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“ TRADING THROUGH TECHNICAL ANALYSIS WITH MACD AND EMA INDICATORS ”

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Abstract: With growing digitization, not only in the financial markets, technical indicators are more accessible to more and more traders. In addition, the ever-shortening investment horizon often leads to a shift away from fundamental analysis and emphasizes the use of technical analysis. Currently, there is still discussion on the effectiveness of technical analysis in contrast to the validity of effective market theory. While practitioners compose, most trading systems are just based on technical indicators and price action, the academic community is increasingly inclined to the theory of random asset development. The aim of the research is to analyse the differences in the effectiveness of technical analysis MACD and EMA indicators of real assets with the application of the same indicators to randomly generated values. Random values are then generated. The output of the article is to evaluate the performance of the trading cycle based on selected indicators of technical analysis by comparing stock market and currency pair data and randomly generated data.

keywords: MACD, EMA, Currency Pairs, Indian Companies

Introduction:

Technical analysis is an analysis methodology for forecasting the direction of prices through the study of past market data, primarily price and volume. Behavioral economics and quantitative researchers use many of the same tools of technical analysis, which, being an aspect of active management, stands in contradiction to much of modern portfolio theory.

The efficacy of both technical and fundamental analysis is disputed by the efficient-market hypothesis, which states that stock market prices are essentially unpredictable, and research on technical analysis has produced mixed results.

Overview of Indicators:

Moving Average Convergence/Divergence (MACD)

Moving average convergence divergence (MACD) is a trend-following momentum indicator that shows the relationship between two moving averages of a security's price. The MACD is calculated by subtracting the 26-period Exponential Moving Average (EMA) from the 12-period EMA. The result of that calculation is the MACD line. A nine-day EMA of the MACD called the "signal line," is then plotted on top of the MACD line, which can function as a trigger for buy and sell signals. Moving average convergence divergence (MACD) indicators can be interpreted in several ways, but the more common methods are crossover, divergence and rapid rises/falls.

Key Features

- Moving average convergence divergence (MACD) is calculated by subtracting the 26-period exponential moving average (EMA) from the 12-period EMA
- MACD triggers technical signals when it crosses above (to buy) or below (to sell) its signal line.
- The speed of crossovers is also taken as a signal that a market is overbought or oversold.

CALCULATION

$$\text{MACD} = \text{EMA}(12) - \text{EMA}(26)$$

$$\text{Signal} = \text{EMA}(\text{MACD}(9))$$

$$\text{EMA} = (K \times (C - P)) + P$$

EMA INDICATOR

An exponential moving average (EMA) is a type of moving average (MA) that places a greater weight and significance on the most recent data points. The

exponential moving average is also referred to as the exponentially weighted moving average. An exponentially weighted moving average reacts more significantly to recent price changes than a simple moving average (SMA), which applies an equal weight to all observations in the period. We select the 5 or 20 period ema.

KEY FEATURES

- The EMA is a moving average that places a greater weight and significance on the most recent data points.
- Like all moving averages, this technical indicator is used to produce buy and sell signals based on crossovers and divergences from the historical average.
- Traders often use several different EMA lengths, such as 10-day, 50-day, and 200-day moving averages.

CALCULATION

$$EMA = (K \times (C - P)) + P$$

Where,

C = Current Price

P = Previous periods EMA (A SMA is used for the first periods calculations)

K = Exponential smoothing constant

OBJECTIVES

- To analyse Historical trend repeat itself
- To identify price moves in trends of currency pairs and selected Indian companies.
- To understand the level of maximum profit earn from use the MACD and EMA indicator

Hypothesis

H0– The return of the investment positions based on the MACD tool is significant of the Buy & Hold strategy;

H1 – The return of the investment positions based on the MACD tool is no significant of the Buy & Hold strategy;

H0– The return of the investment positions based on the EMA tool is significant of Buy & Hold strategy;

H1 – The return of the investment positions based on EMA tool is no significant of the Buy & Hold strategy;

RESEARCH METHODOLOGY

Research methodology outlines the planning table before starting the research.

Research Design: We have been used descriptive research design

Sources of Data: We collect the data from the annual report of the company, and some data collected from the NSE website, currency pairs data collected from the website of global view, website of selected journals, article and research paper on technical analysis, MACD and EMA also considered for the data collection.

Data Collection Method: For this research we focused on secondary data methods for data collection.

Population: We studied 3 currency pairs (EUR/USD, USD/JPY, GBP/USD) and 3 Indian companies (RELIANCE, TATA MOTORS, HDFC) for this research.

Sample size: In this research paper we select only last 10 years data for the sample size in the study

Literature review:

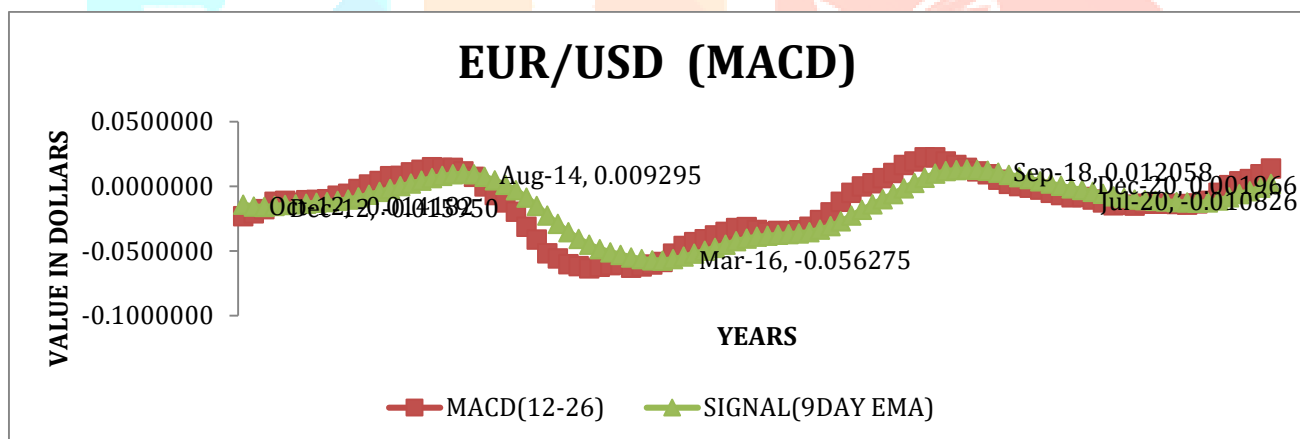
- (1) **Sehgal AND Garhyan,(2002)** evaluated whether share recommendations based on technical analysis provide abnormal returns in the Indian capital market. Several returns have been employed including those adjusted for market trend, risk and transaction costs. The study involved 21645 recommendations for 21 companies using 13 technical indicators. The mean return was found statistically significant for the total period. but the gains disappear in the case of market adjusted measures. The returns were found significant for the risk-adjusted measures and also after the adjustment for transaction costs.
- (2) **R.Chitra,(March, 2011)** Technical analysis on selected stocks of the energy sector' researcher has studies that trends and patterns in share price movement via moving averages. By using technical analysis tools like Moving Averages and Relative Strength Index for interpreting buy and sell price of the stock and by using beta of the stock to discover the risk factor.
- (3) **MURPHY, John J,(1999).** Technical Analysis of the Financial Markets: A Comprehensive Guide to Trading Methods and Applications. New York: New York Institute of Finance: In this book presented a lot of variations on the moving average approach. I only referred to the moving average. Most traders

use simple averages. Although exponential moving averages have become popular, the most commonly used daily moving average combinations in future markets are 4 and 9, 5 and 20, Bollinger Bands make use of 20 day and 20 week moving averages. systems work extremely well in trending markets and can be used on daily , weekly, and monthly charts.

- (4) **Shah Nisarg Pinakin (2013)** In this study, I take two methods for finding Buying and Selling signals and for finding return. Out of two methods MACD comparatively give good return and profit than stochastic oscillator
- (5) **C. Boobalan (Jan-March, 2014)** in this paper titled “Technical analysis in selected stocks of Indian companies” researcher has studied that by using fundamental analysis and technical indicators future price of the stock have been predicted. Technical analysis also required a fundamental understanding.

