

Are US Investors Rational? - Evidence from Return Based and SharpeRatio Based Momentum Approach on AAI Portfolios

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Abstract

The American Association of Individual Investors (AAII) is a non-profit organization that provides a series of popular trading strategies for individual investors to follow for their personal stock portfolio management. We examine the momentum effects based on the monthly returns of the AAI trading strategies from 1998 to 2012. Our research results demonstrate that (1) the momentum effects are significantly and economically strong based on both prior two-month return and prior two-month Sharpe ratio; (2) The Sharpe ratio based momentum approach dominates the return based momentum approach on average; (3) There is an incremental gap between the momentum effects of the two different approaches over time, with a sudden spike starting in 2009. Our findings suggest that US individual investors have learned to be more rational by considering the tradeoff of risks and returns in making investment decisions since 2001. Our study presents additional evidence to support behavioral finance theory and sheds light on the area regarding the evolution of investment rationality in U.S. markets.

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1. Introduction

American Association of Individual Investors (AAII), a nonprofit investment education organization provides a number of trading techniques identified by academic research to the public through their website (www.aaii.com). Through these trading techniques, AAII aims to show to its members on how to manage a stock portfolio and capitalize on these methods without having to commit a great deal of time and effort to day-to-day monitoring and analysis.

In this study, we focus on the momentum effect based on performance of different trading strategies provided by AAII. Traditional momentum studies cover the momentum effects on performances of individual stocks. The benefit of focusing on trading strategies instead of focusing on single stocks is because the trading strategies are purely derived from the outcome of a quantitative screening method. For single stocks, the financial fundamentals are specific across different companies and markets, therefore the momentum effects based on the performance of single stocks are likely to contain confounding factors and create noises to pure momentum effects.

We investigate the predictive effects using two different momentum indicators. One is based on the past average portfolio returns, and the other is based on the past Sharpe ratio of the portfolios, a risk adjusted return. We examine the difference of the predictability by the momentum effect under the two types of measurement for momentum indicators. By comparing the difference, we attempt to find out which indicator drives up the momentum effect more dominantly. We associate the dominance of predictability with the level of rationality of investor composition of the U.S markets.

In the following section, we review prior literature relevant to the issues addressed in this research. Later sections describe the hypothesis development, data and methods, analyze the test results. The final section summarizes our findings and conclusions.

2. Literature Review

Momentum investing is a trading strategy that yields positive returns on average by buying and holding the past stock winners and selling or shorting the past stock losers. There is a rich literature in academia and in industry documenting the momentum efficacy across different time periods (Jegadeesh and Titman (1993) and Asness (1994), Jegadeesh and Titman (2001), Israel and Moskowitz (2013)); across different countries (Rouwenhorst (1998, 1999), Asness, Liew, and Stevens (1997)); and across different markets and asset classes (Moskowitz and Grinblatt (1999), Okunev and White (2003), Moskowitz, Ooi, and Pedersen (2012), Asness, Moskowitz, and Pedersen (2013)).

Obviously, the robustness of the momentum efficacy found in these studies challenge the efficient market hypothesis (Fama, 1970) (Researchers have provided evidence of other market anomalies, including the P/E ratio (Basu, 1977; Campbell and Shiller, 1988b; Fama and French, 1988), dividend yield (Fama and French, 1988), book-to-market ratio (Kothari and Shanken, 1997), dividend-price ratio (Campbell and Shiller, 1988a), and equity share (Baker and Wurgler (2000), to name a few). These market anomalies have inspired two popular explanations that provide different perspectives on the subject. One is based on implications of the traditional efficient market hypothesis. The other is based on the emerged behavioral hypothesis that allows for irrational behavior on the part of investors.

Proponents of the efficient market hypothesis assume that investors are rational and any over-reaction or under-reaction of investors tends to offset or cancel out any mispricing. Hence, prices normally reflect true asset value (Fama, 1998). According to Black (1993), some of the anomalous evidence is purely a result of data mining or statistical artifacts. Davis et al. (2000) reason that due to the limits of currently developed theories

and models, some unobserved risks of the assets cannot be fully captured by the Capital Asset Pricing Model and, therefore, the market anomalies are a result of investors' biased perception of true asset value. Fama and French (1993; 1995; 1996) propose multi-factor models that appear to explain the average returns on a full scale.

