Profitability of Applying Simple Moving Average Trading Rules for the Vietnamese Stock Market

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*A*bstract: This paper considers whether the moving average rules can forecast stock price movements and outperform a simple buy-and-hold strategy over the period from July 2000 to March 2011 on Vietnamese data. We concluded that the technical trading rules examined have strongly predictive ability in term of Vietnamese data. The rules have greater forecasting power for Vietnamese than those for some other Asian markets. Using all the VMA rules and averaging the results yields annualized profit of 39.05% before trading cost, compared to 37.29% in Thailand and 29.2% in some other emerging Asian markets. The profitability of short-term technical trading rules is better than that of longer-term ones. We realize that the (1,10,0) rule, (1,20,0) rule, and (1,50,0) rule are determined to be very effective in Vietnamese stock market because they allow investors to make a large excess returns before trading cost. Specially, unlike almost prior studies for other emerging markets, we prove that the technical trading rules are profitable, even after adjusting for trading costs. However, they are not effective to create access returns for investors in the Vietnamese market after reducing trading costs.

JEL Classifications: G14, G15, G17

Keywords: Variable Moving Averages; Technical trading rules; Excess Returns; Transaction costs; Trading Range Breakout

1. Introduction

Since the mid-1980s, through "Doi Moi" reform period, Vietnam economy has quickly integrated into the global economy. Over that period, Vietnam has experienced rapid growth rate and has become a leading agriculture exporter and served as an attractive destination for foreign investment in Southeast Asia.

According to a forecast by O'Neill, Wilson, Purushothaman, and Stupnytska (2005, pp.8-9), the Vietnamese economy will become the 16th largest economy and the 14th nominal GDP per capita in the world by the year 2050. Similarly, a forecast of PricewaterhouseCoopers (2008) believed that Vietnam may be the fastest growing of emerging economies by the year 2050, with a potential average annual growth rate of about 8.8%[(1)] in the real dollar terms, which would increase the size of economy to 70%[(2)] of the U.K economy by PPPs.

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[1] PricewaterhouseCoopers, The World In 2050, P.20, Table 5.

[2] PricewaterhouseCoopers, The World 2050, P.9, Table 1, Calculated.

With the impressive growth rate of the economy, the Vietnamese equity market established in 2000 when the Ho Chi Minh Stock Exchange (HOSE) began with 2 listings[3]. Since then, it has surged to 650 listings and a market capitalization in excess of $30 billion in 2012[4], a tremendous growth is easily observed. Table 1 describes some main economic indicators of the Vietnamese economy from 2004 to 2011.

Table 1. Vietnamese market indicators

Years	2004	2005	2006	2007	2008	2009	2010	2011
GDP Growth (%)	7.79	8.44	8.23	8.46	6.31	5.32	6.78	5.89
Listed Company	26	33	102	121	171	196	275	301
Capt Of Listed (% GDP)	0.55	0.87	14.93	27.52	10.53	21.81	19.15	14.78
Net Inflows of Portfolio Equity (Current USD)		115,000,000	1,313,000,000	6,243,000,000	-578,000,000	128,000,000	2,383,000,000	N/A

Data source: Collected from website of World Bank

According to the table 1, the growth of the economic indicators of Vietnam economy has been tremendous. Along with a very high growth rate of the economy which has been around 7% during the period, the number and the capitalization of listed companies rocketed from 26 to 301 companies and from 0.55% to 14.78% of GDP during the period, respectively. Similarly, the net inflows of portfolio equity have been impressive and especially, it reached the record of more than $6 billion in 2007.

Although the economy growth was slightly fluctuated, its performance kept an average growth rate of 7% within the period and especially it reached 8.46% in 2007, which is a second high in the area after China's.[5]

The numbers of listed companies quickly increased annually and reached at 301 companies in 2011. However, their capitalization over GDP did not increase correspondingly. This was because the Vietnamese index had been bearish in the end half of the period. Indeed, the capitalization rapidly jumped up from 0.55% of GDP in 2004 to the highest at 27.52% in 2007, suddenly then dropped to 10.53% in 2008 however, it had rapidly soared to 21.81% in 2009. From 2009, the capitalization of listed companies slowly fell to 19.15% in 2010 and 14.78% in 2011.

