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Optimizing Moving-Average Trading Strategy: Evidence in Malaysia Equity Market

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Abstract

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Technical analysis practitioners believe that data on past price and volume provide important and useful information in forecasting future price movements in the financial market. This paper study Optimizing Moving-Average Trading Strategy. We find that the original classical moving average crossover strategies have generated higher risk-adjusted portfolio return as compared to the simple buy-and-hold strategy. The modified MA crossover strategy shows inconsistency in its strategy return as some periods of crossover show higher return as compared to the original strategy, while some shows lower strategy return. This may be due to the stricter additional trading rule that reduces trading signals, and thus lower number of trades.

Keywords: Technical analysis; moving average; buy-and- hold strategy; crossover strategy; modified MA.

1. Introduction

Technical analysis (TA) is a security analysis field for forecasting the direction of stock market prices by studying the past market data, primarily price and volume. Technical analysis has been widely applied by the financial practitioners for market timing in buying or selling securities. Practitioners have been using technical trading systems and rules to profit from the financial market and attempt to earn above-average return and outperform market benchmarks. Some researchers Sweeney et al., (1988), Brock et al., (1992), Levich et al., (1993), Taylor., (1994), Fama et al., (1966), Kaufman, (2005) and Covel, (2011) have explored whether such trading systems and rules can lead to better performance than a simple buy-and-hold strategy. Among many technical trading strategies, the

moving-average (MA) trading system is the most renowned trend-following strategy and widely used strategy in the market. In this study, we want to examine whether such system could generate above-average return for securities in Malaysia. Furthermore, we have added several filtered rules for the MA trading system and test whether it performs better risk-adjusted return than the original MA trading system. Many past studies also have inclined to proof that TA does not outperform simple buy-and-hold strategy when transaction costs are included (Fama et al., 1966; Ready, 1997; Bessembinder et al., 1998). Also, there are no superior advantages in using market-timing strategies (Sullivan et al., 2003; Bauer et al., 2001).

The use of technical analysis as market timing tool in making investment decision whether to buy, hold, or sell, is an active investment strategy that attempts to outperform the simple buy-and-hold passive strategy. At the core of technical analysis lies a belief where direction of future security prices can be predicted by using technical indicators derived from past historical prices. Among the most common presupposition is that security prices move in trends. So, the most widely used market-timing strategy is the trend-following strategy, where it attempts to follow the trend and ride on it.

Until the 21st century, the interest has widespread in the increasing of academic literature on studying the technical analysis of the financial market. As some of the trend-following rules help investors to reduce massive losses during bear markets that happened in the 2000s. Several studies find evidence that in favor to TA (Brock et al., 1992; LeBaron, 1999; Lo et al 2000; Neely, 2002; Wilcox & Crittenden, 2009; Zhu & Zhou, 2009). They found that using technical trading rules do provide profitability and above-average market return as compared to simple buy-and-hold strategy, excluding transaction costs. Furthermore, simple technical trading strategy can generate comparable returns as compared to investing strategy depending on economic and financial fundamentals (Olszewski, 2001).

The most popular strategy of trend-following is the moving-average crossover (MA Crossover) strategy. Among various technical indicators, the moving-averages predominantly show predictive power in the stock market; probably it matches or exceeds of those macroeconomic variables (Neely et al., 2013).

This study examine the effectiveness of optimized moving-average trading system as a better performance technical trading system comparing classical moving-average crossover strategy and simple buy-and-hold strategy.

2. Literature review

Technical analysis practitioners believe that data on past price and volume provide important and useful information in forecasting future price movements in the financial market.

Schwager, (1995) discovers that many fund managers and top traders using TA. Also, Covel, (2011) quotes examples of successful large hedge funds that extensively use TA without having fundamental knowledge about the market. Academics have long been skeptical regarding the practicality of TA, despite the popularity and adoption by market practitioners. Several reasons for academics doubt on the usefulness of TA are: (1) early theoretical studies on random walk and efficient market models disregard excess return and profitability in technical trading (Fama & Blume, 1966; Cowles, 1933) (2) there is no theoretical basis on TA being research; and (3) challenges in

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demonstrating the true effectiveness on technical trading rules mainly due to bias in data-snooping (Sullivan et al., 2003; Lo & MacKinlay, 1990; Jegadeesh, 2000) where the same data set are frequently being used for model selection and implication. Thus, it is not astonishing that academics have yet to conclude the effectiveness of TA.

