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Technical Analysis: A Historical Review

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Abstract

A number of studies have been conducted and published on technical analysis but there are few studies which consolidate the existing facts of technical analysis. Key objective of the present study is to abridge and systematized the considerable research which improve the efficiency of technical analysis. The study presents an overview on the aspect of the literature and the feasible gaps. The study examined the findings of available literature on technical analysis by dividing studies into three parts: Technical Analysis based on index values, studies on Technical Analysis in which transaction cost has been considered and Technical Analysis based on currency pairs. The study concluded that technical analysis can help to earn abnormal return and stock markets are not efficient.

Introduction

Technical analysis is an art of predicting future price movements by analyzing the past prices and volume of securities. Technical analysis use charts to identify patterns that can suggest potential movement (C. Boobalan, 2014). The initial key study was "Can Stock Market Forecaster Forecast?" written by Alfered Cowles 3rd and published in Econometrica, July 1933. Several books have been published by Richered W Schabacker from 1920 to 1930. Richered continued the effort of Charles Dow and William Peter Hamilton in their books. Technical indicator provides distinctive view on the strength and direction of underlying price action for a given time period. Technical traders increase their trading when prices move away from equilibrium values as observed by Luoma et al.(2004). Some studies which support the technical analysis are Gencay (1998), Rodriguez et al. (1999), Rodriguez et al. (2000) Osler (2000) , Luoma et al. (2004), Lento (2007), Metghalchi et al (2007), Kamath (2008), Yen-Hsu (2010), Cialenco and Protopapadakir (2011), Caporin et al. (2013), Yu et al. (2013), Royo et al. (2015), Kresta and Franek (2015), Chen et al. (2016), Chougala and H.S.(2016), Zhang et al. (2016), Arevalo et al. (2017) and Zarrabi et al. (2017). The reason behind is that the intricacy of the stock market is related with many factors such as economic, political, market sentiments, and behavior of traders as observed by Ticknor (2013). The purpose of the study is to provide systematic evaluation of presented papers which helps the researchers and traders in understanding the technical analysis more precisely and identifying research gap. Park and Irwin (2007) and Menkhoff and Taylor (2007) had also presented review papers on technical analysis in view of Forex market While Nazario et al (2017) presented a review paper on technical analysis based on stock market. But this study is classified on the basis of three sections which are less used in the previous studies. So these are the section on which study is based:

1. Section-A: Studies related to technical analysis based on Index Value.
2. Section-B: Studies related to technical analysis in which transaction cost is considered.
3. Section-C: Studies related to technical analysis based on currency pairs.

Section-A: Studies related to technical analysis based on Index Value

Share market index represents the average performance of the security market and Index value is computed from the prices of specified securities. Index value is the measurement tool for the traders, investors and business person to identify the market sentiments and movements which helps in the estimation of the return on particular investment. Trading and investment in index values is less risky because there is less volatility in comparison to individual stock price. So, technical analysis on index values is important. Numerous studies have been done on technical analysis based on index values that is here:

Gencay (1998) used the moving average (MA) and GARCH model to examine the certainty of security return of DJIA daily data series. The result showed that MA rules produce 10% more returns during 1980-1988 and moderate return during 1939-1950. The Ordinary Least Squares (OLS) and GARCH-M (1,1) models produce 1.65% and 2.95% average improved return than standard model.

Rodriguez et al. (1999) used the VMA, FMA, TRB and Arch & GARCH model on the General Index of the Madrid Stock exchange found technical indicator generates higher return and the mean sell return are more volatile than mean buy returns which indication the nonlinearity. GARCH & GARCH-M model are not successful in recognizing the volatility remarks.

Rodriguez et al. (2000) predict the stock price movements of the General Index of the Madrid stock market (IGBM) with the Artificial Neural Network Model (ANN). The results showed that ANN Model outperforms in 54%-58% cases in the absence of transaction cost in the first sub period and 19%-27% in second sub period. But buy and hold strategy gain more returns in uptrend than ANN.

Luoma et al. (2004) observed significant positive returns of theory of supply and demand in technical analysis of the price–volume behavior of equity stocks profits.

Metghalchi et al. (2007) stated that technical trading can enhance average return even in the presence of transaction cost. The result showed that the mean buy returns are 0.023% and the T-value of buy returns are 6.24. T-value of both buy and sell returns are significant.

Kamath (2008) studied the relationship of daily price–volume behavior of Santiago stock exchange, found significant positive relation between volume and returns. The rising market accompanied by rising volume and the volume makes the market movement. This strategy generates 237% return. Additionally GRANGER Causality found significant causality between return and volume.

Yen and HSU (2010) used the SPA test with multiple technical indicator rules such as Relative strength index (RSI), Filter rule (FR), MA, Momentum Strategy in volume (MSV) and On balance volume (OBV) on ten future markets. The results showed that return are significant in bearish market. Sortino ratio also showed better profitability signal.

