The Determinants of India’s Implied Volatility Index
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INTRODUCTION

• Implied volatility index measures the expectation of market's volatility implied in the price of Options.
• In India volatility index was constructed by National Stock Exchange of India Ltd. (NSE) and is called as India VIX.
• The factors considered here are:
  • Purchasing Managers Index (PMI)
  • Business Confidence Index (BCI)
  • Net activity of FII
  • Net activity of DII
  • Purchasing Managers Index (PMI) is an indicator of economic health of manufacturing sector, it is based on five major indicators: new orders, inventory levels, production, supplier deliveries and the employment environment.
  • Domestic institutional investors (DII) are those institutional investors which undertake investment in securities and other financial assets of the country they are based in.
  • Foreign institutional investors (FII) are those institutional investors which undertake investment in securities and other financial assets in other country.
  • Business Confidence Index (BCI) is based on enterprises assessment of production, orders and stocks, as well as its current position and expectation for immediate future.

RESEARCH METHODOLOGY

• Daily closing prices of India volatility index are taken from NSE then calculated for monthly by taking weighted average of closing prices of each month.
• Monthly index of BCI from OECD and PMI from HSBC.
• Monthly Net FII and DII from NSE.

PROPOSED METHODOLOGY

• Unit Root Test: It tests whether a time series variable is non-stationary and possesses a unit root. The null hypothesis is generally defined as the presence of a unit root and the alternative hypothesis is either stationary or trend stationary.
• Granger Causality test: To find whether one time series data will be useful in forecasting another time series data (i.e. one time series data will cause another time series data). Granger Causality has an assumption that future can cause past but the past cause the past or future.

FORMULAE

\[ VIX_t = \sum_{i=0}^{\gamma_i} \alpha_i PMI_{t-i} + \sum_{j=0}^{\gamma_j} \beta_j VIX_{t-j} + \epsilon_{1t} \]
\[ PMI_t = \sum_{i=0}^{\gamma_i} \gamma_i PMI_{t-i} + \sum_{j=0}^{\gamma_j} \delta_j VIX_{t-j} + \epsilon_{2t} \]
\[ BCI_t = \sum_{i=0}^{\gamma_i} \gamma_i BCI_{t-i} + \sum_{j=0}^{\gamma_j} \delta_j VIX_{t-j} + \epsilon_{2t} \]
\[ FI_t = \sum_{i=0}^{\gamma_i} \gamma_i FI_{t-i} + \sum_{j=0}^{\gamma_j} \delta_j VIX_{t-j} + \epsilon_{2t} \]
\[ DI_t = \sum_{i=0}^{\gamma_i} \gamma_i DI_{t-i} + \sum_{j=0}^{\gamma_j} \delta_j VIX_{t-j} + \epsilon_{2t} \]

\[ \gamma_i, \beta_j, \delta_j = \text{coefficients of the model (i.e., the contributions of each lagged observation)} \]
\[ \epsilon_{1t}, \epsilon_{2t} = \text{residuals (prediction errors) for each time series} \]

HYPOTHESIS

H0.1: PMI does not granger cause VIX
H1.1: PMI does granger cause VIX
H0.2: VIX does not granger cause PMI
H1.2: VIX does granger cause PMI
H0.3: BCI does not granger cause VIX
H1.3: BCI does granger cause VIX
H0.4: VIX does not granger cause BCI
H1.4: VIX does granger cause BCI
H0.5: FII does not granger cause VIX
H1.5: FII does granger cause VIX
H0.6: DII does not granger cause VIX
H1.6: DII does granger cause VIX

RESULTS

• This study explored the determinants of IndiaVIX for the period from April 2012 to March 2016.
• Granger Causality test showed that Business Confidence Index (BCI) have positive and significant impact on IndiaVIX while other factors such as PMI, FII and DII do not have much impact on IndiaVIX.
• FII and DII have negative association between them.

REFERENCES