THE BEST TRADING SYSTEM TO GENERATE PROFITS.

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ABSTRACT

This research attempts to use risk adjusted performance measure such as Jensen and Sharpe to evaluate the profitability of technical trading systems in the Malaysian stock market. We tested 13 technical trading systems such 1-30 dual simple moving average crossover, 5-20 dual simple moving average crossover, 3-7 exponential moving average crossover, relative strength index (RSI), momentum, stochastic, moving average convergence divergence (MACD), five Channel Breakout Systems (CBO 20-20, CBO 20-10, CBO 20-5, CBO 10-5 and CBO 15-5) and the directional movement index (DMI). The findings reveal that 8 out of 13 trading systems produced significantly positive gross returns when 0.44 percent transaction costs is applied. This finding confirms that technical analysis not only produce positive investment returns but also can be used as risk management as its ability to reduce risk and also confirm the random walk hypothesis for the market tested.

Keywords: risk management, technical trading system, Jensen test, random walk.

1. INTRODUCTION

Technical analysis has the ability to remove emotional decisions from trading. It also provides the trader with an unbiased view of recent events and trends as well as longer term events and trends. For example, a head and shoulders formation or a double top will indicate an important rally may be coming to an end with an imminent correction to follow.

Industry participants use technical analysis to some extent in their work, sceptics and cynics are quick to denounce its usefulness as an investment tool. A reader in a local newspaper was quoted as saying "...let us leave the 'head-and-shoulders' in the bathroom to combat dandruff rather than as an investment tool."[1] In view of this dichotomy of views, the pertinent question to be asked is, "are technical analysis tools really profitable?" This paper attempts to shed some light upon this controversy by providing further empirical evidence as to whether technical trading systems can be profitable for Malaysian stocks and at the same time can be used as risk management tools by fund manager.

2. LITERATURE REVIEW

The literature review on technical trading rules is divided into early and modern empirical studies. Early empirical studies (1960 – 1987) comprised mainly of statistical analyses such as serial correlation runs analysis and spectral analysis. However, serial correlation cannot detect complicated chart patterns, while runs tests cannot detect size of price reversals. Statistical analysis also suffers from the difficulty of incorporating elements of risk and transaction cost.

Subject to these limitations, early empirical studies on the profitability of technical trading rules by Alexander (1961, 1964), Fama and Blume (1966), Van Horne and Parker (1967) and Jensen and Bennington (1970) concluded that technical analysis was not helpful in predicting U.S. stock market prices. These apparent failures were much clearer when transaction cost was included. For example,

[1] New Straits Times, January 27, 2004, Mailbag "Symphony trades on PE ratio of 52 times."

Alexander concluded that, "In fact, at this point, I should advise any reader who is interested only in practical results and who is not a floor trader and so must pay commissions, to turn to other sources on how to beat buy and hold".

Modern empirical studies (1988 – 2006) on technical trading rules began with the study by Lukac, Brorsen and Irwin (1988). Lukac *et al.* (1988) tested twelve technical trading systems across 12 actively trading U.S. commodities from 1978 to 1984 and found that seven out of the twelve systems had gross returns significantly above zero and four out of the twelve systems produced net returns and significant risk-adjusted returns and concluded that the presence of significant positive profits demonstrated that price adjustments were not instantaneous due to market friction, inferring market inefficiency.

Modern empirical studies improved on early studies by incorporating transaction cost, risk, parameter optimization, out-of-sample tests, and statistical tests in their testing procedures. A number of important modern empirical studies suggested that it is possible to make excess profits from technical analysis in futures and foreign exchange markets (e.g. for currency futures, Taylor and Tari (1989), Silber (1994), Szakmary and Mathur (1997); for spot currency Maillet and Michel (2000), Lee Gleason, and Mathur (2001), Lee, Pan, and Liu (2001) and Martin (2001)). Several studies found economic profits in emerging stock markets (for example Bessembinder and Chan (1995), Ito (1999), Ratna and Leal (1999)) but modern studies indicated that technical trading rules can no longer yield economic profits on U.S. stocks after the late 1980s (for example Bessembinder and Chan (1998), Sullivan, Timmermann, and White, 1999, Ready (2002)).