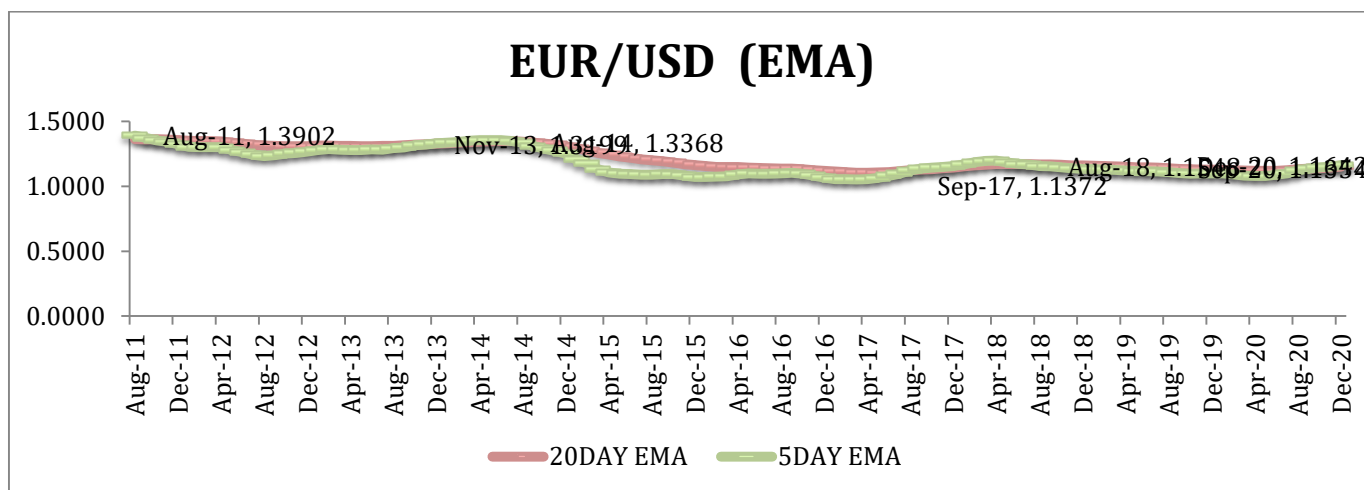
Data Analysis:

MACD v/s Buy & Hold EUR/USD's chart



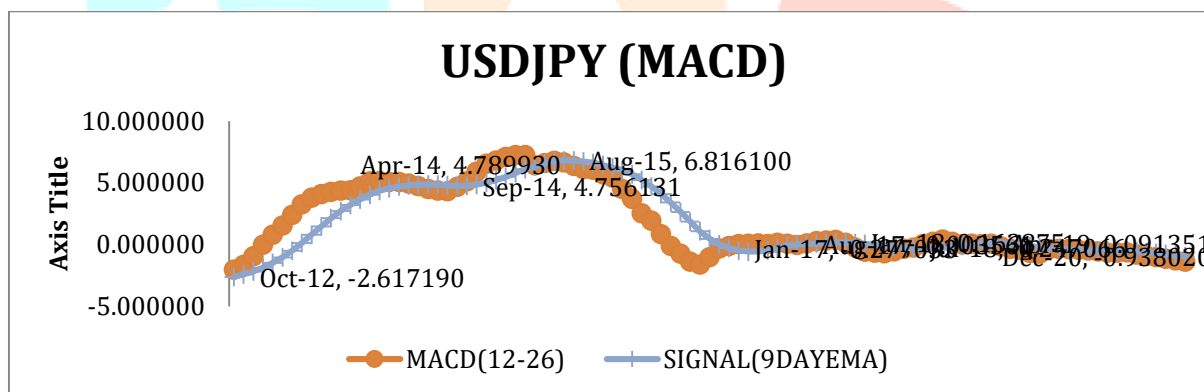
MACD signals for EUR/USD results 1818 pips profit .This 1818 pips profit contained 223 pips loss from buy transaction and 2071 pips profit from sell transaction. From BUY & HOLD strategy loss 778 pips and give return – 6.02%.

EMA v/s Buy & Hold EUR/USD's chart



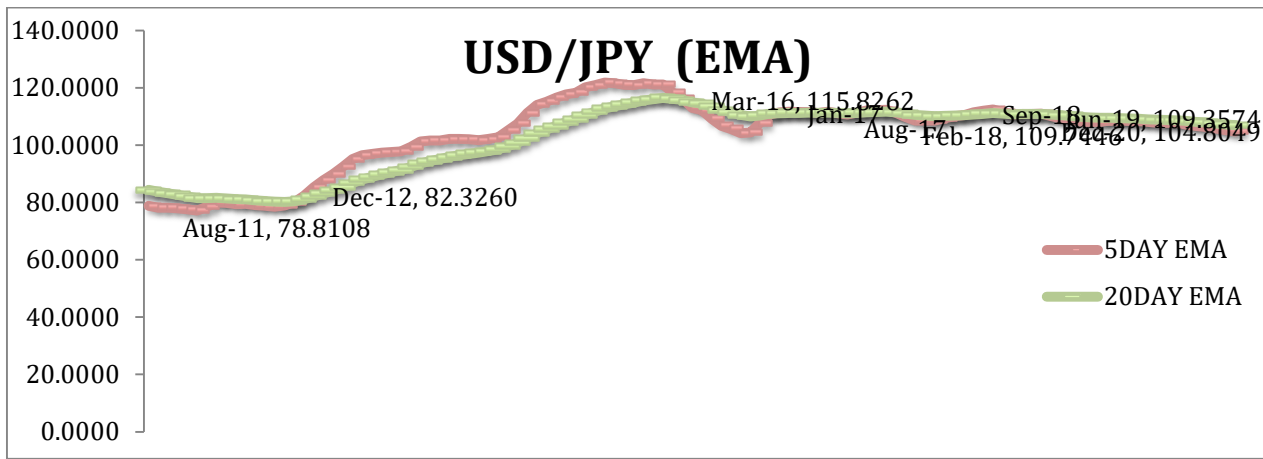
EMA signals from EUR/USD results 1761 pips profit .This 1761 pips profit contained 1999 pips profit from sell transaction and 238 pips loss from buy transaction. From BUY & HOLD strategy loss 2237 pips and return generated from that -15.56%

MACD v/s Buy & Hold USD/JPY's chart



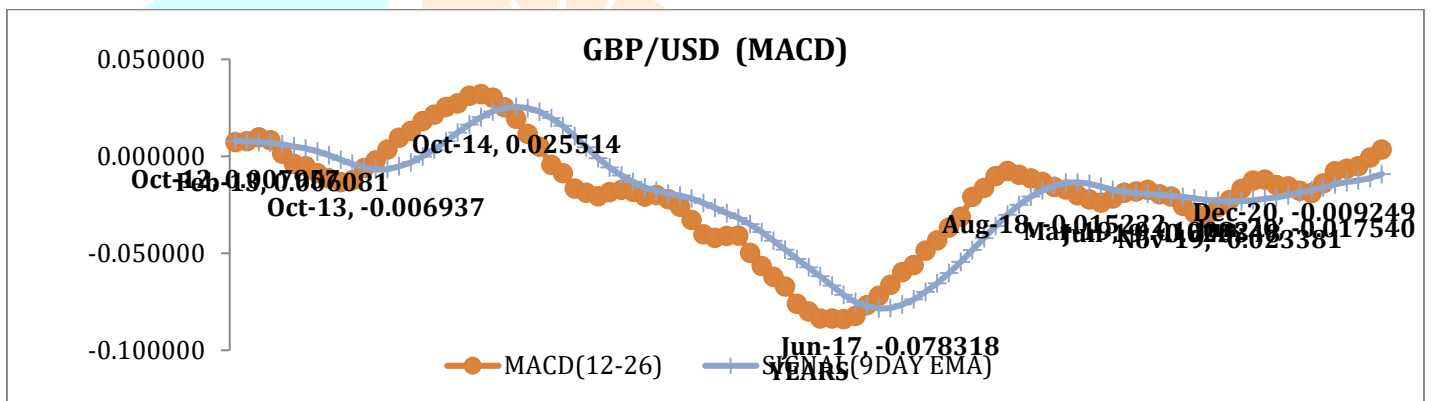
MACD signals for USD/JPY results 35.284 pips profit .This 35.284 pips profit contained 29.697 pips profit from buy transaction and 5.587 pips profit from sell transaction. From BUY & HOLD strategy loss 778 pips and give return 30.21%