The net inflows of portfolio equity had impressively climbed from USD 115 million in 2004 to the greatest amount of over USD 6.2 billion in 2007. However, the figure was negative USD 578 million in 2008. The negative implies that the capital flowed out of the country in the year. Fortunately, the inflows had turned to soar to $128 million in 2010 and over USD 2.3 billion in 2011.

Despite the recent substantial growth of the Vietnamese stock market, its institutional structure has led some to questions whether it is as informatively efficient as its U.S, European or Asian

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[3] Two listings are GMD and REE.

[4] Available at http://www.vietnamam.com/vietnam/vietnam-overview

[5] China growth rate was 14.2% in 2007, figured by World Bank.

counterparts. Vietnamese market has been dominated by some companies with ownership concentrated in the hands of a small number of investors, and the presence of insider trading is relatively high. Also, requirements for financial disclosures are less stringent, leading to a scarcity of publicly available information. Furthermore, Vietnamese market is characterized by relatively low volume and thin trading. On these specific aspects of the market, it therefore, motivates us to find out the profitability of Vietnamese market with the application of technical trading rules. Many researches on predictability of technical trading rules on emerging markets have been conducted for decades; however, so far, there have not been any similar researches on Vietnam market to be done. The present paper is the first academic work in this field on Vietnamese market data. Therefore, one arisen question is that whether these technical trading rules are replicated on Vietnam data.

In this paper, we assess whether fluctuations in Vietnamese stock market index from July, 2000 to March, 2012 can be predicted by some forms of technical analysis. We employ the methodology applied by Brock, Lakonishok, and LeBaron (1992) and Beck and Goldreyer (2002). Overall, our findings are consistent with prior studies on emerging markets. It is interesting to state that the using of technical trading rules is highly profitable in Vietnamese stock market.

The remainder of this paper is set out as following. Section two describes the literature in this area while section three outlines the technical trading rules. Section 4 includes data and methodology. The analysis results are presented in section 5. Finally, conclusions are described in section 6.

2. Literature Review

Early studies on developed stock markets indicated support for random walk hypothesis (Roberts, 1959) and (Brealey, 1969). Similarly, researches were made that investigated the weak form of the efficient market hypothesis which was based on the tests of whether different trading rules could earn profits. The evidence from these studies generally indicated that strategies based on exploiting apparent trends in historic share prices did not yield returns that were superior to a buy and hold strategy even before transaction cost were taken into account.

However, later articles published provided novel evidence on the predictive ability of technical trading rules in the developed market with long series of price histories, see Hudson, Dempsey, and Keasey (1996) and Brock *et al.* (1992) and among others. Both studies employed two of the simplest and most popular classes of technical trading rules: Moving Average and Trading Rang Breakout rules. The general conclusion that emerged from the two studies was that these technical trading rules have predictive ability if sufficiently long data are considered. Buy signals offer positive returns whereas sell signals offer negative returns; the sell signals emanating from technical trading rules seem to have greater predictive ability than their buy signal counterparts. Brock *et al.* did not closely examine whether their trading rules could be used to earn excess returns in a costly trading environment. But this practical aspect of trading was included on study of Hudson *et al.* on U.K data. When transaction costs were integrated to the analysis, the authors found that the technical rules are unlikely to make returns over and above a naïve buy and hold strategy. Fama and Blume (1966) and Jensen and Benington (1970) showed that once trading costs are considered, technical trading rules do not provide abnormal profits in U.S. equity market, other studies on U.S. market contended that potential profits depend on the level of transaction costs, see Sweeney (1988) and Brock *et al.* (1992) among others.