Other past studies provide results that are consistent with the market efficiency through empirical testing that future price cannot be predicted by TA. For instance, the benefits of TA in generating excess return is offset when transaction costs are included (Fama & Blume, 1966; Ready, 1997; Bessembinder & Chan, 1998). Even though with the contrary opinion in EMH, TA is still being studied extensively by many researchers and market practitioners. Here, we can see that there are two philosophies that are contradictory with each other, the random walk efficient market theory and technical analysis. If practitioners' practice of TA is based on hard fact, then it seems that the markets are inefficient. Otherwise, if the markets are efficient, then it appears that the financial community is probably wasting a huge amount of resources on TA.

Hypothetically, incomplete fundamental information probably is a major factor investor use TA. Brown & Jennings, (1989) demonstrate that rational investors can make profit by establishing expectations from historical prices. According to Blume et al., (1994) confirm that traders who utilize market statistics perform better than those who do not. It is in the circumstances of incomplete information; investors face model uncertainty even though stock returns are fairly predictable. Several researchers examine different technical trading rules and provide consistent result that TA providing information beyond those that have already reflected in market price (Brock et al., 1992; Lo et al., 2000). For example, Blume et al., (1994) show that if prices do not react instantly to new information, volume may provide information that is not available in the market.

Among many other studies (Brock et al., 1992; LeBaron, 1999; Neely, 2002) show that using MA signals provides profitability and significant gain greater than stock.

2.1. Problem statement

Given that the widespread classical literature of finance on random walk and efficient market invalidate the use of technical analysis in forecasting future price and profitability of above-average market return, on contrary, while numerous recent studies demonstrate that technical analysis and trading rules that provide buy-sell signals generate better performance than simple-buy-and-hold strategy. However, many top traders, professional fund managers, and Commodity Trading Advisors (CTAs) use technical analysis and technical trading systems (Covel, 2011; Schwager,1995) studied the persistence in performance level of managed futures and found that managers' skill and their reliance on different trading systems to make investment decisions have a positive effect on trading performance persistence.

Therefore, we investigate whether the use of technical analysis and technical trading rules can provide better performance than simple buy-and-hold strategy in Malaysia equity markets. Also, we want to examine whether additional rules add value and perform better than the classical moving-average crossover strategy. The research objectives of this research as follows:

i. To evaluate whether technical trading rules, using moving-average crossover strategy, outperform simple buy-and-hold strategy.
ii. To investigate whether which combination of moving-average crossover provide the best performance

3. Research Methodologies

3.1. Sample data

Based on secondary data on all securities historical prices will be collected from the ChartNexus charting software. The data series used in this study is the FBMKLCI index from first trading day in 2000 to the last trading day in 2014, a collection of 15-years of daily date, to back-test the classical and modified MA crossover trading strategy.

3.2. Simple Moving Average (SMA)

Computing the averages of recent prices is most likely the most common way for smoothing prices and filtering out "noise" or insignificant market fluctuation and movement.
Moving average, MA (n) = Sum of n closing price / n
Where: n = the number of time periods in moving average
A trading signal is shown to enter or exit a trade. To enter a trade, a Long Position (Buy order) is executed; when an exit signal is shown, a Short Position (Sell order) is executed to close (liquidate) their positions.

3.3. Original Moving-Average Crossover System

The original classical MA crossover rule is purely based on only entry point and exit point from the MA crossover of short period MA and long period MA. There is no stop-loss rule for cutting losses. Entry Point; Entry point is the open (Buy/Long) position when entry signal is shown at the signal day's closing price. Exit Point; Exit point is the close (Sell/Short/Liquidate) position when exit signal is shown at the signal day's closing price.

3.4. Modified Moving-Average Crossover System

The modified MA crossover rule is based on the original classical MA crossover rule with some additional trading rules and criteria added with the intention to enhance its risk-adjusted return. Trading rules and criteria such as stop-loss, minimum holding period, no entry on narrow-range day, entry on white candlestick day, etc.