EMA v/s Buy & Hold USD/JPY's chart



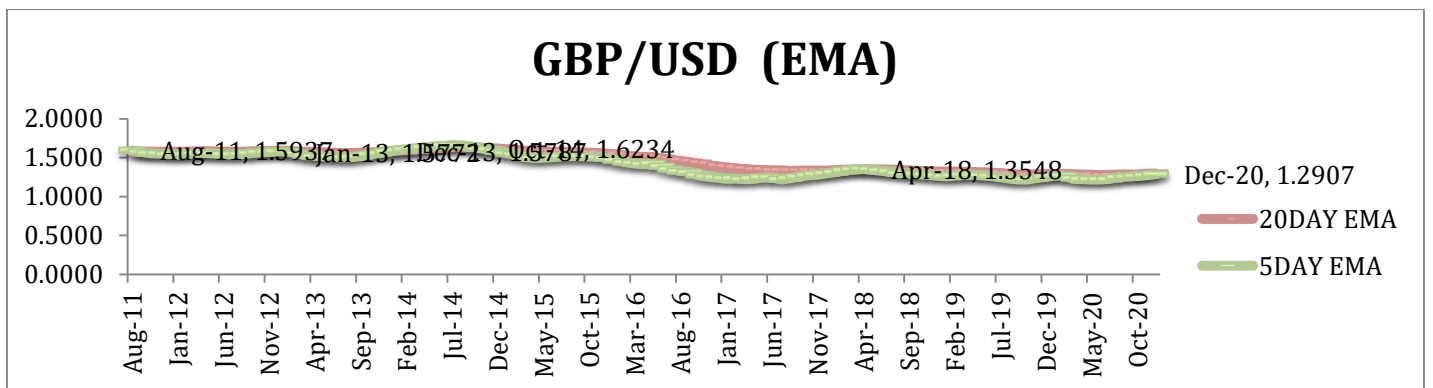
EMA signals from USD/JPY results 44.55 pips profit .This 44.55 pips profit contained 8.608 pips profit from sell transaction and 35.958 pips profit from buy transaction. From BUY & HOLD strategy profit 27.35 pips and return generated from that 35.72%

MACD v/s Buy & Hold GBP/USD's chart



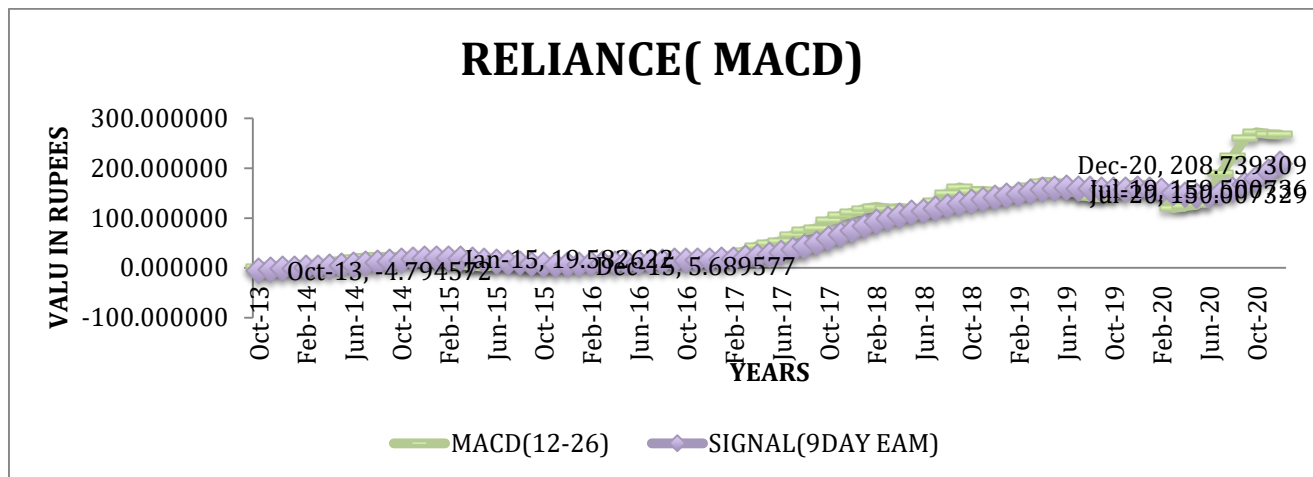
MACD signals for GBP/USD results 342.3 pips profit .This 342.3 pips profit contained 423 pips profit from buy transaction and 3000 pips profit from sell transaction. From BUY & HOLD strategy loss 0.26 pips and generate return -16.08%.

EMA v/s Buy & Hold GBP/USD's chart



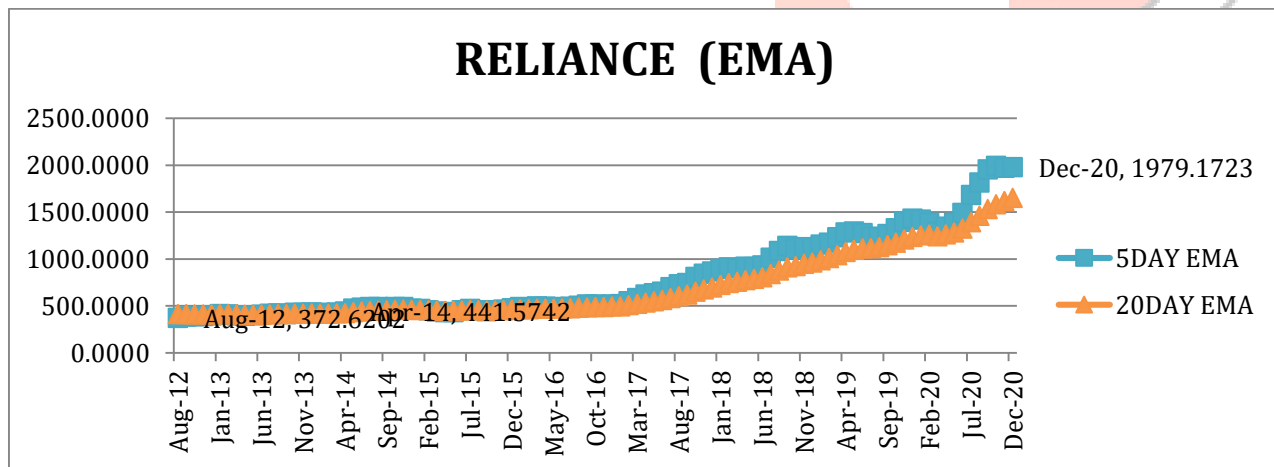
EMA signals from GBP/USD results in 342.3 pips profit .This 342.3 pips profit contained 3000 pips profit from sell transaction and 42.3 pips profit from buy transaction. From BUY & HOLD strategy profit -0.26 pips and return generated from that - 16.08%.

