

DOES TECHNICAL ANALYSIS GENERATE SUPERIOR PROFITS? A STUDY OF KSE-100 INDEX USING SIMPLE MOVING AVERAGES (SMA)

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ABSTRACT

The study evaluates the performance of technical analysis to know whether it can generate abnormal profits and outperform the stock market the research is based on secondary data of 30 companies that are listed on the Karachi stock exchange KSE 100 index from the 2006-2014 simple moving averages is used as a tool for identifying the trend direction as well as generating buy and sell signals. Two sample t-test is used to find significant differences between returns generated by moving average (TTR) and the buy & hold strategy. Based on the analysis the findings shows that returns from technical analysis cannot outperform the returns from buy and hold strategy in KSE. It can be concluded from results that B&H strategy generates higher returns to investors as compared to TTR; one of the reason that can be attributed here is high transaction cost that is added to frequent buying and selling under the technical analysis.

Key words: TTR, MA, B&H, B&S LP, SP, KSE.

INTRODUCTION

Every investor tries to earn high profits in the stock market to ensure abnormal returns traders try to adopt certain analytical approaches of which two are very common i.e. the fundamental analysis and the technical analysis. Investors believing in fundamental analysis mainly focus to find the reasons of price fluctuations from different variables like dividend yield earning potential, fundamental ratios etc.

Technical analysis on the other hand pay attention to past prices of securities to detect trends and patterns and with the help of certain indicators and tools try to predict future price. The common indicators used by technical analysts are bar charts, relative strength index, moving averages, trading break out range, trend lines MACD etc and they have their trading decision on the results of these tools.

The objective of the study is to check whether technical analysis can outperform in the Karachi stock exchange by predicting and forecasting the future prices. This research specifically investigates the performance of returns by the buy and hold strategy refers to the purchasing of a stock in from the starting of defined period and then selling at the ending of the period.

A study conducted by Brock, Lakonishok and Lebaron (1992) concluded his results with positive findings showing the predictive power of technical trading rules using Dow Jones index and after which many other researchers performed considerable amount of work in this field. Emerging markets and Asian markets got special attention.

Unfavorable results of technical trading rules were found in 10 large emerging markets in Asia while positive results in favor of TTR were found in 4 emerging south Asian markets and Chilean market.

Technical analysis is used to predict future price trends using past prices volume and open interest. A renowned technical analyst gave the proper definition as

“The technical approach to investment is essentially a reflection of the idea that prices move in trends that are determined by the changing attitudes of the investors toward a variety of economic, monetary political and psychological forces the art of technical analysis for it is an art, to identify a trend reversal at a relatively early stage and ride on that trend until the weight of the evidence shows or proves that the trend has reversed.” (p.2)

Most traders used TTR to know when to enter and when to exit the market as it is very major factor in earning abnormal returns and they do by forecasting future price and pre-defined patterns some traders rely on fundamental analysis and believe market to be efficient and use passive strategies (Almujamed, Field & Power, 2013).

As mentioned in the above text there are many types of technical analysis tools that can be used for forecasting future price but in this study simple moving averages used. The purpose of the study is to check out whether technical analysis is useful in forecasting the future returns to gain abnormal profit in KSE.

REVIEW OF LITERATURE

Studies done on technical analysis focused different angles and targets, some focused on the determinants of technical analysis while others tested their accuracy like Jones (1973) conducted a research and compared the random walk hypothesis against the idea of technical analysis the study also highlighted the efficiency of random walk hypothesis by stating that the past prices behavior has no connection with future trends of prices.

Another study conducted favored random walk model the study revealed that movements of stock prices could not be based on their historic price behavior further the study suggested that the strategy of buy and hold will yield better results over the method of TTR (Wilder, 2009).

Horne, James, George and Parker (1967) discovered that moving averages with threshold combinations yielded less returns than buy and hold strategy the study used the same methodology that was done in 1960's future prices were checked with previous prices.

Haug and Hirschey (2006) conducted study focused on “January effect” their study indicated that the average return of January in stock markets was at 3.5 percent in comparison with the rest of year it was 0.42 percent for the time period from 1904-1974 so it was concluded that equal weighted returns that were statistically and economically significant in addition no relation was found with technical analysis.

Another study explored the relationship among the technical analysis with profitability

(Park & Irwin, 2004). The study based on early and modern studies revealed that technical analysis can predict the future path for exchange markets but it's unable to predict the stock markets, hence can earned monetary profits for speculative markets.