3. METHODOLOGY, DATA AND HYPOTHESES

This study uses the "filter rule" methodology to test the Bursa Malaysia for weak-form market efficiency by applying 13 technical trading systems to 38 index-linked stocks over a period of seven years on daily data between the periods from 1st January, 1996 to 31st December, 2007. This methodology is similar to the methodology of testing technical trading systems as used by Lukac *et al.* (1988).

The 13 technical trading systems tested in this study have pre-specified trading rules which trigger buy and sell signals without regard to market fundamentals or personal judgment. The buy and sell rules used in each of the following 13 systems to test the hypotheses are those that are either commonly used by analysts and investors or are advocated by the developer of the various systems. The 13 technical trading systems are 1-30 dual simple moving average crossover, 5-20 dual simple moving average crossover, 3-7 exponential moving average crossover, relative strength index (RSI), momentum, stochastic, moving average convergence divergence (MACD), five Channel Breakout Systems (CBO 20-20, CBO 20-10, CBO 20-5, CBO 10-5 and CBO 15-5) and the directional movement index (DMI).

3.1 DATA

The population frame that made up the Bursa Malaysia consisted of 907 stocks as at December 31, 2007, of which 598 stocks are from the Main Board, 277 stocks from the Second Board and 32 stocks are from Mesdaq[2]. The Bursa Malaysia computes indices for each of its many sub-sectors but the most

[2] Main Board/Second Board: Listing on the Main Board/Second Board either (a) requires a profit track record over a period of 3 to 5 years; (b) a minimum market capitalization of RM250 million and profit for the latest financial year; or (c) an infrastructure project as a core business. Minimum paid-up for listing on the Main Board is RM60 million comprising ordinary shares with a minimum par value of RM0.10 each whilst the minimum paid-up for listing on the Second Board is RM40 million comprising ordinary shares with a minimum par value of RM0.10 each. Mesdaq or Malaysian Exchange of Securities Dealing & Automated Quotation Bhd was primarily established to cater for the listing of technology and high-growth companies which have not yet achieved a profit track record over a period of time. Source: www.sc.com.my (July 2005)

widely followed index is the Bursa Malaysia Composite Index, officially known as the Kuala Lumpur Composite Index (KLCI). The KLCI currently comprises 100 stocks and represents a sample of the whole population of 907 stocks. For the purpose of this study these 100 stocks were further sampled into 38 actively traded stocks in view of the peculiarity of the trading rule test of weak-form market efficiency which requires that selected stocks from the sample must be liquid in order that problems associated with non-synchronous trading as suggested by Lo and MacKinlay (1990) are avoided.

Null Hypothesis (Jensen's test of weak-form market efficiency)

H1: Risk-adjusted net returns from trading systems cannot produce returns greater than the returns derived from the buy-and-hold strategy.

4. RESULTS AND FINDINGS

Jensen's test of weak-form market efficiency

In modern empirical studies on technical trading rules, any test of weak-form efficiency must account for risk as an efficient market is one that does not yield a profit above a return to risk. Jensen's measure is based on the Capital Asset Pricing Model to account for risk in returns from trading systems. The procedure is to regress the returns from trading systems with that of returns from the buy-hold strategy, after deducting the risk-free rate of return. Jensen's regression tests were conducted using 0.44 percent transaction cost. Six out of the 13 systems produced returns significantly above a return to risk at the 0.05 and 0.01 level of significance.

TABLE 1. Regression Coefficients for Test of Excess Returns (0.44 percent Transaction Cost) based on the Capital Asset Pricing Model

Trading System	Intercept Coefficient A_{ts}	*p*-value (1-tailed)[a]	Buy-Hold Coefficient β_{ts}	*p*-value (1-tailed)	R^2
1-30 SMA	47.73	0.127	0.259	0.326	0.006
5-20 SMA	42.018	0.035**	0.715	0.014	0.128
3-7 EMA	-27.39	0.197	-0.104	0.406	0.002
RSI	29.371	0.242	0.125	0.414	0.001
Momentum	16.49	0.246	0.427	0.101	0.045
Stochastic	-76.20	0.000	0.272	0.149	0.030
C.B.O. 20-20	**187.07**	**0.001*** **	**1.145**	**0.052**	**0.072**
C.B.O. 10-5	-2.376	0.462	0.126	0.357	0.004
C.B.O. 15-5	48.73	0.050**	0.595	0.072	0.058
C.B.O. 20-10	**140.74**	**0.001*** **	**0.874**	**0.055**	**0.055**
C.B.O. 20-5	49.10	0.046**	0.273	0.244	0.013
MACD	-58.38	0.000	0.243	0.043	0.080
DMI	92.68	0.024**	0.563	0.186	0.022

[a] Significance level is denoted by ** at the 0.05 level and *** at the 0.01 level.

