

Comparison Between Exponential Moving Average Based MACD with Simple Moving Average Based MACD of Technical Analysis



Engineering

KEYWORDS : MACD, EMA, SMA, 1st buying signal predicted then next selling signal predicted (1B, 1S), 26 D (26 days), 12 D (12 days).

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ABSTRACT

The moving average convergence divergence (MACD) is one of the most well known and used indicators in technical analysis. This indicator is comprised of two moving averages, which help to measure momentum in the security. Now the study two types of moving average measures which are: Exponential moving average and Simple moving average. The paper studies that by using these different moving average methods on MACD indicator how well 1 method of moving average provide prediction compare to other method of moving average. This paper also studies that which moving average based MACD indicator of technical analysis generates best profit, maximum no of buying and selling signals, best Average return. The main purpose of the study is to find out from EMA based MACD and SMA based MACD which one moving average based MACD performs well. The moving average convergence divergence (MACD) is one of the most well known and used indicators in technical analysis. This indicator is comprised of two moving averages, which help to measure momentum in the security. Now the study two types of moving average measures which are: Exponential moving average and Simple moving average. The paper studies that by using these different moving average methods on MACD indicator how well 1 method of moving average provide prediction compare to other method of moving average. This paper also studies that which moving average based MACD indicator of technical analysis generates best profit, maximum no of buying and selling signals, best Average return. The main purpose of the study is to find out from EMA based MACD and SMA based MACD which one moving average based MACD performs well.

INTRODUCTION:

The MACD (Moving Average Convergence/Divergence) is in category of trend indicators which shows relationship between prices and moving averages. The MACD was introduced by Gerald Appel, in 1970s. It is the different between moving averages for 26 and 12 days. There is a plot of another average for 9 days which is placed on top of the MACD to indicate long/short opportunities; it is called "trigger" or "signal". MACD as a momentum indicator can predict the moves in the underlying security. MACD divergences are basic elements in forecasting a trend alters. A Negative Divergence signal which bullish momentum is waning and a change in trend from bullish to bearish is possible, too. It warns the traders to take benefits in long positions or for violent traders setting off a short position. Another advantage of MACD is its application in daily, weekly or monthly charts. In this regard, the divergence and convergence of two moving averages will be shown by the MACD. Although, the standard setting defined for the MACD is the difference between the 12 and 26-period EMA, any combination of moving averages can be applied. In addition, the set of moving averages to be applied in MACD can be changed for each individual security. For example, a faster set of moving averages may be suitable for weekly charts. On the other hand, slower moving averages may appropriate to help smooth the data for volatile stocks. Regarding this flexibility, the MACD can be adjusted to the trading style, risk tolerance and objectives of the traders.

Now, the study using two kinds of moving average 1 is simple moving average and other is exponential moving average. In the study we are going to use 26 days, 12 days and 9 days simple moving average based MACD predictions on CNX Nifty and for the same time duration in the study Exponential moving average based MACD predictions are also found. After getting signals for the betterment of the study in the research (1B, 1S) rule was applied which means that after getting the chart 1st we have to look for the buying signals and next we have to compulsory move for selling signal.

REVIEW OF LITERATURE:

Neftci (1991), showed that a few of the rules used in technical analysis generate well-defined techniques of forecasting, but even well-defined rules were shown to be useless in prediction

if the economic time series is Gaussian. However, if the processes under consideration are non-linear, then the rules might capture some information. Tests showed that this may indeed be the case for the moving average rule.

Brock, Lakonishok and LeBaron (1992) tested the Simple Moving Average method and the Trading Range Break Out method by using the closed price of Dow Jones Industrial Average index during 1897 - 1986 and the Bootstrapping method to avoid the limitations of basic statistics. According to the findings, technical analysis was able to outperform returns on Buy-and-Hold investments with statistical significance.

Ming-Ming and Siok-Hwa (2006) indicated the capacity for earning profit from the data of the nine most popular Asian stock exchanges by using the Variable Moving Averages method (VMAs) and the Fixed Moving Averages (FMAs) method. The test results supported the VMAs method, especially regarding the stock exchanges of China, Thailand, Taiwan, Malaysia, Singapore, Hong Kong, Korea and Indonesia.

Z. K. Silagadze (2011) In these research paper using the Moving Mini-Max - a new indicator for technical analysis tools for knowing the market movement of share price. To identify lines of resistance and support, traders usually use some moving average indicator. If the price goes through the local maximum and crosses a moving average, we have a resistance line indicating the price at which a majority of traders expect that prices will move lower. A support line happens when the price crosses a moving average after the local minimum. The support line indicates the price at which a majority of traders feel that prices will move higher. The problem is fluctuations of the price which hampers the identification of both the local extremism and the corresponding crossing points with the moving average.

STATEMENT OF THE PROBLEM

The moving average convergence divergence (MACD) is one of the most well known and used indicators in technical analysis. This indicator is comprised of two moving averages, which help to measure momentum in the security. Now the study two types of moving average measures which are: Exponential moving average and Simple moving average. The paper studies that by us-

ing these different moving average methods on MACD indicator how well 1 method of moving average provide prediction compare to other method of moving average. This paper also studies that which moving average based MACD indicator of technical analysis generates best profit, maximum no of buying and selling signals, best Average return.