Lento (2008) reported the ability of forecasting moving averages in his study the results from the study gave some mixed results showing significance of moving averages at a lag 10 and were clearly outperformed the random- walk model but not at the lag 1. For the development of forecasting model using OLS regression for the DJIA, NASDAQ, TSX and CAD-US exchange rate 5 moving averages were used. However, in the following 10 days 45 to 48% of the variation in return were explained by moving averages clearly and it outperformed the random walk model.

Another study done to check the relationship between the effectiveness of technical trading rules with the size of the firm was done by (Bukhardi, Cai, Hudson & Keasey, 2005). Trading rules applied on a number of companies that were segregated based on their sizes form the period of 1987-2002. It was found that on the basis of smaller capitalization technical trading rules were more successful to give information about future prices movements of the firm.

Mark (2002) observed technical trading rules used by (Allen & Karjalainen, 1999) because of its predictability nature to find out of daily returns for Dow Jones industrial in comparison with moving average rules used by (Brock, Lakonishok & Lebaron, 1992). His recommendation included that simple moving average rules were not completely successful in predicting future returns and because of data probing.

Ahmed, Beck and Goldreyer (2000) reported the worth of using of moving average rules for emerging markets had known financial profits. Tian, Wan and Guo (2002) also supported the forecasting power and profitability of moving averages (MA) and trading range break (TRB) rules for the CSEM (Chinese stock exchange market from (1192-2000).

Lonnark and Soutanaevea (2008) conducted a study on profitability of technical trading rules on the Baltic stock Markets. In the study it was analyzed whether simple TTR's were profitable for use on 3 Baltic Stock Market or not. So for this purpose both methods were used.

Summing up all the discussions different studies gave different contradicting results it didn't solved the mystery whether to use technical analysis for forecasting the future. to summarize all the discussion about the applying TTR's for calculation of profitable return after transaction cost is taken in to consideration. In addition the research is adding up further in an ongoing converse with recent data of KSE 100 index from 2006 to 2014.

OBJECTIVES OF THE STUDY

To check out whether technical analysis is successful in predicting future returns to gain abnormal profits in KSE.

TESTABLE HYPOTHESES

Returns based on moving averages are compared with returns gained from buy and Hold strategy based on the above theoretical evidences and literature following hypothesis is developed

H0: *There is insignificant relationship between returns based on moving average rule and buy and Hold Strategy*

H1: *Returns of moving averages outperform returns of buy and hold strategy*

METHODOLOGY

The study is an attempt to find out whether the returns based on moving average rule are more than Buy & Hold strategy. The KSE is selected for the investigation purposes

Data and sample Description

The Karachi stock market is taken for analysis of the study where KSE- 100 index and thirty companies are arbitrarily chosen across different sectors of KSE, covering the span from January 2006 through December 2014. KSE-100 index contains the largest market capitalization comprising 100 companies. Daily closing prices of 30 companies and KSE-100 index from 2006 to 2014 were used for examination.

Methodology of (Brock, Lakonishok & Lebaron, 1992) is used in this research. Daily returns were calculated for all the observations by simple return formula $(P_i - P_o)/P_o$ where P_i is the current closing price and P_o is the previous closing price of the stock.

In this study popular moving averages for days 1-9, 1-15, 1-30, 1-60, 1-90 & 1-20 are used MA's were calculated for generating Buy and Sell signals to find their returns. In moving average the first digit represents the SP while the second digit represents LP of days. The SPMA consists of 1 day (daily returns in case of companies and index itself in case of KSE-100 index) and the LP MA varies to 9, 15, 30, 60, 90 and 120 days. LP is slow MA as it is calculated over greater number of days BUY & SELL signals are generated from a rule and that is whenever SP crosses LP from below a Buy signal would be generated and if SP crosses LP from above, it would give a sell signal. The signals about buy and sell were generated with the help of MS Excel using if what analysis. The instance where daily returns were greater than moving average returns, Buy signal would generate and a sell signal would be generated if the case is opposite returns of buy and sell signals were calculated by simple formula of return $\{(last\ sell\ price - last\ buy\ price) / last\ buy\ price\}$ using last buy close and last sell price respectively.

For calculation B & S returns number of buy and sell signals were calculate and also additional transaction cost of 0.06% were deducted from it. Average of all brokerage omission was taken while calculating the transaction cost. MA annualized returns for each MA was found out by adding all B&S returns. B&H annualized returns were calculated by subtraction of closing price of year from opening price and dividing the result by opening price for that specific year. Two sample T test was used to find the

significance level for acceptance or rejection of Null hypothesis.