Table 2 highlights the Jensen's measure of ranking the performance of six profitable risk-adjusted trading systems at 0.44 percent transaction cost after adjusting for their beta coefficients.

TABLE 2. Ranking of Six Profitable Risk-Adjusted Trading Systems Based on Jensen's Measure, 0.44 percent Transaction Cost

Rank	Trading system*	α_{ts}	β_{ts}	(α_{ts}/β_{ts})
1	C.B.O. 20-5	49.1	0.273	179.85
2	DMI	92.68	0.563	164.62
3	C.B.O. 20-20	187.07	1.145	163.38
4	C.B.O. 20-10	140.74	0.874	161.03
5	C.B.O. 15-5	48.73	0.595	81.90

6	5-20 SMA	42.018	0.715	58.77

*All six systems beat the buy-and-hold strategy at 0.05 and 0.01 significance level.

Pitfalls of using the CAPM orientated beta to identify risk

One of the pitfalls of using Jensen's measure to adjust for risk is that this measure is based on the CAPM's equilibrium required return equation, $E(R_p) = R_f + \beta_p(R_m - R_f)$, which assumes an efficient market. This limits its usefulness in tests of EMH because of its joint-hypothesis problem. Noting the limitations of Jensen's measure, this study included an alternative measure, the Sharpe ratio, to test for robustness and consistency derived from Jensen's measure.

A positive Sharpe ratio would mean that the risk-adjusted return from a trading system beats the return from a buy-and-hold strategy. When using 0.44 percent transaction cost, the Sharpe ratio listed eight systems with positive returns to risk (see Table 3).

TABLE 3. Ranking on 13 Trading Systems Based on Sharpe's Ratio, 0.44 percent Transaction Cost

System	R_{ts}	R_f	$R_{ts} - R_f$	σ_{ts}	Sharpe Ratio
C.B.O. 20-20	162.99	30.98	132.01	232.5	0.57
C.B.O. 20-10	129.8	30.98	98.82	181.06	0.55
DMI	96.88	30.98	65.9	205.99	0.32
C.B.O. 20-5	67.4	30.98	36.42	128.18	0.28
1-30 SMA	66.73	30.98	35.75	186.07	0.19
C.B.O. 15-5	51.39	30.98	20.41	134.14	0.15
RSI	54.9	30.98	23.92	186.96	0.13
5-20 SMA	38.84	30.98	7.86	108.76	0.07
Momentum	27.33	30.98	-3.65	109.72	-0.03
C.B.O. 10-5	23.07	30.98	-7.91	111.93	-0.07
3-7 EMA	9.28	30.98	-21.7	142.96	-0.15
Buy/Hold	-17.03	30.98	-48.01	54.5	-0.88
Stochastic	-57.82	30.98	-88.8	85.33	-1.04
MACD	-38.59	30.98	-69.57	46.85	-1.48

Table 4 highlights a summary of the number of profitable trading systems returned by the Jensen and Sharpe's performance measure. Results from Table 7 revealed that the Channel Breakout Systems were ranked amongst the top profitable trading systems under two different measures, confirming their robustness and consistency..

TABLE 4. Number of Profitable Systems Based on Jensen and Sharpe's Performance Measure

Transaction Cost	Jensen	Sharpe
0.44 percent	C.B.O. 20-5	C.B.O. 20-20
	DMI	C.B.O. 20-10
	C.B.O. 20-20	DMI
	C.B.O. 20-10	C.B.O. 20-5
	C.B.O. 15-5	1-30 SMA
	5-20 SMA	C.B.O. 15-5
		RSI
		5-20 SMA

5. CONCLUSION AND IMPLICATIONS OF STUDY

This paper examined 13 technical trading systems commonly used by Malaysian analysts, fund managers and investors. The findings revealed that 8 out of 13 trading systems produced significantly positive gross returns when 0.44 percent transaction cost was applied in Jensen's test of weak-form efficiency. These findings refute the assertion that Malaysian stock prices are weak-form efficient for the period studied.

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