A Comparative Study of Two Technical Analysis Tools: Moving Average Convergence and Divergence V/S Relative Strength Index: A Case Study of HDFC Bank ltd Listed in National Stock Exchange of India (NSE)

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ABSTRACT:

Technical analysis is the forecasting of future price movement based on an examination of past prices. Some scientist found that the study of historical prices cannot predict future prices. In this research we intend to study which technical analysis tool is better for prediction of future price movement, for this purpose we are studying two the most strongest technical analysis tools is called as Moving Average Convergence and Divergence (MACD) and Relative Strength Index (RSI). To study we are introducing one formula to determine one index for comparing two technical analysis tools. Generally for buy, hold and sell signal MACD is better than RSI, but we cannot skip the important role of RSI in overbought and oversold signals and simply we can diagnose the price whether is it undervalued or overvalued or with suitable value.

Keywords: *Technical analysis, MACD, RSI, Trading strategy, National Stock Exchange of India*

INTRODUCTION

Technical analysis is the forecasting of future price movement based on an examination of past prices. Technical analysis does not result in absolute predictions about future. Instead, Technical Analysis uses a wide variety of charts that show price overtime. Fama (1965) found that the study of historical prices cannot predict future prices. Niftci (1991) showed that when economic time series are assumed to be Gaussian, market indicators cannot help to predict future prices. When prices are nonlinear, technical trading rules can show some predictability. (Terence Tai-Leung Chong and Wing-Kam Ng, 2008). Hudsen et al. (1996) demonstrated that moving averages and trading range breakout rules are not better than the buy-and-hold strategy under a costly trading movement. When the non price information is taken into account, historical prices can help to generate higher returns. (Treynor and Ferguson, 1985). In testing the moving average and trading range breakout rules on the Dow-Jones Industrial Average it has been concluded that these two rules outperform the buy-and-hold strategy. (Brock et al., 1992). Mills (1997) showed a similar result for the FT30 index. The technical analysis rules beat the buy-and-hold strategy in the NYSE. (Kwon and Kish, 2002). According to Terence Tai-Leung Chong and Wing-Kam Ng (2008), the RSI rule and the MACD rule outperform the buy-and-hold Strategy. In this research we intend to study

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which technical analysis tool is better for prediction of future price movement, for this purpose we are studying two the most strongest technical analysis tools is called as Moving Average Convergence and Divergence (MACD) and Relative Strength Index (RSI). To study we are introducing one formula to determine one index for comparing two technical analysis tools. This is very important to distinguish between technical analysis tools which one is better or which one is good for which purpose. The art of technical analysis – for it is an art– is to identify trend changes at an early stage and to maintain an investment posture unit the weight of the evidence indicates that trend has been reversed. (Pring, 2002). To launch the study we are analyzing the historical share price with the formula and results of study will determine which technical analysis tool is better.

According to Rabert A levy, Shifts in demand and supply bring about changes in trends, Irrespective of why they occur, Shifts in demand and supply can be detected with the help of charts of market action because of the persistence of trends and patterns, analysis of past market data can be used to predict future price behavior. (Chandra, 2008). The technician believes the forces of supply and demand are reflected in patterns of price and volume of trading. (Fischer, 1995). Technical analysis may be useful in timing a buy or sell order –an- order that may be implied by the forecasts of return and risk. (Fischer, 1995).

Major Objectives of Study

1- To identify the role of Technical Analysis in Capital Markets.

2- To analyze the stocks using various technical analysis tools.

3- To evaluate to buy, sell and hold stock based on the analysis.

4- To analyze the recent pattern in the movement of share price to determine the timing of investment.

Literature Review

Technical Analysis is one of the tools used to take decisions as to buy, hold and sell stocks, but Technical Analysis alone cannot prove to be sole device. So, it can be used as a supplement to Fundamental Analysis. (Ranganatham and Mahudathi, 2005). Technical Analysis is much more used than fundamental analysis, 90% of polled investors use it. (Taylore and Allen, 1992). Technical Analysis involves a study of market generated data like prices and volumes to determine the future direction of price movement. (Chandra, 2008). Technical approach to investing is essentially a reflection of the data prices move in trends which are determined by the changing attitudes of investors towards a variety of economic, monetary, political and psychological forces. (Pring, 2002). Fundamental analysis gives information on company performance. This is not only determinant of the market price of companies. If fundamental analysis explained the market price behavior of the company fully, then all investors would be able to quote a single price for company. (Ranganatham and Mahudathi, 2005).

