



MOVING AVERAGES AND STOCK MARKET BEHAVIOUR

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ABSTRACT

The most popular technical indicators, moving averages are used to gauge the direction of the current trend. The present study is focused to understand the behavior of stock market on the basis of moving averages. To attain the objectives of the study exploratory research design has been used. Technical tools used for the study are chart pattern and Line charts. Simple Moving Average 200 DMA is used as an indicator because it is a much better indicator of stock market when compared to 100 DMA or 50 DMA. The interpretation part of the paper carries all the analysed details in theoretical form which are detailed description of the respective charts. The findings of the study documented that the level of risk in the portfolio is reduced by enlisting the help of moving averages. By identifying trends, moving

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averages allow traders to make those trends work in their favour and increases the number of winning trades.

Keywords: *Simple Moving Average, Exponential Moving Average, 200DMA, Crossover.*

INTRODUCTION

Moving averages come in various forms, but their underlying purpose remains the same: to help technical traders track the trends of financial assets by *smoothing* out the day-to-day price fluctuations, or noise. By identifying trends, moving averages allow traders to make those trends work in their favor and increase the number of winning trades.

Among the most popular technical indicators, moving averages are used to gauge the direction of the current trend. Every type of moving average is a mathematical result that is calculated by averaging a number of past data points. Once determined, the resulting average is then plotted onto a chart in order to allow traders to look at smoothed data rather than focusing on the day-to-day price fluctuations that are inherent in all financial markets.

The simplest form of a moving average, appropriately known as a simple moving average (SMA), is calculated by taking the arithmetic mean of a given set of values. For example, to calculate a basic 10-day moving averages add up the closing prices from the past 10 days and then divide the result by 10. In Figure 1, the sum of the prices for the past 10 days (110) is divided by the number of days (10) to arrive at the 10-day average. If a trader wishes to see a 50-day average instead, the same type of calculation would be made, but it would include the prices over the past 50 days. The resulting average below (11) takes into account the past 10 data points in order to give traders an idea of how an asset is priced relative to the

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past 10 days.

7	11	6	15	6	10	15	9	7	11	12	14	11
			$15 + 6 + 10 + 15 + 9 + 7 + 11 + 12 + 14 + 11 = 110$									
			$110 / 10 = 11$									

Why technical traders call this tool a "moving" average and not just a regular mean? The answer is that as new values become available, the oldest data points must be dropped from the set and new data points must come in to replace them. Thus, the data set is constantly "moving" to account for new data as it becomes available. This method of calculation ensures that only the current information is being accounted for. In Figure 2, once the new value of 5 is added to the set, the red box (representing the past 10 data points) moves to the right and the last value of 15 is dropped from the calculation. Because the relatively small value of 5 replaces the high value of 15, you would expect to see the average of the data set decrease, which it does, in this case from 11 to 10.

7	11	6	15	6	10	15	9	7	11	12	14	11	5
			$\cancel{15} + 6 + 10 + 15 + 9 + 7 + 11 + 12 + 14 + 11 + 5 = 100$										
			$100 / 10 = 10$										

Once the values of the MA have been calculated, they are plotted onto a chart and then connected to create a moving average line. These curving lines are common on the charts of technical traders, but how they are used can vary drastically. As we can see in below chart that it is possible to add more than one moving average to any chart by adjusting the number

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of time periods used in the calculation. The red line is simply the average price over the past 50 days, while the blue line is the average price over the past 100 days.





The simple moving average is extremely popular among traders, but like all technical indicators, it does have its critics. Many individuals argue that the usefulness of the SMA is limited because each point in the data series is weighted the same, regardless of where it occurs in the sequence. Critics argue that the most recent data is more significant than the older data and should have a greater influence on the final result. In response to this criticism, traders started to give more weight to recent data, which has since led to the invention of various types of new averages, the most popular of which is the exponential moving average (EMA).

Exponential Moving Average

The exponential moving average is a type of moving average that gives more weight to recent prices in an attempt to make it more responsive to new information. Learning the somewhat complicated equation for calculating an EMA may be unnecessary for many traders, since nearly all charting packages do the calculations. Here is the EMA equation:



$$EMA = (P * \alpha) + (Previous EMA * (1 - \alpha))$$

P = Current Price

$$\alpha = \text{Smoothing Factor} = \frac{2}{1 + N}$$

N = Number of Time Periods

When using the formula to calculate the first point of the EMA, there is no value available to use as the previous EMA. This small problem can be solved by starting the calculation with a simple moving average and continuing on with the above formula from there.