MACD v/s Buy & Hold RELIANCE's chart



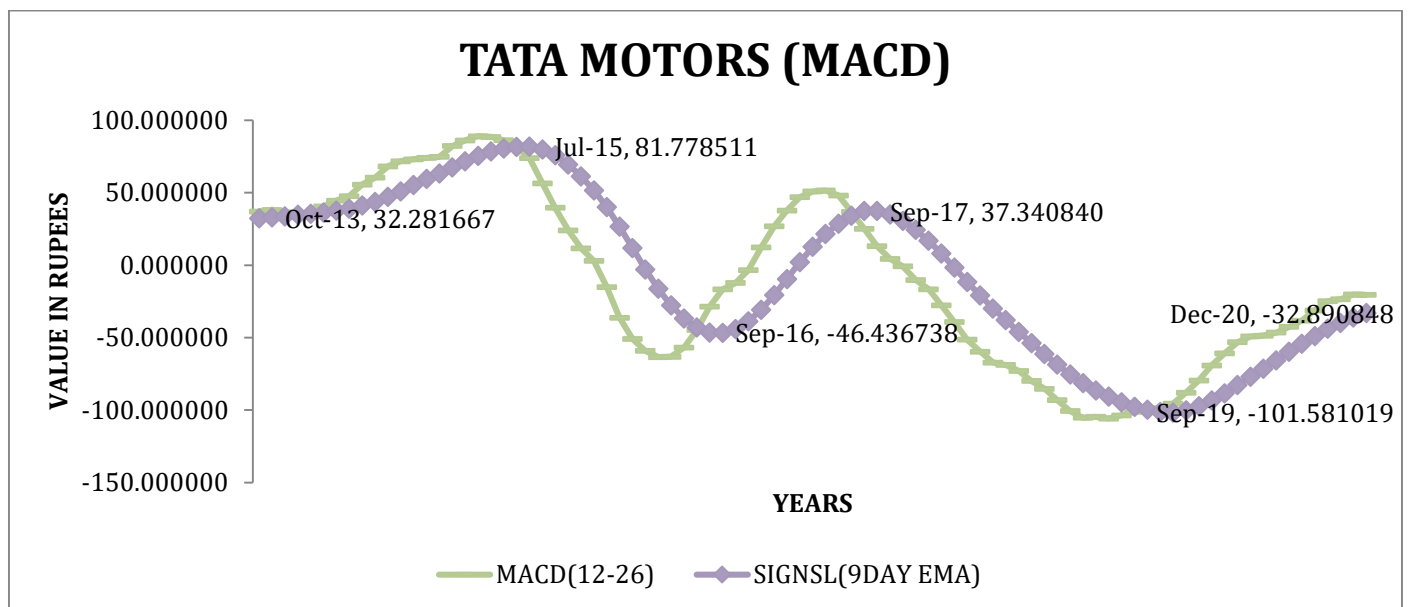
MACD signals for Reliance results -379.58 loss .This -379.58 loss contained Rs 581.43 profit from buy transaction and Rs 961.01 profit from sell transactions. From BUY & HOLD strategy loss Rs 1542.44 and generate return 340.45%

EMA v/s Buy & Hold RELIANCE's chart



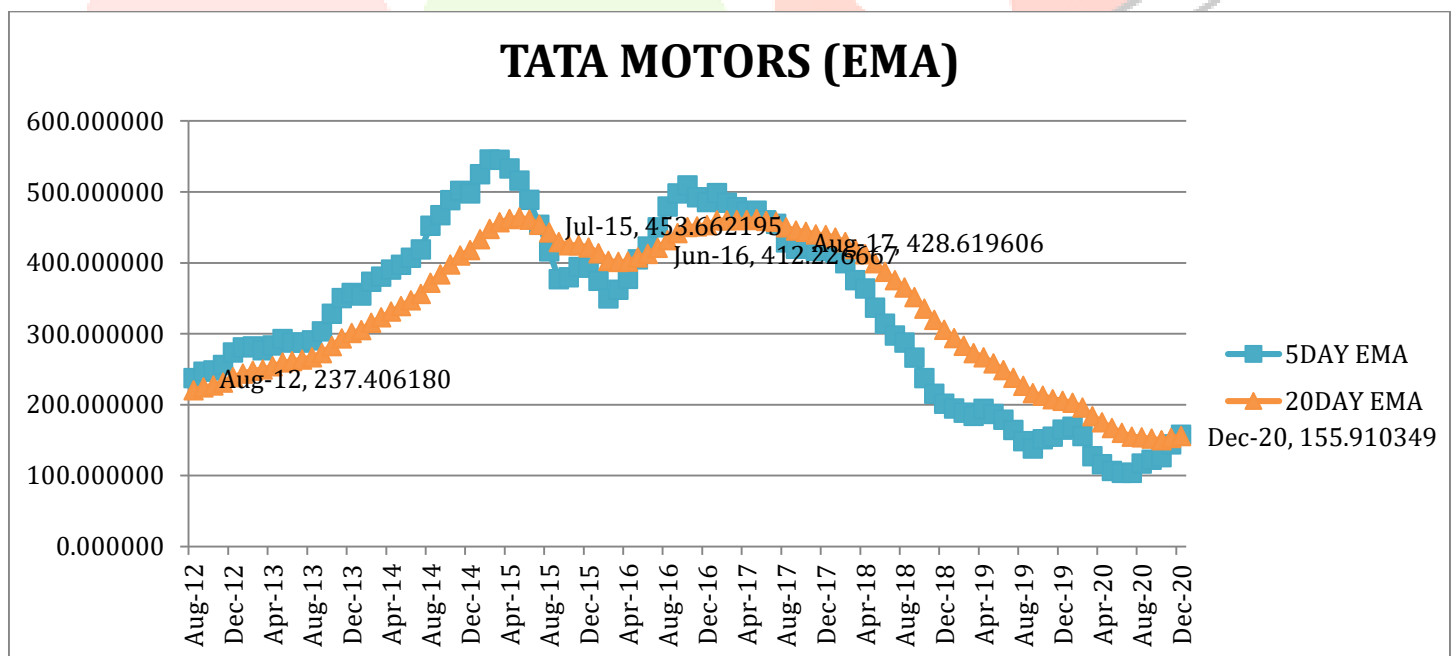
EMA signals from RELIANCE results in (Rs 1358.78) loss.This (Rs 1358.78) loss contained (1500.84) loss from sell transaction and Rs 115.06 profit from buy transaction. From BUY & HOLD strategy profit Rs 1615.9 and return generated from that 425.68%.

MACD v/s Buy & Hold TATA MOTORS's chart



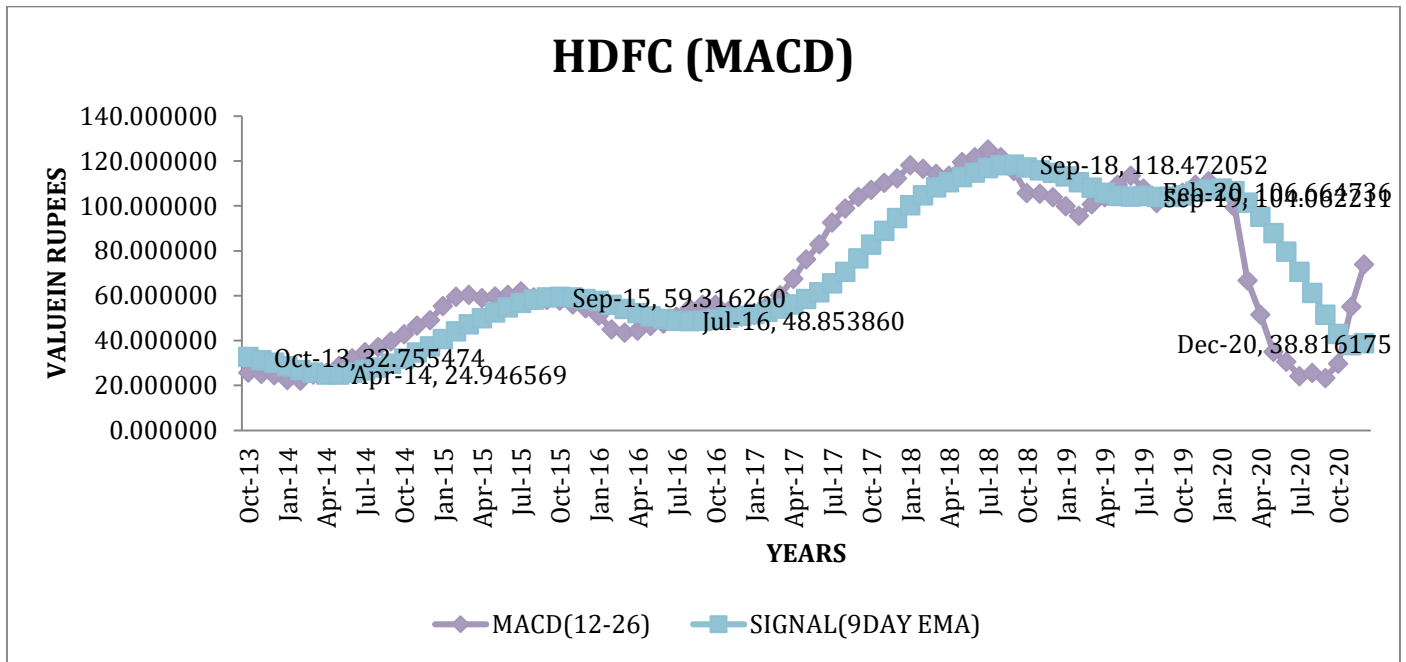
MACD signals for TATA MOTORS results in Rs 73.14 profit contained (Rs 59.91) loss from buy transaction and Rs 133.05 profit from sell transaction. From BUY & HOLD strategy loss (Rs192.96) and generate return -51.17%.