Furthermore, recent literatures have concluded that technical trading rules have also predictive ability on emerging markets. Bessembinder and Chan (1995) found the technical trading rules to be quite successful in the emerging markets of Malaysia, Thailand, and Taiwan using methodology similar to Brock *et al.* (1992). However, the rules have less explanation power in more developed markets such as Hong Kong and Japan. Similarly, Gunasekarage and Power (2001) indicated that

technical trading rules have predictable ability in the South Asian markets (The Bombay Stock Exchange, The Colombo Stock Exchange, The Dhaka Stock Exchange and the Karachi Stock Exchange) and rejected the null hypothesis that the returns to be earned from studying moving average values are equal to those achieved from a naïve buy and hold strategy. The employ of these techniques generates excess returns to investors in the South Asian markets. Furthermore, Lai and Lau (2006) examined the technical trading rules of Variable Moving Average (VMAs) and Trading Range Breakout (TRBs) on nine popular daily Asian market indices. The test results provided strong support for Variable Moving Averages (VMAs) in Hong Kong, Korean and Indonesia markets. The length of 20 days and 60 days appeared to be the most profitable for VMAs rules. In addition, Beck and Goldreyer (2002) made a comparison of profits from a naïve buy and hold strategy with those from using VMAs rules in Thailand stock market. The authors used spreadsheet to model VMAs rules and showed that technical trading rules yielded better profits even after taking into account transaction costs. Especially, the most recent paper published by Yu, Nartea, Gan, and Yao (2013) gives evidences that the technical trading rules have stronger predictive power in Malaysia, Thailand, Indonesia, and The Philippines than in the more developed stock market in Singapore. The short-term variants of technical trading rules have better predictive ability than long-term variants. However, the rules are not profitable after subtracting transaction costs.

The present paper tests VMA models on Vietnamese stock market. In contrast to Brock *et al.* and some other authors, we do not test Trading Range Breakout [6] in our study. Ratner and Leal (1999) reports no major differences in his conclusion about the efficacy of a trading model in the presence or absence of a trading band. If the technical trading profits are uncovered in developed and other emerging markets they may be more likely to be present in Vietnamese market.

3. Data and Methodology

Our data set is daily local closing prices of the Ho Chi Minh stock exchange index (HOSE) which is represented as the Vietnamese national security index. The data sample is the longest daily series available in Vietnam, from August 2000 to March 2012. The data were available to download from www.vietstock.vn[7]

3.1 Data Statistics

Table 2 contains summary statistics for daily returns for the full period of Vietnamese stock data. The returns are computed as log differences of the level of the index. The market indices display negative skewness while the returns are leptokurtic for the entire series.

Table 2. Descriptive statistics for daily returns

Statistics	Full sample
Mean	0.00069
Standard Deviation	0.01741
Skewness	-0.0655
Kurtosis	2.12189

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[6] The effect of Trading Range Breakout is to reduce the number of trades and thus be more cost effective.

[7] www.vietstock.vn is one of the most popular financial service suppliers in Vietnam.

3.2 Technical Trading Rules[8]

Technical analysis is based on the idea that the prices move in trends that are determined by the changing attitudes of investors toward a variety of economic, monetary, political and psychological forces. The goal is to identify a trend reversal at a relatively early stage and ride it until the evidence shows that the trend has reversed. Technical analysis can be broken down in to three general areas: Sentiment, flow-of-funds, and market structure indicators (Beck & Goldreyer, 2002). Sentiment indicators monitor the actions and beliefs of different market participants. Flow-of-funds indicators analyze the financial position of various investor groups in an attempt to measure their potential capacity for buying or selling stocks. The type of technical trading that we will be modeling in this paper, moving averages, falls into the third category – market structure indicators. This area monitors the trend of various price indexes, market breadth, cycles, volume, etc., to evaluate the health of the prevailing trend. There are three general types of MAs: Simple, weighted, and exponential. The simple MA is by far the more widely used model. The latter two apply more weight to more recent data. We discuss a version of simple MA, the variable moving average (VMA), in this paper. A VMA consists of comparison of two simple moving averages, a longer and a shorter. Signals are generated by the short-term Moving Average crossing above or below the longer-term Moving Average. Note that changes in price trend are identified by the short-term MA crossing its long-term MA, not by a reversal in the direction of the MA.