Trend

Identifying trends is one of the key functions of moving averages, which are used by most traders who seek to "make the trend their friend". Moving averages are lagging indicators, which means that they do not predict new trends, but confirm trends once they have been established. As in below chart a stock is deemed to be in an uptrend when the price is above a moving average and the average is sloping upward. Conversely, a trader will use a price below a downward sloping average to confirm a downtrend. Many traders will only consider holding a long position in an asset when the price is trading above a moving average. This simple rule can help ensure that the trend works in the traders' favor.



LITERATURE REVIEW

Mack Courter indicates that an investor can reduce risk in his portfolio by enlisting the help of moving averages. Using the S&P 500 as a proxy investment, it is clear that the 50-day/200-day crossover system is superior to the 50-day or 200-day moving averages by themselves. While this may be true for the broad stock market, results may vary for different indexes.

Ana Jovanovic concluded that moving average is an excellent tool for evaluation of price patterns, but that the possibility of its use is limited to subjective way of forecasting



future price movement of securities. Given the subjectivity, signals for purchase or sales may differ from the actual (future), which affects wrong investment decisions. Therefore, it is often used as an additional technique with the use of fundamental analysis.

By John Ehlers, moving averages can be used to generate buying and selling signals by the investors. Although they are lagging indicators, i.e. they indicate the trend after it has occurred but if used with other technical indicators, can be of good use to the investor. Normally 5 DMA, 10 DMA, 15 DMA are used for short term movements. 50 DMA is used for medium term movements and 200 DMA is used for long term movements. When the price cuts the MA from below, a buy signal is generated and when price cuts MA from above, a sell signal is generated. But as is said earlier the investor should not rely only on moving averages. It proves to be a best technique when used in conjunction with other indicators.

Ken Little said that a simple moving average chart treats each data point equally. In our example above, the day one price is treated the same as the day 50 price. This reduces the ability of stock investors to quickly spot changes in price trends, which may be signals to buy or sell. A solution to that problem is to use an exponential moving average. An exponential moving average follows the same basic formula as a simple moving average. The difference is each data point is weighted with more weight given to the most recent data points and less weight given to the oldest data. Since more recent data counts more, the exponential moving average reacts more quickly to price changes.

Fortunately, investors in the stock market have ready access to these moving averages through a number of Web sites. Most will chart both simple and exponential moving averages



for many different periods. Shorter periods are more important to traders, while longer periods are more helpful to long-term investors.

OBJECTIVES OF THE STUDY

1. To gain practical knowledge of moving averages.
2. To know how future behaviour of market is predicted by using moving averages.
3. To know how buying and selling decisions can be made using moving averages.
4. To know how an investor can take rational investment decisions by the study of market trends and movements.
5. To provide the investors with a technique with which they can make a decent profit by trading in stocks.

RESEARCH DESIGN: To attain the objectives of the study exploratory research design has been used.

SAMPLING DESIGN: The samples selected are from the index of NIFTY of **two** sectors: **Banking and Power & Steel**. The basis for selection of these two sectors is the convenience factor. The data for the selected 5 companies is easily available and moreover the selected companies represent their respected sectors efficiently. The samples of companies selected are: **PNB, SBI, NTPC, TATA POWER and RELIANCE POWER**

TECHNIQUES OF DATA ANALYSIS: Technical tools used for the study are chart pattern and Line charts.

INDICATOR OF STUDY



Simple Moving Average 200 DMA is used as an indicator because it is a much better indicator of stock market when compared to 100 DMA or 50 DMA. It covers one whole year (as the stock market remains closed on weekends and trading is done only on 220-240 days approximately after deducting all the holidays). So, it is regarded as the best among the moving averages to study the behaviour of stock market.

DATA SOURCE

To achieve the objective of the study secondary data has been used such as websites of BSE.com, NSE.com, Yahoo finance and newspapers like Economic Times and textbooks of Statistics and Security analysis.