4. Results

Table 1. Descriptive statistics for the simple buy-and-hold strategy

Total No. of Months	**180**
Avg. Profit per month (%)	0.0522
Avg. Loss per month (%)	-0.0364
Reward-to-Risk ratio	1.4352

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Strategy Return	1.1121
Portfolio avg. return (geometric return)	0.0042
Standard deviation of return	0.0041
Sharp Ratio	0.0944
Skewness	-0.2841
Kurtosis	1.1743

Based on table 1, the simple buy-and-hold strategy generates a total return of 111.21%. Its average monthly return is 0.42% with a standard deviation of 4.41%, therefore the risk-adjusted return (sharp ratio) is 0.09 (i.e., for every unit risk taken, the average monthly return will increase by 0.09%). The strategy has a maximum drawdown of -15.22% during October-2008; and a maximum upside gain of 13.55% during April 2009. The return distribution is quite symmetrical but with flatter and thinner tail, with a skewness of -0.2841 and kurtosis of 1.1743 (negative kurtosis, platykurtic). This shows that the central mean is lower and broader, and its tails are thinner and shorter. Returns following this distribution have less large fluctuations which makes the investment using this strategy less risky.

Table 2. Summary of trades based on different moving average periods

Strategy Type	**B&H**		**MA** (1,10)	**MA** (1,20)	**MA** (1,50)	**MA** (1,100)	**MA** (1,200)
Total No. of	180	Original	224	144	79	44	39
Trades		Modified	169	114	63	44	28
Reward-to Risk	0.95	Original	3.99	3.84	7.90	5.78	12.74
Ratio		Modified	2.85	2.53	5.41	5.78	9.11
Total Strategy	111.21%	Original	726.47%	381.79%	312.85%	247.02%	220.19%
Return		Modified	791.28%	325.48%	336.36%	247.02%	241.14%
Geometric Mean	4.16%	Original	0.95%	1.10%	1.81%	2.87%	3.03%
Return		Modified	1.30%	1.28%	2.37%	2.87%	4.48%
S. Deviation of	4.41%	Original	3.05%	3.75%	7.14%	9.94%	8.14%
Return		Modified	3.55%	4.27%	7.97%	9.94%	9.35%
Sharpe Ratio	0.09	Original	0.31	0.29	0.25	0.29	0.37
		Modified	0.37	0.30	0.30	0.29	0.48
Skewness	-0.28	Original	2.24	2.48	3.44	2.85	2.40
		Modified	1.73	1.95	2.91	2.85	1.81
Kurtosis	1.17	Original	6.00	8.11	14.04	7.87	5.12
		Modified	3.57	5.10	10.08	7.84	2.35

4.1. The moving-average crossover strategy

Based on table 2, the original classical MA crossover strategies have generated higher risk-adjusted portfolio return as compared to the simple buy-and-hold strategy, as seen in the higher sharp ratio. The return are positively skewed to the right and has excess kurtosis (kurtosis > 0, leptokurtic) where its central mean is taller and sharper with longer and fatter tails. This shows that the return distribution has less frequency for small changes as the observations clustered around the mean, nevertheless this also suggest that large fluctuations in return are more probably within the fat tails.

The MA of 1-10 shows the highest strategy return for the combination of classical MA crossover and followed by 1-20, 1-50, 1-100 and 1-200 MA. The MA crossover (e.g., MA (1-10) shows the most trading frequency as compared to one short period MA with one long period MA crossover (e.g., MA(1-200)), as the former strategy generates frequent trading signals than the latter. Although the former generates frequent trading signals with small average return per trade and small return

volatility, in the long-run, the strategy generates larger return than the latter strategy (less frequent trading signal, with large average return per trade and large return volatility).

4.2 The Moving-Average Crossover Strategy (Modified MA)

Based on table 2, similarly, all of the modified MA crossover strategies have generated higher risk-adjusted portfolio return as compared to the simple buy-and-hold as well as the original classical MA crossover strategy, as seen in the higher sharp ratio. The returns are positively skewed to the right and their kurtoses are generally lower than the original classical MA crossover strategy. This suggest that this modified strategy has less large volatility that makes the investment less risky compared to the original MA crossover strategy, given that the risk-adjusted return is higher.

The modified MA crossover strategy shows inconsistency in its strategy return as some periods of crossover show higher return as compared to the original strategy, while some shows lower strategy return. This may be due to the stricter additional trading rule that reduces trading signals, and thus lower number of trades. Especially the additional rule for entry buy signal (entry on white candle crossover, no entry on dark candle or narrow-ranged day), that has significantly filtered out and reduce the signal for buying opportunities when the original strategy shows. The stop-loss rule has limited the downside loss as we can see the maximum drawdown in the modified strategy is lesser than the original strategy, given the same amount of maximum gain. The modified strategy that outperform original strategy are MA (1-10, 1-50, 1-100).