3.3 Methodology

The methodology used in this paper is similar to those in Beck and Goldreyer (2002). However, not as theirs, we use six VMA models for the Ho Chi Minh Stock Exchange Index returns instead of five as in Thailand market. In addition, we further test two shorter length rules of (1,10,0) and (1,20,0) which were not done in Kristine Beck and Elizabeth Goldreyer's study for Thailand market. We add these two rules with Vietnamese market because of main reasons as followings: Firstly, compared to Thailand and some other emerging markets, Vietnam market is a younger and smaller one, where the market is heavily dominated by novice and individuals so, strongly affected by emotional rather than rational decisions. Secondly, as natural aspect of young markets, the decision makings of traders in Vietnam are mainly based on a very short run. The investors usually jump in and out market emotionally. Thus, the VMA rules are as follows: (1,10,0); (1,20,0); (1,50,0); (1,200,0); (2,200,0); (5,200,0), where the 1,2, and 5 represent the number of days in the short moving average, and the 10, 20, 50, and 200 represent the number of days in the long moving average. The third number represents a trading band of zero. The effect of trading bands is to reduce the number of trades and thus be more effective. However, Ratner and Leal (1999) reports no major differences in his conclusion about the efficacy of a trading model in the presence or absence of a trading band. Lai and Lau (2006) concluded that application of Trading Range Breakout (TRB) in Asian stock market did not produce attractive returns.

A buy position is a long position, and a **buy signal** is indicated when the short moving average exceeds the long moving average:

$$\frac{\sum_{s=1}^{S} C_{i,t}}{S} > \frac{\sum_{l=1}^{L} C_{i,t-1}}{L} = Buy \tag{1}$$

Where

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[8] Technical trading rules by Beck and Goldreyer (2002)

$C_{i,t}$ is the daily close prices of the index used to compute the short average over period S (1,2 or 5 days)

$C_{i,t-1}$ is the closing prices of the index used to compute the long average over period L (10, 20, 50, or 200 days).

S represents the short periods of 1, 2, or 5 days.

L represents the long periods of 10, 20, 50, or 200.

Returns are not adjusted by inflation. The test is repeatedly daily with the moving averages changing throughout the sample. The **buy position** is maintained until a **sell** signal is indicated. With the **sell** signal, the investor is not short, but out of the market.

$$\frac{\sum_{s=1}^{S} C_{i,t}}{S} < \frac{\sum_{l=1}^{L} C_{i,t-1}}{L} = Sell \tag{2}$$

The **sell position** is maintained until a **buy** signal is indicated. A rule is determined to be effective (make excess return) if the average **buy minus sell (buy-sell)** signal is positive and greater than a buy and hold alternative. If trading costs are considered, **buy-sell** must be positive and larger than a buy and hold alternative after including trading costs [**buy-sell (net)**].

4. Analysis Results

Previous studies found that technical trading rules are predictable in almost emerging markets. Overall, this paper indicates that the rules have a very strong forecasting power in Vietnamese equity market. The results are presented in table 3.

4.1 Explanation for the Result Table (Table 3)

In order to ease comparison the profit from using VMA rules with those from naïve buy and hold strategy, the holding period return during the full period and average annual return are enclosed above this table.

The VMA trading rules are listed in column 1. They are in the following order: The number of days in short moving average, the number of days in long moving average, and the level of trading band. For each VMA rule, columns 2, 3 and 4 shows the numbers of buy signals, sell signals and number of trades. The annualized returns from buy and sell signals gained by VMA rules are described in columns 5 and 6. The difference between buy and sell returns are averaged over time and computed in column 7. The VMA rules to be profitable before trading cost when the average buy return should be significantly larger than the average sell return or the column 7 should be positive. The selling signal in this trading rule does not indicate selling the asset short, but require an exit strategy from the market. The returns after including trading costs are calculated in column 8. The VMA rules assigned to be profitable after trading costs when the column 8 is a positive number.

