Testing of EMA and MACD on Equity Indices in India with Special Reference to Oil & Gas, Power and IT Index

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Abstract

The present study re-examines the efficiency of technical indicators by using the technical tools Exponential Moving average (EMA) and Moving Average Convergence/Divergence (MACD) over the passive strategy before and after considering the transaction cost on daily closing price of three equity index of BSE i.e. Oil & Gas, Power and Information Technology (IT) index. The result shows that MACD rule have stronger prophetic power in all the equity indices and t-values of return are significant at 1% level of significance but the EMA rule have average predictive power in any of the period for index in some cases. All the technical rules indicate highest predictability for the power market index. In some cases, transaction cost eliminates the trading profit except MACD. On the bases of gross and net compound annual growth rate the IT sector has been given 1st ranking in case EMA (13-65) but in the remaining cases Power sector at 1st rank.

I. Introduction

TECHNICAL ANALYSIS IS mainly used in practice to forecast the entry and exit signals for trading from past prices and volume. The theory of technical trading is created on the postulation that present price patterns will be reoccurring in future and these patterns helps the traders in the early recognition of buying and selling signals (Lento 2007, Gorgula, Neves and Horta, 2011 and Yu, Nartea, Gan and Yao, 2013). Early experimental studies have certainly shown that technical indicators are able to outperform over the passive strategy as deduced by the studies of Gencay

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Annexure

Annexure I
Exponential Moving Average (EMA)

The present research study uses the EMA (13,65), EMA (65,110), EMA (65,140) crossover strategy, where the 13, 65 days EMA was taken as the shorter moving average and the 65,110,140 days EMA was used as the longer moving average. The formula is given in equation (3)

$$EMA_t = Price\ (t)*K+EMA(y)*(1-K) \tag{3}$$

where t is current day, y denotes previous day, $K=2/(N+1)$ and N is number of days. EMA has gained maximum popularity among traders because it gives maximum weightage to current price because recent prices are more relevant in forecasting the security price which maximizes the trading return. Buying signals produced when short runs EMA cut the long run EMA from below and vice-versa.

Annexure II
Moving Average Convergence and Divergence (MACD)

Itis a momentum indicator. It is a trend following strategy. It is calculated by deducting the long run EMA from short run EMA as shown in equation (4)

$$MACD_t = EMA(s)_t - EMA(l)_t \tag{4}$$

where, $EMA\ (n)_t \qquad = 2/(n+1)\ [P_t - EMA_{t-1}] + EMA_{t-1}$

$MACDHISTOGRAM \quad = MACD - MACDSIGNAL$

A trigger line is calculated with the help of nine day EMA of the MACD is a trigger line (signal line). Buy and sell signals produced when MACDHISTOGRAM greater/less than zero. Buy signal generated when MACDHISTOGRAM > 0 and sell signal generate when MACDHISTOGRAM < 0.