ANALYSIS AND INTERPRETATION

Line charts are shown depicting the closing prices and 200 DMA of the 5 selected companies of the banking and the power sector. First of all moving averages are calculated. 200 DMA is used as it is the best to study the behaviour of stock market as it takes into account trading for one whole year. It is calculated by summing up closing prices for last 200 days and then dividing it by 200. The charts are then prepared to analyse how 200 DMA is used in predicting stock market, how they are studied with relation to price and how they help the investor in generating buying and selling signals which further help the investor in maximising profits or reducing losses.



The interpretation part of the paper carries all the analysed details in theoretical form which are a detailed description of the respective charts. The interpretation is done using crossovers. A crossover is the most basic type of signal and is favored among many traders because it removes all emotion. The most basic type of crossover is when the price of an asset moves from one side of a moving average and closes on the other. Price crossovers are used by traders to identify shifts in momentum and can be used as a basic entry or exit strategy. A cross below a moving average signals the beginning of a downtrend and would likely be used by traders as a signal to close out any existing long positions. When the price reemains below the 200 DMA, the stock is in a weak position. When the price is above the 200 DMA, the stock is in a strong position.

Line chart showing Closing Prices & 200 DMA of PNB from Jan, 2009 to Dec, 2012

The belows chart shows the prices and 200 DMA of Punjab National Bank from 1 Jan, 2009 to 31 Dec, 2012. The blue line represents the price and the red line represents the 200 DMA. The point where blue line, i.e. price; crossed the red line, i.e. 200 DMA; from below generated the buying signal as the tendency of the price was to rise further and it could have been profitable for the investor to buy at that point. The green arrow represents the buying signal. The point where the blue line crossed the red line from above generated the sell signal as the tendency of the price was to fall further and it could have been profitable for the investor to sell at that point. The black arrow represents the selling signal.

When the price was below the 200 DMA, it meant that the stock was in a weak position, for instance in January, 2012. When the price was above the 200 DMA, it meant that the stock was in a strong position, for instance on November, 2010. The stock had fluctuated

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significantly, i.e. it followed both upward trend and downward trend. The uptrend was when the price was above 200 DMA, for instance from May, 2009 to December, 2010 and the downtrend was when it was below 200 DMA, for instance from January, 2011 to February 2012.

