TECHNICAL TRADING REVISITED: EVIDENCE FROM THE ASIAN STOCK MARKETS

Thorben Lubnau*, Neda Todorova**

Abstract

We examine the forecasting power and profitability of moving average (MA) and trading range break (TRB) rules for the daily prices of ten Asian stock indices from January 1990 to September 2012 using bootstrap tests. The results confirm the predictive ability of MA rules whereas the picture uncovered by the TRB rules is more mixed. The MA rules consistently generate positive excess returns after transaction costs, with highest magnitudes often achieved for less developed markets. However, more developed markets surprisingly seem to be far from informationally efficient as well. Furthermore, short-term variants of the trading rules outperform systematically long-term variants.

Keywords: Technical Trading Rules, Moving Averages, Trading Range Break, Bootstrap Tests, Asian Stock Markets

* *Department of Business Administration, European University Viadrina, Große Scharrnstraße 59, 15230 Frankfurt (Oder), Germany*
Email: lubnau@europa-uni.de
** *Department of Accounting, Finance and Economics, Griffith University, 170 Kessels Road, Nathan, Queensland 4111, Australia*
Phone: +61 7 3735 7219
Fax: +61 7 3735 3719
Email: n.todorova@griffith.edu.au

1. Introduction

Technical analysis may be simply defined as a variety of methods which aspire to predict the price movements of financial instruments based on historical data. Technical analysts aim at identifying trends at an early stage and maintaining their positions until they see signs of a trend reversal. However, if price trends could be exploited profitably by means of technical analysis, the Efficient Market Hypothesis (EMH) established by Fama (1970) would be violated. This hypothesis states that prices on efficient capital markets fully reflect all information and adjust immediately to new information arrivals. Furthermore, Fama (1970) subclassifies three forms of efficiency: the weak form, in which the information set comprises only historical capital markets data; the semistrong form, in which the information set includes all publicly available information; and the strong form, in which the information set extends to all available information. Therefore, if market participants could deploy profitably technical trading rules, efficiency is not inherent in capital markets even in its weak form. Due to its neglection of the EMH, the perception of technical analysis in the academic world tends to be rather lukewarm. However, the studies of Taylor and Allen (1992) and Menkhoff and Taylor (2007) show the prominent position it possesses in investment practice.

Park and Irwin (2007) review the international evidence on the profitability of technical analysis and show that extant studies are not able to provide conclusive evidence advocating the benefits of technical trading strategies. More specifically, out of 95 considered studies published in the period between 1960 and 2004, 56 studies find positive results regarding technical trading strategies, 20 studies obtain negative results, and 19 studies provide mixed results. As the seminal study of Brock et al. (1992) dates back 20 years, we intend to test whether the rules described in their paper do still exhibit predictive power although being well-known and examine for this purpose ten Asian stock indices.

Probably the most popular contribution in the area of Asian markets can be assigned to Bessembinder and Chan (1995). Their results show that moving average (MA) and trading range break (TRB) rules are quite successful in the emerging markets of Malaysia, Thailand and Taiwan. In contrast, they exhibit less explanatory power in more developed markets such as

Hong Kong and Japan in the period between 1975 and 1989. The results of Harvey (1995a) and Harvey (1995b) that compare expected returns and volatility levels across markets document that returns are more predictable in emerging than in developed markets. A number of studies test the random walk hypothesis for Asian markets and establish inter-temporal predictability which can be exploited by sophisticated

investors. Lima and Tabak (2000) reject the random walk hypothesis for Singapore and Chinese Class B shares for a sample period from 1992 through 2000. A mean-reverting behavior is observed by Nam et al. (2003) for nine markets in the Pacific basin from 1982 and 1999. Hoque et al. (2007) show that the stock markets of Indonesia, Malaysia, the Philippines, Singapore and Thailand exhibit a significant mean-reverting and predictable behavior from 1990 to 2004 while Taiwan and Korea are characterized by largely unpredictable patterns.

The debate on the predictability of returns has also triggered a substantial amount of empirical research on the performance of technical trading rules in Asian markets. We review these studies and show that the question about the sustainable profitability of technical trading in this region remains still open. Overall, it appears that technical analysis is more attractive in emerging than in developed markets but its predictive power and economic exploitability seem to diminish in the course of time. Therefore, it is of interest to examine whether the attractiveness of technical analysis continues to hold for most recent sample periods. A variety of financial instruments is available to implement such simple trading strategies as we propose. Equity index futures exist at least for the "more developed" markets in our sample and meanwhile, Exchange Traded Funds which track the performance of all markets under consideration are accessible for foreign investors.

Our study contributes to the existent literature with an analysis whether technical analysis possesses forecasting power which can be economically exploited in terms of excess returns above buy-and-hold by applying the trading rules of Brock et al. (1992) and Bessembinder and Chan (1995) to a very recent, broad sample of ten popular Asian stock indices. Moreover, since we employ data from January 1990 to September 2012, we extend the existing literature by examining a sample period spanning the various financial crises of the new millennium. To assess the significance of the attained results, bootstrap tests are applied. The profitability of the trading rules is evaluated by taking transaction costs into account. To avoid data-snooping concerns emerging from potential non-synchronous trading, we also report results obtained with the one-day lag adjustment proposed by Bessembinder and Chan (1995).

The paper is arranged as follows: Section 2 reviews the literature on technical trading tests in Asian markets. Section 3 presents the sample, the trading rules and employed methods of analysis. The empirical results are presented in Section 4, followed by a discussion and comparison with extant studies (Section 5). The final section concludes.

2. Literature Review

In the following, the focus is set on results based on a methodology similar to that of Brock et al. (1992) and Bessembinder and Chan (1995) and data from Asian markets[28]. The research in this domain can be broadly divided into two subgroups according to whether transaction costs are taken into account in the analysis or not. To begin with studies focusing on the predictive ability of technical trading rules without implications for their profitability, Gunasekarage and Power (2001) apply variable length moving average (VMA) rules and fixed length moving average (FMA) rules to the market indices of India, Sri Lanka, Bangladesh and Pakistan for the period from 1990 to 2000 and show that they have predictive ability with India exhibiting the lowest performance, probably due to being the largest market in the region. Wong et al. (2003) confirm that MA rules can be used to generate significantly positive returns with the Singapore equity index market between 1974 and 1994. Chang et al. (2006) present evidence that various VMA, FMA and TRB rules applied to the Taiwan equity index market from 1983 to 2002 exhibit pronounced predictive power. McKenzie (2007) tests VMA, FMA and TRB rules for 17 emerging markets (seven of which Asian) over the period of 1986 to 2003. His results show that some of the trading rules considered are able to earn significant returns but the forecasting accuracy decreases for more recent sample periods.

It becomes obvious that research not accounting for profitability of trading rules for the most part confirms the existence of predictive patterns which can be uncovered with simple trading rules. A number of studies extend the analysis by taking transaction costs into account. However, they contribute to the discussion whether any potential patterns in past price information can be used to generate profits for Asian markets with contradictory results.

Starting with studies which confirm the profitability of technical trading, Ito (1999) applies the same set of technical rules as Brock et al. (1992) to the Japanese, US, Canadian, Indonesian, Mexican and Taiwanese equity indices over the period from 1980 to 1996 documenting the stronger forecast power for emerging than for developed markets where trading rules remain profitable relative to the buy-and-hold strategy after transaction costs. Ahmed et al. (2000) establish that emerging markets have predictable and economically profitable patterns using VMA rules for Taiwan, Thailand, and the Philippines from 1994 to 1999. Tian et al. (2002) provide support for the profitability of VMA, FMA and TRB rules for the Chinese stock market from 1992 to 2000. Lai et al. (2003) show that the predictability of technical trading rules can be translated into profits for the equity index market in Malaysia from 1977 to 1999. Lam et al. (2007) apply VMA, FMA and TRB rules to the Hang Seng Index (Hong Kong) from 1972 to 2006 and show that average returns remain high after transaction costs

[28] Further studies treating momentum, contrarian portfolio strategies or order submission behavior when conducting technical trading investments in Asia can be found in Hameed and Kusnadi (2002), Hameed and Ting (2000) and Wang et al. (2012), respectively

but the considered trading rules work better before 1986. Ming-Ming and Siok-Hwa (2006) observe that VMA, FMA and TRB rules offer many profit opportunities for market participants in eight Asian markets from 1988 to 2003, but consistent with market efficiency, the moving averages rules have less or no value in the more developed Japanese stock market. Finally, Lento (2007) tests VMA, FMA, TRB and filter rules for Australia, India, Indonesia, Korea, Japan, Hong Kong, Singapore and Taiwan from 1987 to 2005 and demonstrate that profits can be generated especially in the markets of India, Hong Kong, Indonesia, Korea, Singapore, and Taiwan.

In contrast, a large number of further studies reject the profitability of trading rules for Asian equity markets. Following the results of Bessembinder and Chan (1995), Ratner and Leal (1999) examine VMA rules in ten emerging Latin American and Asian stock markets from 1982 to 1995 and find that the VMA trading rules may be profitable in Taiwan, Thailand and Mexico but nowhere else. Coutts and Cheung (2000) apply moving average oscillator and TRB rules to the Hong Kong equity index market for the period from 1985 to 1997 showing that transaction costs eliminate any abnormal returns. Similar conclusions are drawn by Chang et al. (2004) for the case of VMA and TRB rules applied to 11 markets (9 of them Asian) from 1991 through 2004. Furthermore, Cai et al. (2005) use VMA and TRB rules for the US, the UK, Japan, Hong Kong, and China from 1969 to 2003 and establish that they have predictive ability and profitability during the 1970's but that this ability has largely disappeared by the 1990's. Chen et al. (2009) investigate the potential effects data snooping can have on trading rules and argue that after accounting for transaction costs and a non-synchronous trading bias, economic profits are unlikely to be earned for all markets under consideration (Hong Kong, Indonesia, South Korea, Malaysia, Singapore, Taiwan, Thailand, and Japan) from 1975 to 2006. Lastly, Yu et al. (2013) explore whether VMA, FMA and TRB rules can outperform a simple buy-and-hold strategy after adjusting for transaction costs from 1991 to 2008 in the case of Malaysia, Singapore, Thailand, Indonesia, and the Philippines. Their results show that even if technical trading is slightly profitable in Thailand, there is no evidence of profitability in any of the other markets and the average additional returns generated by the trading signals decrease in the course of time.

To sum up, the discussion about the economic benefits of applying simple technical trading rules to Asian markets, especially after taking transaction costs into account, is still open. Overall, technical trading rules prove to be more attractive in emerging than in developed markets but their predictive power and profitability appear to diminish with the advancing market development in recent years. Moreover, none of the presented studies includes the period after 2008 following the global financial crisis. The current paper fills this void and addresses the ongoing debate with most recent data for ten Asian countries.

3 Data and methodology

3.1 Stock Indices

The market indices examined in this study are the Hang Seng Index for Hong Kong, the Jakarta Composite Index for Indonesia, the Korea Composite Stock Index for South Korea (in the following referred to as Korea), the Kuala Lumpur Composite Index for Malaysia, the Taiwan Stock Exchange Capitalization Weighted Stock Index for Taiwan, the Stock Exchange of Thailand Index for Thailand, the Bombay Stock Exchange Sensitive Index for India, the Karachi Stock Exchange 100 Index for Pakistan, the Colombo Stock Exchange Price Index for Sri Lanka and the Tokyo Stock Price Index for Japan. The sample includes the period from January 1, 1990 to September 30, 2012. The data were obtained from Datastream.

Table 1 contains summary statistics for one-day returns for these indices showing that the sample covers assets with very different characteristics in terms of return and price variation over time. The mean returns for all markets except Japan and Taiwan are positive. The Korean stock market is the most volatile during the sample period under consideration, followed by India and Taiwan.

3.2 Methodolgy

The term technical analysis is an umbrella for literally hundreds of different rules and concepts. Practitioners depending on these rules for their investment decisions are almost certainly going to use a combination of various rules or will not solely rely on technical analysis (see Taylor and Allen 1992). Therefore, the methodology we use in this study is rather basic as we only look at variable length moving averages and trading range breaks. Although practitioners may accuse us of being too simplistic, the intention of this paper is not to optimize combinations of trading rules but to test whether a set of well-known and well-researched basic rules is able to outperform a buy-and-hold strategy. Furthermore, as we limit our rules to the sets of researchers like Brock et al. (1992) and Bessembinder and Chan (1995), we are able to directly compare our results with the existing literature.