Moving Average Convergence and Divergence (MACD)

Moving Average Convergence and Divergence oscillator is commonly referred to as MACD, which is pronounced Mack Dee. The MACD is the difference between a short-term and long-term moving Average of security's price. (McMillan et al., 2011).The MACD is constructed by calculating two lines, the MACD line and the signal line. (McMillan et al., 2011).

✓ MACD line: difference between two exponentially smoothed moving averages, generally 12 and 26 years. (McMillan et al., 2011).

✓ Signal line: exponentially smoothed average of MACD line, generally 9 days the indicator oscillates around zero and has no upper or lower limit. (McMillan et al., 2011).

Rather than using a set overbought –oversold Range for MACD , the analyst compare the current level with the historical performance of the oscillator for a particular security to determine when a security is out of its normal sentiment range. (McMillan et al., 2011). MACD is used in technical analysis in three ways. The first is to note crossovers of the MACD line and the signal line .Crossovers of the two lines may indicate a change in trend. The second is to look for times when the MACD is outside its normal range for a given security. The third is to use trend lines on the MACD itself.

(Michael G. McMillan et al, 2011). When the MACD is trending in the same direction as price, this pattern is convergence, and when the two are trending in opposite directions, the pattern is divergence. (McMillan et al., 2011). MACD is calculated by subtracting the 26-day exponential moving average (EMA) from the 12-day moving average. A nine day EMA of the MACD, called the "Single line" is the plotted on top of the MACD, functioning as a trigger for buy and sell signals.

Relative Strength Index

The Relative Strength Index (RSI) is an extremely useful and popular momentum oscillator. The RSI compare the magnitude of a stock's recent gains to the magnitude of its recent losses and turns that information into a number that ranges from 0 to 100. It takes a single parameter, the number of time periods to use in the calculation.

Calculation:

RSI = 100 – 100 / (1+RS)

Average gain = (Total gains / n)

Average loss = (Total loss / n)

Relative Strength = Average gain / Average loss

Relative Strength Index = 100 – 100 / (1+ RS)

n = number of RSI periods. (Most analysis use 9-15 days.)

A few different tools can be used to interpret the strength of a stock. One of these is the Relative Strength Index (RSI) which is a comparison between the day that a stock finishes up and the day it finishes down. This Indicator is a big tool in momentum trading. The RSI ranges from 0 to 100. An asset is deemed to be overbought once the RSI approaches the 70 level, meaning that it may be getting over valued and is a good candidate for a pullback likewise, if the RSI approaches 30, it is an indication that the asset may be getting oversold and there for likely to become undervalued. Another method of interpreting the RSI is RSI Divergence signal line for RSI Divergence is 50 so that whenever RSI crossovers 50 from below a buy signal will be generated and whenever RSI crossovers 50 from over a sell signal will be generated. Relative strength Analysis is widely used to compare the performance of a particular asset such as a common stock, with that of some benchmark- such as, in the case of common stocks, the FTSE 100, THE Nikkei 225, or the

S&P 500 index-or the performance of another security. The intent is to show out –or underperformance of the individual issue relative to some other index or asset. (McMillan et al., 2011).