NEED FOR THE STUDY

There are several studies in which MACD is used as a tool of Technical Analysis. And there is also belief that MACD is one of the best signal indicator from Technical Analysis various tools. So, here we need to find out that by using which method of moving average MACD generates good profit, maximum no. of signals and good average return. So, main need of the study is to prove that while using MACD indicator of Technical analysis whether to use Exponential moving average or Simple moving average.

OBJECTIVE OF THE STUDY:

Main Objective:

To compare Exponential Moving Average based MACD with Simple Moving Average based MACD of Technical Analysis by taking CNX Nifty as the base.

Supportive Objectives:

- To find out profit ability of both EMA based MACD and SMA based MACD by applying 1 buy 1 sell signal selection rule.
- To identify that from the taken indicator EMA based MACD and SMA based MACD which indicator provides highest buying and selling signals for CNX Nifty.
- To identify from the taken indicator EMA based MACD and SMA based MACD which indicator provides highest average return for CNX Nifty.
- To identify overall performance of CNX Nifty on the basis of Signals, Profitability and average return in trading transaction with help EMA based MACD and SMA based MACD.

METHODOLOGY OF THE STUDY:

Sampling Design:

Sample:

- Daily closing price of CNX Nifty is taken in yearly time interval
- Daily closing price of CNX Nifty from the date 01-04-2010 to 31-03-2011
- Daily closing Price of CNX Nifty from the date 01-04-2011 to 31-03-2012
- Daily closing Price of CNX Nifty from the date 01-04-2012 to 31-03-2013
- Daily closing Price of CNX Nifty from the date 01-04-2013 to 31-10-2013

Sample size:

3 years and 6 months data of CNX nifty on Daily basis.

Sampling Method: Non-Probability Judgmental.

Nature and Sources of Data: The Present study is of analytical nature and secondary data are used. The data for CNX Nifty is taken from the website www.nseindia.com.

LIMITATION OF STUDY:

- Technical analysis is based on individual perspective the prediction of all individual for investment is different so one can not rely on others prediction.
- Technical analysis is based on the prediction so, it is individual investor choice to take the risk for investment by using this tool or not.
- The technical analysis is based on present price data of shares so it predicts the future investment time not provide accurate time for investment.
- To prove the study the rule after The rule of "1 buy 1 sell" is taken means after predicting 1 buying signal next we have to predict 1 selling signal though technical analysis can provide next buying signal after getting 1 buying signal and next selling signal after 1 selling signal.

TOOLS AND TECHNIQUES OF DATA ANALYSIS:

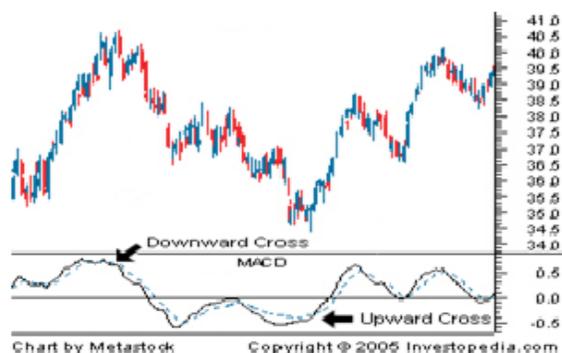
Moving Average Convergence Divergence (MACD)

The moving average convergence divergence (MACD) is one of the most well known and used indicators in technical analysis. This indicator is comprised of two exponential moving averages, which help to measure momentum in the security. The MACD is simply the difference between these two moving averages plotted against a centerline. The centerline is the point at which the two moving averages are equal. Along with the MACD and the centerline, an exponential moving average of the MACD itself is plotted on the chart. The idea behind this momentum indicator is to measure short-term momentum compared to longer term momentum to help signal the current direction of momentum.

MACD= shorter term moving average - longer term moving average

When the MACD is positive, it signals that the shorter term moving average is above the longer term moving average and suggests upward momentum. The opposite holds true when the MACD is negative - this signals that the shorter term is below the longer and suggest downward momentum. When the MACD line crosses over the centerline, it signals a crossing in the moving averages. The most common moving average values used in the calculation are the 26-day and 12-day exponential moving averages. The signal line is commonly created by using a nine-day exponential moving average of the MACD values. These values can be adjusted to meet the needs of the technician and the security. For more volatile securities, shorter term averages are used while less volatile securities should have longer averages. Another aspect to the MACD indicator that is often found on charts is the MACD histogram. The histogram is plotted on the centerline and represented by bars. Each bar is the difference between the MACD and the signal line or, in most cases, the nine-day exponential moving average. The higher the bars are in either direction, the more momentum behind the direction in which the bars point.

As you can see in Figure , one of the most common buy signals is generated when the MACD crosses above the signal line (blue dotted line), while sell signals often occur when the MACD crosses below the signal.



Exponential Moving Average Calculation

Exponential moving averages reduce the lag by applying more weight to recent prices. The weighting applied to the most recent price depends on the number of periods in the moving average. There are three steps to calculating an exponential moving average. First, calculate the simple moving average. An exponential moving average (EMA) has to start somewhere so a simple moving average is used as the previous period's EMA in the first calculation. Second, calculate the weighting multiplier. Third, calculate the exponential moving average. The formula below is for a 10-day EMA.