Our set of moving average rules comprises cross-over systems. Cross-over systems need and input of at least two moving averages of different lengths of the price series. Buy (sell) signals are generated whenever the short moving average (SMA) crosses the long moving average (LMA) from below (above). To take so-called whiplashs into account, a percentage band around the long moving average may be used. The term whiplash refers to the tendency of the SMA to cross the LMA multiple times before a significant trend is established. Using bands means that the signal is not generated when the LMA is crossed but when the upper band is crossed from below

(Buy signal) or the lower band from above (Sell signal). We run our tests with SMA of 1, 2 and 5 days, LMA of 50, 150 and 200 days and bands of 0% and 1%, resulting in a total of 18 rules.

The second type of rules is trade range breaks. The basic idea is that price series of financial instruments tend to form certain levels of support to the downside and resistance to the upside. A support level is interpreted as a price where strong demand for the assets sets in, probably because investors perceive it to be a cheap buy at that price. This demand pushes the price upwards. If the price happens to fall below the support level, technical analysts expect a further depreciation of the price and interpret this as a Sell signal. Within our set of rules the support level is given by the lowest price observed over a specified time span of t days with t = 25, 50, 100, 150, 200. Therefore, a Sell signal is generated whenever the current price drops below the lookback period's lowest price. The reasoning for the resistance levels goes along the same line. Once the price is approaching the resistance level, a strong selling pressure, that is an increased supply of assets, starts. Technical analysts argue that investors show a tendency to break even, therefore all those who bought at or near the up-to-now highest price try to sell to prevent losses in case of depreciating prices. If this selling pressure is overcome and the price rises above the resistance level, this is interpreted as a strong Buy signal. We use the highest prices over the last 25, 50, 100, 150 and 200 days as resistance levels.

A critical point when implementing a technical system is the time span between the signal generation and the actual trade. Given the current technological situation, it can be assumed that an investor is able to react immediately whenever a signal occurs. However, one may argue that time gaps between signal and trade execution can arise due to technological deficiencies, especially in emerging markets, or simply because the investor needs some time to update his rules. We therefore also check the performance of the rules when considering a lag of one trading day before an order is executed.

Any discussion of technical analysis would be incomplete without further insights into the profitability of the systems. An even weakly efficient market would rule out any successful application of technical analysis. This does not mean that an investor loses money by using technical rules but he would not be better off than by simply using a buy-and-hold strategy. Therefore, we take the buy-and-hold strategy as benchmark to test whether technical analysis is profitable or not. The investor is assumed to go long the market when a Buy signal is in effect and to short the market when a Sell signal appears. It should be stressed that this is just one possibility of how to implement a trading strategy. Furthermore, we assume that each order leads to transaction costs of 0.1 %, a figure that seems reasonable even for rather small investors. Having defined the strategy this way, the adjusted excess return (AER) is computed as follows:

$$AER = \sum_{i=1}^{N_B} r_{B,i} - \sum_{j=1}^{N_S} r_{S,j} - \sum_{t=1}^{N} r_t - 2 \cdot (S_B + S_S) \cdot C^{TAC} \quad (1)$$

In equation (1), $r_{B,i}$ and $r_{S,j}$ are Buy and Sell returns while N_B, N_S and N are the Buy days, Sell days and total number of days $(N_B + N_S = N)$, respectively. Therefore, the third term on the right-hand side of the equation is just the buy-and-hold return which is our benchmark. S_B and S_S are the numbers of Buy and Sell signals, C^T are the transaction costs. We double the number of signals to calculate the total transaction costs because a signal leads to the closing of the existing position, for example exiting the long position, and to the opening of a new position, for example a short position.

To test the statistical significance of the obtained results, we use a bootstrap methodology. The basic methodology was developed by Efron and Tibshirani (1986) and, in the field of technical analysis, was also applied in the study by Brock et al. (1992), for example. The bootstrap helps to overcome some shortfalls of traditional t-tests because it does not demand normally distributed returns, which is rather doubtful for our sample as Table 1 indicates,

and independent samples. The original return series is resampled by randomly drawing with replacement. This creates new time series of returns in which dependencies among the original returns are likely to be destroyed. The rule used to create the bootstrap samples is basically the random walk model of stock prices.

Afterwards, the trading rules are applied to the bootstrap sample. By comparing the results with those of the original series, it is possible to derive a simulated *p*-value or an approximated achieved significance level. If the rules perform as well for the bootstrap samples as for the original data set, the results would be deemed not significant. As in Efron and Tibshirani (1993), the achieved significance level *(ASL)* is computed as:

$$\widehat{ASL} = \frac{\#\{t(S^{*i}) \geq t(S)\}}{B}, \quad i = 1, \ldots, B, , \quad B = 1\,000, \quad (2)$$

with *t* being the statistic of interest, for example the return for Buy periods.

4. Results

The results for the trading rules are given in tables 2 to 9. All tables are structured as follows. Results for mean Buy and Sell returns across the relevant trading rules are displayed in the columns labelled as $\bar{r}_B$ and $\bar{r}_S$. The standard deviations of the Buy and Sell returns are presented in the columns labelled σ_B and σ_S, respectively. AER is the adjusted excess return, as defined in equation (1). Sig denotes the number of trading signals. The statistical significance of the

results from each rule is assessed using a bootstrapping methodology with 1 000 samples. The values in parentheses below each value of mean returns, standard deviations and adjusted excess returns denote the percentage of the bootstrap samples which achieved a value higher than that of the trading rule applied to the original price time series.

4.1 MA Rules

The MA rules differ by the length of the short and long period and by the size of the band. For example, the notation (1,50,0) implies that the SMA period is one day, the LMA is calculated over 50 days, and the band is zero percent. We report the results for all 18 rules separately if an order is executed on the same day when a signal is generated. When the order is executed one day later, the rules with the same LMA and band are grouped together and only average values are presented, in order to save space[29]. This approach results in six categories, with (50,0) for example denoting mean values of the tests obtained with SMA periods of 1, 2 and 5 days and a band of 0%.

To start with the case of the simultaneous generation and execution of trading signals, it becomes obvious that the moving average rules have a strong forecasting power. Across all countries, the difference between mean Buy and mean Sell returns is positive without exception. The statistical significance of $\bar{r}_B - \bar{r}_S$, however, varies across the individual markets. All 18 trading rules are significant at the 5 % level for Pakistan, Indonesia, Malaysia and Sri Lanka. 16 (15) rules are significant at the 5 % level while the remaining 2 (3) are significant at the 10% level for Korea (Hong Kong). For the remaining markets, the results are slightly more ambiguous. Taiwan, Thailand, Japan and India have 7, 6, 9 and 12 (12, 10, 12 and 13) rules significant at the 5 % (10 %) level, respectively. The insignificant results are obtained mostly with a LMA of 200 whereas when the LMA is based on the prices over the last 50 trading days, the trading rules provide significant results in all but one case – (5, 50, 1) for Japan. This holds for both trading with a band of 1% or without a band. The results also show that with the exception of just a few combinations in the Thai and Japanese market, there is a negative mean return when Sell signals are in effect. Therefore, the technical trading rules not only separate days of higher and lower returns but are able to point out periods of falling prices.

The standard deviations of the Buy periods are significantly lower than those of the Sell periods with p-values of 0.000 in most of the cases. This means that no bootstraped series' standard deviation exceeds the one of the original series. Obviously, the trading rules are able to identify periods of low volatility with Buy signals indicating that the obtained positive returns are not to be interpreted as a compensation for bearing risk. This is consistent with the results of Brock et al. (1992). Only exception is the stock index market of Sri Lanka for which the hypothesis that the standard deviations of the Buy periods are significantly lower than of Sell periods is rejected for all 18 rules. For LMA periods of 50 days, σ_B and σ_S have a very similar magnitude while for all other rules σ_B is much higher than σ_S. This discrepancy to all other markets may be due to the fact that the daily returns in Sri Lanka are much less volatile compared to all other considered markets (Table 1).

We next address the degree to which traders using MA rules could have earned trading profits in excess of the buy-and-hold strategy after transaction costs. The analysis uncovers a picture consistent with the results on general forecasting power. All 18 trading rules are significantly profitable at the 5% level for Pakistan, Indonesia, Malaysia and Sri Lanka. All MA rules for Korea and Hong Kong are significantly profitable at the 10% level and the AERs of the remaining countries are mixed. Taking a closer look, there is a strikingly clear pattern: The predominant portion of profits is achieved with a LMA period of the shortest length, 50 days. For this set of rules, negative AERs are documented only for India. Overall, it holds that the shorter the length of SMA and LMA periods, the higher the number of trading signals, with trading rules of a 1% band exhibiting a lower number of signals than their counterparts without a band. Nevertheless, the rules with LMA of 50 days generate profits after trading costs of the highest magnitude and significantly outperform the buy-and-hold position in most of the cases whereas the lowest AERs are often obtained with the rules with LMA period of 200 days.

When undertaking a comparison with the results obtained with a lag of one day, it becomes clear that the strategies with a one-day lag, which might be necessary due to delays in trading, reduce but does not eliminate the predictive power of the technical rules. The difference $\bar{r}_B - \bar{r}_S$ remains positive on average for all countries, but for the (200,0) set of rules applied to the Indian stock market. Again, the standard deviations of the Buy periods are significantly lower than those of the Sell periods, except for Sri Lanka. Most importantly, even though of a lower magnitude, the average AERs of Pakistan, Indonesia, Malaysia and Sri Lanka (Korea and Hong Kong) remain significant at the 5% (10 %) level. Thaiwan, Thailand and India still offer profitable opportunities with the sets of (50,0) and (50,1) trading rules. Japan is an exception only being profitable at the 10 % level for the (150,0), on average.

4.2 TRB Rules

The results of the trade tange break rules are reported in Tables 7, 8 and 9. Five different lookback periods with immediate order execution and a one day lag are investigated. The column labelled "Rule" gives the number of days in the lookback period (25, 50, 100, 150 or 200). The rest of the tables is organized as described above.

In general, we find the results for the TRB to be

[29]The complete results are available upon request

mixed and their performance inferior to the MA rules. Although the difference between the mean Buy return and the mean Sell return is positive for all tested combinations with the exception of India (two rules) and Taiwan (three rules), the bootstrap significance level is much lower than for the MA. For nine out of ten markets, the short lookback periods of 25 or 50 days perform the best, the exception being Japan where we obtain the best results for the 200 days lookback period. Furthermore, the shortest lookback periods lead often to the only significant results at the 5 % or 10 % level, only Sri Lanka and Pakistan show a 1% significance for all rules. Even though the results are less pronounced for the TRB than for the MA rules, it is obvious that those rules that work with short-term market trends show the highest predictive power in the Asian markets. In contrast to the MA rules, TRB Sell periods do not always result in negative mean returns. Hong Kong, Korea and India exhibit positive mean Sell returns. On the other hand, four out of ten rules for the Japanese market exhibit negative mean Buy returns. That means these TRB rules are not able to reverse the negative tendency of the Japanese stock market that can be deducted from the negative unconditional mean return given in Table 1.

As for the MA rules, standard deviations during Buy periods tend to be lower than for Sell periods except for Sri Lanka where it is the other way round and India where we do not find much of a difference between Buy and Sell standard deviations. Again, this indicates that higher returns on Buy days do not come at the cost of taking a higher risk.

Taking a closer look at the profitability of the TRB rules gives a mixed picture. Overall, the 25 and 50 days lookback periods tend to be the most profitable combinations, sometimes being the only rules that are able to beat the buy-and-hold strategy we use as benchmark. Profitability is especially poor for the markets in Hong Kong (only one profitable rule out of ten) and India (two profitable rules). On the other hand, the market of Sri Lanka is not only very profitable for all of the TRB rules, but these profits are also significant at the 1 %-level. The rules are significantly profitable in Pakistan, Malaysia (except for 200 days), Thailand (except for 150 days) and Indonesia (except for 200 days), too. For Taiwan and Korea, the TRB rules with 25, 50 and 100 days work quite well, yielding AERs of almost 400% in the case of Taiwan. However, the longer the lookback period, the more the AERs and the significance deteriorate. One should also note that the Japanese market exhibits extremely high AERs as well, with magnitudes ranging from 150% to 300% above buy-and-hold. However, only five AERs are significant at the 10%-level when we test with the bootstrap, probably due to the long-lasting bear market in Japan.