The behavioral camp, on the other hand, relaxes the assumption of investor rationality. Proponents of behavioral finance suggest that equilibrium prices reflect the weighted average of the beliefs of both rational and irrational traders (Hirschleifer, 2001). Albert Einstein once said "Only two things are infinite, the Universe and Human Stupidity and I'm not sure about the former." The behaviorists believe that investors are subject to various cognitive errors and can make illogical and irrational investment decisions. According to Barber and Odean (1999), people's deviations from rationality are often systematic. Systematic over-reaction to information is common among investors. When the over-reaction is eventually corrected, over-adjusted stock returns converge or reverse. Hogarth and Reder (1986); Einhorn and Hogarth (1986); Kleidon (1986); De Bondt et al. (1987) and Lakonishok et al. (1994) are among the group that support the behavioral hypothesis.

Our study contributes to the literature in the following aspects:

First, the traditional studies of momentum effects are mainly implemented on individual stocks or market indices. This paper develops an innovative approach by examining the momentum effects on different trading strategies. In general, trading stocks or indices involves investors' perception on a large variety of firm specific, industry specific and macro-economic variables, therefore momentum study on stock or indices is subject to significant confounding disturbance and may create spurious results. However, portfolios formed on trading strategy are determined by quantitative models, thus studying the strategy momentum can facilitate with a cleaner data set for our research interest by eliminating the fundamental aspects of the securities as well as investors' sentiments in their investment decisions.

Second, unlike prior research design, we apply two types of momentum trading approach. One is based on average past returns as used in previous studies. The second is based on past Sharpe ratios of the portfolios. By comparing differences in the momentous power between the two measurements, we can capture the source of momentum effects by answering question on whether the momentum is driven by naïve investors who make judgment purely on raw returns or by more sophisticated investors who weigh both the returns and the risks of an investment opportunity in forming their portfolios. The finding of this study provides a different perspective to better understand the nature of the well-documented momentum phenomena and an additional empirical evidence to the growing behavioral finance literature.

Third, prior research (Frederick and Brett, 2008) on the performance of AAI trading strategies covers the year of 1998 through 2005. Our study extends the sample period to the more current year (May 2012). A longer time horizon can capture the impact from the post-financial crisis during 2008 and 2009 and deserves an updated test of the effectiveness of AAI strategies.

The empirical results from this study provides a new investment alternative for individual investors and has practical implications to the investment community, academia researchers and educators.

3. Hypothesis Development

Since the behavioral finance has brought into the main stream of the academic research, one central argument of this line of study focuses on various irrational and cognitive bias that plague the public investors

when they make investment decisions. We argue that investors cannot be, probably will never be rational enough to make perfect judgments as the information available to the public is increasing exponentially and is impossible for one individual to absorb and to process completely on a timely basis unless he/she is a robot. The journey to the full rationality is a dynamic, continuous, and infinite course as the human economic world develops.

Inexperienced investors tend to think linearly. This manner of thinking is common among individual investors and is mainly determined by the limited amount of time on a daily basis and the limited vigor of brain power due to a lack of quantitative training, compared to institutional investors. We study and compare the momentum effects based on two different levels of dimension of considerations by investors respectively. The one dimension consideration is based on the past average return only. Naïve investors tend to focus on the raw returns to chase capital gains only given their linear thinking habit. Unless this type of investors encounter dramatic negative losses by taking excessive risks and suffered from the pain of the losses, they are typically blind to risk factors since risks are invisible and adds an additional dimension of thinking to them. The two-dimension consideration is based on a balance of risk and return, such as a risk adjusted return measured by Sharpe ratio. More educated or more experienced investors understand the huge impact on their wealth by taking excessive type I risk. They normally choose to take a more conservative approach by weighing both risk and return in forming their portfolios.

We study the predictability of the momentum trading between the one dimension approach and the two-dimension approach based on the monthly returns of the AAI portfolios. By comparing the different levels of the predictive power by the two different approaches, we can tackle the issue on whether the public investors of U.S. are composed of more naïve investors or more sophisticated investors.

