive statistics presented above.

Table V
GARCH - M Results

Indices	SD - Coefficient	z-Statistic	Prob.
LBSE	0.024456	0.596977	0.5505
LJCI	0.019558	0.569616	0.5689
LKOS	0.057677	1.647542	0.0994
LNKY	0.051147	1.052849	0.2924
LSSE	0.109359*	3.277571	0.0010

Source: Self Computed

IV. Conclusion

In the present scenario, the Asian stock markets are deeply influencing and intimidating the world economy. The most essential concern of the study towards ASIA-5 stock markets is to assess the nonlinearity and risks associated with each market. The daily closing prices of S&P BSE Sensex, Jakarta Stock Exchange, Korea Stock Exchange, Nikkei 225 Stock Average Index, Shanghai Stock Exchange were analyzed by applying BDS, GARCH (1,1), and GARCH-M (1,1) models after the preliminary checks of stationary, volatility clustering and diagnostic tests. The ADF, PP, and KPSS test statistic rejected the null hypothesis at level (at 1% significance level) for all returns and confirmed the application of time series stochastic models of the returns under the study.

The BDS test accepted the alternate hypothesis and proved that ASIA - 5 stock market return are nonlinearly dependent, which proves that financial time series data are having chaotic behaviour and not independently and identically distributed. GARCH (1, 1) reveal that all the ASIA-5 markets are of more volatility and are close to unity. The result of GARCH –M model discloses risk influence of respective index and found Shenzhen Composite Index is a risky asset which seems to have more SD than other markets.

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Annexure I
Diagnostic Tests Results

Table A1
Heteroskedasticity Test : ARCH

F-statistic	435.6201	Prob. F(1,5898)	0.0000
Obs*R-squared	405.7961	Prob. Chi-Square(1)	0.0000

Source: Self Computed

Table A2
Breusch-Godfrey Serial Correlation LM Test

F-statistic	29.37781	Prob. F(2,5895)	0.0000
Obs*R-squared	54.27285	Prob. Chi-Square(2)	0.0000

Source: Self Computed

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