With very few exceptions (lookback periods of 25 days for Malaysia and of 200 days for Japan and Thailand) the lagged rules' performance does not match that of the rules that are immediately executed, no matter if we look at the predictive power measured by $\bar{r}_B - \bar{r}_S$ or at the AERs. The same is true for the significance of the results. In the case of Hong Kong and India, a lag of one day between signal and trade leads to no rule showing positive AERs any more. Although some of the profits are lost in most markets, even when considering the time lag we still find especially the short rules to show predictive power and positive AERs. AERs of around 400 % can be found in Taiwan, Indonesia and Thailand. Japan, Pakistan, Sri Lanka and Malaysia all show around or more than 250% for the shortest rule. Although the Korean market trails the seven markets just mentioned, we still record AERs of 100% to 150 % for 50 and 100 day lookback periods. Therefore the argument that non-synchronous trading eliminates the usefulness of technical trading rules cannot be supported for most of the Asian markets in the TRB case with short lookback periods.

5. Discussion

Based on a very recent sample spanning almost 23 years, our results confirm the conclusions of Bessembinder and Chan (1995) that technical trading rules have predictive power for changes in Asian stock market indices from 1975 to 1989 which indicates that these markets remain in- formationally inefficient, even 20 years later. This result is at odds with the studies for example of Cai et al. (2005) and Yu et al. (2013) who argue that the short term predictive ability and profitability of Asian markets diminishes with the course of time. Furthermore, our findings also contradict to Chang et al. (2004) and Yu et al. (2013), who conclude that transaction costs tend to eliminate the trading profits implying weak form efficiency in most Asian stock markets. Our results show that the predictability of technical trading rules can be translated into significant excess returns after taking trading costs into account even for developed markets like Japan. In addition, sophisticated traders may have earned significant profits in the markets under consideration even during the last two decades which are doubtlessly marked by a distinctive liberalization. Furthermore, we confirm the results of Bessembinder and Chan (1995) and Ito (1999) that the significant forecast power of the trading rules is not completely eliminated by accounting for potential delays in trading. For our sample, it still holds that executing Buy and Sell orders with one day lag exhibits a pronounced forecast power and leads to statistically significant profits, especially with shorter-term rules.

The existence of a specific set of rules which consistently outperforms the buy-and-hold strategy is a further issue of controversy in existing literature. Our findings differ from those of McKenzie (2007) who argues that no trading rule systematically has a significant forecasting accuracy. For our broad and very recent sample, rules with a LMA period of 50 days consistently outperform all other rules, especially in terms of AER, while TRB rules of the shortest lookback periods perform the best. Thus, our results are more in

line with Cai et al. (2005), Lam et al. (2007) and Yu et al. (2013) who document that the short-term variants of the trading rules have better predictive ability than their longer-term counterparts. In addition, our results support the prevailing belief that on average TRB rules tend to perform worse than MA trading rules (e.g. Chang et al., 2004, Ming-Ming and Siok-Hwa, 2006 Lam et al., 2007). A reason for the underperformance of the TRB rules may be that they detect upward and downward trends later than the MA rules do. An upward trend, for example, may start way below the price used as resistance level. The Buy signal, however, is only generated when the highest price of the lookback period is exceeded. When the MA crossover appears below that the resistance level, the MA rules have a good chance to outperform the TRB rules.

Although our results indicate that technical analysis is more profitable in less developed markets like Pakistan, Sri Lanka and Indonesia, we do obtain good results for developed markets like Hong Kong, Taiwan, Korea and Japan as well, even though less significant in the case of Japan. The better results in the emerging markets may be due to inefficiencies in the information processing in these countries. However, the profits obtained by using very simple and well-known trend-following rules based on historic prices in rather developed markets are a contradiction to the Efficient Market Hypothesis and are at odds with newer studies like Cai et al. (2005), Lento (2007), and Ming-Ming and Siok-Hwa (2006). Even though it is difficult to name one reason to explain this phenomenon with certainty, the ever growing use of algorithmic trading devices in today's markets may be a driving force behind the pronounced market trends we witnessed over the last two decades. Computer-based trading systems seem to amplify and prolong existing trends, and this leads to the successful application of technical analysis as is the case for the Asian markets we research.

6. Conclusion

This study investigates whether simple moving average and trading range break rules can forecast stock index movements and outperform a simple buy-and-hold strategy after adjusting for transaction costs over the period from January 1990 to September 2012. Although we use rather simple rules without optimizing the parameters, we are able to show that technical trading rules have predictive power in various Asian stock markets. Furthermore, this forecasting power can be exploited by implementing a long-short strategy that beats a buy-and-hold investor even when transaction costs and non-synchronous trading are taken into account. A very remarkable point in favor of the technical rules is that, with the exception of Sri Lanka, they identify periods of above-average returns without simultaneously raising the level of risk. Just the other way round, an investor who enters the market on Buy signals can expect a lower standard deviation than a buy-and-hold investor. Thus, our results confirm that the findings of Bessembinder and Chan (1995) still hold in very recent sample periods. We also document that for our sample, the short-term variants of the technical trading rules are consistently more useful in predicting stock price movements than their long-term counterparts. MA rules with a long moving average period of 50 days consistently outperform all other rules, especially in terms of adjusted excess returns. TRB rules of the shortest lookback periods perform the best, with the TRB rules being generally less predictive and profitable than the MA rules. Considering that the highest excess returns are not widely and arbitrarily spread over the different rules across the countries under consideration provides evidence, along with the conducted bootstrap tests, that there is a distinctive pattern which can be successfully exploited by the participants in these markets. This result may have significant economic implications.

Although we often find the highest adjusted excess returns in emerging markets, developed markets like Taiwan, Korea and Japan seem to be far from being informationally efficient. This is a rather surprising result of our study as one would expect technical analysis to lose its predictive power the more technologically advanced the market is. In fact, faster means of communication may indeed favor the use of technical analysis as algorithmic trading intensifies trends. If this is the case, markets may never be fully efficient and there will be a chance to exploit this inefficiency even with the simple rules used in this paper.

References

1. Ahmed, P., Beck, K. and Goldreyer, E. (2000), "Can moving average technical trading strategies help in volatile and declining markets? A study of some emerging Asian markets", Managerial Finance, Vol. 6, pp. 49-62.
2. Bessembinder, H. and Chan, K. (1995), "The profitability of technical trading rules in the Asian stock markets", Pacific-Basin Finance Journal, Vol. 3, pp. 257–284.
3. Brock, W., Lakonishok, J. and LeBaron, B. (1992), "Simple technical trading rules and the stochastic properties of stock returns", The Journal of Finance, Vol. 47, pp. 1731–1764.
4. Cai, B., Cai, C. and Keasey, K. (2005), "Market efficiency and returns to simple technical trading rules: Further evidence from U.S., U.K., Asian and Chinese stock markets", Asia-Pacific Financial Markets, Vol. 12, pp. 45-60.
5. Chang, E.J., Lima, E.J.A. and Tabak, B.M. (2004), "Testing for predictability in emerging equity markets", Emerging Markets Review, Vol. 5, pp. 295–316.
6. Chang, Y.-H., Metghalchi, M. and Chan, C.-C. (2006) "Technical trading strategies and cross-national information linkage: The case of Taiwan stock market", Applied Financial Economics, Vol. 16, pp. 731–743.
7. Chen, C.-W., Huang, C.-S. and Lai, H.-W. (2009), "The impact of data snooping on the testing of technical

analysis: An empirical study of Asian stock markets", Journal of Asian Economics, Vol. 20, pp. 580–591.
8. Coutts, J.A. and Cheung, K.C. (2000), "Trading rules and stock returns: Some preliminary short run evidence from the Hang Seng 1985-1997", Applied Financial Economics, Vol. 10, pp. 579–586.
9. Efron, B. and Tibshirani, R. (1986), "Bootstrap methods for standard errors, confidence intervals, and other measures of statistical accuracy", Statistical Science, Vol. 1, pp. 54–75.
10. Efron, B. and Tibshirani, R. (1993), An introduction to the bootstrap, Chapman and Hall, New York.
11. Fama, E. (1970), "Efficient capital markets: a review of theory and empirical work", The Journal of Finance, Vol. 25, pp. 383–417.
12. Gunasekarage, A., Power, D.M., 2001. The profitability of moving average trading rules in South Asian stock markets. Emerging Markets Review 2, 17–33.
13. Hameed, A. and Kusnadi, Y. (2002), "Momentum Strategies: Evidence from the Pacific Basin Stock Markets", Journal of Financial Research, Vol. 25, pp. 383–397.
14. Hameed, A. and Ting, S. (2000), "Trading volume and short horizon contrarian profits: Evidence from the Malaysian market", Pacific Basin Finance Journal, Vol. 8, pp. 67–84.
15. Harvey, C. (1995a), "The cross-section of volatility and autocorrelation in emerging markets. Finanzmarkt und Portfolio Management", Vol. 9, pp. 12–34.
16. Harvey, C. (1995b), "Predictable risk and returns in emerging markets", Review of Financial Studies, Vol. 8, pp. 773–816.
17. Hoque, H.A.A.B., Kim, J.H. and Pyun, C.S. (2007), "A comparison of variance ratio tests of random walk: A case of Asian emerging stock markets", International Review of Economics and Finance, Vol. 16, pp. 488–502.
18. Ito, A. (1999), "Profits on technical trading rules and time-varying expected returns: Evidence from Pacific-Basin equity markets", Pacific-Basin Finance Journal, Vol. 7, pp. 283–330.
19. Lai, M-M, Balachandher, K.G and Nor, F.M. (2003), "An examination of the random walk model and technical trading rules in the Malaysian stock market", Quarterly Journal of Business and Economics, Vol. 41, pp. 81–97.
20. Lam, K., Yeung, H.F. and Cheung, W.M.Y. (2007), "The profitability of simple technical trading strategies: The case of Hong Kong". 20th Australasian Finance & Banking Conference 2007 Paper, available at SSRN: http://ssrn.com/abstract=1008740.
21. Lento, C. (2007), "Tests of technical trading rules in the Asian-Pacific equity markets: A bootstrap approach", Academy of Financial and Accounting Studies Journal, Vol. 11, pp. 51–73.
22. Lima, E.J.A. and Tabak, B.M. (2004), "Testing of the random walk hypothesis for equity markets: Evidence from China, Hong Kong and Singapore", Applied Economic Letters, Vol. 11, pp. 255–258.
23. McKenzie, M.D. (2007), "Technical trading rules in emerging markets and the 1997 Asian currency crises", Emerging Markets Finance and Trade, Vol. 43, pp. 46-73.
24. Menkhoff, L. and Taylor, M. (2007), "The obstinate passion of foreign exchange professionals: Technical analysis", Journal of Economic Literature, Vol. 45, pp. 936–972.
25. Ming-Ming, L. and Siok-Hwa, L. (2006), "The profitability of the simple moving averages and trading range breakout in the Asian stock markets", Journal of Asian Economics, Vol. 17, pp. 144-170.
26. Nam, K., Pyun, C.S. and Kim, S.W. (2003), "Is asymmetric mean-reverting pattern in stock returns systematic? Evidence from Pacific-basin markets in the short-horizon", Journal of International Financial Markets, Institutions and Money, Vol. 13, pp. 481–502.
27. Park, C.-H. and Irwin, S.H. (2007), "What do we know about the profitability of technical analysis?" Journal of Economic Surveys, Vol. 21, pp. 786–826.
28. Ratner, M. and Leal, R. (1999), "Tests of technical trading strategies in the emerging equity markets of Latin America and Asia", Journal of Banking and Finance, Vol. 23, pp. 1881–1905.
29. Taylor, M. and Allen, H. (1992), "The use of technical analysis in the foreign exchange market", Journal of International Money and Finance, Vol. 11, pp. 304–314.
30. Tian, G.G., Wan, G.H. and Guo, M. (2002), "Market efficiency and the returns to simple technical trading rules: New evidence from U.S. equity market and Chinese equity markets", Asia-Pacific Financial Markets, Vol. 9, pp. 241–258.
31. Wang, Z. -M., Chiao, C. and Chiao, Y.-T. (2012), "Technical analyses and order submission behaviors: Evidence from an emerging market", International Review of Economics and Finance, Vol. 24, pp. 109–128.
32. Wong, W.-K., Manzur, M. and Chew, B.-K. (2003), "How rewarding is technical analysis? Evidence from Singapore stock market", Applied Financial Economics, Vol. 13, pp. 543–551.
33. Yu, H., Nartea, G.H., Gan, C. and Yao, L.J. (2013), "Predictive ability and profitability of simple technical trading rules: Recent evidence from Southeast Asian stock markets", International Review of Economics and Finance, Vol. 25, pp. 356–371.