SMA: 10 period sum / 10

Multiplier or Smoothing Constant: $(2 / (\text{Time periods} + 1)) = (2 / (10 + 1)) = 0.1818$

EMA: $\{\text{Close} - \text{EMA}(\text{previous day})\} \times \text{multiplier} + \text{EMA}(\text{previous day})$.

	Date	Price	10-day SMA	Smoothing Constant 2/(10 + 1)	10-day EMA
1	24-Mar-10	22.27			
2	25-Mar-10	22.19			
3	26-Mar-10	22.08			
4	29-Mar-10	22.17			
5	30-Mar-10	22.18			
6	31-Mar-10	22.13			
7	1-Apr-10	22.23			
8	5-Apr-10	22.43			
9	6-Apr-10	22.24			
10	7-Apr-10	22.29	22.22		22.22
11	8-Apr-10	22.15	22.21	0.1818	22.21
12	9-Apr-10	22.39	22.23	0.1818	22.24
13	12-Apr-10	22.38	22.26	0.1818	22.27
14	13-Apr-10	22.61	22.31	0.1818	22.33
15	14-Apr-10	23.36	22.42	0.1818	22.52
16	15-Apr-10	24.05	22.61	0.1818	22.80
17	16-Apr-10	23.75	22.77	0.1818	22.97
18	19-Apr-10	23.83	22.91	0.1818	23.13
19	20-Apr-10	23.95	23.08	0.1818	23.28
20	21-Apr-10	23.63	23.21	0.1818	23.34
21	22-Apr-10	23.82	23.38	0.1818	23.43
22	23-Apr-10	23.87	23.53	0.1818	23.51
23	26-Apr-10	23.65	23.65	0.1818	23.54
24	27-Apr-10	23.19	23.71	0.1818	23.47
25	28-Apr-10	23.10	23.69	0.1818	23.40
26	29-Apr-10	23.33	23.61	0.1818	23.39
27	30-Apr-10	22.68	23.51	0.1818	23.26
28	3-May-10	23.10	23.43	0.1818	23.23
29	4-May-10	22.40	23.28	0.1818	23.08
30	5-May-10	22.17	23.13	0.1818	22.92

Simple Moving Average Calculation

A simple moving average is formed by computing the average price of a security over a specific number of periods. Most moving averages are based on closing prices. A 5-day simple moving average is the five day sum of closing prices divided by five. As its name implies, a moving average is an average that moves. Old data is dropped as new data comes available. This causes the average to move along the time scale. Below is an example of a 5-day moving average evolving over three days.

Daily Closing Prices: 11,12,13,14,15,16,17

First day of 5-day SMA: $(11 + 12 + 13 + 14 + 15) / 5 = 13$

Second day of 5-day SMA: $(12 + 13 + 14 + 15 + 16) / 5 = 14$

Third day of 5-day SMA: $(13 + 14 + 15 + 16 + 17) / 5 = 15$

The first day of the moving average simply covers the last five days. The second day of the moving average drops the first data point (11) and adds the new data point (16). The third day of the moving average continues by dropping the first data point

(12) and adding the new data point (17). In the example above, prices gradually increase from 11 to 17 over a total of seven days. Notice that the moving average also rises from 13 to 15 over a three day calculation period. Also notice that each moving average value is just below the last price. For example, the moving average for day one equals 13 and the last price is 15. Prices the prior four days were lower and this causes the moving average to lag.

DATA ANALYSIS

EMA (Exponential Moving Average) Based MACD

The chart 1.1-1.4 and Table 1.1-1.4 shows the analysis of MACD by taking EMA in the calculations. It helps MACD to generate Signals of buying and selling what we view in the chart and also helps to generate profit and return as given calculation in the table.

Note:

1: To prove the study the 1st date data must be considered for buying signals and next date data must be considered as of selling signals data in all table from 1.1 to 1.4

Chart 1.1: Generates signals on daily price movement of CNX Nifty for the year 1-4-2010 to 31-3-2011

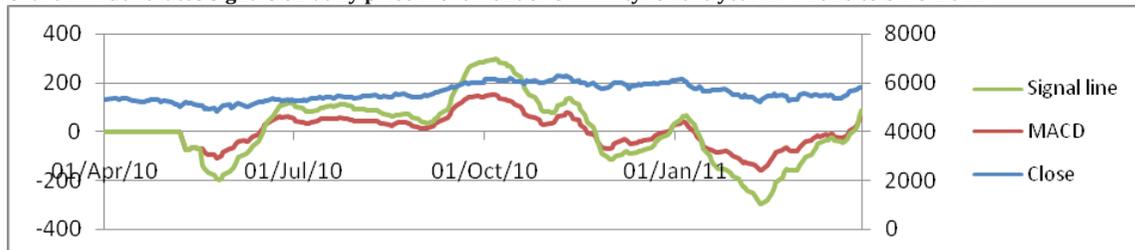


Table 1.1: Generates Profit/Loss and Return from the signals on daily price movement of CNX Nifty for the year 1-4-2010 to 31-3-2011