RESEARCH METHOD

We are analyzing the historical price of share from 01-04-2010 to 24-05-2011with 2 technical analysis tools as called as Moving Average Convergence and Divergence and Relative Strength Index. In this research we are not going to speak about volume. Trading Volume which is ordinarily provided at the bottom of a bar chart gives a fair idea of the extent of public interest in the stock. (Chandra, 2008). We are using two indicators to make buy, hold or sell signal according to past price of the stocks. These two indicators are:

1- Relative Strength Index (RSI)

2- Moving Average Convergence and Divergence (MACD)

Because we didn't have any sell signal in RSI we had to use RSI Divergence for making buy, hold and sell signal. Type of data is secondary data and is collected from Websites (www.moneycontrol.com) and (www.icharts.in)

For analyzing the data we are suggesting a formula for obtaining an index to compare which index is better for making buy, hold and sell signals.

$$\text{Performance Index} = \sum_{k=1}^{n} \text{NU}(\text{HPU} - \text{SPU}) + \sum_{k=1}^{n} \text{ND}(\text{SPD} - \text{LPD})$$

NU= number of uptrend days after buy signal

HPU=highest price in the uptrend

SPU=price in buy signal day

ND=number of downtrend days after sell signal

SPD=price in sell signal day

LPD=lowest price in the downtrend

Performance Index will determine which index is good for making buy, hold and sell signals.

RESULTS AND DISCUSSION

According to figure 2 we can observe that whenever MACD line that is result of subtracting 26 day exponential moving average from 12 day exponential moving average is above signal line that is 9 day exponential moving average we have bullish trend and

whenever MACD line (red line) crosses over signal line (blue line) from below there will be a buy signal. And also if MACD line (red line) is below signal line (blue line) we have bearish trend. Whenever MACD line crosses over the signal line (blue line) from above there will be a sell signal. (see figure 2).

As shown in figure 1, the RSI ranges from 0 to 100. An asset is deemed to be overbought once the RSI approaches the 70 level, meaning that it may be getting over valued and is a good candidate for a pullback likewise, if the RSI approaches 30, it is an indication that the asset may be getting oversold and there for likely to become undervalued. (figure1)
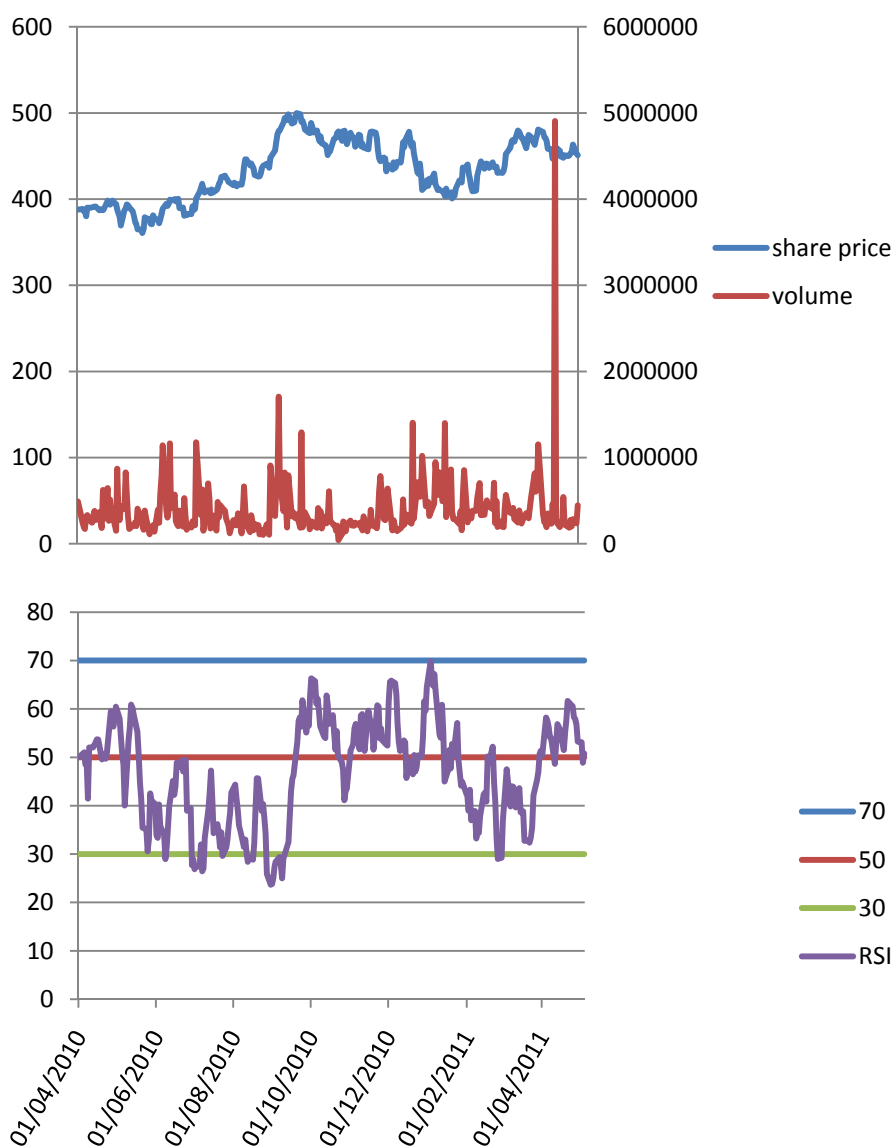