ANALYSIS

Yearly comparison of MAs B & S with B & H

Buy Sell (1-9) with Buy & Hold

The returns of B & S 1 – 9 and B & H of 30 companies compared from time period of 2004 to 2014 for B & S (1-9) and for B & H are mentioned in table 4.1 the mean annualized return from 2004 to 2014 for B & S (1-9) is 12.42% and 23.50% for B & H strategy. The table showing results p-value greater than 0.05 in all years meaning all values are insignificant and null hypothesis is accepted for B & S (1-9) rule.

Table 1: Comparison of Buy- sell (1-9) & B & H strategy

Years	B & S (1-9)	B& H Returns	Mean difference	T value	P value
2006	0.3110	0.4677	-0.156	-1.3479	0.1829
2007	0.4124	0.3852	0.0272	0.2471	0.8057
2008	-0.1870	-0.1035	-0.0835	-0.6183	0.5388
2009	0.3984	0.5923	-0.1939	-0.8247	0.4129
2010	-0.6128	-0.6423	0.0295	0.4198	0.6762
2011	0.2863	0.5687	-0.2824	-1.7557	0.0844
2012	0.0635	-0.0123	0.0757	0.8554	0.3958
2013	-0.1817	-0.2589	0.0772	0.9793	0.3315
2014	0.6282	1.1183	-0.04901	-1.6850	0.1027

Buy – sell (1-9) B & H

Mean Return	0.1242	0.2350
Observations	270	270
Hypothesized Mean Diff.	0.00	0.00

Buy Sell (1-15) with Buy & Hold

The returns of B & S 1-15 and B & H of 30 companies are compared from time period 2006 to 2014 annualized returns from 2006 to 2014 for B & S (1-15) and for B& H are mentioned in table 4.2. The mean return for B & S (1-15) is 10.23% and 23.50% for B & H strategy according to the results provided by t-test, p value is significant only in 2008, & 2009, rest all p values are insignificant and our null hypothesis is accepted for B & S (1-15) rule.

Table 2: Comparison of Buy- sell (1-15) & B & H strategy

Years	B & S (1-15)	B& H Returns	Mean difference	T value	P value
2006	0.2393	0.4677	-0.2283	-1.9708	0.0585

2007	0.40502	0.3852	0.0200	0.1800	0.8578
2008	-0.1448	-0.1035	-0.0413	-0.2992	0.7659
2009	0.3405	0.5923	0.2518	-1.0804	0.2844
2010	-0.4428	-0.6423	0.1995	3.4297	0.0011
2011	0.1236	0.5687	-0.4451	-2.6921	0.0093
2012	0.0354	-0.0123	0.0476	0.5660	0.5736
2013	-0.2017	-0.2589	0.0572	0.8233	0.4137
2014	0.5656	1.1183	-0.5527	-1.8058	0.3761

Buy – sell (1-15) B & H

Mean Return	0.1023	0.2350
Observations	270	270
Hypothesized Mean Diff.	0.00	0.00

Buy Sell (1-30) with Buy & Hold

The returns of B & S 1-30 and B & H of 30 companies are compared from 2006 to 2014 annualized returns from 2006 to 2014 for B & S (1-30) and for B & H are mentioned in table. The mean returns from 2006 to 2014 for B & S (1-30) is 9.9% and 23.50% for B & H strategy. The results suggested only 2006 and 2014 are significant for the rest the values are insignificant so null hypothesis is accepted for B& S (1-30) rule.

Table 3: Comparison of Buy- sell (1-30) & B & H strategy

Years	B & S (1-30)	B & H Returns	Mean difference	T - value	P- value
2006	0.1217	0.4677	-3.2414	-3.2414	0.0020
2007	0.3106	0.3852	-0.0746	-0.6494	0.5187
2008	0.0626	-0.1035	1.0626	1.0626	0.2924
2009	0.3815	0.5923	-0.8710	-0.8710	0.3873
2010	-0.1918	-0.6423	1.4441	1.4441	0.8947
2011	-0.0786	0.5687	-1.1109	-1.1109	0.2761
2012	-0.0593	-0.0123	-0.5986	-0.5986	0.5518
2013	-0.1283	-0.2589	0.0798	0.0798	1.7834
2014	0.4728	1.1183	-2.0446	-2.0446	0.0454

Buy – sell (1-30) B & H

Mean Return	0.0990	0.2350
Observations	270	270
Hypothesized Mean Diff.	0.00	0.00

Buy Sell (1-60) with Buy & Hold

The returns of B & S 1-60 and B & H of 30 companies are compared from 2006 to 2014 the annualized returns from 2006 to 2014 are mentioned in the table the mean return from 2006 to 2014 for B & S (1-60) is 13.33% and 23.50%for B & H strategy further

the table displays t-value, p value, annualized returns mean returns and number of observations. Looking at the results provided by these tests p value is significant in 2008 and 2013 so our null hypothesis is accepted for B & S (1-60) rule.