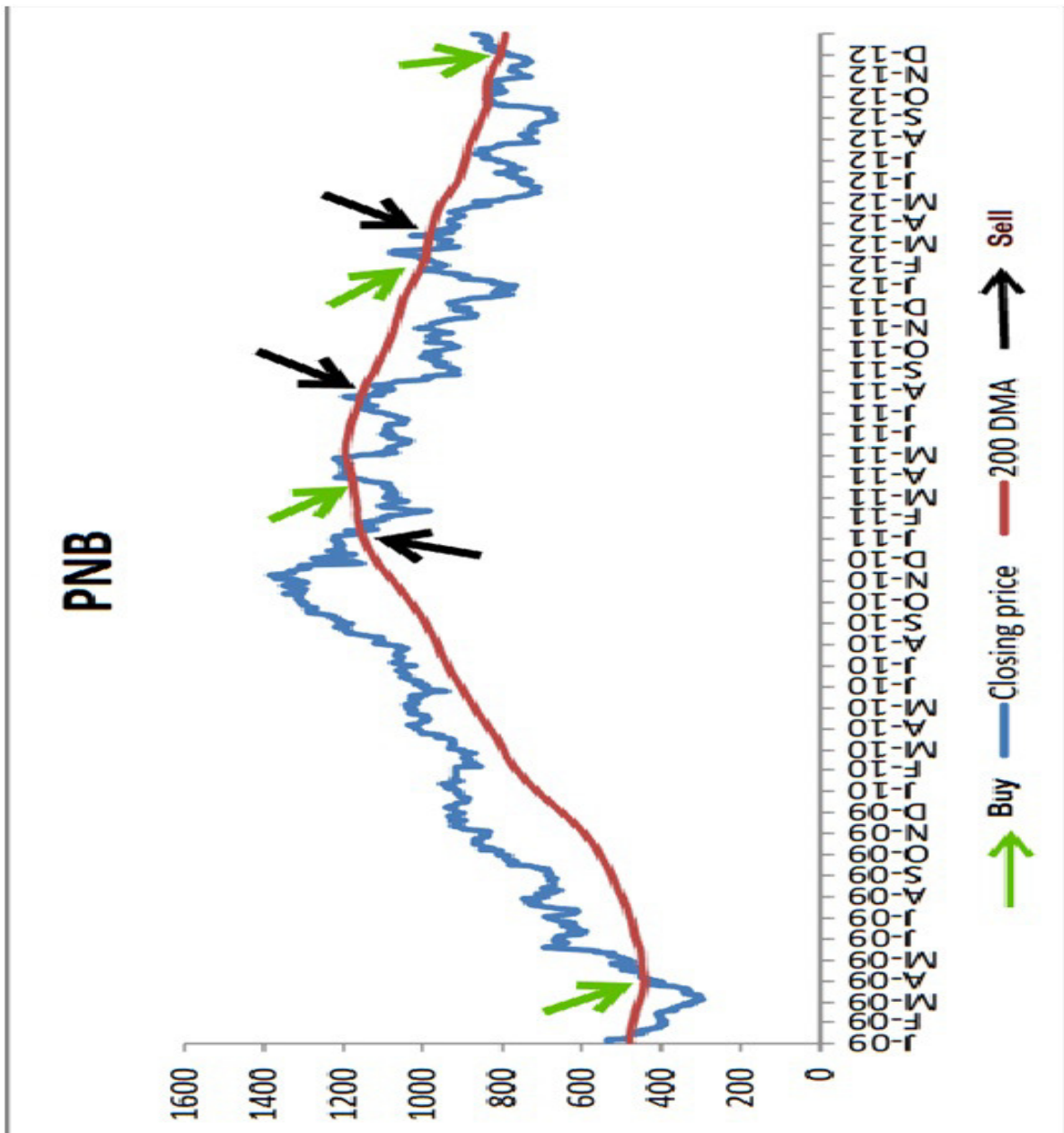
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**Line chart showing Closing Prices & 200 DMA of SBI from Jan, 2009 to Dec, 2012**

The below chart depicts the prices and 200 DMA of State Bank of India from 1 Jan, 2009 to 31 Dec, 2012. When the price was below the 200 DMA, it meant that the stock was in a weak position, for instance in December, 2011. When the price was above the 200 DMA, it meant that the stock was in a strong position, for instance on October, 2010. The stock had fluctuated dramatically, i.e. it followed both upward trend and downward trend. The uptrend was when the price was above 200 DMA, for instance from June, 2009 to February, 2010 and the downtrend was when it was below 200 DMA, for instance from May, 2011 to February 2012.