Ulku and Prodon (2013) observed Moving Average Convergence/ Divergence (MACD) generate positive returns in 76.67% cases i.e. (23 out of 30) and moving average in 100% cases for stock market indexes of different economy. Technical indicator does not produce significant return in the future market.

Caporin et al. (2013) found that high and low range of prices is very useful for highly liquid stocks of DJIA. Technical traders can improve the profitability with H/L prices strategy. Fractionally Co integrated vector Autoregressive model showed low degree correlation between high and low prices.

Yu et al. (2013) observed out of 60 Variable Moving Average (VMA) and Fixed Moving Average (FMA) rules 57% (50%) rules showed significant returns for five major Southeast Asian markets in short run.

Zakamulin (2014) analyzed the market timing strategy and technical indicators performance on S&P, DJIA indices and US bond indices. The results showed that Market timing strategy and SMA did not show significant returns.

Royo et al. (2015) examined intraday observation of DJIA index, DAX and FTS with technical indicator Flag chart pattern with if than rules, stop loss & profit with new parameter to generate the significant returns. The trading rule show more positive returns. In 96 cases average return are positive and the maximum return is 180.2%. European markets are more inefficient than US market.

Chougala & H.S. (2016) observed price index of BSE, S&P500 of NY, NASDAC, London, Japan and Songhai stock exchange found average performance of Moving Average Crossover (MAC-O), SMA and Trading Range Breakout (TRB) indicators.

Zhang et al. (2016) examined the closing prices of S&P 500 and China Securities Index. The results showed that trends in Chinese market are frequently changing and the returns are greater than American market. The momentum effect in Chinese stock market is stronger.

Chougala & H.S. (2016) observed price index of BSE, S&P500 of NY, NASDAC, London, Japan and Songhai stock exchange found average performance of MAC-O,SMA and TRB indicators.

Arevalo et al. (2017) examined index values of DJIA with dynamic window scheme with updated stop loss and take profit. Flag and candle stick patterns was also used to recognize the profitable stock price movements in the presence of transaction cost. The dynamic window scheme generates 134.34% return in buy position and 151.69% in sell position. Exponential Moving Average Strategy (EMA) strategy also generates 200% significant returns.

Section-B: Studies related to technical analysis in which transaction cost is considered

Transaction cost is very important element for the computation of net returns for trader and investors because higher transaction cost can eliminates the returns generated by technical trading. If a trader or investor wants to maximize their returns then they have to efficiently reduce the transaction cost. So the studies related to technical analysis in which transaction cost is considered is important. Here some studies which considered transaction cost:

Lebaron (1999) studied the foreign exchange series from Nat West Bank which represents the London close for the currency DM and JN with the help of Moving Average found that technical indicator rule generate abnormally large amount of profit with large Sharpe ratio and frequent trading reduce the transactional cost. But technical indicator's profitability dramatically reduced after removing the period in which the Federal Reserve is active.

Rodriguez et al. (2000) predict the stock price movements of the General Index of the Madrid stock market (IGBM) by using the Artificial Neural

Network Model (ANN). The results showed that ANN Model outperforms in 54%-58% cases in the absence of transaction cost in the first sub period and 19%-27% in second sub period. But buy and hold strategy gain more returns in uptrend than ANN.

Lento et al. (2007) studied the closing price of S&P/ TSX, DJIA, NASDAQ and Canada/US Spot exchange rate with combined technical strategy (MACO, Filter rules, Bollinger Band and TRB) in the presence of transaction cost. The result shows that MACO, TRB rules generates excess return for the S&P/TSX 300 index, NASDAQ, CANDA/US spot exchange rate. Filter rule generate significant return for CANDA/US market. In total 48.4% rules produce significant return which means combined signal approach can enhance the productivity of technical trading strategies.

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Cialenco and Protopapadakis (2011) examined the predictability of Filter and Moving Average rules on currencies data of fourteen developed countries in the presence of transactional cost found significant returns in the first sub period. Technical trading indicator show very low significant returns for out of sample period.

Ulku and Prodon (2013) observed Moving Average Convergence/ Divergence (MACD) generate positive returns in 76.67% cases i.e. (23 out of 30) and moving average in 100% cases for stock market indexes of different economy. Technical indicators generate less return in the future market.

Yu et al. (2013) observed out of 60 VMA and FMA rules 57% (50%) rules showed significant returns for five major Southeast Asian markets in short run.

Kresta and Franek (2015) analyzed the maximum combination of LMA & SMA on Czech Stock Market in a Mat lab found that Moving Average Crossover delivers significant returns even after considering the transactional cost than buy and hold strategy.

Royo et al. (2015) examined intraday observation of DJIA index, DAX and FTS with technical indicator Flag chart pattern with if than rules, stop loss & profit with new parameter to produce significant returns. The trading rule show more positive returns. In 96 cases average return are positive and the maximum return is 180.2%. European markets are more inefficient than US market.