Date (1 B, 1 S)	Constant 12 D	Constant 26 D	MACD	Signal line	Closing Price	BUY	SELL	Profit	Return %
17-May-10	0.15	0.074	-67.88	1.20	5059.90	5059.90			
18-Jun-10	0.15	0.074	34.73	3.22	5262.60		5262.60	202.70	4.01
23-Nov-10	0.15	0.074	-19.99	16.31	5934.75	5934.75			

30-Dec-10	0.15	0.074	18.06	0.24	6101.85		6101.85	167.10	2.82
13-Jan-11	0.15	0.074	-40.26	1.02	5751.90	5751.90			
28-Mar-11	0.15	0.074	19.00	-11.5	5687.25		5687.25	-64.65	-1.12
TOTAL PROFIT/LOSS & RETURN								305.15	5.70
Average Return%									1.90
SIGNALS						3	3		

From The Table 1.1 and chart 1.1 we can interpret that The “CNX Nifty” daily price movement analysis by MACD generates 3 buying signals and 3 selling signals in the financial year 1-4-2010 to 31-3-2011. The index has given profit in trading transactions is Rs.305.15/- per share and providing Average Return of 1.90% per trading transaction. The Minimum Return faced in 3rd trading transaction which is (-) 1.12% and Maximum Return faced in 1st trading transaction which is 4.01%

Chart 1.2: Generates signals on daily price movement of CNX Nifty for the year 1-4-2011 to 31-3-2012

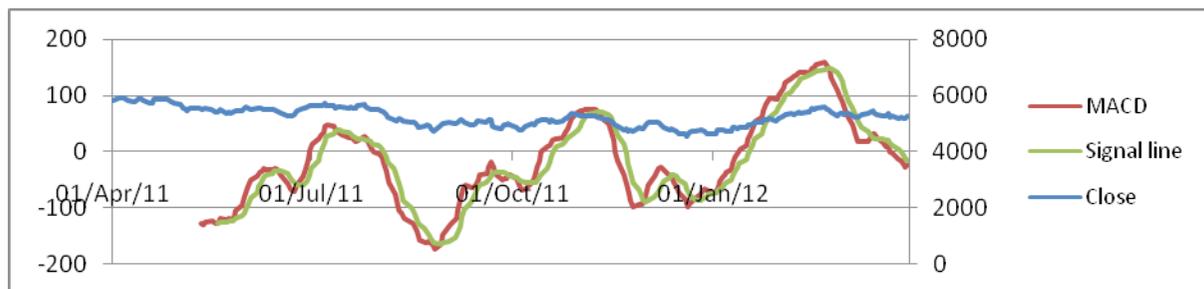


Table 1.2 Generates Profit/Loss and Return from the signals on daily price movement of CNX Nifty for the year 1-4-2011 to 31-3-2012

Date (1 B, 1 S)		Constant 26 D	MACD	Signal line	Closing Price	BUY	SELL	Profit	Return %
23-May-11	0.15	0.074	-121.05	-123.99	5386.55	5386.55			
14-Jun-11	0.15	0.074	-29.85	-34.45	5500.50		5500.50	113.95	2.12
23-Jun-11	0.15	0.074	-71.60	-54.51	5320.00	5320.00			
12-Jul-11	0.15	0.074	36.09	36.98	5526.15		5526.15	206.15	3.87
30-Aug-11	0.15	0.074	-148.54	-162.52	5001.00	5001.00			
22-Sep-11	0.15	0.074	-28.41	-38.32	4923.65		4923.65	-77.35	-1.55
10-Oct-11	0.15	0.074	-54.52	-54.63	4979.60	4979.60			
08-Nov-11	0.15	0.074	74.97	70.94	5289.35		5289.35	309.75	6.22
30-Nov-11	0.15	0.074	-90.95	-85.51	4832.05	4832.05			
12-Dec-11	0.15	0.074	-43.82	-45.42	4764.60		4764.60	-67.45	-1.40
23-Dec-11	0.15	0.074	-84.46	-83.64	4714.00	4714.00			
22-Feb-12	0.15	0.074	152.37	148.23	5505.35		5505.35	791.35	16.79
TOTAL PROFIT/LOSS & RETURN								1276.40	26.06
Average Return%									4.34
SIGNALS						6	6		

From The Table 1.2 and chart 1.2 we can interpret that The “CNX Nifty” daily price movement analysis by MACD generates 6 buying signals and 6 selling signals in the financial year 1-4-2011 to 31-3-2012. The index has given profit in trading transactions is Rs.1276.40/- per share and providing Average Return of 4.34% per trading transaction. The Minimum Return faced in 5th trading transaction which is (-) 1.40% and Maximum Return faced in 6th trading transaction which is 16.79%.