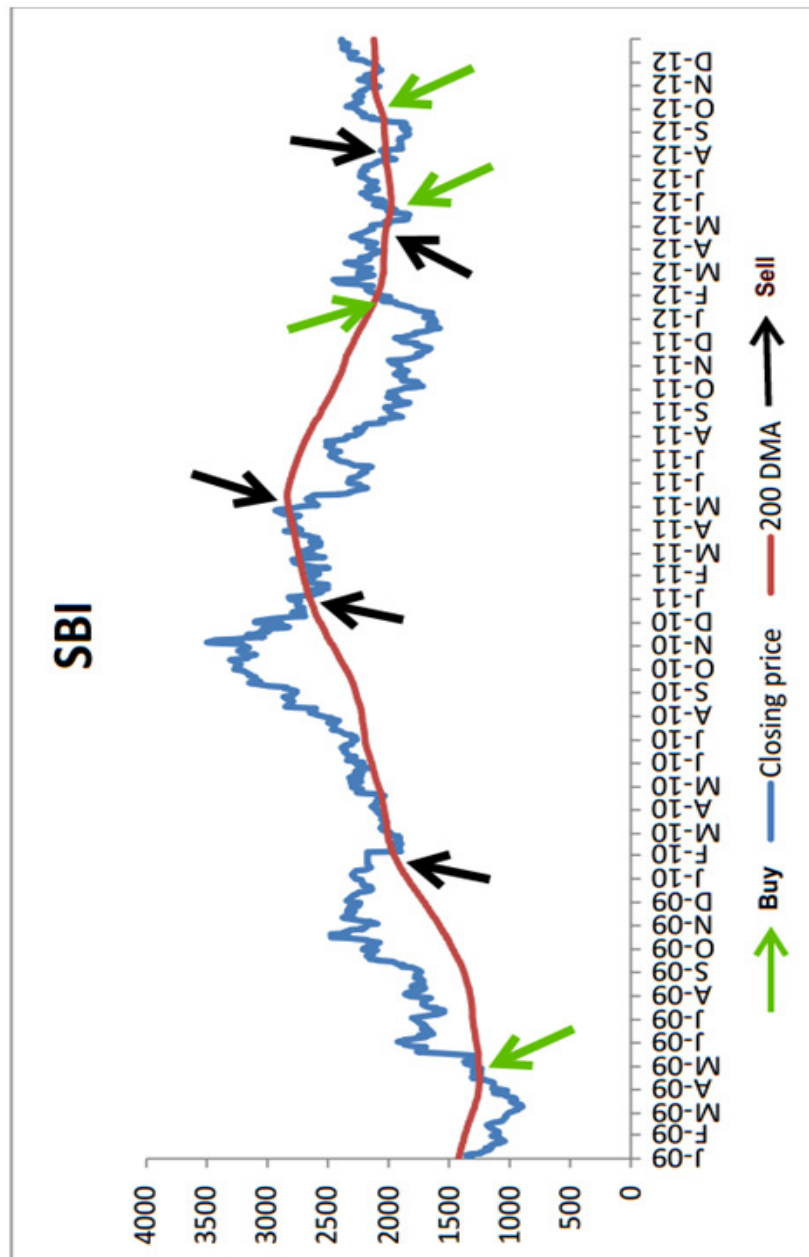
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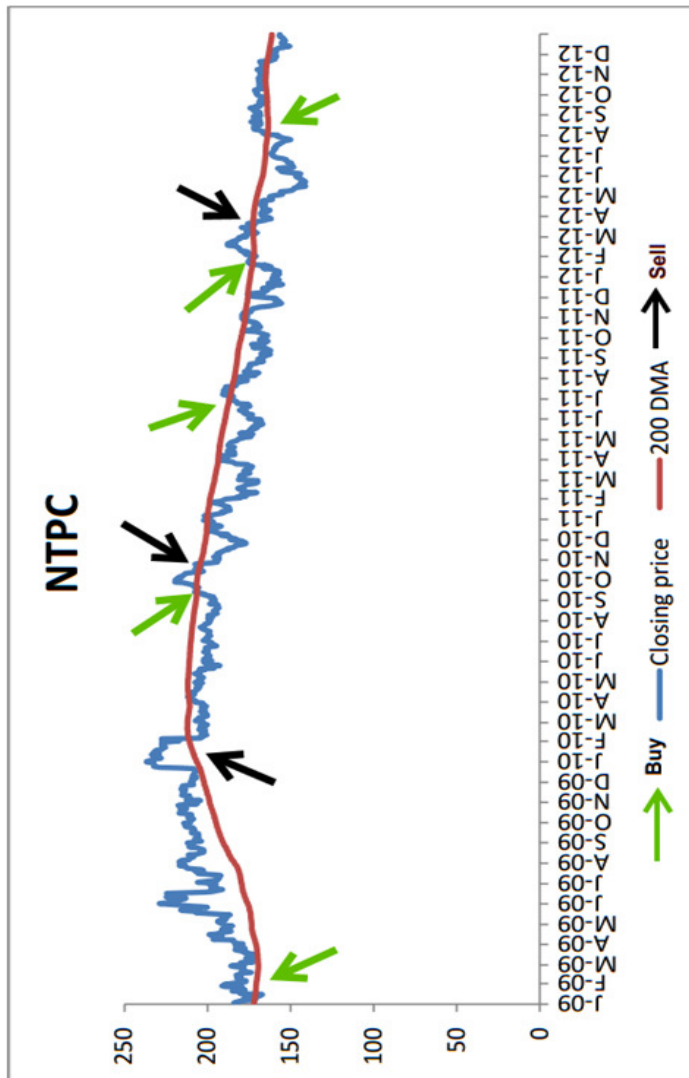




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Line chart showing Closing Prices & 200 DMA of NTPC from Jan, 2009 to Dec, 2012





The above chart reveals the prices and 200 DMA of NTPC Ltd. from 1 Jan, 2009 to 31 Dec, 2012. When the price was below the 200 DMA, it meant that the stock was in a weak position, for instance in June, 2010. When the price was above the 200 DMA, it meant that the stock was in a strong position, for instance on June, 2009. The stock had fluctuated significantly, i.e. it followed both upward trend and downward trend. The uptrend was when the price was above 200 DMA, for instance from February, 2009 to January, 2010 and the downtrend was when it was below 200 DMA, for instance from April, 2012 to August 2012 .