EMA v/s Buy & Hold TATA MOTORS's chart



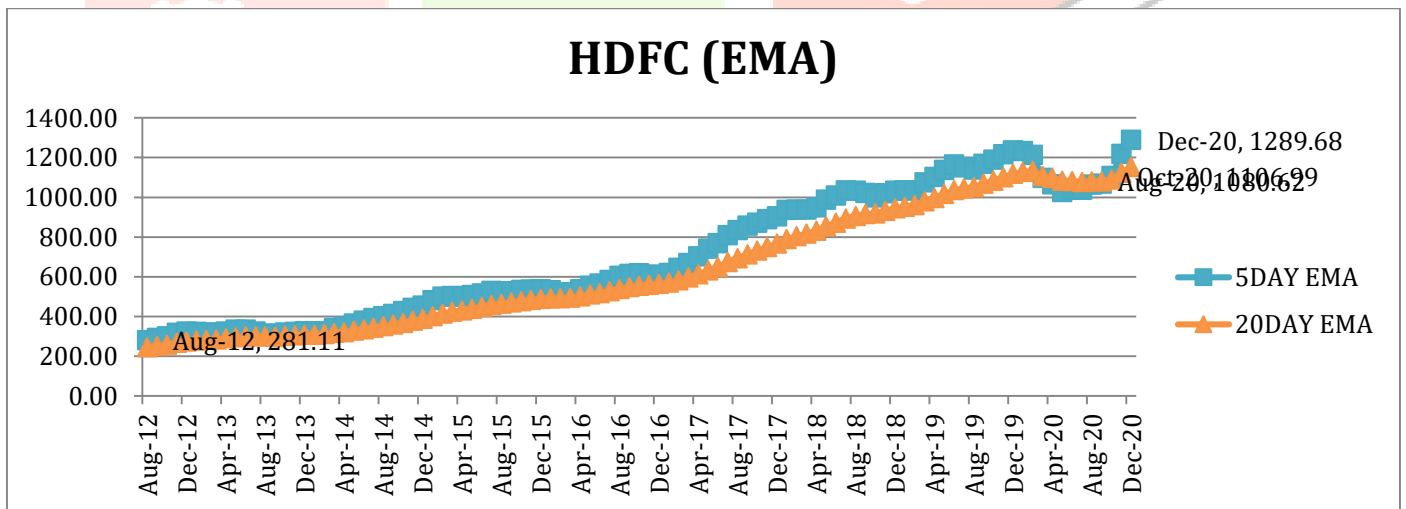
EMA signals for TATA MOTORS results in Rs 186.34 profit. This Rs 186.34 profit contained Rs 117 profit from sell transaction and Rs 69.34 profit from buy transaction. From BUY & HOLD strategy loss Rs 47.66 and return generated from that -20.56%.

MACD v/s Buy & Hold HDFCS's chart

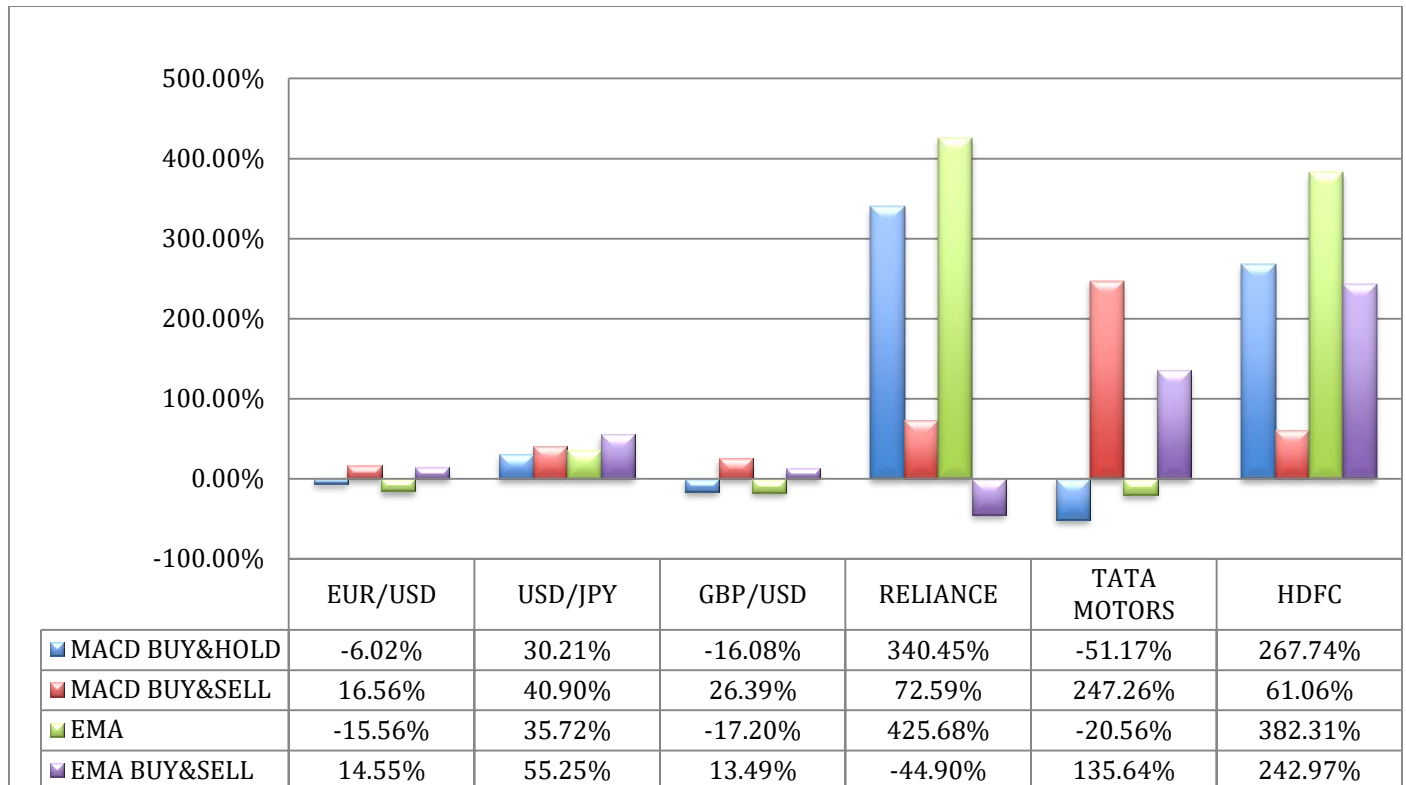


MACD signals for HDFC results at Rs 95.93 profit. This Rs 95.93 profit contained Rs 502.64 profit from buy transaction and Rs (406.71) loss from sell transaction. From BUY & HOLD strategy profit Rs 909.35 and generate return 267.74%. in this whole time duration given the 7 buy &sell signal given.

EMA v/s Buy & Hold HDFCS's chart



EMA signals for HDFC results at Rs 771.99 profit. This Rs 771.99 profit contained Rs (181.75) loss from sale transaction and Rs 953.74 profit from buy transaction. From BUY & HOLD strategy profit Rs 1135.49 and return generated from that 242.97%.In this given 4 signal for buy and

FINDINGS:**MACD and EMA result**

In this research paper we deeply understood the different return generated from different companies and different currency pairs for the MACD

1. EUR/USD through BUY & HOLD strategy generate the return -6.02% and buy & sell through generated return 16.56% overall return generated from the MACD is 22.58%.
2. In the USD/JPY , the overall MACD profit is 10.69%.
3. Highest overall return generated from the TATA MOTORS is 298.43%. and lowest profit generated from the USD/JPY its 10.69% for the EMA
4. In GBPUSD through buy&hold strategy generate the return – 16.08% and from the buy&sell generate the profit 26.39% overall profit from this 30.69%.
5. Highest overall return generated from the RELIANCE 470.58% and lowest return generated through USD/JPY 19.53%.

CONCLUSION

EMA indicator is more return generated for the companies in RELIANCE higher profit generated in buy&hold strategy then the buy & sell signals so buy&hold strategy significant for reliance.

TATA MOTORS higher profit generated through the buy & sell strategy in MACD indicator 298.43%. but for the HDFC higher return generated through buy&hold strategy 267.74% overall return 206.68%. it's quite good. There are various strategies significant for the different companies and currency pairs. Some had generated higher profit from the MACD buy&hold strategy or buy & sell strategy and some were from the EMA indicators buy & hold or buy & sell strategy.