Appendix A

Table A.1 Data characteristics

Market	N	Mean	SD	Skewness	Kurtosis
Hong Kong	5626	0.000354	0.016825	-0.002590	11.958471
India	5400	0.000588	0.018165	0.107642	10.230747
Indonesia	5567	0.000426	0.015520	-0.046499	11.885647
Japan	5597	-0.000244	0.013629	-0.114810	8.791536
Malaysia	5611	0.000188	0.013884	0.369284	48.052167
Pakistan	5349	0.000610	0.015846	-0.264936	8.552016
Korea	5580	0.000173	0.019341	0.029495	7.467575
Sri Lanka	5427	0.000641	0.011819	0.446092	26.579753
Taiwan	5593	-0.000046	0.018108	-0.106490	6.537791
Thailand	5574	0.000067	0.017112	-0.032203	9.264072

Table A.2 Test results for MA rules for Korea and Pakistan

Rule	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig
	Korea Lag 0							**Pakistan Lag 0**						
1,50,0	0.000978	-0.000725	0.001703	0.016806	0.021978	3.137967	285	0.001557	-0.000725	0.002282	0.014137	0.018064	2.599874	279
	(0.001)	(0.999)	(0.001)	(1.000)	(0.000)	(0.001)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
2,50,0	0.000848	-0.000579	0.001427	0.016726	0.022072	2.475197	237	0.001631	-0.000827	0.002458	0.014115	0.018068	3.197556	205
	(0.003)	(0.998)	(0.003)	(1.000)	(0.000)	(0.003)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
5,50,0	0.000736	-0.000449	0.001185	0.016760	0.022056	1.950846	167	0.001606	-0.000776	0.002382	0.014276	0.017874	3.116667	145
	(0.019)	(0.988)	(0.016)	(1.000)	(0.000)	(0.017)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
1,150,0	0.000646	-0.000272	0.000918	0.015751	0.023201	0.974656	165	0.001259	-0.000460	0.001719	0.014566	0.018256	1.497928	119
	(0.033)	(0.949)	(0.036)	(1.000)	(0.000)	(0.059)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
2,150,0	0.000630	-0.000252	0.000883	0.015734	0.023216	0.963062	123	0.001220	-0.000393	0.001614	0.014596	0.018224	1.277701	103
	(0.033)	(0.936)	(0.048)	(1.000)	(0.000)	(0.070)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
5,150,0	0.000697	-0.000339	0.001037	0.015746	0.023216	1.481339	71	0.001183	-0.000326	0.001509	0.014746	0.018014	1.089499	71
	(0.015)	(0.969)	(0.021)	(1.000)	(0.000)	(0.038)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
1,200,0	0.000647	-0.000316	0.000964	0.015718	0.023119	1.282303	119	0.001262	-0.000557	0.001820	0.014805	0.018241	1.808550	87
	(0.033)	(0.962)	(0.036)	(1.000)	(0.000)	(0.043)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
2,200,0	0.000703	-0.000387	0.001091	0.015712	0.023127	1.699402	79	0.001277	-0.000573	0.001849	0.014828	0.018183	1.920049	65
	(0.016)	(0.977)	(0.021)	(1.000)	(0.000)	(0.027)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
5,200,0	0.000583	-0.000235	0.000818	0.015881	0.022981	1.019876	57	0.001163	-0.000357	0.001520	0.014848	0.018170	1.177465	51
	(0.045)	(0.937)	(0.052)	(1.000)	(0.000)	(0.060)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
1,50,1	0.000819	-0.000558	0.001378	0.016796	0.022057	2.483536	167	0.001480	-0.000558	0.002038	0.014216	0.017901	2.216370	141
	(0.005)	(0.996)	(0.004)	(1.000)	(0.000)	(0.005)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
2,50,1	0.000740	-0.000458	0.001198	0.016759	0.022074	2.023180	149	0.001487	-0.000615	0.002102	0.014164	0.018032	2.449348	121
	(0.010)	(0.992)	(0.008)	(1.000)	(0.000)	(0.009)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
5,50,1	0.000714	-0.000428	0.001142	0.016776	0.022060	1.945540	111	0.001274	-0.000285	0.001559	0.014380	0.017768	1.043643	113
	(0.016)	(0.988)	(0.013)	(1.000)	(0.000)	(0.012)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
1,150,1	0.000646	-0.000273	0.000919	0.015723	0.023230	1.141943	83	0.001202	-0.000353	0.001554	0.014637	0.018153	1.187010	75
	(0.021)	(0.955)	(0.024)	(1.000)	(0.000)	(0.051)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
002,150,1	0.000639	-0.000262	0.000901	0.015730	0.023212	1.119532	69	0.001158	-0.000261	0.001418	0.014638	0.018125	0.869085	65
	(0.026)	(0.952)	(0.030)	(1.000)	(0.000)	(0.054)		(0.001)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
5,150,1	0.000639	-0.000271	0.000910	0.015760	0.023238	1.177487	55	0.001153	-0.000253	0.001406	0.014828	0.017861	0.875136	47
	(0.024)	(0.952)	(0.030)	(1.000)	(0.000)	(0.052)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
1,200,1	0.000644	-0.000316	0.000960	0.015755	0.023114	1.391549	61	0.001175	-0.000377	0.001552	0.014926	0.018040	1.235496	59
	(0.022)	(0.968)	(0.021)	(1.000)	(0.000)	(0.036)		(0.000)	(0.999)	(0.000)	(1.000)	(0.000)	(0.000)	
2,200,1	0.000673	-0.000345	0.001018	0.015818	0.023009	1.568878	47	0.001196	-0.000417	0.001612	0.014870	0.018127	1.397652	49
	(0.015)	(0.979)	(0.014)	(1.000)	(0.000)	(0.026)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
5,200,1	0.000569	-0.000209	0.000778	0.015867	0.022929	0.935443	43	0.001177	-0.000343	0.001520	0.014979	0.017897	1.195978	33
	(0.039)	(0.930)	(0.056)	(1.000)	(0.000)	(0.076)		(0.000)	(0.999)	(0.000)	(1.000)	(0.000)	(0.000)	

Table A.2 Continued

	Korea Lag 1							Pakistan Lag 1						
50,0	0.000706	-0.000411	0.001117	0.016794	0.022021	1.646562	229.67	0.001486	-0.000614	0.002100	0.014263	0.017926	2.264576	209.67
	(0.018)	(0.985)	(0.018)	(1.000)	(0.000)	(0.018)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
150,0	0.000641	-0.000272	0.000913	0.015736	0.023219	1.054537	119.67	0.001156	-0.000280	0.001436	0.014801	0.017942	0.861055	97.67
	(0.032)	(0.950)	(0.039)	(1.000)	(0.000)	(0.056)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
200,0	0.000605	-0.000257	0.000862	0.015825	0.023032	1.063058	85.00	0.001165	-0.000367	0.001533	0.014885	0.018123	1.175496	67.67
	(0.032)	(0.962)	(0.034)	(1.000)	(0.000)	(0.041)		(0.001)	(0.999)	(0.001)	(1.000)	(0.000)	(0.001)	
50,1	0.000675	-0.000382	0.001058	0.016751	0.022094	1.660161	142.33	0.001340	-0.000381	0.001721	0.014323	0.017837	1.439510	125.00
	(0.019)	(0.981)	(0.018)	(1.000)	(0.000)	(0.019)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
150,1	0.000611	-0.000235	0.000846	0.015782	0.023190	0.975671	69.00	0.001125	-0.000210	0.001335	0.014803	0.017912	0.677242	62.33
	(0.036)	(0.941)	(0.049)	(1.000)	(0.000)	(0.064)		(0.001)	(0.998)	(0.002)	(1.000)	(0.000)	(0.002)	
200,1	0.000582	-0.000226	0.000808	0.015872	0.022970	0.988157	50.33	0.001138	-0.000297	0.001435	0.014974	0.017957	0.979187	47.00
	(0.034)	(0.946)	(0.041)	(1.000)	(0.000)	(0.057)		(0.001)	(0.997)	(0.002)	(1.000)	(0.000)	(0.003)	

Note: $\bar{r}_i, i = B, S$ is the mean return per trading period classified as Buy/ Sell. $\sigma_i, i = B, S$ is the standard deviation of the Buy/ Sell returns. AER is the adjusted excess return, i.e. the return in excess of the buy-and-hold strategy after transaction costs. Sig denotes the number of trading signals.

Table A.3 Test results for MA rules for Indonesia and Malaysia

Rule	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig
	Indonesia Lag 0							**Malaysia Lag 0**						
1,50,0	0.001522	-0.001276	0.002798	0.013225	0.018051	5.426094	213	0.000854	-0.000755	0.001609	0.011133	0.016970	2.900483	303
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
2,50,0	0.001374	-0.001054	0.002429	0.013206	0.018079	4.505624	179	0.000751	-0.000616	0.001367	0.010747	0.017343	2.422397	215
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.001)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
5,50,0	0.001335	-0.001010	0.002345	0.013247	0.018062	4.368429	135	0.000901	-0.000833	0.001734	0.010628	0.017450	3.548440	146
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
1,150,0	0.000906	-0.000548	0.001454	0.013074	0.018939	1.963265	119	0.000666	-0.000527	0.001194	0.009841	0.018586	2.036148	119
	(0.003)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.001)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
2,150,0	0.000822	-0.000408	0.001230	0.013081	0.018950	1.428426	103	0.000619	-0.000453	0.001072	0.009873	0.018568	1.779076	89
	(0.009)	(1.000)	(0.001)	(1.000)	(0.000)	(0.000)		(0.002)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
5,150,0	0.000861	-0.000475	0.001336	0.013314	0.018669	1.775549	63	0.000570	-0.000375	0.000945	0.009958	0.018479	1.500909	63
	(0.008)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.006)	(1.000)	(0.001)	(1.000)	(0.000)	(0.001)	
1,200,0	0.000873	-0.000369	0.001242	0.013083	0.018970	1.214793	101	0.000552	-0.000432	0.000985	0.009760	0.019384	1.397959	103
	(0.003)	(1.000)	(0.001)	(1.000)	(0.000)	(0.002)		(0.011)	(0.999)	(0.002)	(1.000)	(0.000)	(0.005)	
2,200,0	0.000865	-0.000350	0.001215	0.013196	0.018810	1.194760	77	0.000535	-0.000400	0.000934	0.009836	0.019324	1.321885	79
	(0.006)	(0.999)	(0.002)	(1.000)	(0.000)	(0.004)		(0.014)	(0.999)	(0.002)	(1.000)	(0.000)	(0.006)	
5,200,0	0.000831	-0.000296	0.001127	0.013305	0.018696	1.015667	57	0.000480	-0.000292	0.000773	0.009957	0.019182	0.972734	57
	(0.007)	(0.997)	(0.003)	(1.000)	(0.000)	(0.004)		(0.035)	(0.990)	(0.013)	(1.000)	(0.000)	(0.024)	
1,50,1	0.001290	-0.000968	0.002259	0.013146	0.018214	4.127789	139	0.000643	-0.000478	0.001121	0.010526	0.017610	1.933841	126
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.003)	(1.000)	(0.001)	(1.000)	(0.000)	(0.000)	
2,50,1	0.001210	-0.000860	0.002071	0.013198	0.018187	3.656891	123	0.000744	-0.000621	0.001365	0.011350	0.016846	2.618993	112
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
5,50,1	0.001047	-0.000639	0.001686	0.013383	0.018049	2.675135	101	0.000809	-0.000746	0.001555	0.010586	0.017651	3.170188	88
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
1,150,1	0.000769	-0.000330	0.001099	0.013099	0.018991	1.161159	73	0.000589	-0.000389	0.000978	0.009889	0.018437	1.607542	53
	(0.029)	(0.997)	(0.007)	(1.000)	(0.000)	(0.004)		(0.006)	(0.998)	(0.003)	(1.000)	(0.000)	(0.002)	
2,150,1	0.000780	-0.000352	0.001131	0.013106	0.018995	1.263350	63	0.000520	-0.000285	0.000805	0.009925	0.018428	1.155709	53
	(0.026)	(1.000)	(0.003)	(1.000)	(0.000)	(0.002)		(0.023)	(0.994)	(0.012)	(1.000)	(0.000)	(0.008)	
5,150,1	0.000761	-0.000317	0.001078	0.013506	0.018495	1.163594	45	0.000441	-0.000164	0.000605	0.010022	0.018334	0.631346	53
	(0.025)	(0.999)	(0.003)	(1.000)	(0.000)	(0.002)		(0.065)	(0.960)	(0.050)	(1.000)	(0.000)	(0.046)	
1,200,1	0.000814	-0.000251	0.001065	0.013346	0.018585	0.846287	61	0.000527	-0.000375	0.000902	0.009806	0.019277	1.301141	51
	(0.013)	(0.997)	(0.005)	(1.000)	(0.000)	(0.005)		(0.022)	(0.998)	(0.002)	(1.000)	(0.000)	(0.007)	
2,200,1	0.000790	-0.000211	0.001001	0.013362	0.018570	0.697652	55	0.000465	-0.000257	0.000721	0.009866	0.019224	0.872110	45
	(0.013)	(0.995)	(0.005)	(1.000)	(0.000)	(0.005)		(0.045)	(0.990)	(0.024)	(1.000)	(0.000)	(0.022)	
5,200,1	0.000760	-0.000153	0.000913	0.013355	0.018549	0.495696	43	0.000474	-0.000278	0.000752	0.009973	0.019144	0.963642	37
	(0.020)	(0.994)	(0.010)	(1.000)	(0.000)	(0.009)		(0.041)	(0.988)	(0.016)	(1.000)	(0.000)	(0.019)	