5. Conclusion

Overall, the technical trading system using moving-average strategy outperforms the simple buy-and-hold strategy with better risk-adjusted return. Although some modified MA crossover strategy improve the strategy effectiveness with generate better strategy return, lower distribution of return variability and lesser trade than the original MA crossover strategy, mainly due to the additional trading rule applied to the original strategy; however, some modified MA crossover strategy showed lower strategy return.

References

Bauer, R., & Dahlquist, J., (2001). Market Timing and Roulette Wheels. *Financial Analyst Journal*, 57(1), 28-40.
Bessembinder, H., & Chan, K. (1998).Market Efficiency and the Returns to Technical Analysis. *Financial Management,* 27, 5-17.
Blume, L., Easley, D., & O'Hara, M. (1994).Market Statistics and Technical Analysis: The Role of Volume. *Journal of Finance,* 49, 153-181.
Brock, W., Lakonishock, J., & LeBaron, B. (1992).Simple Technical Trading Rules and the Stochastic Properties of Stock Returns. *Journal of Finance*, 47, 1731-1764.
Brown, D., & Jennings, R. (1989).On Technical Analysis. *Review of Financial Studies*, 2, 527-551.
Covel, M. (2011)Trend Commandments: Trading for Exceptional Returns. FT Press.
Cowles, A. (1933). Can Stock Market Forecasters Forecast? Econometrica*: Journal of the Econometric Society*, 309-324.
Faber, M. A. (2007) Quantitative Approach to Tactical Asset Allocation. *Journal of Investing*, 16, 69-79
Fama, E., & Blume, M. (1966). Filter Rules and Stock Market Trading. *Journal of Business*, 39, 226-241.
Jegadeesh, N. (2000). Foundations of Technical Analysis: Computational Algorithms, Statistical Inference, and Empirical Implementation - Discussion. *Journal of Finance*, 55, 1765-1770.
Kaufman, P. (2005) Trading Systems and Methods (4 ed.). John Wiley & Sons.
LeBaron, B. (1999). Technical Trading Rule Profitability and Foreign Exchange Intervention. *Journal of International Economics,* 49, 125-143.

Levich, R., & Thomas, L. (1993). The Significance of Technical Trading Rule Profits in the Foreign Exchange Market: A Bootstrap Approach. *Journal of International Money and Finance*, 12, 451-474.

Lo, A., & MacKinlay, A. (1990). Data Snooping Biases in Tests of Financial Asset Pricing Models. *Review of Financial Studies*, 3, 431-467.

Lo, A., Mamaysky, H., & Wang, J. (2000). Foundations of Technical Analysis: Computational Algorithms, Statistical Inference, and Empirical Implementation. *Journal of Finance*, 55, 1705-1765.

Neely, C. (2002). The Temporal Pattern of Trading Rule Returns and Exchange Rate Intervention: Intervention Does Not Generate Technical Trading Profits. *Journal of International Economics*, 58, 211-232.

Neely, C., Rapach, D., Tu, J., & Zhou, G. F(2013). orecasting the Equity Risk Premium: The Role of Technical Indicators. Working Paper: Federal Reserve Bank of St. Louis.

Olszewski, E. (2001). A Strategy for Trading the S&P 500 Futures Market. *Journal of Economics and Finance*, 25(1), 62-79.

Ready, M.J. (1997) Profits from Technical Trading Rules. Working paper. University of Wisconsin-Madison.

Schwager, J. (1995). *Futures: Fundamental Analysis*. John Wiley & Sons, Inc.

Sullivan, R., Timmermann, A., & White, H. (2003). Forecast Evaluation with Shared Data Sets. *International Journal of Forecasting,* 19, 217-227.

Sweeney, R. (1988). Some New Filter Rule Tests: Methods and Results. *Journal of Financial and Quantitative Analysis,* 23, -300.

Taylor, S. (1994). Trading Futures Using a Channel Rule: A Study of the Predictive Power of Technical Analysis with Currency Examples. *Journal of Futures Markets*, 14, 215-235.

Wilcox, C., & Crittenden, E. (2009). Does Trend Following Work on Stocks? Working Paper, Blackstar Funds, LLC. .

Zhu, Y., & Zhou, G. (2009).Technical Analysis: An Asset Allocation Perspective on the Use of Moving Averages. *Journal of Financial Economics,* 92(3), 519-544.