Profitability of simple technical trading rules of Chinese stock exchange indexes

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HIGHLIGHTS

- Profitability of simple technical trading rules is investigated on Chinese stock exchange indexes.
- We focus on moving average and trading range break rules.
- Trading range break rules outperform moving average rules.
- Short-term VMA rules outperform long-term VMA rules.
- Simple trading rules cannot beat the standard buy-and-hold strategy for Chinese stock indexes.

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ABSTRACT

Although technical trading rules have been widely used by practitioners in financial markets, their profitability still remains controversial. We here investigate the profitability of moving average (MA) and trading range break (TRB) rules by using the Shanghai Stock Exchange Composite Index (SHCI) from May 21, 1992 through December 31, 2013 and Shenzhen Stock Exchange Component Index (SZCI) from April 3, 1991 through December 31, 2013. The t-test is adopted to check whether the mean returns which are conditioned on the trading signals are significantly different from unconditioned returns and whether the mean returns conditioned on the buy signals are significantly different from the mean returns conditioned on the sell signals. We find that TRB rules outperform MA rules and short-term variable moving average (VMA) rules outperform long-term VMA rules. By applying White's Reality Check test and accounting for the data snooping effects, we find that the best trading rule outperforms the buy-and-hold strategy when transaction costs are not taken into consideration. Once transaction costs are included, trading profits will be eliminated completely. Our analysis suggests that simple trading rules like MA and TRB cannot beat the standard buy-and-hold strategy for the Chinese stock exchange indexes.

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1. Introduction

Investors investigate market behavior by using technical analysis with the aim to predict future market trends. From the microscopic view, investors may get profits by applying technical analyses to investment decision-making. From the

macroscopic view, the significant profitability of trading rules is often interpreted as evidence against market efficiency. The debates on the usefulness of technical analysis have attracted considerable research interests in recent years. Most of the early studies support the random walk hypothesis, which means that technical analyses are invalid. The traditional statistical tests have been applied to demonstrate the failure of technical analyses [1,2]. On the other hand, most of the studies after 1992 provide strong arguments that technical trading rules can forecast the market trend and earn excess returns. Brock, Lakonishok, and Lebaron employed the t-tests to check whether the returns conditioned on the trading signals generated by the MA and TRB rules were significantly different from unconditioned returns [3] and found that the technical trading rules had significant predictive ability in US market during the period from 1897 to 1986.

By applying the same methods in the study of Ref. [3], many scholars advocate that the technical trading rules are profitable in different markets. In the European and American markets, Hudson, Dempsey and Keasey also found that the MA rules could provide trading profits when they were applied on the Financial Times Industrial Ordinary Index from 1935 to 1994. However, these trading profits would be eliminated by the inclusion of transaction costs [4]. Coe and Laosethakul tested four technical trading rules (the arithmetic moving average, the relative strength index, a stochastic oscillator and its moving average) against 576 stocks which also included S&P 100, the NASDAQ 100 and the S&P Midcap 400 indices and found that none of these technical trading rules could outperform the market [5]. Vasiliou, Eriotis, and Papathanasiou applied MA and MACD strategies to the Athens General Index from the beginning of 1990 till the end of 2004 and found that MA strategies (annual return 36.10%) and MACD strategies (annual return 55.65%) were able to outperform the buy-and-hold strategy (annual return 12%) in Athens Stock Market [6]. Choe et al. found the strong arguments of the usefulness of technical trading rules in G-7 stock markets (Canada, France, Germany, Italy, Japan, United Kingdom and United States) [7].

In the Asian markets, Bessembinder and Chan found that the technical trading rules are successful in predicting stock price movements in emerging markets such as Malaysia, Thailand and Taiwan, and the forecast ability is greatly reduced in relatively developed Hong Kong and Japan markets [8]. Even if the transaction costs and nonsynchronous trading are taken into account, the possibility of trading profits in Malaysia, Thailand and Taiwan cannot be dismissed in their study periods. Yu et al. investigated five south-east markets (Singapore, Malaysia, Thailand, Indonesia and the Philippines) by means of 60 kinds of VMA, FMA and TRB trading rules during the period from 1991 to 2008 and found quite similar results as in Ref. [8]. Trading rules have stronger predictive power in the emerging stock markets of Malaysia, Thailand, Indonesia, and the Philippines than in the more developed stock market of Singapore [9]. Ahmed, Beck, and Goldreyer explored the efficacy of VMA trading rules in three volatile and declining Asian stock markets Taiwan, Thailand, and the Philippines from 1994 to 1999 [10]. Results supported the predictive ability even with the inclusion of transaction costs, which is in contrast to the results from the developed markets like US and Japan. Such conclusions are in consistent with the finding that Taiwan, Thailand, and Mexico markets had strong profitability even with transaction costs in Ref. [11]. Lai and Balachandher focused on the predictability of VMA and FMA rules on Kuala Lumpur Stock Exchange Composite Index which covered the period from 1977 to 1999 in the Malaysian Stock Market and found that VMA and FMA rules could outperform the buy-and-hold strategy even with transaction costs [12]. Lento investigated nine variants of three trading rules (MA, TRB and filter rules) on eight Asian-Pacific equity markets and found that, on average, technical trading rules have predictive ability and exhibit profitability in certain markets, mainly Bombay, Hong Kong, Indonesia, Korea, Singapore, and Taiwan [13]. Mitra found the strong arguments of the usefulness of technical trading rules in Indian stock market [14].

In the Great China markets, Wong, Du and Chong applied the MA family (the Simple MA and its extensions, Exponential MA, Dual MA, Triple MA, MACD and TRIX) to Shanghai, Hong Kong and Taiwan markets and found that MA family achieved better performance than the buy-and-hold strategy regardless of transaction costs [15]. In the Chinese mainland markets, it was found that the technical trading rules could bring excess returns [16–19] and the transaction costs had effects on the overall performance of trading rules [20,21].

There are also studies which compare the profitability of technical trading rules between the developing and developed markets. Ito evaluated the profitability of technical trading rules in Pacific-Basin equity markets from 1980 to 1996 and found that trading rules had the predict ability in Japan, Canada, Indonesia, Mexico, and Taiwan markets, not in US market [22]. Cai, Cai and Keasey applied the same set of trading rules in Ref. [3] to US, UK, Asian and Chinese stock markets and found that trading rules had short term predictive ability and profitability in the Chinese stock markets during the 1990s, this lessened as the decade progressed [23]. In contrast, developed markets had predictive ability during the 1970s and disappeared by the 1990s. When a set of data has been used for many times to inference and model selection, data snooping effects will occur. Hence, some scholars doubt the positive evidence of the profitability of technical trading rules because of the data snooping effect. White put forward White's Reality Check (WRC) method to test whether a financial market trading strategy generates returns superior to the benchmark by considering the effect of data snooping [24]. Sullivan et al. found that the results of Ref. [3] passed WRC tests. Li found that the technical trading rules could not predict the future trend very well for Hushen 300 index [25] by means of WRC tests. Chen, Huang and Lai brought together WRC tests and the superior predictive ability test, along with non-synchronous trading and transaction costs to examine the profitability of technical analysis among eight Asian stock markets from 1975 to 2006 [26]. Results indicated that trading rules could not provide significant economic profits.

In this paper, we will apply technical trading rules to Shanghai and Shenzhen markets and to examine whether any of these technical trading rules would generate higher profits against the buy-and-hold strategy by means of t-test and WRC tests. The rest of the paper is arranged as follows. Section 2 discusses the technical trading rules. The data and methodology of t-test and WRC test are presented in Section 3. Section 4 describes the empirical results and Section 5 is the conclusion.