Table A.3 Continued

	Indonesia Lag 1							Malaysia Lag 1						
50,0	0.001266	-0.000908	0.002174	0.013287	0.018029	3.819001	175.67	0.000855	-0.000765	0.001620	0.010229	0.017764	3.094935	220.67
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
150,0	0.000782	-0.000338	0.001120	0.013353	0.018628	1.169082	95.00	0.000539	-0.000331	0.000870	0.009920	0.018526	1.222749	90.33
	(0.019)	(0.998)	(0.003)	(1.000)	(0.000)	(0.002)		(0.017)	(0.996)	(0.006)	(1.000)	(0.000)	(0.007)	
200,0	0.000813	-0.000237	0.001050	0.013300	0.018669	0.828042	78.33	0.000472	-0.000265	0.000737	0.009924	0.019222	0.847358	79.67
	(0.013)	(0.995)	(0.005)	(1.000)	(0.000)	(0.005)		(0.044)	(0.985)	(0.023)	(1.000)	(0.000)	(0.023)	
50,1	0.001040	-0.000616	0.001656	0.013378	0.018028	2.545594	121.00	0.000770	-0.000670	0.001440	0.010470	0.017680	2.825948	108.67
	(0.003)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
150,1	0.000752	-0.000300	0.001051	0.013467	0.018549	1.068841	60.33	0.000480	-0.000227	0.000707	0.009980	0.018375	0.869929	53.00
	(0.029)	(0.999)	(0.007)	(1.000)	(0.000)	(0.002)		(0.030)	(0.987)	(0.019)	(1.000)	(0.000)	(0.018)	
200,1	0.000779	-0.000164	0.000943	0.013371	0.018517	0.601727	53.00	0.000451	-0.000219	0.000670	0.009970	0.019125	0.753693	44.33
	(0.021)	(0.988)	(0.014)	(1.000)	(0.000)	(0.011)		(0.043)	(0.979)	(0.029)	(1.000)	(0.000)	(0.031)	

Note: $\bar{r}_i, i = B,S$ is the mean return per trading period classified as Buy/ Sell. $\sigma_i, i = B,S$ is the standard deviation of the Buy/ Sell returns. AER is the adjusted excess return, i.e. the return in excess of the buy-and-hold strategy after transaction costs. Sig denotes the number of trading signals.

Table A.4 Test results for MA rules for Sri Lanka and Taiwan

Rule	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig
	Sri Lanka Lag 0							**Taiwan Lag 0**						
1,50,0	0.001839	-0.000761	0.002600	0.011645	0.011939	3.504349	189	0.000913	-0.001107	0.002020	0.015250	0.020575	5.462464	265
	(0.000)	(1.000)	(0.000)	(0.717)	(0.386)	(0.000)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
2,50,0	0.001676	-0.000578	0.002254	0.011730	0.011884	2.653682	149	0.000868	-0.001055	0.001923	0.015271	0.020551	5.304832	211
	(0.000)	(1.000)	(0.000)	(0.637)	(0.424)	(0.000)		(0.001)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
5,50,0	0.001540	-0.000427	0.001968	0.012065	0.011534	1.928620	127	0.000681	-0.000858	0.001539	0.015629	0.020282	4.347790	157
	(0.000)	(1.000)	(0.000)	(0.247)	(0.666)	(0.000)		(0.001)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
1,150,0	0.001375	-0.000506	0.001881	0.012601	0.009878	2.303876	91	0.000401	-0.000208	0.000609	0.014664	0.020020	0.722455	189
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.037)	(0.786)	(0.088)	(1.000)	(0.000)	(0.227)	
2,150,0	0.001315	-0.000439	0.001754	0.012602	0.009886	1.993940	79	0.000413	-0.000220	0.000633	0.014655	0.020015	0.887198	139
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.028)	(0.810)	(0.077)	(1.000)	(0.000)	(0.200)	
5,150,0	0.001206	-0.000317	0.001523	0.012604	0.009899	1.422029	63	0.000404	-0.000205	0.000610	0.014839	0.019820	0.927089	85
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.031)	(0.785)	(0.088)	(1.000)	(0.000)	(0.225)	
1,200,0	0.001465	-0.000569	0.002034	0.012699	0.009735	2.646289	77	0.000284	-0.000003	0.000288	0.014330	0.019480	-0.360451	189
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.074)	(0.480)	(0.236)	(1.000)	(0.000)	(0.526)	
2,200,0	0.001381	-0.000470	0.001851	0.012697	0.009764	2.189768	65	0.000296	-0.000018	0.000314	0.014393	0.019431	-0.193604	141
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.069)	(0.502)	(0.211)	(1.000)	(0.000)	(0.502)	
5,200,0	0.001289	-0.000365	0.001655	0.012798	0.009634	1.702400	53	0.000257	0.000029	0.000228	0.014415	0.019411	-0.322799	91
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.097)	(0.418)	(0.281)	(1.000)	(0.000)	(0.570)	
1,50,1	0.001618	-0.000485	0.002102	0.011720	0.011906	2.290658	109	0.000867	-0.001072	0.001939	0.015280	0.020584	5.465956	149
	(0.000)	(1.000)	(0.000)	(0.636)	(0.419)	(0.000)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
2,50,1	0.001494	-0.000346	0.001840	0.011781	0.011864	1.597386	99	0.000781	-0.000980	0.001761	0.015297	0.020579	5.004811	133
	(0.000)	(1.000)	(0.000)	(0.579)	(0.436)	(0.000)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
5,50,1	0.001498	-0.000369	0.001867	0.011974	0.011650	1.724493	85	0.000589	-0.000767	0.001356	0.015826	0.020142	3.929948	111
	(0.000)	(1.000)	(0.000)	(0.337)	(0.583)	(0.000)		(0.003)	(1.000)	(0.001)	(1.000)	(0.000)	(0.001)	
1,150,1	0.001251	-0.000385	0.001636	0.012550	0.009940	1.740544	61	0.000388	-0.000184	0.000573	0.014711	0.019898	0.815924	89
	(0.000)	(1.000)	(0.000)	(0.001)	(1.000)	(0.000)		(0.039)	(0.756)	(0.091)	(1.000)	(0.000)	(0.249)	
2,150,1	0.001166	-0.000280	0.001446	0.012563	0.009947	1.244062	57	0.000506	-0.000314	0.000820	0.014724	0.019897	1.525742	71
	(0.000)	(1.000)	(0.000)	(0.001)	(1.000)	(0.000)		(0.016)	(0.898)	(0.039)	(1.000)	(0.000)	(0.115)	
5,150,1	0.001133	-0.000259	0.001391	0.012547	0.009939	1.141375	47	0.000435	-0.000244	0.000679	0.014791	0.019891	1.178788	55
	(0.000)	(1.000)	(0.000)	(0.001)	(1.000)	(0.000)		(0.024)	(0.828)	(0.075)	(1.000)	(0.000)	(0.187)	
1,200,1	0.001386	-0.000466	0.001852	0.012744	0.009711	2.228193	43	0.000321	-0.000046	0.000367	0.014394	0.019405	0.068200	79
	(0.000)	(1.000)	(0.000)	(0.001)	(1.000)	(0.000)		(0.066)	(0.548)	(0.195)	(1.000)	(0.000)	(0.451)	
2,200,1	0.001335	-0.000413	0.001747	0.012720	0.009750	1.970718	37	0.000307	-0.000029	0.000336	0.014471	0.019334	0.005923	69
	(0.000)	(1.000)	(0.000)	(0.001)	(1.000)	(0.000)		(0.066)	(0.524)	(0.212)	(1.000)	(0.000)	(0.470)	
5,200,1	0.001228	-0.000298	0.001526	0.012821	0.009609	1.401216	37	0.000307	-0.000028	0.000335	0.014498	0.019296	0.038592	51
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.062)	(0.527)	(0.204)	(1.000)	(0.000)	(0.472)	

Table A.4 Continued

	Sri Lanka Lag 1							Taiwan Lag 1						
50,0	0.001534	-0.000421	0.001954	0.011822	0.011812	1.836954	155.00	0.000714	-0.000886	0.001600	0.015612	0.020292	4.390891	211.00
	(0.000)	(1.000)	(0.000)	(0.529)	(0.468)	(0.000)		(0.001)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
150,0	0.001174	-0.000289	0.001463	0.012608	0.009894	1.247636	77.67	0.000422	-0.000208	0.000630	0.014663	0.019972	0.849354	137.67
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.029)	(0.779)	(0.081)	(1.000)	(0.000)	(0.233)	
200,0	0.001305	-0.000381	0.001686	0.012770	0.009672	1.746585	65.00	0.000259	0.000026	0.000233	0.014426	0.019401	-0.410491	140.33
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.100)	(0.427)	(0.273)	(1.000)	(0.000)	(0.567)	
50,1	0.001426	-0.000280	0.001706	0.011848	0.011804	1.250722	97.67	0.000681	-0.000861	0.001541	0.015666	0.020277	4.384703	131.00
	(0.000)	(1.000)	(0.000)	(0.488)	(0.488)	(0.000)		(0.003)	(0.999)	(0.002)	(1.000)	(0.000)	(0.001)	
150,1	0.001095	-0.000214	0.001309	0.012555	0.009946	0.913006	55.00	0.000484	-0.000271	0.000754	0.014745	0.019867	1.315868	71.67
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.016)	(0.854)	(0.056)	(1.000)	(0.000)	(0.154)	
200,1	0.001216	-0.000276	0.001492	0.012810	0.009639	1.286008	39.00	0.000300	-0.000022	0.000322	0.014489	0.019316	-0.028652	66.33
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.080)	(0.512)	(0.214)	(1.000)	(0.000)	(0.482)	

Note: $\bar{r}_i, i = B,S$ is the mean return per trading period classified as Buy/ Sell. $\sigma_i, i = B,S$ is the standard deviation of the Buy/ Sell returns. AER is the adjusted excess return, i.e. the return in excess of the buy-and-hold strategy after transaction costs. Sig denotes the number of trading signals.