Line chart showing Closing Prices & 200 DMA of TATA Power from Jan, 2009 to Dec, 2012

The below chart explains the prices and 200 DMA of TATA Power Ltd. from 1 Jan, 2009 to 31 Dec, 2012. The blue line represents the price and the red line represents the 200 DMA. The point where blue line, i.e. price; crossed the red line, i.e. 200 DMA; from below generated the buying signal as the tendency of the price was to rise further and it could have been profitable for the investor to buy at that point. The green arrow represents the buying signal. The point where the blue line crossed the red line from above generated the sell signal as the tendency of the price was to fall further and it could have been profitable for the investor to sell at that point. The black arrow represents the selling signal.

When the price was below the 200 DMA, it meant that the stock was in a weak position, for instance in December, 2011. When the price was above the 200 DMA, it meant that the stock was in a strong position, for instance on November, 2009. The stock had fluctuated sharply, i.e. it followed both upward trend and downward trend. The uptrend was

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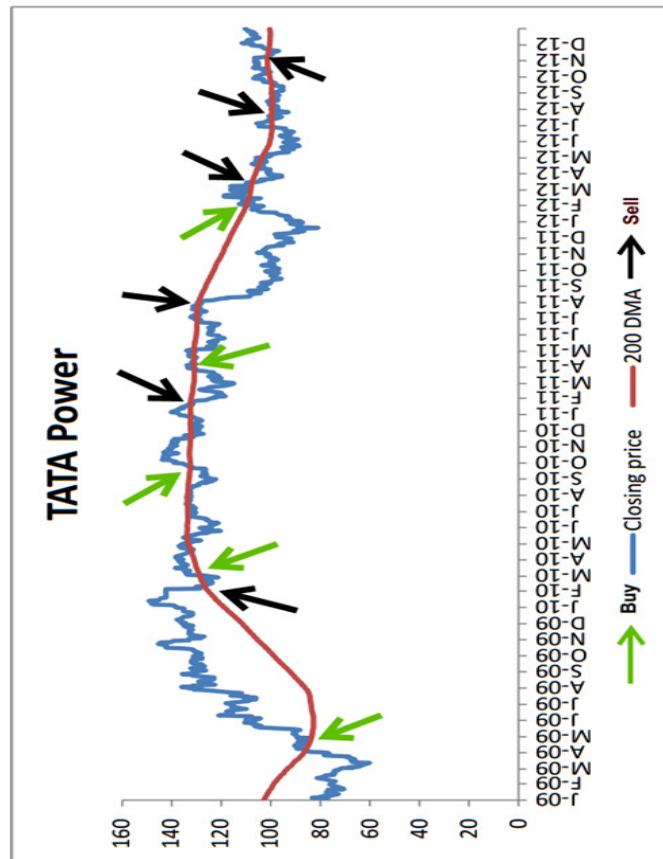
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when the price was above 200 DMA, for instance from May, 2009 to February, 2010 and the downtrend was when it was below 200 DMA, for instance from April, 2011 to February 2012.