Chart 1.3: Generates signals on daily price movement of CNX Nifty for the year 1-4-2012 to 31-3-2013

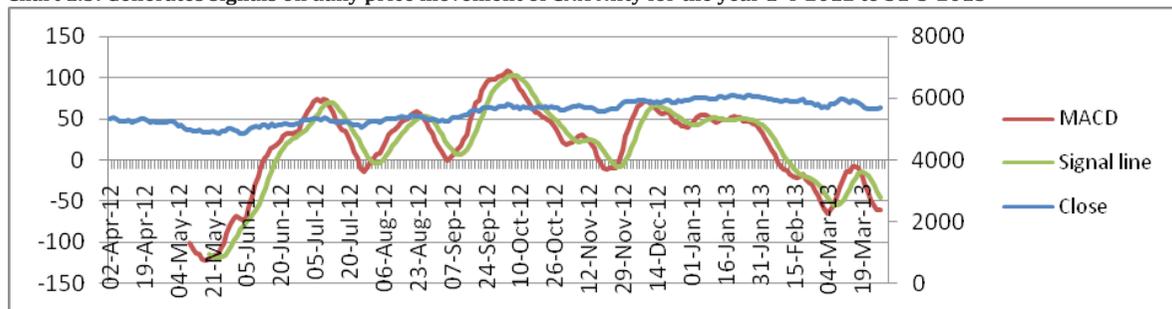


Table 1.3: Generates Profit/Loss and Return from the signals on daily price movement of CNX Nifty for the year 1-4-2012 to 31-3-2013

Date (1 B, 1 S)	Constant 12 D	Constant 26 D	MACD	Signal line	Closing Price	BUY	SELL	Profit	Return %
21-May-12	0.15	0.074	-117.45	-116.96	4906.05	4906.05			
11-Jul-12	0.15	0.074	72.87	69.51	5306.30		5306.30	400.25	8.16
31-Jul-12	0.15	0.074	-3.16	-0.74	5229.00	5229.00			
27-Aug-12	0.15	0.074	51.66	53.59	5350.25		5350.25	121.25	2.32
08-Sep-12	0.15	0.074	7.99	9.14	5358.70	5358.70			
05-Oct-12	0.15	0.074	107.48	102.73	5746.95		5746.95	388.25	7.25
26-Nov-12	0.15	0.074	-9.38	-7.22	5635.90	5635.90			
13-Dec-12	0.15	0.074	64.29	66.52	5851.50		5851.50	215.60	3.83
31-Dec-12	0.15	0.074	39.47	45.53	5905.10	5905.10			
28-Jan-13	0.15	0.074	46.91	49.71	6074.80		6074.80	169.70	2.87
06-Mar-13	0.15	0.074	-55.50	-53.77	5818.60	5818.60			
19-Mar-13	0.15	0.074	-18.47	-13.70	5745.95		5745.95	-72.65	-1.25
TOTAL PROFIT/LOSS & RETURN								1222.40	23.17
Average Return%									3.86
SIGNALS						6	6		

Form The Table 1.3 and chart 1.3 we can interpret that The “CNX Nifty” daily price movement analysis by MACD generates 6 buying signals and 6 selling signals in the financial year 1-4-2012 to 31-3-2013. The index has given profit in trading transactions is Rs.1222.40/- per share and providing Average Return of 3.86% per trading transaction. The Minimum Return faced in 6th trading transaction which is (-) 1.25% and Maximum Return faced in 6th trading transaction which is 8.16%.

Chart 1.4: Generates signals on daily price movement of CNX Nifty for the year 1-4-2013 to 31-10-2013

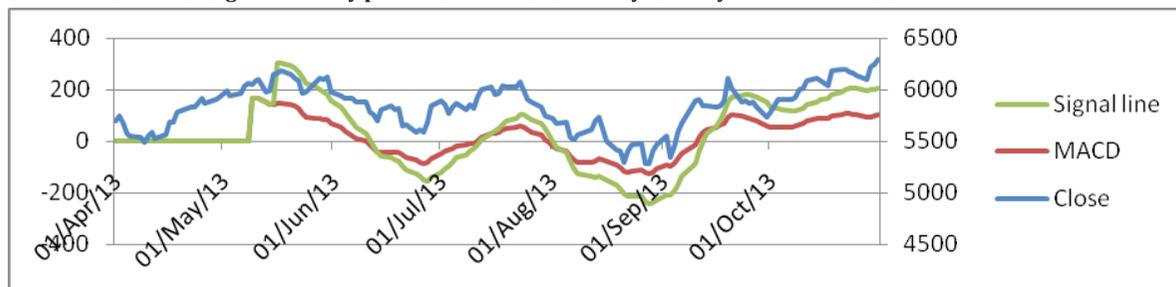


Table 1.4 Generates Profit/Loss and Return from the signals on daily price movement of CNX Nifty for the year 1-4-2013 to 31-10-2013

Date (1 B, 1 S)	Constant 12 D	Constant 26 D	MACD	Signal line	Closing Price	BUY	SELL	Profit	Return %
13-Jun-13	0.15	0.074	-41.53	-3.43	5699.10	5699.10			
15-Jul-13	0.15	0.074	29.11	-0.79	6030.80		6030.80	331.70	5.82
02-Aug-13	0.15	0.074	-31.22	8.15	5677.90	5677.90			
16-Sep-13	0.15	0.074	56.02	2.89	5840.55		5840.55	162.65	2.86
TOTAL PROFIT/LOSS & RETURN								494.35	8.68
Average Return%									4.34
SIGNALS						2	2		

Form The Table 1.4 and chart 1.4 we can interpret that The “CNX Nifty” daily price movement analysis by MACD generates 2 buying signals and 2 selling signals in the financial year 1-4-2013 to 31-10-2013. The index has given profit in trading transactions is Rs.494.35/- per share and providing Average Return of 4.34% per trading transaction. The Minimum Return faced in 2nd trading transaction which is 2.86% and Maximum Return faced in 1st trading transaction which is 5.82%.