Table A.5 Test results for MA rules for Thailand and Japan

Rule	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig
	Thailand Lag 0							**Japan Lag 0**						
1,50,0	0.001092	-0.001059	0.002151	0.015067	0.019151	4.907813	273	0.000318	-0.000674	0.000992	0.010648	0.015756	3.365254	330
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.001)	(0.998)	(0.002)	(1.000)	(0.000)	(0.002)	
2,50,0	0.001093	-0.001063	0.002156	0.015118	0.019109	5.033290	217	0.000260	-0.000626	0.000886	0.010702	0.015737	3.229807	250
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.004)	(0.992)	(0.005)	(1.000)	(0.000)	(0.009)	
5,50,0	0.001005	-0.000958	0.001963	0.015215	0.019026	4.664316	137	0.000050	-0.000440	0.000490	0.010921	0.015580	2.294096	177
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.063)	(0.893)	(0.079)	(1.000)	(0.000)	(0.110)	
1,150,0	0.000353	-0.000273	0.000627	0.014848	0.019412	0.996003	207	0.000268	-0.000540	0.000808	0.010724	0.015414	3.095535	130
	(0.091)	(0.940)	(0.072)	(1.000)	(0.000)	(0.067)		(0.008)	(0.974)	(0.011)	(1.000)	(0.000)	(0.026)	
2,150,0	0.000378	-0.000306	0.000684	0.014914	0.019369	1.282621	141	0.000188	-0.000478	0.000666	0.010901	0.015322	2.774958	100
	(0.086)	(0.955)	(0.060)	(1.000)	(0.000)	(0.055)		(0.016)	(0.937)	(0.029)	(1.000)	(0.000)	(0.061)	
5,150,0	0.000281	-0.000186	0.000467	0.015158	0.019119	0.785854	97	0.000272	-0.000544	0.000816	0.011038	0.015247	3.236117	70
	(0.162)	(0.884)	(0.132)	(1.000)	(0.000)	(0.128)		(0.006)	(0.981)	(0.006)	(1.000)	(0.000)	(0.023)	
1,200,0	0.000221	0.000008	0.000214	0.014670	0.019210	-0.425233	193	0.000111	-0.000384	0.000495	0.010538	0.015235	2.063852	144
	(0.229)	(0.673)	(0.265)	(1.000)	(0.000)	(0.337)		(0.043)	(0.846)	(0.070)	(1.000)	(0.000)	(0.180)	
2,200,0	0.000186	0.000055	0.000130	0.014661	0.019190	-0.597334	167	0.000046	-0.000335	0.000381	0.010803	0.015096	1.827243	112
	(0.278)	(0.569)	(0.334)	(1.000)	(0.000)	(0.446)		(0.066)	(0.761)	(0.127)	(1.000)	(0.000)	(0.261)	
5,200,0	0.000135	0.000121	0.000014	0.014803	0.019055	-0.782764	107	0.000043	-0.000331	0.000374	0.010929	0.015015	1.886548	74
	(0.345)	(0.467)	(0.440)	(1.000)	(0.000)	(0.522)		(0.081)	(0.755)	(0.136)	(1.000)	(0.000)	(0.277)	
1,50,1	0.001088	-0.001065	0.002153	0.015073	0.019164	5.193280	133	0.000174	-0.000553	0.000728	0.010763	0.015710	2.967976	162
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.010)	(0.975)	(0.014)	(1.000)	(0.000)	(0.030)	
2,50,1	0.001051	-0.001010	0.002061	0.015345	0.018899	4.981127	113	0.000062	-0.000453	0.000516	0.010899	0.015613	2.412813	150
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.051)	(0.919)	(0.062)	(1.000)	(0.000)	(0.090)	
5,50,1	0.000942	-0.000863	0.001805	0.015447	0.018781	4.315399	95	-0.000095	-0.000318	0.000223	0.011031	0.015535	1.668217	119
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.195)	(0.698)	(0.230)	(1.000)	(0.000)	(0.304)	
1,150,1	0.000335	-0.000252	0.000587	0.014858	0.019404	1.104007	99	0.000162	-0.000451	0.000613	0.010728	0.015366	2.710235	66
	(0.108)	(0.928)	(0.089)	(1.000)	(0.000)	(0.081)		(0.028)	(0.921)	(0.038)	(1.000)	(0.000)	(0.081)	
2,150,1	0.000259	-0.000161	0.000420	0.015020	0.019252	0.687162	83	0.000153	-0.000444	0.000597	0.010971	0.015238	2.678599	60
	(0.183)	(0.854)	(0.164)	(1.000)	(0.000)	(0.151)		(0.027)	(0.922)	(0.043)	(1.000)	(0.000)	(0.078)	
5,150,1	0.000353	-0.000268	0.000621	0.015244	0.019015	1.268455	63	0.000134	-0.000432	0.000567	0.011090	0.015184	2.616063	50
	(0.083)	(0.925)	(0.078)	(1.000)	(0.000)	(0.080)		(0.029)	(0.899)	(0.052)	(1.000)	(0.000)	(0.101)	
1,200,1	0.000153	0.000098	0.000055	0.014709	0.019165	-0.660193	101	0.000038	-0.000327	0.000365	0.010602	0.015184	1.868058	72
	(0.318)	(0.500)	(0.408)	(1.000)	(0.000)	(0.481)		(0.087)	(0.761)	(0.137)	(1.000)	(0.000)	(0.275)	
2,200,1	0.000199	0.000037	0.000162	0.014719	0.019148	-0.347028	85	-0.000012	-0.000290	0.000278	0.010837	0.015053	1.668436	58
	(0.265)	(0.594)	(0.319)	(1.000)	(0.000)	(0.402)		(0.118)	(0.675)	(0.189)	(1.000)	(0.000)	(0.356)	
5,200,1	0.000250	-0.000028	0.000278	0.014861	0.018976	-0.003983	65	-0.000050	-0.000261	0.000211	0.011006	0.014953	1.507606	52
	(0.175)	(0.712)	(0.234)	(1.000)	(0.000)	(0.296)		(0.151)	(0.583)	(0.241)	(1.000)	(0.000)	(0.437)	

Table A.5 Continued

	Thailand Lag 1							Japan Lag 1						
50,0	0.001030	-0.000984	0.002014	0.015409	0.018845	4.642480	209.00	0.000053	-0.000433	0.000485	0.010944	0.015572	2.117813	252.33
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.076)	(0.869)	(0.094)	(1.000)	(0.000)	(0.126)	
150,0	0.000344	-0.000270	0.000614	0.015145	0.019138	1.019782	148.33	0.000194	-0.000482	0.000677	0.010978	0.015283	2.787442	100.00
	(0.090)	(0.937)	(0.070)	(1.000)	(0.000)	(0.076)		(0.023)	(0.943)	(0.033)	(1.000)	(0.000)	(0.060)	
200,0	0.000189	0.000031	0.000158	0.014880	0.018959	-0.502998	155.67	0.000003	-0.000303	0.000306	0.010886	0.015050	1.657133	110.00
	(0.274)	(0.595)	(0.335)	(1.000)	(0.000)	(0.430)		(0.106)	(0.700)	(0.159)	(1.000)	(0.000)	(0.319)	
50,1	0.001023	-0.000972	0.001995	0.015522	0.018732	4.782653	113.67	-0.000021	-0.000370	0.000349	0.011113	0.015476	1.958197	143.00
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.139)	(0.772)	(0.173)	(1.000)	(0.000)	(0.223)	
150,1	0.000291	-0.000204	0.000495	0.015199	0.019075	0.831846	81.67	0.000134	-0.000430	0.000564	0.011076	0.015187	2.576681	58.67
	(0.138)	(0.899)	(0.115)	(1.000)	(0.000)	(0.114)		(0.033)	(0.889)	(0.055)	(1.000)	(0.000)	(0.111)	
200,1	0.000230	-0.000022	0.000252	0.014926	0.018908	-0.108722	83.67	-0.000035	-0.000273	0.000238	0.010943	0.014999	1.580784	60.67
	(0.212)	(0.692)	(0.255)	(1.000)	(0.000)	(0.327)		(0.163)	(0.602)	(0.239)	(1.000)	(0.000)	(0.414)	

Note: $\bar{r}_i, i = B,S$ is the mean return per trading period classified as Buy/ Sell. $\sigma_i, i = B,S$ is the standard deviation of the Buy/ Sell returns. AER is the adjusted excess return, i.e. the return in excess of the buy-and-hold strategy after transaction costs. Sig denotes the number of trading signals.

Table A.6 Test results for MA rules for Hong Kong and India

Rule	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig
	Hong Kong Lag 0							India Lag 0						
1,50,0	0.000781	-0.000270	0.001051	0.013593	0.020741	0.571923	325	0.001235	-0.000193	0.001428	0.016555	0.020069	0.390296	261
	(0.011)	(0.998)	(0.004)	(1.000)	(0.000)	(0.003)		(0.000)	(0.999)	(0.000)	(1.000)	(0.000)	(0.001)	
2,50,0	0.000777	-0.000269	0.001046	0.013588	0.020777	0.723291	245	0.001092	-0.000013	0.001105	0.016717	0.019916	-0.363382	215
	(0.010)	(0.998)	(0.005)	(1.000)	(0.000)	(0.004)		(0.006)	(0.989)	(0.007)	(1.000)	(0.000)	(0.010)	
5,50,0	0.000697	-0.000149	0.000847	0.013588	0.020767	0.337616	169	0.001153	-0.000168	0.001320	0.017459	0.019170	0.464620	141
	(0.030)	(0.991)	(0.017)	(1.000)	(0.000)	(0.011)		(0.002)	(0.998)	(0.002)	(0.986)	(0.012)	(0.002)	
1,150,0	0.000695	-0.000228	0.000923	0.013435	0.021508	0.617199	157	0.000985	-0.000211	0.001196	0.016793	0.019872	0.595755	149
	(0.027)	(0.993)	(0.012)	(1.000)	(0.000)	(0.011)		(0.008)	(0.998)	(0.002)	(1.000)	(0.001)	(0.002)	
2,150,0	0.000607	-0.000085	0.000692	0.013397	0.021565	0.088099	125	0.001028	-0.000271	0.001299	0.016783	0.019873	0.941329	105
	(0.063)	(0.977)	(0.036)	(1.000)	(0.000)	(0.027)		(0.005)	(0.998)	(0.003)	(1.000)	(0.000)	(0.002)	
5,150,0	0.000629	-0.000115	0.000744	0.013566	0.021331	0.315604	75	0.000920	-0.000112	0.001032	0.016983	0.019632	0.332323	71
	(0.051)	(0.980)	(0.027)	(1.000)	(0.000)	(0.024)		(0.025)	(0.994)	(0.009)	(1.000)	(0.002)	(0.006)	
1,200,0	0.000595	-0.000092	0.000687	0.013428	0.022163	0.081890	125	0.000691	0.000409	0.000282	0.015026	0.020640	-2.147133	115
	(0.086)	(0.978)	(0.040)	(1.000)	(0.000)	(0.030)		(0.235)	(0.768)	(0.231)	(1.000)	(0.000)	(0.281)	
2,200,0	0.000601	-0.000101	0.000701	0.013480	0.022072	0.194966	85	0.000583	0.000538	0.000045	0.015168	0.020541	-2.703354	95
	(0.074)	(0.978)	(0.037)	(1.000)	(0.000)	(0.026)		(0.443)	(0.620)	(0.401)	(1.000)	(0.000)	(0.486)	
5,200,0	0.000617	-0.000125	0.000742	0.013666	0.021791	0.353258	53	0.000610	0.000506	0.000104	0.015213	0.020511	-2.482638	63
	(0.063)	(0.983)	(0.030)	(1.000)	(0.000)	(0.020)		(0.389)	(0.666)	(0.341)	(1.000)	(0.000)	(0.437)	
1,50,1	0.000746	-0.000265	0.001011	0.013482	0.021144	0.811222	167	0.001086	0.000001	0.001084	0.016659	0.019964	-0.320971	161
	(0.028)	(0.997)	(0.010)	(1.000)	(0.000)	(0.005)		(0.008)	(0.983)	(0.011)	(1.000)	(0.000)	(0.016)	
2,50,1	0.000691	-0.000177	0.000868	0.013497	0.021121	0.457704	155	0.001263	-0.000291	0.001554	0.017406	0.019190	1.067304	125
	(0.033)	(0.992)	(0.018)	(1.000)	(0.000)	(0.012)		(0.000)	(1.000)	(0.000)	(0.989)	(0.004)	(0.000)	
5,50,1	0.000684	-0.000174	0.000858	0.013579	0.021101	0.528344	109	0.001071	-0.000058	0.001129	0.017652	0.018930	0.036975	111
	(0.050)	(0.988)	(0.022)	(1.000)	(0.000)	(0.018)		(0.012)	(0.987)	(0.012)	(0.937)	(0.041)	(0.013)	
1,150,1	0.000608	-0.000081	0.000689	0.013399	0.021493	0.161435	81	0.000948	-0.000153	0.001101	0.016857	0.019787	0.479458	85
	(0.083)	(0.966)	(0.049)	(1.000)	(0.000)	(0.038)		(0.034)	(0.987)	(0.018)	(1.000)	(0.000)	(0.011)	
2,150,1	0.000640	-0.000120	0.000759	0.013429	0.021366	0.363839	65	0.000911	-0.000094	0.001005	0.016866	0.019766	0.255172	73
	(0.058)	(0.974)	(0.035)	(1.000)	(0.000)	(0.030)		(0.048)	(0.984)	(0.023)	(1.000)	(0.000)	(0.017)	
5,150,1	0.000606	-0.000086	0.000692	0.013605	0.021371	0.246192	47	0.000926	-0.000122	0.001048	0.017032	0.019568	0.419341	49
	(0.094)	(0.966)	(0.056)	(1.000)	(0.000)	(0.036)		(0.041)	(0.981)	(0.023)	(1.000)	(0.001)	(0.018)	
1,200,1	0.000572	-0.000044	0.000615	0.013453	0.022076	0.017398	67	0.000809	0.000172	0.000638	0.017068	0.018891	-0.840859	83
	(0.114)	(0.939)	(0.070)	(1.000)	(0.000)	(0.062)		(0.108)	(0.921)	(0.090)	(1.000)	(0.092)	(0.088)	
2,200,1	0.000573	-0.000045	0.000618	0.013527	0.021966	0.044968	55	0.000598	0.000521	0.000076	0.015201	0.020484	-2.566407	59
	(0.114)	(0.943)	(0.070)	(1.000)	(0.000)	(0.057)		(0.452)	(0.614)	(0.407)	(1.000)	(0.000)	(0.509)	
5,200,1	0.000605	-0.000107	0.000712	0.013660	0.021842	0.306519	41	0.000577	0.000546	0.000030	0.015364	0.020358	-2.649029	47
	(0.084)	(0.961)	(0.048)	(1.000)	(0.000)	(0.042)		(0.491)	(0.584)	(0.446)	(1.000)	(0.000)	(0.555)	