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video link

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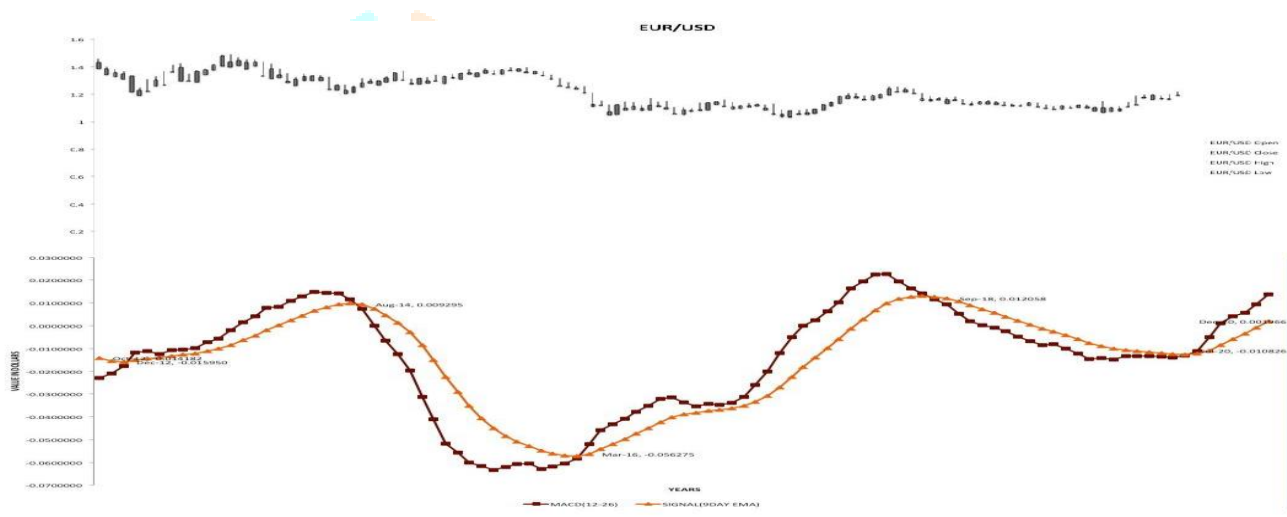
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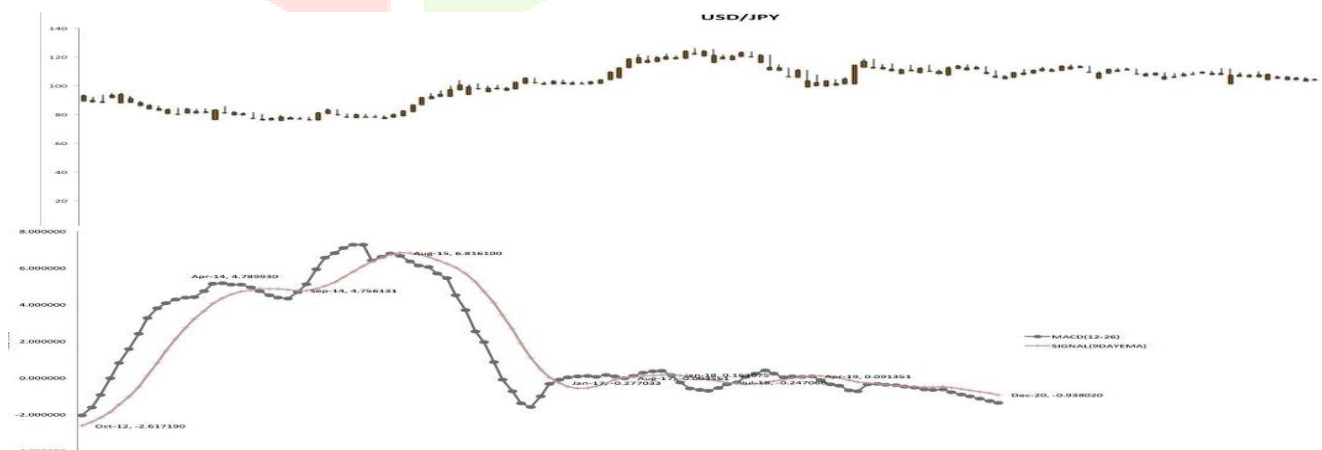
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Appendix- EUR/USD Price [MACD] (Jan 1st,2010–Dec 31st 2020)



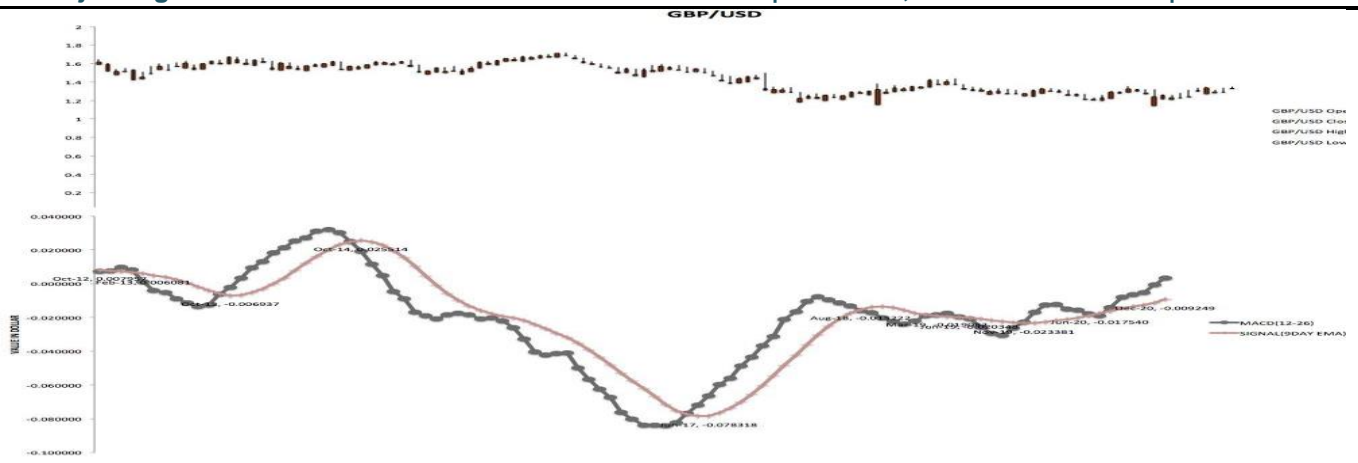
Source: Author

Appendix- USD/JPY Price [MACD] (Jan 1st,2010–Dec 31st 2020)



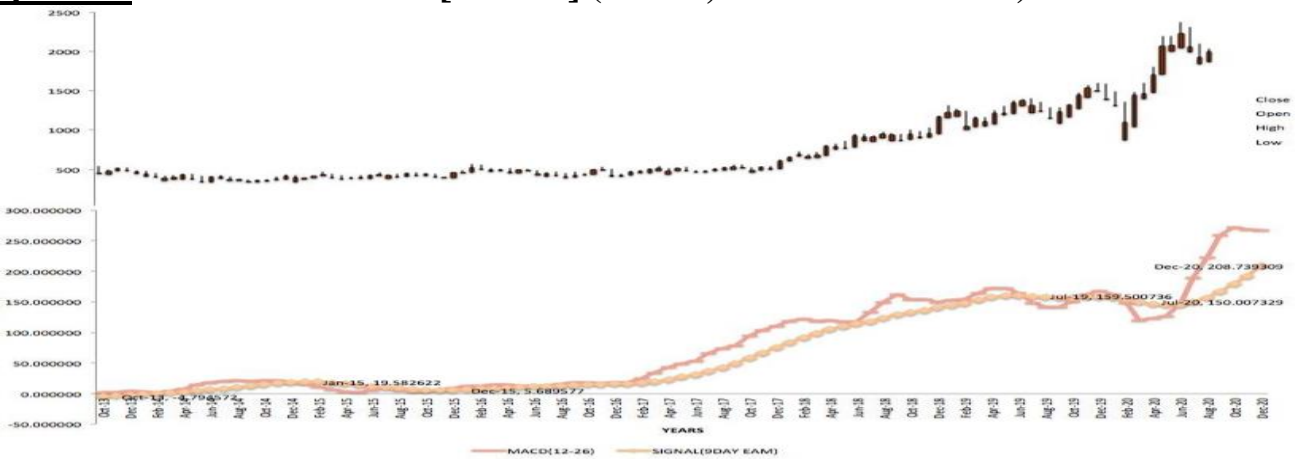
Source: Author

Appendix- GBP/USD Price [MACD] (Jan 1st,2010–Dec 31st 2020)