Figure 1: Depicts relative strength index of HDFC Bank, for period April 1st 2010 to May 24th 2011
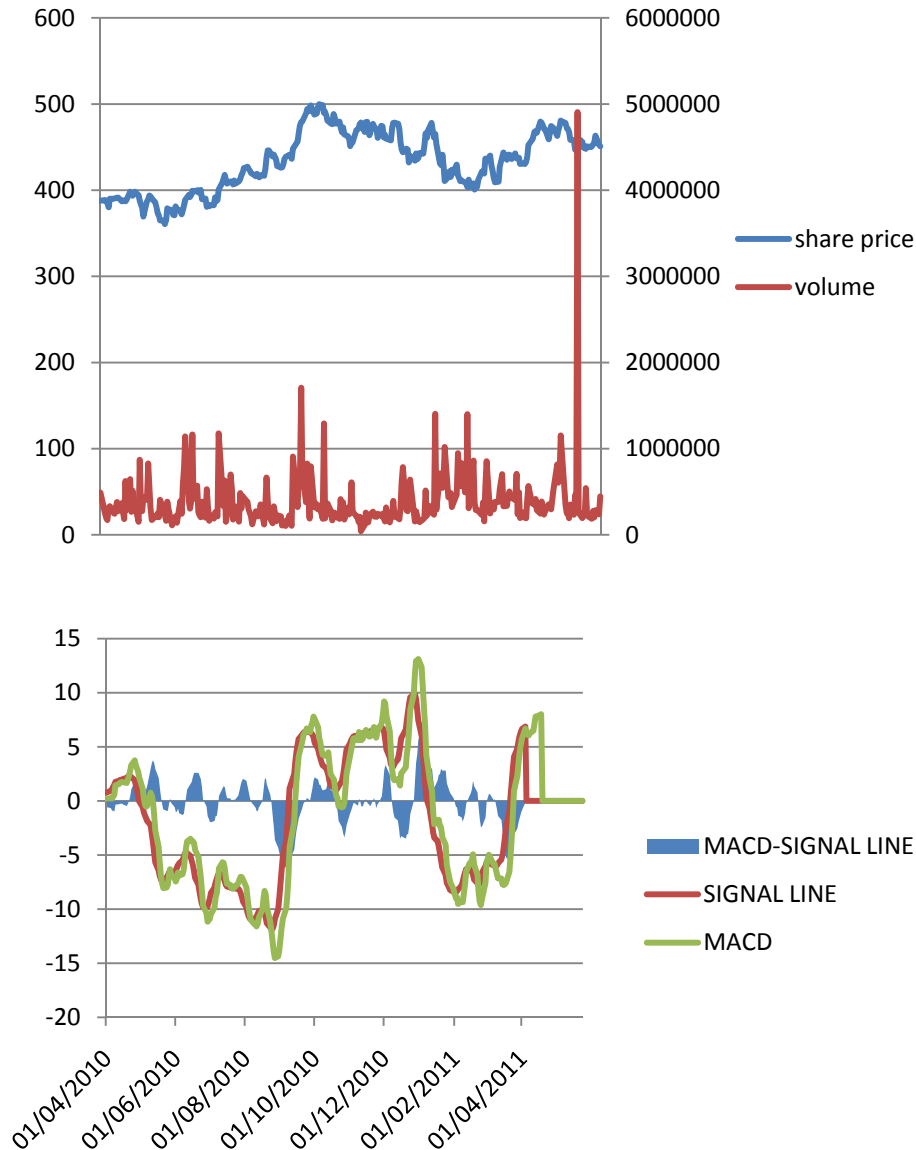
Figure 2: Depicts the MACD indicator of HDFC Bank, for period April 1st 2010 to May 24th 2011. The MACD is as a way to keep track of a moving average crossover system. MACD is defined as the difference between a 12-day and 26-day moving average. A 9-day moving average of this difference is used to generate signals.