4. Data and Methods

The AAI was founded in 1978 in Chicago. In its website, it reports the monthly returns on a total of 82 portfolios based on different trading screening methods beginning with January 1998. It also updates the descriptive statistics on the portfolio characteristics including Sharpe Ratio, Standard Deviation, average return, return range, largest monthly gain and loss for each calendar year. Table 1 presents a complete list of the portfolios in AAI report.

Table 1 – List of AAI Portfolio

| # | Portfolio Names |
|----|--|
| 1 | S&P 500 p+B1:W1rice chg |
| 2 | S&P MidCap 400 price chg |
| 3 | S&P SmallCap 600 price chg |
| 4 | NASDAQ 100 price chg |
| 5 | Dow Jones 30 price chg |
| 6 | T-Bills price chg |
| 7 | S&P 500 (TR) |
| 8 | S&P 500 Growth (TR) |
| 9 | S&P 500 Value (TR) |
| 10 | S&P MidCap 400 (TR) |
| 11 | S&P MidCap 400 Growth (TR) |
| 12 | S&P MidCap 400 Value (TR) |
| 13 | S&P SmallCap 600 (TR) |
| 14 | S&P SmallCap 600 Growth (TR) |
| 15 | S&P SmallCap 600 Value (TR) |
| 16 | All Exchange-Listed Stocks price chg |
| 17 | ADR Screen price chg |
| 18 | All ADRs price chg |
| 19 | Buffett: Hagstrom price chg |
| 20 | Buffettology: EPS Growth price chg |
| 21 | Buffettology: Sustainable Growth price chg |
| 22 | O'Neil's CAN SLIM price chg |
| 23 | O'Neil's CAN SLIM Revised 3rd Edition price chg |
| 24 | Cash Rich Firms price chg |
| 25 | Dual Cash Flow price chg |
| 26 | Dividend (High Relative Yield) price chg |
| 27 | Dogs of the Dow price chg |
| 28 | Dogs of the Dow: Low Priced 5 price chg |
| 29 | Dreman price chg |
| 30 | Dreman With Est Revisions price chg |
| 31 | Driehaus price chg |
| 32 | Dividend Screen: DRPs price chg |
| 33 | Dividend Screen: Non-DRPs price chg |
| 34 | Est Rev: Lowest 30 Down price chg |
| 35 | Est Rev: Down 5% price chg |
| 36 | Est Rev: Top 30 Up price chg |
| 37 | Est Rev: Up 5% price chg |
| 38 | Fisher (Philip) price chg |
| 39 | Foolish Small Cap 8 price chg |
| 40 | Foolish Small Cap 8 Revised price chg |
| 41 | Price-to-Free-Cash-Flow price chg |
| 42 | Fundamental Rule of Thumb price chg 25 |
| 43 | Graham--Defensive Investor (Non-Utility) price chg |
| 44 | Graham--Defensive Investor (Utility) price chg |
| 45 | Graham--Enterprising Investor price chg |

Specifically, we obtain the monthly returns of 82 different popular trading strategies provided by the American Association of Individual Investors (AAII) from January 1998 through May 2012. Furthermore, we identify the best performing strategy based on past two-month average returns and past two-month Sharpe ratios respectively at the end of each month starting from January 1998. Then we start with \$1 investment in the identified best strategy for the following month, i.e. March 1998, and rebalance the funds every month until May 2012. Subsequently, we calculate the cumulative return and the terminal value of the \$1 initial investment of the constructed momentum portfolio. We compare the return performance with the S&P 500 index return on a risk-adjusted basis over the sample period. Table 2 reports the terminal values under the two approaches, the return based approach and the Sharpe ratio based approach over time, in comparison with the S&P terminal value. Figure 1 is a graphic expression of Table 2 figures.