Table A.6 Continued

	Hong Kong Lag 1							India Lag 1						
50,0	0.000691	-0.000142	0.000833	0.013660	0.020699	0.142991	246.33	0.000996	0.000078	0.000917	0.017176	0.019421	-0.812283	205.67
	(0.050)	(0.978)	(0.033)	(1.000)	(0.000)	(0.025)		(0.034)	(0.953)	(0.041)	(0.976)	(0.017)	(0.043)	
150,0	0.000591	-0.000049	0.000640	0.013504	0.021431	-0.016563	119.00	0.000977	-0.000217	0.001195	0.016911	0.019701	0.661269	108.33
	(0.104)	(0.948)	(0.067)	(1.000)	(0.000)	(0.051)		(0.026)	(0.995)	(0.010)	(1.000)	(0.003)	(0.006)	
200,0	0.000628	-0.000154	0.000782	0.013679	0.021828	0.399124	87.67	0.000554	0.000587	-0.000033	0.015209	0.020491	-2.913519	91.00
	(0.073)	(0.978)	(0.039)	(1.000)	(0.000)	(0.027)		(0.526)	(0.531)	(0.491)	(1.000)	(0.000)	(0.594)	
50,1	0.000657	-0.000128	0.000785	0.013601	0.021043	0.259918	143.67	0.001012	0.000048	0.000964	0.017493	0.019065	-0.512058	132.33
	(0.070)	(0.977)	(0.041)	(1.000)	(0.000)	(0.027)		(0.020)	(0.973)	(0.022)	(0.930)	(0.047)	(0.026)	
150,1	0.000583	-0.000030	0.000612	0.013609	0.021275	0.013986	64.33	0.000918	-0.000127	0.001045	0.017035	0.019542	0.358655	69.00
	(0.114)	(0.942)	(0.074)	(1.000)	(0.000)	(0.054)		(0.036)	(0.993)	(0.013)	(1.000)	(0.005)	(0.007)	
200,1	0.000625	-0.000147	0.000772	0.013702	0.021778	0.439534	54.33	0.000625	0.000485	0.000140	0.015932	0.019838	-2.298087	63.00
	(0.070)	(0.978)	(0.034)	(1.000)	(0.000)	(0.029)		(0.362)	(0.685)	(0.332)	(1.000)	(0.042)	(0.415)	

Note: $\bar{r}_i, i = B,S$ is the mean return per trading period classified as Buy/ Sell. $\sigma_i, i = B,S$ is the standard deviation of the Buy/ Sell returns. AER is the adjusted excess return, i.e. the return in excess of the buy-and-hold strategy after transaction costs. Sig denotes the number of trading signals.

Table A.7 Test results for TRB rules for Hong Kong, India, Indonesia and Malaysia

Rule	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig
	Hong Kong Lag 0							India Lag 0						
25	0.000675	-0.000104	0.000778	0.013532	0.020708	0.2073	125	0.001194	-0.000124	0.001318	0.017452	0.019051	0.3540	123
	(0.055)	(0.965)	(0.044)	(1.000)	(0.000)	(0.037)		(0.003)	(0.992)	(0.007)	(0.987)	(0.014)	(0.008)	
50	0.000579	0.000039	0.000540	0.013679	0.020539	-0.3124	67	0.001096	-0.000033	0.001130	0.017778	0.018711	0.0462	57
	(0.107)	(0.907)	(0.094)	(1.000)	(0.000)	(0.092)		(0.010)	(0.984)	(0.014)	(0.880)	(0.131)	(0.016)	
100	0.000388	0.000292	0.000096	0.014134	0.020220	-1.3991	32	0.000851	0.000184	0.000667	0.018178	0.018280	-0.8190	29
	(0.372)	(0.659)	(0.357)	(1.000)	(0.000)	(0.345)		(0.070)	(0.917)	(0.074)	(0.501)	(0.397)	(0.086)	
150	0.000429	0.000195	0.000234	0.014547	0.020565	-0.8177	18	0.000495	0.000515	-0.000020	0.018147	0.018044	-2.2209	23
	(0.290)	(0.760)	(0.254)	(1.000)	(0.000)	(0.221)		(0.657)	(0.669)	(0.426)	(0.547)	(0.575)	(0.443)	
200	0.000507	0.000061	0.000446	0.014460	0.021064	-0.2588	12	0.000632	0.000478	0.000154	0.017469	0.018192	-2.2505	15
	(0.164)	(0.884)	(0.126)	(1.000)	(0.000)	(0.114)		(0.333)	(0.686)	(0.308)	(0.996)	(0.484)	(0.508)	

Table A.7 Continued

	Hong Kong Lag 1							**India Lag 1**							
25	0.000619	-0.000032	0.000652	0.013646	0.020600	-0.1216	125	0.001045	0.000063	0.000981	0.017768	0.018677	-0.5614	123
	(0.108)	(0.929)	(0.087)	(1.000)	(0.000)	(0.076)		(0.020)	(0.965)	(0.024)	(0.866)	(0.127)	(0.036)	
50	0.000464	0.000199	0.000265	0.013803	0.020427	-1.0589	67	0.000954	0.000144	0.000809	0.017836	0.018645	-0.8059	57
	(0.271)	(0.751)	(0.255)	(1.000)	(0.000)	(0.231)		(0.033)	(0.943)	(0.044)	(0.842)	(0.157)	(0.066)	
100	0.000472	0.000168	0.000304	0.014308	0.020049	-0.8468	32	0.000798	0.000260	0.000538	0.018294	0.018096	-1.1358	29
	(0.235)	(0.801)	(0.215)	(1.000)	(0.000)	(0.200)		(0.128)	(0.841)	(0.147)	(0.354)	(0.528)	(0.171)	
150	0.000418	0.000224	0.000194	0.014701	0.020370	-0.9003	18	0.000433	0.000589	-0.000156	0.018196	0.017952	-2.5742	23
	(0.325)	(0.734)	(0.286)	(1.000)	(0.000)	(0.235)		(0.769)	(0.545)	(0.577)	(0.469)	(0.629)	(0.614)	
200	0.000466	0.000139	0.000327	0.014587	0.020895	-0.5352	12	0.000576	0.000559	0.000017	0.017486	0.018165	-2.6167	15
	(0.209)	(0.832)	(0.192)	(1.000)	(0.000)	(0.150)		(0.479)	(0.589)	(0.429)	(0.987)	(0.462)	(0.656)	
	Indonesia Lag 0							**Malaysia Lag 0**						
25	0.001547	-0.001043	0.002590	0.013641	0.017519	4.8739	109	0.000766	-0.000570	0.001336	0.010908	0.016900	2.5812	114
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
50	0.001029	-0.000497	0.001525	0.013557	0.017596	2.2860	61	0.000693	-0.000414	0.001108	0.010200	0.017212	2.0022	62
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.000)	(0.999)	(0.000)	(1.000)	(0.000)	(0.000)	
100	0.000796	-0.000282	0.001078	0.013344	0.018002	1.2236	29	0.000455	-0.000276	0.000731	0.010241	0.018654	1.0468	31
	(0.008)	(0.998)	(0.003)	(1.000)	(0.000)	(0.002)		(0.039)	(0.990)	(0.018)	(1.000)	(0.000)	(0.018)	
150	0.000747	-0.000273	0.001019	0.013252	0.018722	1.0651	17	0.000465	-0.000322	0.000787	0.010102	0.019392	1.1806	13
	(0.014)	(0.999)	(0.003)	(1.000)	(0.000)	(0.001)		(0.045)	(0.994)	(0.015)	(1.000)	(0.000)	(0.017)	
200	0.000561	0.000169	0.000392	0.013300	0.018754	-0.7243	15	0.000351	-0.000037	0.000388	0.009974	0.019058	0.1162	13
	(0.143)	(0.866)	(0.135)	(1.000)	(0.000)	(0.154)		(0.135)	(0.861)	(0.132)	(1.000)	(0.000)	(0.144)	
	Indonesia Lag 1							**Malaysia Lag 1**						
25	0.001404	-0.000863	0.002266	0.013675	0.017513	3.9934	109	0.000782	-0.000587	0.001369	0.010273	0.017398	2.6707	114
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
50	0.000894	-0.000322	0.001216	0.013863	0.017303	1.4366	61	0.000586	-0.000291	0.000876	0.010277	0.017169	1.3649	62
	(0.005)	(1.000)	(0.002)	(1.000)	(0.000)	(0.000)		(0.012)	(0.989)	(0.013)	(1.000)	(0.000)	(0.011)	
100	0.000738	-0.000199	0.000937	0.013413	0.017937	0.8460	29	0.000428	-0.000231	0.000659	0.010250	0.018648	0.8621	31
	(0.030)	(0.992)	(0.016)	(1.000)	(0.000)	(0.008)		(0.062)	(0.981)	(0.034)	(1.000)	(0.000)	(0.030)	
150	0.000714	-0.000216	0.000930	0.013270	0.018706	0.8418	17	0.000449	-0.000296	0.000745	0.010122	0.019372	1.0484	13
	(0.038)	(0.990)	(0.015)	(1.000)	(0.000)	(0.009)		(0.054)	(0.993)	(0.019)	(1.000)	(0.000)	(0.023)	
200	0.000567	0.000183	0.000384	0.013442	0.018543	-0.6961	15	0.000344	-0.000012	0.000355	0.009978	0.019047	0.0420	13
	(0.146)	(0.831)	(0.159)	(1.000)	(0.000)	(0.171)		(0.153)	(0.845)	(0.152)	(1.000)	(0.000)	(0.149)	

Note: $\bar{r}_i, i = B, S$ is the mean return per trading period classified as Buy/ Sell. $\sigma_i, i = B, S$ is the standard deviation of the Buy/ Sell returns. AER is the adjusted excess return, i.e. the return in excess of the buy-and-hold strategy after transaction costs. Sig denotes the number of trading signals.