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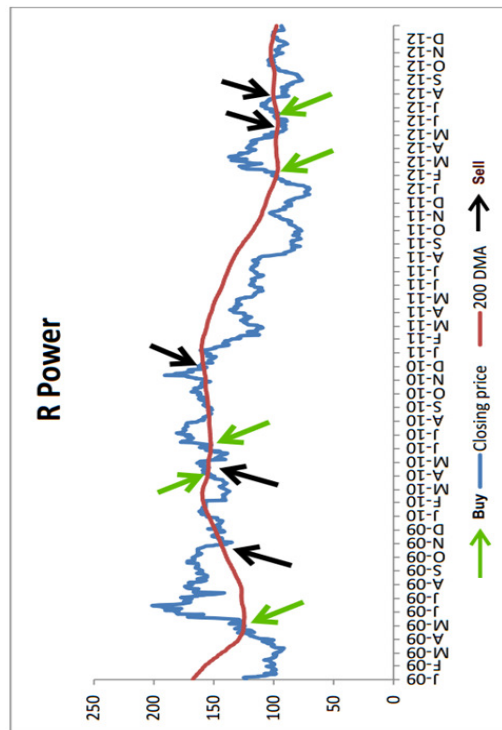
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Line chart showing Closing Prices & 200 DMA of R Power from Jan, 2009 to Dec, 2012



Line chart showing Closing Prices & 200 DMA of R Power from Jan, 2009 to Dec, 2012



The above chart depicts the prices and 200 DMA of Reliance Power Ltd. from 1 Jan, 2009 to 31 Dec, 2012. The blue line represents the price and the red line represents the 200 DMA. The point where blue line, i.e. price; crossed the red line, i.e. 200 DMA; from below generated the buying signal as the tendency of the price was to rise further and it could have been profitable for the investor to buy at that point. The green arrow represents the buying signal. The point where the blue line crossed the red line from above generated the sell signal as the tendency of the price was to fall further and it could have been profitable for the investor to sell at that point. The black arrow represents the selling signal.

When the price was below the 200 DMA, it meant that the stock was in a weak position, for instance in December, 2011. When the price was above the 200 DMA, it meant that the stock was in a strong position, for instance on December, 2010. The stock had fluctuated dramatically, i.e. it followed both upward trend and downward trend. The uptrend was when the price was above 200 DMA, for instance from June, 2009 to November, 2009 and the downtrend was when it was below 200 DMA, for instance from February, 2011 to February 2012.

CONCLUSIONS

The study focussed on 5 companies that operate in two different sectors, i.e. Banking sector and Power sector. Moving averages help in generating buying and selling signals which can help the investors in profitable handling of the securities. Although it is beneficial to use other technical indicators such as ROC, RSI along with moving averages but it is better to stick with moving averages and learn how best to read the signals otherwise it will create confusion and undermine the focus of your analysis.

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The findings of the study documented that in Punjab National Bank, various signals were generated. The buying signals were generated in April, 2009; April, 2011; Feb, Dec, 2012. The selling signals were generated in Jan, August, 2012; April, 2012. In State Bank India, various signals were generated. The buying signals were generated in May, 2009; Feb, June, Sept, 2012. The selling signals were generated in Feb, 2010; Jan, May, 2011; May, August, 2012.

The study concludes that in NTPC, various signals were generated. The buying signals were generated in Jan, 2009; Oct, 2010; July, 2011; Feb, August, 2012. The selling signals were generated in Jan, Oct, 2010; March, 2012. In Tata Power, various signals were generated. The buying signals were generated in April, 2009; May, Oct, 2010; April, 2011; March, 2012. The selling signals were generated in Feb, 2010; Feb, Aug, 2011; April, July, Nov, 2012. In Reliance Power, various signals were generated. The buying signals were generated in April, 2009; April, July, 2010; Feb, June, 2012. The selling signals were generated in Nov, 2009; May, Dec, 2010; May, August, 2012.

In case a person is investing for the first time, he must see the behaviour of the market in relation to 200 DMA before investing his funds. If the motive of the investor is to invest in a new company, then 200 DMA cannot be used. In that case he should go for short term moving averages like 50 DMA, 10 DMA etc. Whenever the price starts moving above 200 DMA the investor should buy the stock. The more he waits, the more he reduces his profit as moving averages are already a lagging indicator. The same is true in case of selling. The 200 day simple moving average may not always be correct. The signals generated by them may sometimes be wrong as they are lagging indicators. It is better to use exponential moving



average when the market is fluctuating intensely as exponential moving averages takes into account current changes. Important factors such as data used, responsiveness of price must be considered carefully while using moving averages otherwise the use of moving averages will go in vain. Although moving average is a good representation of the stock market behaviour, but using it with other technical indicators will always be less prone to errors in forecasting future prices and making profitable investment.

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