"Exponential Moving Average" Optimize Momentum Trading Psychology of Energy Stocks in India: A Quantitative Insight

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Abstract---Purpose: The fundamental goal of this study is to evaluate the evidence ,understand, and explore technical analysis approaches. If we were using an expert system and execute an exponential moving average on energy stocks over a certain time frame, our portfolio shallout perform passive strategies and nifty index returns (benchmark). EMA might optimize trading psychology of professionals, it may give positive momentum of energy stock prices.
Design/Methodologies/Approach: In this paper, apply technical analysis for selecting energy stocks (NSE), further apply technical analysis system trading for optimize momentum trading. The empirical analysis includes back-testing (EMA) of the chosen portfolio from Jan 2016 toJan2022 with the help of Ami-brokers oftware, and compare with passive strategy.
Originality&Value: This paper validates EMA trading strategy on energy stocks (NSE). It is written primarily for those financial enthusiasts who want to take advantage of technical analysis momentum strategy over passive strategy in a short to medium time frame.
Results & Practical Implication: Momentum strategy andTechnic alanalys is on three selected energy stocks i.e. RIL, NTPC PGC, achieve significant high returns over passive strategy and Nifty index return(Benchmark)during the selected time frame. The successful empirical analysis of "momentum strategy" on energy stocks shall encourage the practitioners and academicians of Financial markets to research and explore new areas, strategy and indicators to explore further with new untapped dimensions.

Keywords--- Technical Analysis, Exponential moving average (EMA), Indicators, Back-test, Nifty Index, Portfolio, Expert system.

I. Introduction

The great advantage in technical analysis is that it studies past prices and volumes relationships, which discounts all the available information in a financial market. The tactical application ideally focuses on four important points i.e. when to enter a position, when to exit a position, what is target and what is stop-loss. The rational investor aware about the risk-return trade-off, so, investor understands the importance of indicator selection in technical analysis.

In physics, momentum is defined as the quantity of motion of a moving body. Here, momentum trading may refer to either long term or short-term trading. It is a trading strategy in which, investor buy the securities when markets are rising and sell (short-sell) them when market fall down. A technical analyst majorly looks at the "trend" i.e. trend following or trend reversal. Each buyer looks at demand (bid price) and each seller looks at supply (ask price), transformation is based on demand– supply equilibrium. Buyer and seller agreed on certain level only when available information digested by price.

The NIFTY Energy sector index includes the companies that are involved in the petroleum, natural gas ,and electric power industries. The index consists often companies that are publicly traded on the National Stock Exchange of India (NSE). A free-float market capitalization model is used to determine the NIFTY Energy Index. This method is characterized by its level of reflecting the total free float market value of all of the stocks in the index in relation to a specific base market capitalization value. For a variety of purposes, such as benchmarking fund portfolios, launching of index funds, exchange-traded funds, and structured products, the NIFTY Energy Index can be used.

In this research paper, we use energy stocks as a sample for exploring the significance of exponential moving average on momentum strategy (long side). We choose following stocks as a research sample Reliance Industries (32.83), Power Grid Corporation (11.65) and NTPC(9.86), since they have highest weightage in the energy index, collectively more than 53% of Nifty Energy Index.

II. Literature Review

Sadorsky,P.(2021)suggestthattheforecaststhestockpricedirectionofcleanenergyexchange-traded funds is possible through the machine learning method of random forests. If we add well-known features like moving average technical indicators. Also,it is more accurate to predict stock price direction using decision tree bagging and random forests than it is to predict stock price direction using logit models.

(Ahmadi et al, 2018) (Adebayo et al,2017) (Thanh et al, 2018) (Chan et al, 2017) suggest that technical trading rules provides a significant contribution to make forecasting of stock market. Ramlall(2017) and Sobreiroet all (2016) Technical analysis has been widely used by practitioners, and they particularly rely on moving averages for their buy-sell strategies.

(Kumaretal,2020) look into the theoretical foundation of prediction models as well as genetic programming, genetic algorithm, and fuzzy logic. They also find that with the help of computational intelligent methods, one can reduce the risk associated with stock market prediction. The findings demonstrate that technical analysis can be profitable in both emerging and developed marketsalike.

Cervello et al (2015) discuss how their research work challenges the notion that beating the market is not possible based on historical data. They employ a technical analysis pattern rule(flag)andachievereturnsthatarehigherfortheEuropeanmarketthanfortheUSstockmarketindex (USindex).