Table A.8 Test results for TRB rules for Korea, Pakistan, Sri Lanka and Taiwan

Rule	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig
	Korea Lag 0							**Pakistan Lag 0**						
25	0.000672	-0.000352	0.001024	0.016817	0.021786	1.6413	121	0.001663	-0.000704	0.002367	0.014396	0.017476	3.0872	109
	(0.025)	(0.975)	(0.028)	(1.000)	(0.000)	(0.025)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
50	0.000606	-0.000310	0.000915	0.016575	0.022291	1.4287	61	0.001175	-0.000158	0.001333	0.014863	0.017235	0.5717	63
	(0.031)	(0.966)	(0.033)	(1.000)	(0.000)	(0.033)		(0.001)	(0.999)	(0.001)	(1.000)	(0.000)	(0.001)	
100	0.000662	-0.000326	0.000988	0.016026	0.022594	1.5985	26	0.001115	-0.000201	0.001316	0.015100	0.017287	0.7422	23
	(0.009)	(0.980)	(0.014)	(1.000)	(0.000)	(0.022)		(0.004)	(0.993)	(0.004)	(1.000)	(0.000)	(0.005)	
150	0.000335	0.000130	0.000205	0.016580	0.022240	-0.6980	21	0.001019	-0.000300	0.001318	0.015040	0.018173	0.8766	15
	(0.201)	(0.618)	(0.313)	(1.000)	(0.000)	(0.387)		(0.003)	(0.998)	(0.002)	(1.000)	(0.000)	(0.002)	
200	0.000473	-0.000043	0.000517	0.016153	0.022215	0.2194	12	0.001021	-0.000340	0.001361	0.014857	0.018829	0.9743	11
	(0.078)	(0.830)	(0.112)	(1.000)	(0.000)	(0.163)		(0.005)	(0.997)	(0.002)	(1.000)	(0.000)	(0.002)	
	Korea Lag 1							**Pakistan Lag 1**						
25	0.000498	-0.000163	0.000661	0.016874	0.021747	0.6264	121	0.001601	-0.000628	0.002230	0.014413	0.017471	2.7318	109
	(0.108)	(0.885)	(0.108)	(1.000)	(0.000)	(0.113)		(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)	
50	0.000527	-0.000214	0.000742	0.016542	0.022326	0.9605	61	0.001074	-0.000014	0.001088	0.014946	0.017147	-0.0620	63
	(0.060)	(0.933)	(0.063)	(1.000)	(0.000)	(0.071)		(0.007)	(0.988)	(0.008)	(1.000)	(0.001)	(0.011)	
100	0.000636	-0.000299	0.000935	0.016128	0.022515	1.4597	26	0.001111	-0.000192	0.001303	0.015113	0.017271	0.7106	23
	(0.018)	(0.963)	(0.028)	(1.000)	(0.000)	(0.034)		(0.002)	(0.999)	(0.001)	(0.999)	(0.000)	(0.001)	
150	0.000344	0.000113	0.000231	0.016640	0.022189	-0.6260	21	0.001010	-0.000280	0.001290	0.015064	0.018129	0.8175	15
	(0.195)	(0.644)	(0.288)	(1.000)	(0.000)	(0.368)		(0.002)	(0.998)	(0.002)	(1.000)	(0.000)	(0.003)	
200	0.000462	-0.000026	0.000488	0.016157	0.022214	0.1265	12	0.000988	-0.000259	0.001247	0.014872	0.018808	0.7351	11
	(0.088)	(0.794)	(0.137)	(1.000)	(0.000)	(0.202)		(0.002)	(0.996)	(0.001)	(1.000)	(0.000)	(0.001)	
	Sri Lanka Lag 0							**Taiwan Lag 0**						
25	0.001830	-0.000837	0.002667	0.012179	0.011241	3.8738	101	0.000592	-0.000729	0.001321	0.015817	0.020024	3.9069	123
	(0.000)	(1.000)	(0.000)	(0.142)	(0.850)	(0.000)		(0.006)	(0.994)	(0.006)	(1.000)	(0.000)	(0.005)	
50	0.001574	-0.000719	0.002293	0.012557	0.010684	3.1657	49	0.000552	-0.000685	0.001237	0.015996	0.019883	3.7122	63
	(0.000)	(1.000)	(0.000)	(0.006)	(0.984)	(0.000)		(0.009)	(0.998)	(0.002)	(1.000)	(0.000)	(0.002)	
100	0.001103	-0.000130	0.001232	0.012505	0.010264	0.5483	31	0.000108	-0.000128	0.000236	0.015017	0.020599	0.5267	37
	(0.000)	(0.998)	(0.001)	(0.000)	(0.999)	(0.001)		(0.239)	(0.688)	(0.277)	(1.000)	(0.000)	(0.346)	
150	0.001035	-0.000198	0.001233	0.012663	0.009623	0.8660	17	0.000124	0.000103	0.000022	0.014545	0.020044	-0.5459	22
	(0.000)	(1.000)	(0.000)	(0.000)	(1.000)	(0.000)		(0.226)	(0.302)	(0.451)	(1.000)	(0.000)	(0.674)	
200	0.000958	-0.000204	0.001162	0.012483	0.009521	0.8085	12	-0.000039	0.000468	-0.000508	0.014692	0.019853	-1.9629	18
	(0.001)	(1.000)	(0.000)	(0.001)	(1.000)	(0.000)		(0.443)	(0.035)	(0.817)	(1.000)	(0.000)	(0.920)	

Table A.8 Continued

	Sri Lanka Lag 1							Taiwan Lag 1						
25	0.001649	-0.000620	0.002269	0.012282	0.011155	2.8204	101	0.000576	-0.000708	0.001284	0.015861	0.019992	3.8118	123
	(0.000)	(1.000)	(0.000)	(0.063)	(0.889)	(0.000)		(0.003)	(0.999)	(0.001)	(1.000)	(0.000)	(0.000)	
50	0.001481	-0.000592	0.002073	0.012551	0.010723	2.5900	49	0.000591	-0.000715	0.001306	0.016060	0.019826	3.8862	63
	(0.000)	(1.000)	(0.000)	(0.003)	(0.981)	(0.000)		(0.005)	(0.998)	(0.003)	(1.000)	(0.000)	(0.003)	
100	0.001038	-0.000063	0.001101	0.012521	0.010248	0.2386	31	0.000049	-0.000044	0.000093	0.015099	0.020514	0.1891	37
	(0.000)	(0.998)	(0.000)	(0.002)	(0.999)	(0.001)		(0.299)	(0.561)	(0.359)	(1.000)	(0.000)	(0.437)	
150	0.000997	-0.000160	0.001157	0.012648	0.009644	0.6824	17	0.000116	0.000132	-0.000015	0.014584	0.019991	-0.6769	22
	(0.000)	(0.999)	(0.000)	(0.000)	(1.000)	(0.000)		(0.223)	(0.282)	(0.464)	(1.000)	(0.000)	(0.698)	
200	0.000918	-0.000136	0.001053	0.012505	0.009484	0.5262	12	-0.000070	0.000516	-0.000586	0.014720	0.019824	-2.1643	18
	(0.004)	(0.996)	(0.002)	(0.000)	(1.000)	(0.002)		(0.477)	(0.018)	(0.843)	(1.000)	(0.000)	(0.945)	

Note: $\bar{r}_i, i = B, S$ is the mean return per trading period classified as Buy/ Sell. $\sigma_i, i = B, S$ is the standard deviation of the Buy/ Sell returns. AER is the adjusted excess return, i.e. the return in excess of the buy-and-hold strategy after transaction costs. Sig denotes the number of trading signals.

Table A.9 Test results for TRB rules for Thailand and Japan

Rule	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig	$\bar{r}_B$	$\bar{r}_S$	$\bar{r}_B$-$\bar{r}_S$	σ_B	σ_S	AER	Sig
	Thailand Lag 0							Japan Lag 0						
25	0.001050	-0.000993	0.002043	0.015189	0.019006	5.0021	113	0.000057	-0.000487	0.000543	0.010965	0.015568	2.6750	130
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.061)	(0.934)	(0.066)	(1.000)	(0.000)	(0.063)	
50	0.000624	-0.000486	0.001110	0.015436	0.018767	2.4691	59	0.000149	-0.000512	0.000661	0.010796	0.015575	3.0251	56
	(0.004)	(0.992)	(0.004)	(1.000)	(0.000)	(0.007)		(0.017)	(0.966)	(0.023)	(1.000)	(0.000)	(0.031)	
100	0.000151	-0.000082	0.000233	0.015573	0.019100	0.2957	39	-0.000028	-0.000379	0.000351	0.011109	0.015330	2.1937	32
	(0.299)	(0.775)	(0.252)	(1.000)	(0.000)	(0.235)		(0.129)	(0.849)	(0.141)	(1.000)	(0.000)	(0.187)	
150	0.000104	0.000022	0.000081	0.015028	0.019353	-0.0961	23	-0.000116	-0.000238	0.000122	0.011203	0.014929	1.5519	22
	(0.362)	(0.644)	(0.357)	(1.000)	(0.000)	(0.337)		(0.245)	(0.517)	(0.335)	(1.000)	(0.000)	(0.464)	
200	0.000352	-0.000153	0.000505	0.014428	0.019351	0.6954	13	0.000203	-0.000442	0.000645	0.011050	0.014910	2.7338	10
	(0.078)	(0.855)	(0.109)	(1.000)	(0.000)	(0.157)		(0.021)	(0.927)	(0.032)	(1.000)	(0.000)	(0.094)	
	Thailand Lag 1							Japan Lag 1						
25	0.000895	-0.000809	0.001703	0.015518	0.018718	4.0511	113	0.000018	-0.000453	0.000471	0.011225	0.015413	2.4725	130
	(0.000)	(1.000)	(0.000)	(1.000)	(0.000)	(0.000)		(0.088)	(0.898)	(0.098)	(1.000)	(0.000)	(0.102)	
50	0.000499	-0.000347	0.000846	0.015543	0.018679	1.7265	59	0.000083	-0.000445	0.000528	0.011032	0.015428	2.6512	56
	(0.030)	(0.955)	(0.033)	(1.000)	(0.000)	(0.046)		(0.051)	(0.905)	(0.064)	(1.000)	(0.000)	(0.082)	
100	0.000112	-0.000036	0.000148	0.015789	0.018864	0.0792	39	-0.000050	-0.000358	0.000308	0.011208	0.015272	2.0842	32
	(0.373)	(0.710)	(0.331)	(1.000)	(0.000)	(0.304)		(0.137)	(0.812)	(0.148)	(1.000)	(0.000)	(0.229)	
150	0.000109	0.000008	0.000100	0.015060	0.019320	-0.1050	23	-0.000093	-0.000252	0.000159	0.011329	0.014869	1.6303	22
	(0.379)	(0.630)	(0.373)	(1.000)	(0.000)	(0.374)		(0.194)	(0.592)	(0.251)	(1.000)	(0.000)	(0.392)	
200	0.000364	-0.000188	0.000553	0.014451	0.019308	0.8207	13	0.000200	-0.000441	0.000641	0.011060	0.014907	2.7467	10
	(0.075)	(0.883)	(0.087)	(1.000)	(0.000)	(0.141)		(0.017)	(0.925)	(0.030)	(1.000)	(0.000)	(0.095)	

Note: $\bar{r}_i, i = B, S$ is the mean return per trading period classified as Buy/ Sell. $\sigma_i, i = B, S$ is the standard deviation of the Buy/ Sell returns. AER is the adjusted excess return, i.e. the return in excess of the buy-and-hold strategy after transaction costs. Sig denotes the number of trading signals.