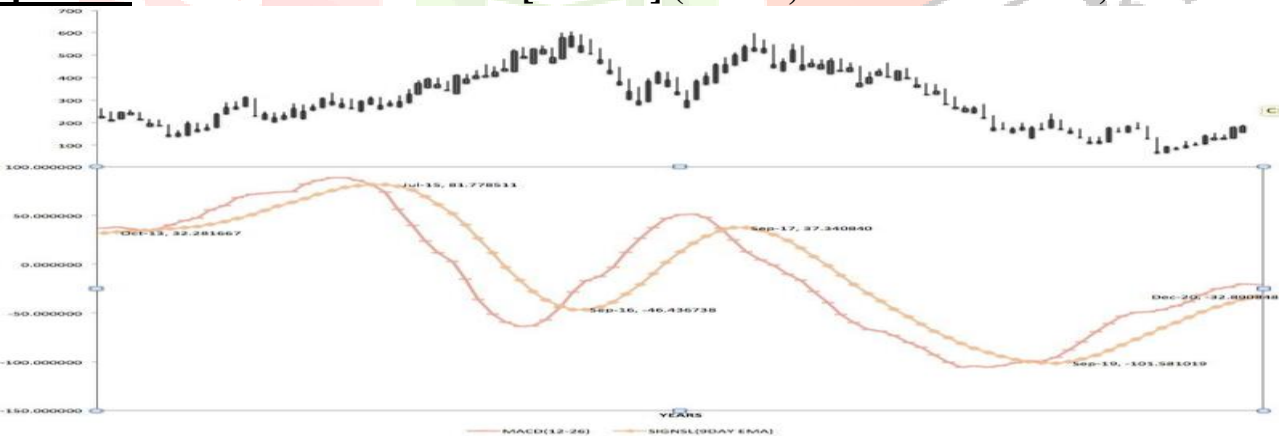
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Appendix- RELIANCE Price [MACD] (Jan 1st,2010–Dec 31st 2020)



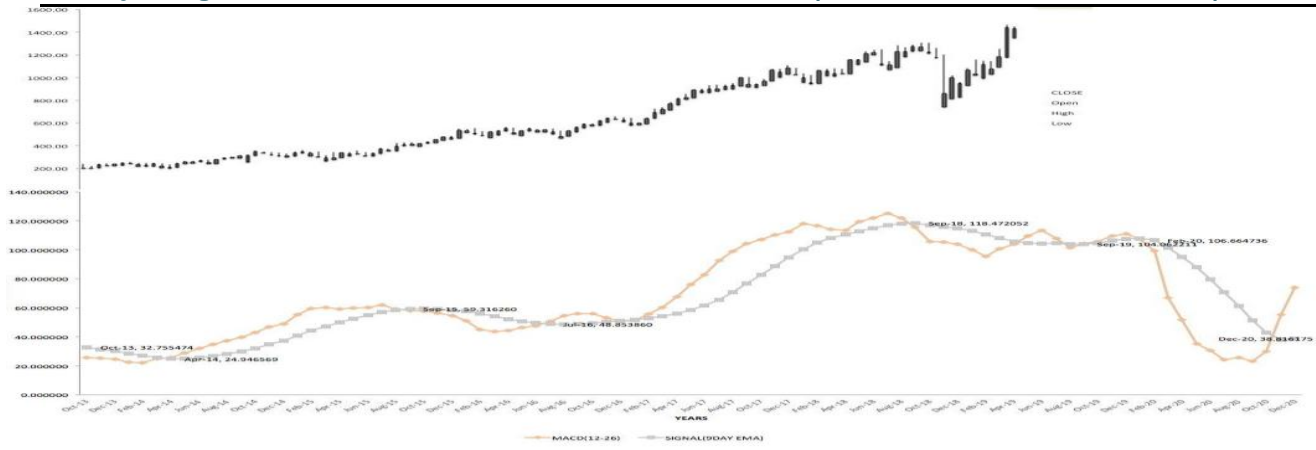
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Appendix- TATA MOTORS Price [MACD] (Jan 1st,2010–Dec 31st 2020)



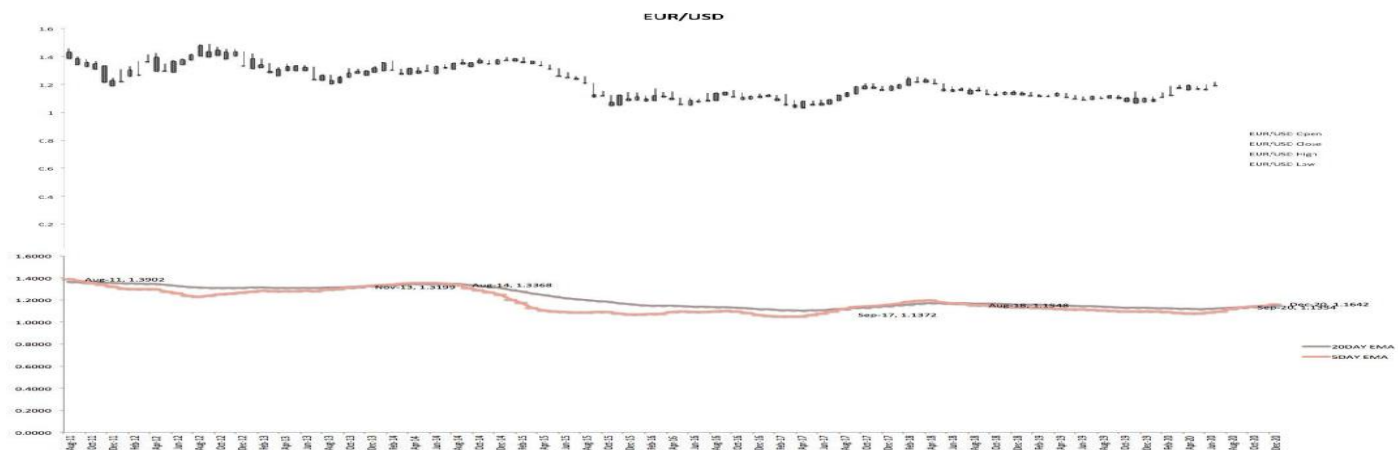
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Appendix- HDFC Price [MACD] (Jan 1st,2010–Dec 31st 2020)