Chen et al. (2016) observed that MA generate superior performance even after considering the transaction cost in the cash market but not for the option trading in the Taiwan stock market.

Arevalo et al. (2017) examined stock price behavior of DJIA with dynamic window scheme with updated stop loss and take profit. Flag and candle stick patterns was also used to recognize the profitable stock price movements in the presence of transaction cost. The dynamic window scheme showed significant return. The dynamic window scheme generate134.34% return in buy position and 151.69% in sell position. The EMA strategy also obtained significant returns more than 200%.

Zarrabi et al. (2017) studied the forex market with technical indicators after considering the data snooping bias and transaction cost. False Discovery Rate (FDR) combines the signals of multiple technical indicators. The results showed that FDR with multiple indicators generates significant returns for the forex market. Annualized Sharpe ratio remains volatile. The results showed that if an investor wants to take advantage of dynamic economy then they have to timely update their portfolio.

Section-C: Studies related to technical analysis based on currency pairs

Forex market is the leading financial market of the world. Foreign exchange market is very popular among traders because of liquidity, availability of margin money, high liquidity, 24 hours trading and high volatility. There are 28 major currency in the world in which 8 currency pairs are highly tradable. If a trader likes to trade in volatile market then he can make huge profit. So studies on technical analysis based on currency pairs are important. Here are some studies based on currency pairs:

Lebaron (1999) studied the foreign exchange series from Nat West Bank which represents the London close for the currency DM and JN with the help of SMA found that technical indicator rule generate abnormally large amount of profit with large Sharpe ratio and frequent trading reduce the transactional cost. But technical indicator's profitability dramatically reduced after removing the period in which the Federal Reserve is active.

Osler, (2000) studied the support and resistance level published daily by six firms (commercial bank, investment bank and news services based on US and abroad) of three currencies Mark, Yen and Pound relative to the U.S. dollar based on bounce frequency found that published support and resistance levels are very helpful in the interruption of trend.

Lento et al. (2007) studied the closing price of S&P/ TSX, DJIA, NASDAQ and Canada/US Spot exchange rate with combined technical strategy (MACO, Filter rules, Bollinger Band and TRB) in the presence of transaction cost. The results showed that MACO, TRB rules generates excess return for the S&P/TSX 300 index, NASDAQ, CANDA/US spot exchange rate. Filter rule generate significant return for CANDA/US market. In total 48.4% rules predict correct signal that means combined signal approach can enhance the productivity of technical trading strategies.

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Conclusion

The purpose of this study to review the literature on technical analysis on the basis of three categories; index values, transaction cost and currency pairs. The review paper focuses on old and recent studies. Park and Irwin (2007) and Menkhoff and Taylor (2007) had also presented review papers on technical analysis in view of Forex market While Nazario et al (2017) presented a review paper on technical analysis based on stock market. This article is useful for many researchers. The result show that in the first section 87.5% i.e. (14 out of 16) studies support the technical analysis. While Ulku and Prodon (2013) observed that index future market significantly reduces the effectiveness of technical rules. Zakamulin (2014) observed market timing strategy and technical indicators does not show significant returns. Yen and HSU (2010) deduced that returns are significant in bearish market. Caporin et al. (2013) showed that high-low price strategy can improve the returns.

In the second section 76.9% i.e. (10 out of 13) studies support the technical analysis in the presence of transaction cost. While Lebaron (1999) observed that technical indicators profitability dramatically reduced after removing the period in which Federal Reserve is active. Ulku and Prodon (2013) deduced that index future market significantly reduces the effectiveness of technical rules and yu et al. (2013) found that technical signals returns are not significant in long run.

In the third section 80% i.e. (4 out of 5) studies support the technical analysis. Result on the basis of all section of studies Gencay(1997), Rodriguez et al. (1999), Rodriguez et al. (2000) Osler (2000) , Luoma et al. (2004), Lento (2007), Metghalchi et al (2007), Kamath (2008), Yen-Hsu (2010), Cialenco and Protopapadakir (2011), Caporin et. al. (2013), Yu et al.(2013), Royo et al. (2015), Kresta and Franek (2015),Chen et. al. (2016),Chougala and H.S.(2016), Zhang et al. (2016), Arevalo et al. (2017), Zarrabi et al. (2017) support the technical analysis. All these studies prove that stock market is not efficient. Lento (2007) proved combined use of technical tools improve returns. The result show significant return in bull/bear market as observed by Rodriguez et al. (2000) and Louma et al. (2004). Chen et al. (2016) observed technical tools significantly outperform on without option issuance portfolio. Technical analysis is an old area of research among researchers but still study should be on how the technical indicators behave in different economic scenarios for emerging and developing economy. Popular currency pairs have been used for technical analysis but in future another currency pairs should be used for the study.

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