The chart 2.1-2.4 and Table 2.1-2.4 shows the analysis of MACD by taking SMA in the calculations. It helps MACD to generate Signals of buying and selling what we view in the chart and also helps to generate profit and return as given calculation in the table.

Note:

1: To prove the study the 1st date data must be considered for buying signals and next date data must be considered as of selling signals data in all table from 1.1 to 1.4

Chart 2.1: Generates signals on daily price movement of CNX Nifty for the year 1-4-2010 to 31-3-2011

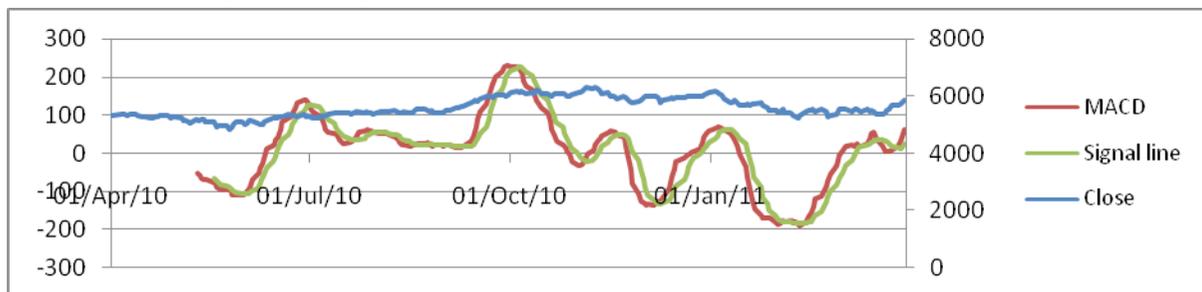


Table 2.1 Generates Profit/Loss and Return from the signals on daily price movement of CNX Nifty for the year 1-4-2010 to 31-3-2011

Date (1 B, 1 S)	MACD	Signal line	Closing Price	BUY	SELL	Profit	Return %
31-May-10	-108.96	-103.34	5086.30	5086.30			
30-Jun-10	128.12	123.87	5312.50		5312.50	226.20	4.45
08-Sep-10	14.04	18.21	5607.85	5607.85			
05-Oct-10	221.59	225.61	6145.80		6145.80	537.95	9.59
03-Nov-10	-28.73	-13.89	6160.50	6160.50			
19-Nov-10	47.96	47.94	5890.30		5890.30	-270.20	-4.39
07-Dec-10	-126.40	-127.39	5976.55	5976.55			
07-Jan-11	61.40	62.95	5904.60		5904.60	-71.95	-1.20
03-Feb-11	-177.46	-177.99	5526.75	5526.75			
18-Mar-11	38.82	35.35	5373.70		5373.70	-153.05	-2.77
TOTAL PROFIT/LOSS & RETURN						268.95	5.68
Average Return%							1.14
SIGNALS				5	5		

From The Table 2.1 and chart 2.1 we can interpret that The “CNX Nifty” daily price movement analysis by MACD generates 5 buying signals and 5 selling signals in the financial year 1-4-2010 to 31-3-2011. The index has given profit in trading transactions is Rs.268.95/- per share and providing Average Return of 1.14% per trading transaction. The Minimum Return faced in 3rd trading transaction which is (-) 4.39% and Maximum Return faced in 2nd trading transaction which is 9.59%.

Chart 2.2 Generates signals on daily price movement of CNX Nifty for the year 1-4-2011 to 31-3-2012

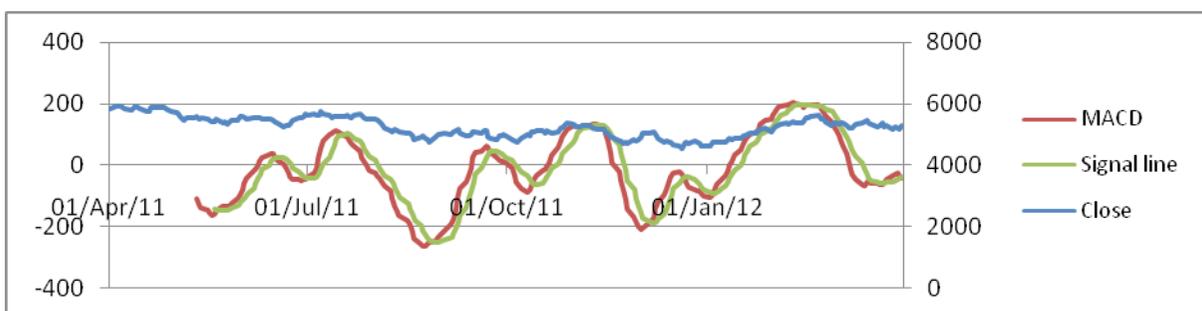


Table 2.2 Generates Profit/Loss and Return from the signals on daily price movement of CNX Nifty for the year 1-4-2011 to 31-3-2012