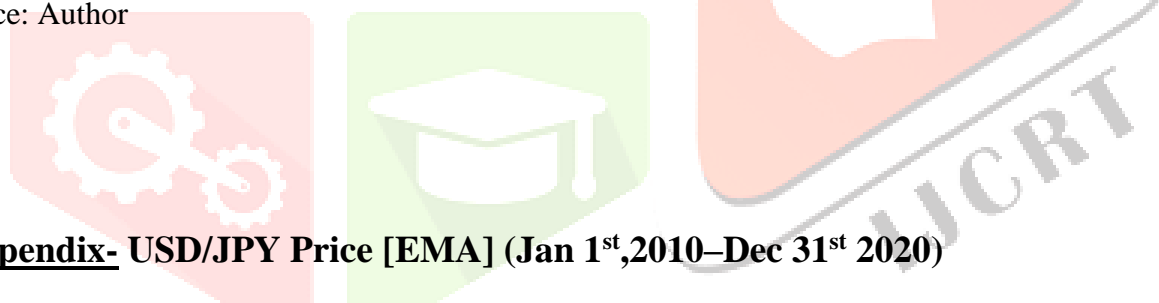


Source: Author

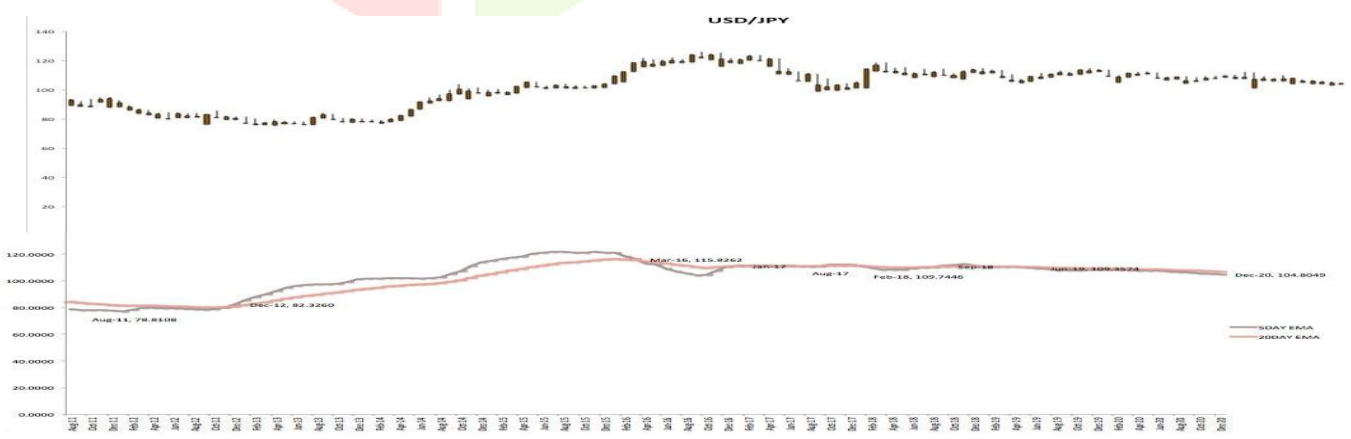
Appendix- EUR/USD Price [EMA] (Jan 1st,2010–Dec 31st 2020)



Source: Author

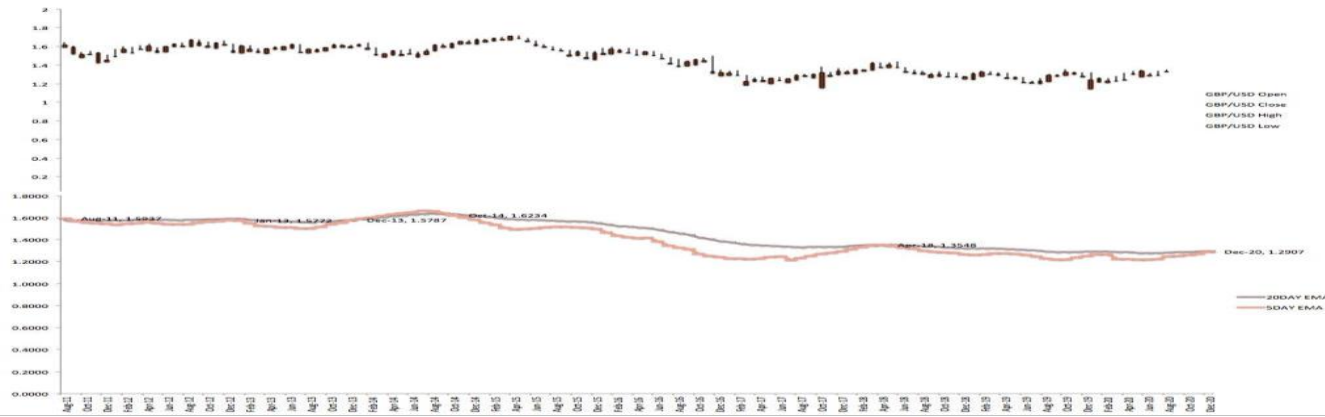


Appendix- USD/JPY Price [EMA] (Jan 1st,2010–Dec 31st 2020)



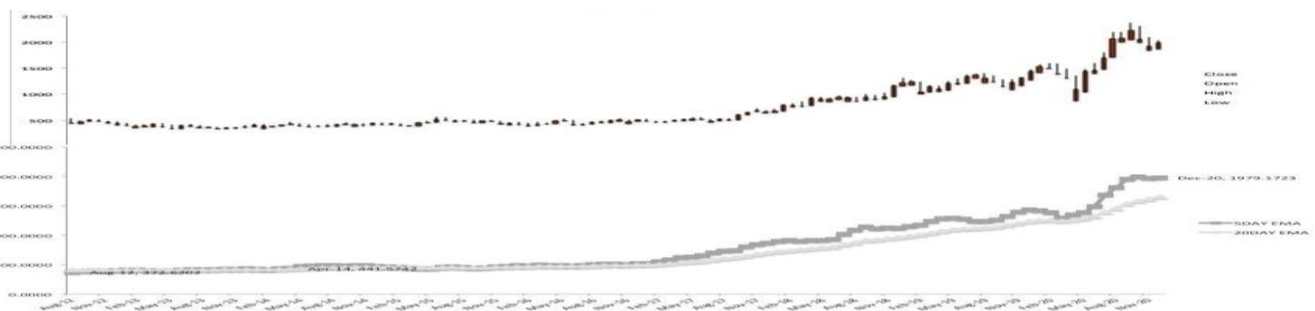
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Appendix- GBP/USD Price [EMA] (Jan 1st,2010–Dec 31st 2020)



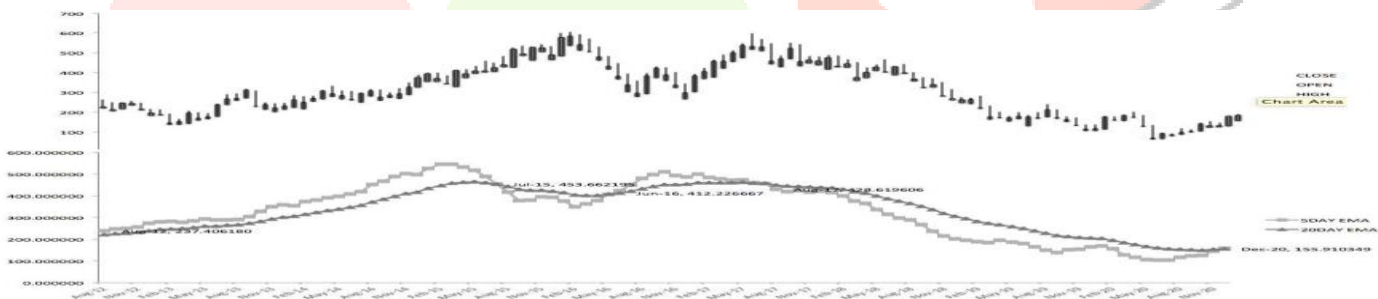
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Appendix- RELIANCE Price [EMA] (Jan 1st,2010–Dec 31st 2020)



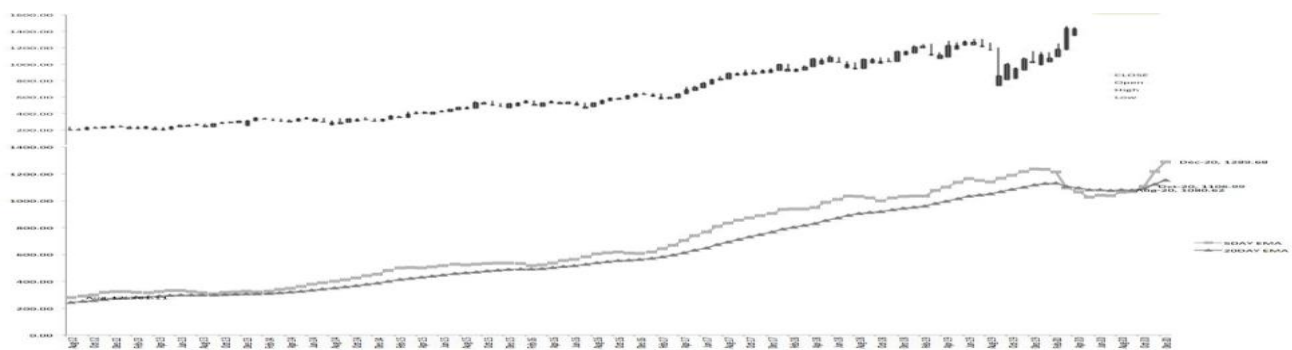
Source: Author

Appendix- TATA MOTORS Price [EMA] (Jan 1st,2010–Dec 31st ,2020)



Source: Author

Appendix- HDFC Price [EMA] (Jan 1st,2010–Dec 31st ,2020)



Source: Author