Onlyafewauthorsfocusedoncomparingthe actual returns withthe Buy–Hold Strategy When Evaluating the performance of their strategies (Dymova et al,2010, 2012). Furthermore, return volatility adds value to technical analysis rules by increasing their predictability (Ulku&Prodan,2013). Technical analysis strategies can be used to create a linear forecasting model,which must then be adjusted in response to market conditions (Neely & Weller 2014). Sinceartificial intelligence adds value to technical analysis indicators by reducing time decay and eliminating human emotions and interruptions,ithasbecomeincreasinglypopular(Chandwaniet al, 2014).

Lee et al (2021) studies deep neural network and technical analysis for short term pricepredictionofstockmarket.HeusesLSTMmodel(LongShort-
TermMemory),whichincludespopulartechnicalindicatorslikeRSI,MACD,RSI,BIASetc.Themodelhavemorethan83%s ignificance on prediction.

Shynkevich(2012)investigatetechnicalanalysisruleontechnologyandsmallcapsectorswiththe help of data from 1995 to 2010, and they conclude that technical analysis is not able toperformwellwhencomparedtoBuy-Holdstrategy;ontheotherhand,technicalanalysishasasuperiorshorttermpredictability.

III. Objectives

1. To explore the significance of EMA(technical analysis)onenergy stocks through Momentum trading.
2. Toreviewandcomparetheactiveinvestmentstrategyandpassiveinvestmentstrategy.
3. To develop "Momentum Trading/Investment Model".

IV. Hypothesis

Null Hypothesis (H0)

1. The mean returns through momentum trading of portfolioreturns are equal.
   Null Hypothesis (H0)
2. Themeanreturnofactiveinvestmentstrategyandpassiveinvestmentstrategyareequal.

V. Methodology

In this research paper, we use energy stocks as a sample for exploring the significance of exponential moving average on momentum strategy (long side). We choose following stocks as a research sample Reliance Industries (32.83), Power Grid Corporation (11.65) and NTPC(9.86), since they have highest weight age in the energy index, collectively more than 53% of Nifty Energy Index. Thesample time duration for research is2016-2021.
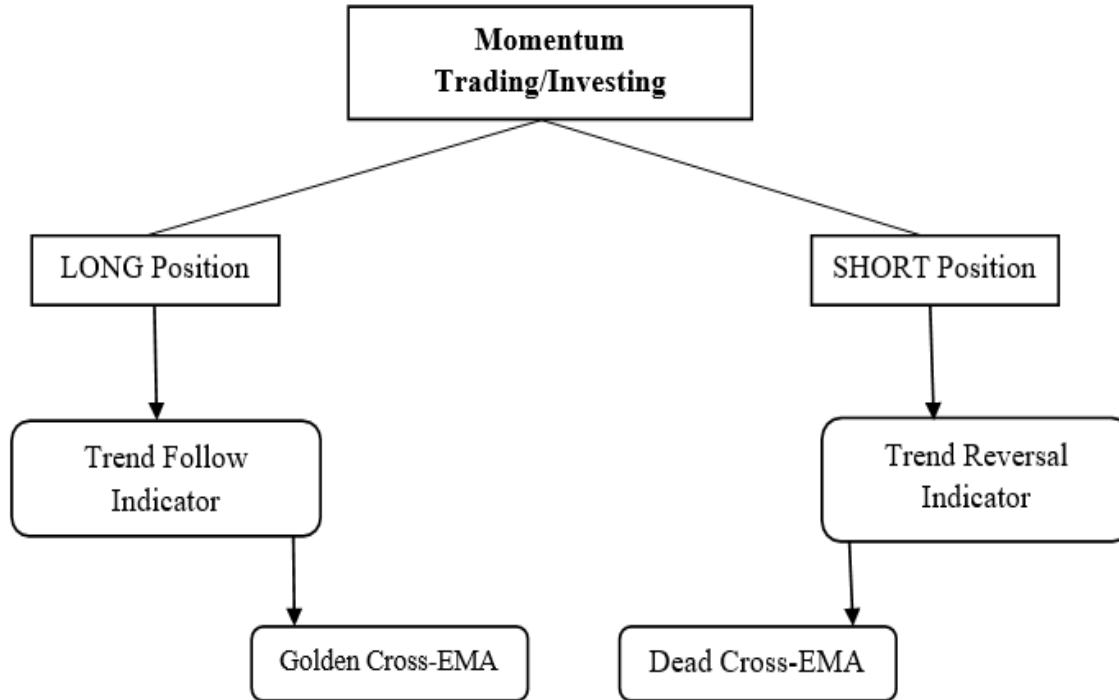
Fig. 1: Momentum Trading Model based on Exponential Moving Average

First, we cross-check the least square method for validation and identification of trend ofselectedstocks.Since,momentumtradingisallaboutunderstandingtrendfollowingandtrendreversal. Once we validate the up-trend of selected stocks then with the help of EMA crossover trading system (Ami-broker), we proceed for back-test based on historical data (2016-2021).