With refer to tables 1 and 2; we compared all items in MACD with items in RSI. We can obviously see number of uptrend days in RSI is more than uptrend days in MACD and number of bearish days in RSI is very less than bearish days in MACD from the performance index point of view RSI performance index in downtrend or making sell signals is very less and negative and absolutely we can conclude RSI is not a good indicator for bearish trend or making sell signals, but according to uptrend performance index, RSI is very good for making buy signals and is a important indicator for identifying the bullish trend (see table 1).

On the other hand MACD is good for making both buy and sell signals and recognizing bearish and bullish trend with regards of downtrend and uptrend performance indices are approximately same (see table 2).

Table 1: Calculating the RSI performance index

ND	1	3	3	1	1	1			
SPD	383.04	455.98	443.68	421.87	450.61	454.76			
LPD	392.8	469.84	442.74	415.09	450.49	463.14			
SSD	-9.76	-41.58	2.82	6.78	0.12	-8.38			
DPI	-50								
NU	33	45	3	23	14	1	13	35	42
HPU	400.32	500.15	460.28	479.17	479.13	440.16	478.1	443.65	482.13
SPU	379.36	387.46	460.94	470.07	459.58	432.58	461.1	421.09	438.65
SSU	691.68	5071.05	-1.98	209.3	273.7	7.58	221	789.6	1826.16
UPI	9088.09								
TPI	9038.09								

Table 2: Calculating the MACD performance index

ND	27	9	11	12	29	7	21	30	6	34
SPD	389.7	380.88	418.14	427.83	489.56	462.28	456.09	430.45	429.86	472.62
LPD	360.75	381.48	414.63	426.34	450.86	457.08	432.58	400.57	430.32	444.09
SSD	781.65	-5.4	38.61	17.88	1122.3	36.4	493.71	896.4	-2.76	970.02
DPI	4348.8									
NU	25	27	8	26	44	1	5	13	37	21
HPU	417.22	427.27	446.26	500.15	479.17	474.36	479.13	478.1	443.65	480.16
SPU	381.12	400.55	438.39	448.97	477.84	475.98	478.35	451.23	404.46	453.01
SSU	902.5	721.44	62.96	1330.68	58.52	-1.62	3.9	349.31	1450.03	570.15
UPI	5447.9									
TPI	9796.7									

CONCLUSION

According to the results of processing the data MACD Performance Index is: 9796.68 (Table 2) and RSI Divergence Performance Index is: 9038.09 (table 1) Then we can conclude MACD Performance Index is better than RSI Performance Index. Table 2 is showing the MACD data we are processed in the Microsoft excel 2007, ND is number of bearish days, SPD is signal day price in bearish trend, LPD is lowest price of downtrend days, SSD is signal significance in downtrend or bearish trends days, DPI is downtrend performance index, NU is number of days with uptrend, HPU is highest price in uptrend, SPU is signal price day in uptrend, SSU is signal significance in uptrend, UPI is uptrend performance index and TPI is total performance index (DPI+UPI). In comparison of two tables (tables 1 and 2) we can observe that MACD performance in making buy, hold and sell signals is better than RSI Divergence. But we cannot skip the important role of RSI in overbought and oversold signals and simply we can diagnose the price whether is it undervalued or overvalued or with suitable value.

In my opinion both of two indices are necessary for technical analysis of share price, MACD for the purpose of making the buy, hold and sell signals and RSI for the purpose of diagnosing the overbought and oversold signal.

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