Date (1 B, 1 S)	MACD	Signal line	Closing Price	BUY	SELL	Profit	Return %
20-May-11	-149.60	-148.53	5486.35	5486.35			
16-Jun-11	29.64	24.23	5396.75		5396.75	-89.60	-1.63
01-Jul-11	-39.31	-45.00	5627.20	5627.20			
18-Jul-11	96.80	101.06	5567.05		5567.05	-60.15	-1.07
26-Aug-11	-251.98	-249.18	4747.80	4747.80			
23-Sep-11	42.09	46.27	4867.75		4867.75	119.95	2.53

13-Oct-11	-45.53	-63.64	5077.85	5077.85			
11-Nov-11	132.72	128.24	5168.85		5168.85	91.00	1.79
05-Dec-11	-189.82	-185.64	5039.15	5039.15			
21-Dec-11	-42.62	-40.69	4693.15		4693.15	-346.00	-6.87
04-Jan-12	-82.41	-92.41	4749.65	4749.65			
13-Feb-12	195.14	196.78	5390.20		5390.20	640.55	13.49
21-Mar-12	-61.69	-59.96	5364.95	5364.95			
29-Mar-12	-35.80	-41.74	5178.85		5178.85	-186.10	-3.47
TOTAL PROFIT/LOSS & RETURN						169.65	4.77
Average Return%							0.68
SIGNALS				7	7		

Form The Table 2.2 and chart 2.2 we can interpret that The “CNX Nifty” daily price movement analysis by MACD generates 7 buying signals and 7 selling signals in the financial year 1-4-2011 to 31-3-2012. The index has given profit in trading transactions is Rs.168.65/- per share and providing Average Return of 0.68% per trading transaction. The Minimum Return faced in 5th trading transaction which is (-) 6.85% and Maximum Return faced in 6th trading transaction which is 13.49%.

Chart 2.3 Generates signals on daily price movement of CNX Nifty for the year 1-4-2012 to 31-3-2013

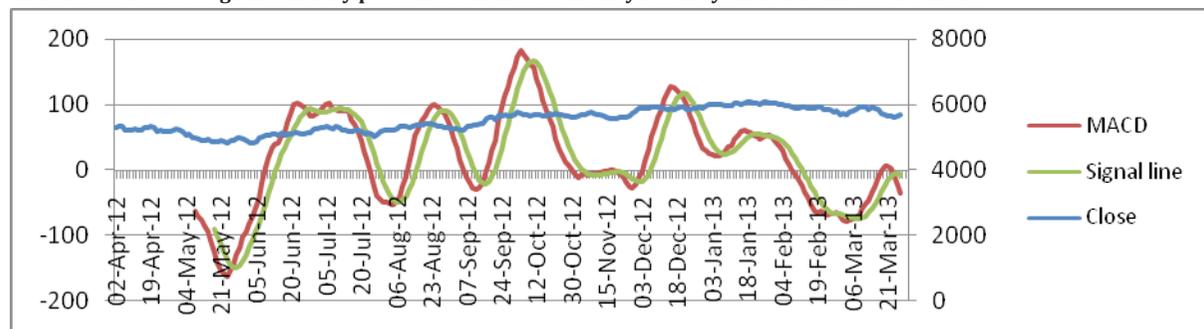


Table 2.3 Generates Profit/Loss and Return from the signals on daily price movement of CNX Nifty for the year 1-4-2012 to 31-3-2013

Date (1 B, 1 S)	MACD	Signal line	Closing Price	BUY	SELL	Profit	Return %
25-May-12	-144.06	-148.71	4920.40	4920.40			
26-Jun-12	95.52	87.79	5120.80		5120.80	200.40	4.07
06-Aug-12	-50.11	-48.39	5282.55	5282.55			
28-Aug-12	91.72	90.14	5334.60		5334.60	52.05	0.99
13-Sep-12	-19.76	-19.59	5435.35	5435.35			
10-Oct-12	160.61	165.82	5652.15		5652.15	216.80	3.99
06-Nov-12	-8.16	-4.98	5724.40	5724.40			
20-Nov-12	-1.38	-2.47	5571.55		5571.55	-152.85	-2.67
29-Nov-12	-21.88	-15.90	5825.00	5825.00			
19-Dec-12	116.23	115.53	5929.60		5929.60	104.60	1.80
09-Jan-13	29.58	24.77	5971.50	5971.50			
28-Jan-13	53.10	52.81	6074.80		6074.80	103.30	1.73
06-Mar-13	-74.61	-73.22	5818.60	5818.60			
25-Mar-13	-8.09	-4.88	5633.85		5633.85	-184.75	-3.18
TOTAL PROFIT/LOSS & RETURN						339.55	6.73
Average Return%							0.96
SIGNALS				7	7		

Form The Table 2.3 and chart 2.3 we can interpret that The “CNX Nifty” daily price movement analysis by MACD generates 7 buying signals and 7 selling signals in the financial year 1-4-2012 to 31-3-2013. The index has given profit in trading transactions is Rs.339.55/- per share and providing Average Return of 0.96% per trading transaction. The Minimum Return faced in 5th trading transaction which is (-) 3.18% and Maximum Return faced in 6th trading transaction which is 4.07%.