Table 4: Comparison of Buy- sell (1-60) & B & H strategy

Years	B & S (1-60)	B & H Returns	Mean difference	T - value	P- value
2006	0.0363	0.4677	-0.4314	-1.8223	0.0601
2007	0.2002	0.3852	-0.1851	-1.6733	0.0997
2008	0.2646	-0.1035	0.3681	2.2515	0.0282
2009	0.2306	0.5923	-0.3617	-1.5633	0.1234
2010	0.3563	-0.6423	0.9987	1.8425	0.0756
2011	-0.2795	0.5687	-0.8482	-1.3963	0.9860
2012	-0.0575	-0.0123	-0.0453	-0.4685	0.6412
2013	-0.0808	-0.2589	0.1781	2.3658	0.0214
2014	0.5291	1.1183	-0.5892	-1.4010	0.1665

Buy – sell (1-60) B & H

Mean Return	0.1333	0.2350
Observations	270	270
Hypothesized Mean Diff.	0.00	0.00

The returns of B & S (1-90) and B & H of 30 companies are compared from 2006 to 2014. The annual returns for the said time period for B & S (1-90) and B & H are mentioned in the table 4.5 the mean returns from 2006 to 2014 for B & S (1-90) is 12.03% and 23.50% for B & H the table also shows the t value, p value, annualized returns, mean returns and number of observations the results shows that p-value is significant only in 2010 and 2011 rest all p values are insignificant so our null hypothesis is accepted for B & S (1-90) rule.

Table 5: comparison of Buy- sell (1-90) & B & H strategy

Years	B & S (1-90)	B & H Returns	Mean difference	T - value	P- value
2006	0.1966	0.4677	-0.2711	-1.5240	0.1796
2007	0.1725	0.3852	-0.2127	-1.3898	0.0601
2008	0.2320	-0.1035	0.3355	1.8735	0.0760
2009	0.1881	0.5923	-0.4042	-1.6384	0.1068
2010	0.0587	-0.6423	0.7010	8.1292	0.0000
2011	-0.3171	0.5687	-0.8858	-7.4839	0.0000
2012	0.0412	-0.0123	0.0535	0.5478	0.5860
2013	-0.0856	-0.2589	0.1733	0.4659	0.0866
2014	0.5964	1.1183	-0.5219	-1.6865	0.0905

Buy – sell (1-90) B & H

Mean Return	0.1203	0.2350
Observations	270	270
Hypothesized Mean Diff.	0.00	0.00

The returns of B & S 1-120 and B & H of 30 companies are compared from time period of 2006 to 2014. Annualized returns from the said time period are expressed in the table 4.6. The mean return from 2006 to 2014 for B & S (1-120) is 2.08% and 23.50% for B & H strategy. According to the table results provided by t test, p value is insignificant only in 2009 and 2012, rest all p-values are significant and our alternate hypothesis is accepted for B & S (1-120) rule.

Table 6: comparison of Buy- sell (1-120) & B & H strategy

Years	B & S (1-120)	B & H Returns	Mean difference	T - value	P- value
2006	0.0031	0.4677	-0.4646	-4.6010	0.0000
2007	0.1247	0.3852	-0.2605	-2.3384	0.0228
2008	0.2938	-0.1035	0.3973	2.5428	0.0137
2009	0.1473	0.5923	-0.4450	-1.8713	0.0664
2010	0.1544	-0.6423	0.7967	8.3395	0.0000
2011	-0.5236	0.5687	1.0924	-7.7622	0.0000
2012	0.0601	-0.0123	0.0724	0.7028	0.4850
2013	0.0013	-0.2589	0.2602	3.6983	0.0005
2014	-0.0078	1.1183	-1.1261	-4.0347	0.0002

Buy – sell (1-120) B & H

Mean Return	0.0281	0.2350
Observations	270	270
Hypothesized Mean Diff.	0.00	0.00

Comparisons of All MAs B & S with B & H

The returns of B & S 1-9, 1-15, 1-30, 1-60, 1-90 & 1-120 and B & H of 30 companies are compared from time period 2006 to 2014 annualized returns from 2006 to 2014 for B & S of all MA's and for B & H are mentioned in table 4.7 the mean returns from 2006 to 2014 for of B & S (1-9, 1-15, 1-30, 1-60, 1-90 & 1-120) is 3.3% and 21.13% for B & H strategy . According to the results provided by t- test p value is significant only 1-15 & 1-120 rest all p values are significant and our alternate hypothesis is accepted for B & S (1-9, 1-30, 1-60, 1-90) rule.