By developing this strategy in Ami-broker formula language, we can use back-testing past data individually and collectively as portfolio for selected Nifty energy stocks which are heavy weights in the index.

1. Reliance Industries Limited
2. Power Grid Corporation
3. NTPC

VI. Result and Discussion
Benchmark Indian Banks FD:6%

Table 1: Result of the Selected Stocks

Co.Name/Factors	Portfolio	RIL	PGC	NTPC
	1	2	3	4
InitialCapital	100000	100000	100000	100000
Ending Capital	320370	584346	189987	186776
PassiveReturn(B/H)	11%	27%	7.50%	-2%
Drawdown(PassiveReturn)	38%	36%	31%	48%
ActiveReturn	18%	33%	11%	11%
Drawdown(ActiveReturn)	13%	14%	11%	13%
R Square	33%	47%	24%	29%
Trend(Slope)	UPWARDS	UPWARDS	UPWARDS	UPWARDS

Source: Author Compilation

Table 1. depict us that the trend of all the selected security is an upward direction as perregression analysis,andRsquareofRIL,PGCandNTPCis47%,24%and29%respectively.As per Fig. (2,3,4) every one percent nifty increase gives positive impact of RIL, PGC andNTPCby38%, 46% and40%.

After back-testing with EMA, all the securities having positive returns RIL, PGC and NTPC33%,11%,11%respectively.Ontheotherhand,NTPChavingnegativereturnsinPassivestrategy. In the passive strategy drawdown is also very high. Overall Portfolio having a significant result in active strategy but passive strategy not having a significant contribution,although they manage toget11%,which is more thanFixeddeposit(7%)as a benchmark.

In the short to medium term, the Exponential Moving Average (EMA) demonstrates a strong presence in the Indian stock market (energy sector). When we compare the present returns ofallselectedcompanieswithafixedrate,wefindthatallequitiesachieverespectableresultsaswell.Thenumberoftradesinase lectedtimeframeislower,buttheaccuracyrateisquitehigh.WhenNTPC'sdrawdowniscomparedtootherselectedstocks,the differenceissignificant.Allofthetradesareprofitablebecauseofthetechnicalanalysisstrategy. Whencomparedtootherstocks and even universal benchmarks such as fixed deposits, the overall portfolio returns are outstanding(7 percent P.A).