4.2 Results

Firstly, the buy signals are significantly positive whereas the sell signals are remarkably negative, which therefore, provides evidence to reject the hypothesis that the mean return generated by technical trading rules is zero (columns 5 and 6). The VMA rules with shorter lengths appear to be more profitable than the longer ones. Indeed, the VMA rule of (1,10,0) produces the highest returns

among the various rules, on the contrary, the VMA rule of (5,200,0) produces the lowest return. This result is highly consistent with those of previous literatures on other emerging markets. Such as, with Gunasekarage and Power (2001) applied for South Asian Markets. With Bessembinder and Chan (1995) for Malaysia, Thailand and Taiwan. With Gunasekarage and Power (2001) for South Asian capital markets. With Lai and Lau (2006) for China, Thailand, Singapore, Malaysia, Taiwan, HongKong, Korea and Indonesia. And with Yu *et al.* (2013) for Malaysia, Thailand, Indonesia, and The Philippines.

Table 3. Vietnamese stock returns[9]

1	2	3	4	5	6	7	8
Test	**N(Buy)**	**N(Sell)**	**N(Trades)**	**Buy***	**Sell***	**Buy*-Sell***	**Buy*-Sell*(Net)**
(1,10,0)	168	168	168	0.3983	(0.2510)	0.6493	(0.19)
(1,20,0)	90	91	91	0.3794	(0.2315)	0.6109	0.16
(1,50,0)	57	57	57	0.2899	(0.1712)	0.4611	0.18
(1,200,0)	25	25	25	0.1379	(0.0768)	0.2147	0.09
(2,200,0)	22	22	22	0.1345	(0.0734)	0.2079	0.10
(5,200,0)	18	18	18	0.1302	(0.0691)	0.1993	0.11
Average				0.2450	(0.1455)	0.3905	0.0730

Note: Buy and Hold Return over from July 2000 to March 2012 = 438.1%

Annual Buy and Hold Returns = 37.57%

Trading Cost = 0.5%/Trade

In contrast to the findings of Brock *et al.* on U.S market, there are two different aspects in our results. Foremost, while long periods are needed to display predictability in U.S data, our study suggests that short periods may be useful in detecting the predictability of these technical rules on Vietnamese data. Next, we find evidence that the profits generated from buy signals are higher than those from sell signals. Yet, these two aspects are consistent with those from Gunasekarage and Power (2001), applied for South Asian Markets.

Secondly, the annualized mean return on buy signals largely exceeds annualized mean return on sell signals. In this way, the rules are profitable before trading cost over the sample (column 7). Averaged across the 6 rules, the difference in mean for Vietnamese market is 39.05% annually. Likewise, Beck and Goldreyer (2002) found that the difference in annualized mean of averaged across 5 rules for Thailand is 37.29%. According to the findings of Bessembinder and Chan (1995), the difference in means of buy signals over sell signals is 29.2% annually on six markets including Malaysia, Thailand, Taiwan, Hong Kong, Japan and Korea. Consequently, forecasting power of the VMA rules for Vietnamese market is greater than that for other Asian counterparts (exceed 1.76%[10] over Thailand market, and 9.85%[11] over the six markets). Possibly, the presence of very high predictable power of VMA rules in Vietnamese market may be because Vietnam is the least informatively efficiency in the emerging Asian markets.

Thirdly, the application of VMA rules generate excess returns of 1.48% for the all 6 rules and of 19.8% for the three shortest-term rules before taking into account trading costs, on average. To determine if these VMA rules could earn an excess return, a comparison should be made:

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[9] All returns are calculated in Spreadsheet

[10] 1.76=39.05-37.29.

[11] 9.85=39.5-29.2.

annualized buy-hold return versus the returns provided by VMA rules before trading costs. For Vietnamese market, comparison of annualized profit from a naïve buy and hold strategy with that from using all VMA rules shows that the difference of them is just 1.48%[12]. Obviously, an excess return of 1.48% is relatively small if compared to those from some other emerging markets such as 4.7% from Sri Lanka , 9.81% from Bangladesh and 8,6% from Pakistan markets (Gunasekarage & Power, 2001)[13]. However, if merely considering the three shortest technical trading rules of (1,10,0), (1,20,0), and (1,50,0) instead of all six rules, the difference of annualized buy-hold return over that of the three rules reaches 19.8%, an unmistakable gain. Evidently, over the eleven-year period from July, 2000 to March, 2012, this market climbed 438.1%[14] of its value, and so its annual buy and hold return was 37.57%[15]. In the meanwhile, the annual returns generated from the three mentioned rules are 64.93%, 61.09% and 46.11% before costs, respectively (column 7); hence, compared to annualized mean return from a buy and hold strategy for Vietnamese market, the excess returns from the three rules are 19.8%[16], on average, before trading costs. This result is a very dramatic showing of a technical trading rule for Vietnamese data. This perfective performance of the rules is much higher than those of prior explores on other emerging Asian markets.