Chart 2.4: Generates signals on daily price movement of CNX Nifty for the year 1-4-2013 to 31-10-2013

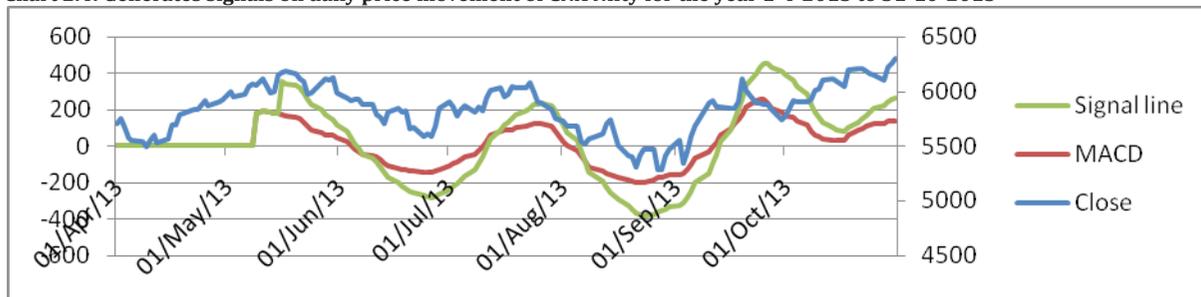


Table 2.4 Generates Profit/Loss and Return from the signals on daily price movement of CNX Nifty for the year 1-4-2013 to 31-10-2013

Date (1 B, 1 S)	MACD	Signal line	Closing Price	BUY	SELL	Profit	Return %
07-Jun-13	-47.94	3.88	5881.00	5881.00			
15-Jul-13	79.93	4.06	6030.80		6030.80	149.80	2.55
08-Aug-13	-114.21	-27.36	5565.65	5565.65			
16-Sep-13	94.59	-5.80	5840.55		5840.55	274.90	4.94
TOTAL PROFIT/LOSS & RETURN						424.70	7.49
Average Return%							3.74
SIGNALS				2	2		

From The Table 2.4 and chart 2.4 we can interpret that The “CNX Nifty” daily price movement analysis by MACD generates 2 buying signals and 2 selling signals in the financial year 1-4-2013 to 31-10-2013. The index has given profit in trading transactions is Rs.424.70/- per share and providing Average Return of 3.74% per trading transaction. The Minimum Return faced in 1st trading transaction which is 2.55% and Maximum Return faced in 2nd trading transaction which is 4.94%.

Comparison between Exponential Moving average based MACD with Simple Moving Average based MACD of Technical Analysis Table 3.1

EMA BASED MACD'S PERFORMANCE				
Time Interval (DATE)	Total Profit	Total Return	No. of Signals (Buying signals, Selling Signals)	Average return
01-04-2010 to 31-03-2011	305.15	5.70%	(3,3)	1.90%
01-04-2011 to 31-03-2012	1276.40	26.06%	(6,6)	4.34%
01-04-2012 to 31-03-2013	1222.40	23.17%	(6,6)	3.86%
01-04-2013 to 31-10-2013	494.35	8.68%	(2,2)	4.34%
TOTAL	3298.30	63.61%	(17,17)	3.74%
SMA BASED MACD'S PERFORMANCE				
Time Interval (DATE)	Total Profit	Total Return	No. of Signals (Buying signals, Selling Signals)	Average return
01-04-2010 to 31-03-2011	268.95	5.68%	(5,5)	1.14%
01-04-2011 to 31-03-2012	169.65	4.77%	(7,7)	0.68%
01-04-2012 to 31-03-2013	339.55	6.73%	(7,7)	0.96%
01-04-2013 to 31-10-2013	424.70	7.49%	(2,2)	3.74%
TOTAL	1202.85	24.66%	(21,21)	1.17%

The above table 3.1 is generates overall performance of MACD by using EMA and SMA. The above portion of data generates the financial year wise total profit, total return, no of signals and yearly average return from that year's no. of trading transactions.

The table shows that by comparing the data EMA based MACD provide better performance against SMA based MACD performance of technical analysis. The overall performance of these 3 years and 6 months data generates EMA based MACD generates Total profit of RS.3298.30/- which is more than the total profit of SMA based MACD which is only RS/- 1202.85.

On the basis of total return EMA based MACD perform well generating 63.61% total return for taken 3 years and 6 months data and also much more high the SMA based MACD's total return of 24.66% only.

The SMA based MACD generates more than the EMA based MACD. SMA based MACD has generated 21 buying signals and 21 selling signals while EMA based MACD has generated 17 buying signals and 17 selling signals.

Last but not the least EMA based MACD has overall Average return of 3.74% which is higher compare to SMA based MACD's average return of 1.17%

In short, By comparing EMA based MACD and SMA based MACD of technical analysis EMA based MACD has perform well in the field of Generating Profit, Return and Average return and SMA based MACD performed well in only one field of Generating more signals compare to EMA based MACD

Conclusion:

The research paper is done to identify which one moving aver-

age based MACD generates better profit, buying and selling signals, Return performance and Average return %. The research paper proves that except in generating maximum no of buying and selling signals EMA based MACD generates maximum profit and return compare to SMA based MACD. The smoothening constant used in EMA supports MACD for generating better profitable signals compare to SMA. So, overall EMA based MACD generates most trustable signals compare to SMA based MACD.

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