Table 7: Comparison of All M.As & B & H strategy

M.A	M.A Returns	B & H Returns	Mean difference	T - value	P- value
1-9	0.0031	0.4677	-0.4646	4.6010	0.0000
1-15	0.1247	0.3852	-0.2605	2.3384	0.0228
1-30	0.2938	-0.1035	0.3973	2.5428	0.0137
1-60	0.1473	0.5923	-0.4450	1.8713	0.0664
1-90	0.1544	-0.6423	0.7967	8.3395	0.0000
1-120	-0.5236	0.5687	-1.0924	7.7622	0.0000

M.A Returns B & H

Mean Return	0.0333	0.2113
Observations	1620	1620
Hypothesized Mean Diff.	0.00	0.00

Comparisons of KSE-100 Index M.A B & S with B & H

The returns of B & S 1-9, 1-15, 1-30, 1-60, 1-90, & 1-120 and B & H of KSE-100 index is compared from time period of 2006 to 2014. Annualized returns from 2006 to 2014 for B & S of all MA's and for B & H are mentioned in table 4.8. The mean return from 2006 to 2014 for B & S (1-9, 1-15, 1-30, 1-60, 1-90, 1-120) is 14.28 % and 23.29% for B & H strategy. According to the results provided by the t-test, p value is greater than 0.05 in all respective years from 2006-2014 meaning all values are insignificant and our null hypothesis is accepted for B & S (1-9, 1-15, 1-30, 1-60, 1-90 and 1-120) rule.

Table 8: Comparison of KSE-100 index M.As & B & H strategy

M.A	M.A Returns	B & H Returns	Mean difference	T - value	P- value
1-9	0.1058	0.2329	-0.1271	-0.4685	0.6412
1-15	0.1570	0.2329	-0.0759	-0.5206	0.6098
1-30	0.1732	0.2329	-0.0597	-0.4073	0.6892
1-60	0.1589	0.2329	-0.0740	-0.5285	0.6044
1-90	0.1415	0.2329	-0.0914	-0.6655	0.5152
1-120	0.1207	0.2329	-0.1122	-0.7431	0.4682

M.A Returns B & H

Mean Return	0.1428	0.2329
Observations	54	54
Hypothesized Mean Diff.	0.00	0.00

CONCLUSION

The study examined the technical trading rule performance of the KSE-100 index for predicting future price movements to gain abnormal returns. Returns for buy & sell

(B & S) signals of moving average were calculated by applying Brock, Lakonishok and LeBaron (1992) methodology for 09 years from 2006 to 2014 popular moving averages were used in this report as they were widely used by technicians for analysis To conduct the comparisons of returns, two sample t-test assuming equal variances was used comparison was made between the buy and hold (B&H) strategy returns with the buy and sell (B&S) moving averages returns provided by 30 companies of KSE-100 index on annual basis. Comparisons were also made between the buy and hold (B & H) versus buy and sell (B & S) strategy returns for the KSE-100 index on moving average rule basis.

Results concluded that the annualized 09 years average returns provided by the buy & sell signal of 30 companies of KSE-100 index are 10.42% whereas returns provided by buy & hold strategy are 23.50%. the t-test result is significant only for 1-120 rule and is insignificant for rest of the moving average rules which shows inefficient results for moving average buy and sell (B & S) strategy.

Furthermore comparisons between the return of the KSE-100 index provided by buy and sell versus buy and hold moving average revealed that annualized 9 years average returns are 14.28% and 23.29% respectively. The t-test results are insignificant for all moving average rules which clearly highlighted that buy and hold strategy is in the winning situation.

The study is in the support of efficient market hypothesis signifying the higher returns provided by the buy and Hold (B & H) strategy over the technical trading rule this research result concluded that stock prices of KSE-100 index cannot be predicted based on past data using TTR and investors can earn higher returns by holding the stocks for a long span of time.

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