This portfolio is based on the synergies of two separate analyses of the financial markets.Regression analysis and technical analysis on the momentum strategy are performed on thethree companies in the portfolio, which results in a diversified portfolio. In consideration of afavorablestockmarketsituationandastrongfundamentalvalueofacompany,onecanexpecta good return in the medium to long term with the help of indicators such as the RSI, MACD,andBollinger band,asdemonstratedin researchappliedtoselected data.
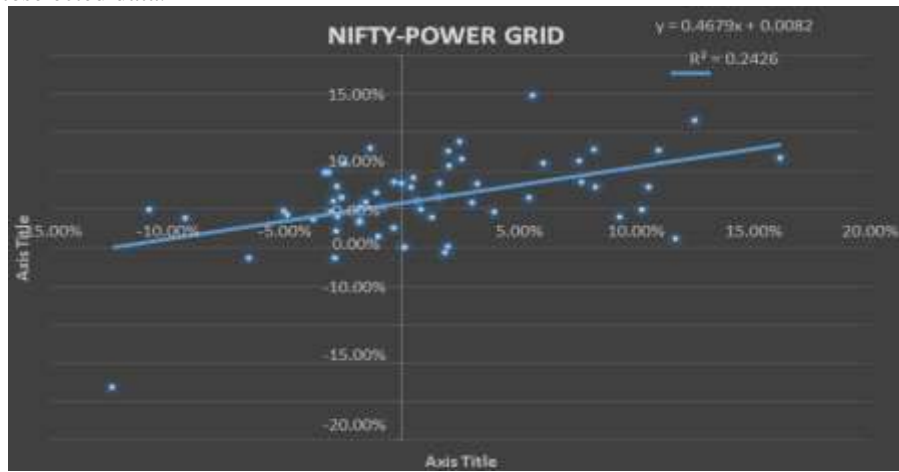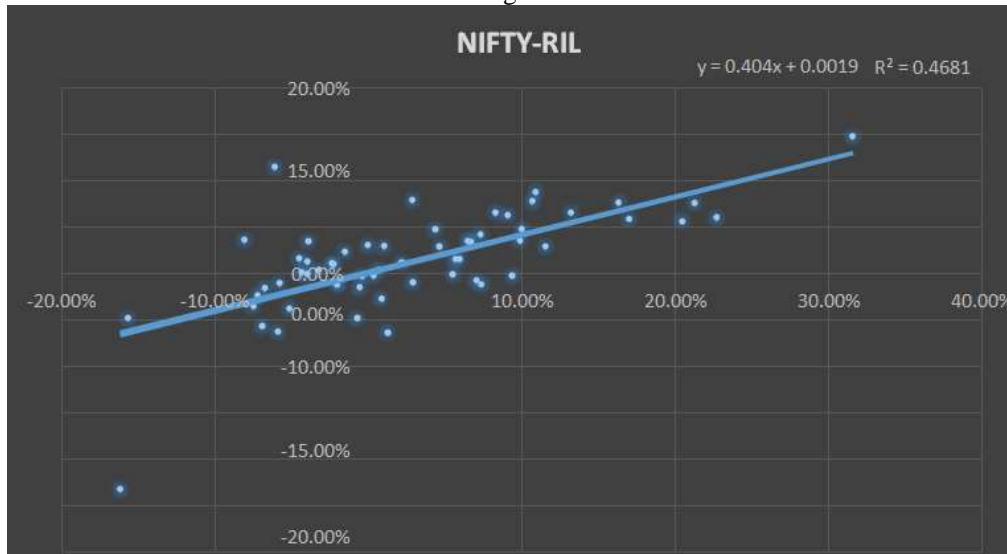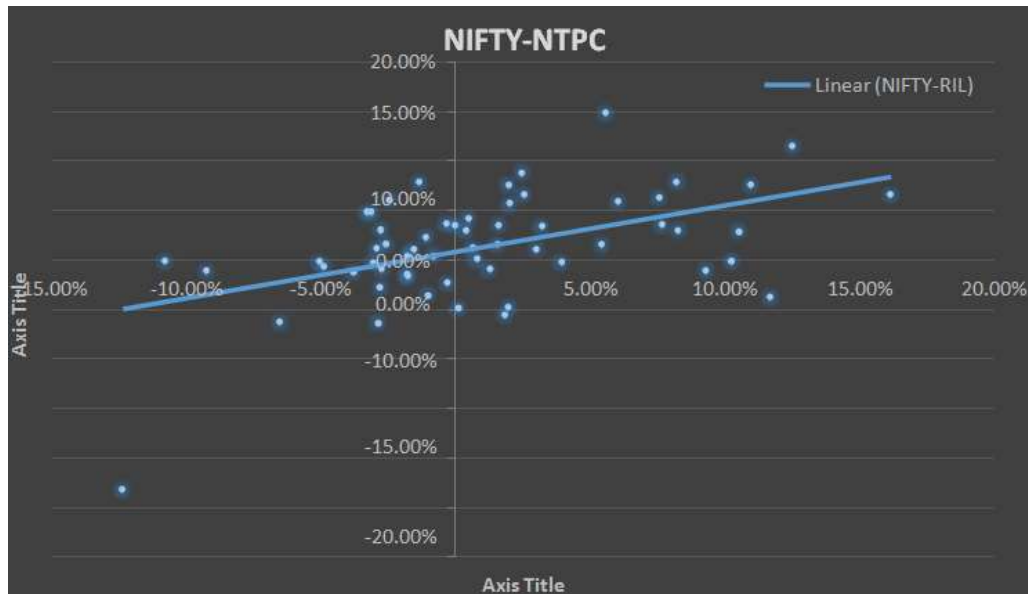

Fig. 2

Fig. 3

Fig. 4

VII.   Conclusion

1. By looking at the results Regression analysis and Technical analysis we can conclude that the mean returns through momentum trading of portfolio returns are unequal. So,we can reject Null Hypothesis(Ho).

2. The mean returns of Passive strategy are not significant as compare to Active strategy Since active strategy return is more than passive strategy. We can reject NullHypothesis (Ho).

Our results suggest that momentum trading positively influence trading behaviors with respect to Exponential moving Average. EMA outperform positively, when we compare the results with benchmark (7%).

Future research could be on behavioral technical analysis and other mix of financial analysis methods along with machine learning, deep learning, artificial intelligence and quantum computing with finance.

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