Fourthly, the finding reveals that the VMA rules have predictability in Vietnamese stock market after subtracting trading costs; however the rules are unlikely to make access returns after reducing them (column 8). Transaction costs keep an important role in determining the efficacy of any trading rules, especially if they are high. Many of these trading rules lead to a large number of trades. In this paper, the transaction costs per trade, provided by Ban Viet Corporation [17] (November, 2012), is 0.5%[18], assumed to be constant. Column 8 provides the annualized estimates of the VMA rules return reduced by the costs of each trade for Vietnam. Averaged across the 6 rules, the difference in mean for Vietnamese market is 7.3% annually. This result reveals that the VMA rules have predictability in Vietnamese stock market after subtracting trading costs; however, when comparing the performance of the rules to those from buy and hold strategy after calculating trading cost, all the rules are unlikely to make access returns. Indeed, among the rules, rule of (1,50,0) appears to be the most profitable with 18% annually which is still less than 37.07 %[19] earned from buy and hold strategy. Thus, the profit created by VMA rules is smaller than that of buy and hold strategy after considering trading cost. In other words, for Vietnamese market, the rules are unlikely to make access returns after considering trading costs.

5. Conclusions

This paper examines whether the technical trading rules have predictability on Vietnamese market from July 2000 to March 2012. In general, the results presented in this paper are similar to those proved by former authors in developed and other emerging markets in many aspects. The buy signals are significantly positive whereas the sell signals are negative and therefore, provide evidence to reject the hypothesis that the mean return generated by technical trading rules is zero.

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[12] 1.48 = 39.05-37.57

[13] The results were produced by FLMA (1,50,0) rule

[14] Vietnamese stock index has increased from 100 to 438.1 during the sample.

[15] 37.57 = 438.1/11.66

[16] 19.8 = (64.93+61.09+46.11)/3 – 37.57

[17] Ban Viet is a security company in Viet Nam

[18] Include 0.15% commission fee and 0.1% tax per position. Thus, total costs for a round trade will be 0.5%.

[19] 37.07=37.57-0.5, where 37.57 is annual mean return generated by buy and hold strategy and 0.5 is cost per trade. All numbers are in percentage.

The mean return on buy signals highly exceeds mean return on sell signals, so the rules have strong predictability in Vietnamese market. We also recognize that the short-term VMA rules are more effective in forecasting stock movement than the long-term ones. The findings are consistent with many prior publishes on emerging Asian markets. Furthermore, our results find an outstanding aspect of using VMA rules in Vietnamese market compared to those in other Asian counterparts. The rate of returns obtained in Vietnamese market from VMA rules is much larger than those made in other Asian ones. Apparently, the difference of returns obtained from buy and sell signals in mean is 39.05% annually on Vietnamese market while that is 37.29% on Thailand market (Beck & Goldreyer, 2002) and only 29.2% on six markets including Malaysia, Thailand, Taiwan, Hong Kong, Japan and Korea (Bessembinder & Chan, 1995). Especially, the VMA rules may generate excess returns of 19.8% annually, on average for the three shortest rules (1,10,0), (1,20,0), and (1,50,0) for investors in Vietnamese market before considering trading costs. This performance is much better than those from 4.7% of Sri Lanka , 9.81% of Bangladesh and 8,6% of Pakistan markets (Gunasekarage & Power, 2001)[20]. Furthermore, with a 0.5% transaction cost per round-trip trade, unlike some prior researches, it reveals that the applying of VMA rules may help traders to produce profit on Vietnamese stock market, even after taking into account trading costs. However, they are unlikely to make excess returns after subtracting trading costs in Vietnamese market.

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