Table 2 – Terminal value of \$1 invested at the end of each month over sample period (1998 – 2012)

| Month | Terminal Value on Returns | Terminal Value on Sharpe Ratio | Terminal Value of S&P Index Return |
|------------|---------------------------|--------------------------------|------------------------------------|
| 2/28/1998 | \$1.11 | | |
| 3/31/1998 | \$1.26 | \$1.05 | \$ 1.12 |
| 4/30/1998 | \$1.34 | \$1.07 | \$ 1.13 |
| 5/31/1998 | \$1.19 | \$1.04 | \$ 1.11 |
| 6/30/1998 | \$1.18 | \$1.04 | \$ 1.16 |
| 7/31/1998 | \$1.16 | \$0.94 | \$ 1.14 |
| 8/31/1998 | \$1.03 | \$0.94 | \$ 0.98 |
| 9/30/1998 | \$1.03 | \$0.95 | \$ 1.04 |
| 10/31/1998 | \$1.02 | \$0.95 | \$ 1.12 |
| 11/30/1998 | \$1.03 | \$0.97 | \$ 1.19 |
| 12/31/1998 | \$1.06 | \$0.99 | \$ 1.25 |
| 1/31/1999 | \$1.16 | \$1.08 | \$ 1.31 |
| 2/28/1999 | \$1.22 | \$0.98 | \$ 1.26 |
| 3/31/1999 | \$1.16 | \$0.94 | \$ 1.31 |
| 4/30/1999 | \$1.19 | \$0.96 | \$ 1.36 |
| 5/31/1999 | \$1.46 | \$1.18 | \$ 1.01 |
| 6/30/1999 | \$1.52 | \$1.16 | \$ 1.40 |
| 7/31/1999 | \$1.52 | \$1.16 | \$ 1.36 |
| 8/31/1999 | \$1.67 | \$1.21 | \$ 1.35 |
| 9/30/1999 | \$1.68 | \$1.21 | \$ 1.31 |
| 10/31/1999 | \$1.62 | \$1.17 | \$ 1.39 |
| 11/30/1999 | \$2.64 | \$1.91 | \$ 1.42 |

| | | | |
|------------|--------|--------|----------------|
| 12/31/1999 | \$2.83 | \$2.19 | \$ 1.50 |
| 1/31/2000 | \$2.74 | \$2.12 | \$ 1.42 |
| 2/29/2000 | \$2.95 | \$2.28 | \$ 1.39 |
| 3/31/2000 | \$2.49 | \$1.92 | \$ 1.53 |
| 4/30/2000 | \$2.29 | \$1.77 | \$ 1.48 |
| 5/31/2000 | \$2.22 | \$1.82 | \$ 1.45 |
| 6/30/2000 | \$2.30 | \$1.83 | \$ 1.48 |
| 7/31/2000 | \$1.84 | \$1.72 | \$ 1.46 |
| 8/31/2000 | \$1.83 | \$1.71 | \$ 1.55 |
| 9/30/2000 | \$1.74 | \$1.73 | \$ 1.47 |
| 10/31/2000 | \$1.71 | \$1.70 | \$ 1.46 |
| 11/30/2000 | \$1.66 | \$1.66 | \$ 1.34 |
| 12/31/2000 | \$2.08 | \$2.07 | \$ 1.35 |
| 1/31/2001 | \$1.94 | \$1.93 | \$ 1.39 |
| 2/28/2001 | \$1.52 | \$1.96 | \$ 1.26 |
| 3/31/2001 | \$1.40 | \$1.95 | \$ 1.18 |
| 4/30/2001 | \$1.53 | \$2.13 | \$ 1.27 |
| 5/31/2001 | \$1.60 | \$2.23 | \$ 1.28 |
| 6/30/2001 | \$1.80 | \$2.22 | \$ 1.25 |
| 7/31/2001 | \$1.55 | \$1.92 | \$ 1.24 |
| 8/31/2001 | \$1.40 | \$1.92 | \$ 1.16 |
| 9/30/2001 | \$1.20 | \$1.65 | \$ 1.06 |
| 10/31/2001 | \$1.21 | \$1.65 | \$ 1.08 |
| 11/30/2001 | \$1.46 | \$1.99 | \$ 1.16 |
| 12/31/2001 | \$1.68 | \$2.29 | \$ 1.17 |
| 1/31/2002 | \$1.52 | \$2.18 | \$ 1.15 |
| 2/28/2002 | \$1.53 | \$2.21 | \$ 1.13 |
| 3/31/2002 | \$1.63 | \$2.35 | \$ 1.17 |
| 4/30/2002 | \$1.52 | \$2.58 | \$ 1.10 |
| 5/31/2002 | \$1.55 | \$2.62 | \$ 1.09 |
| 6/30/2002 | \$1.55 | \$2.40 | \$ 1.01 |
| 7/31/2002 | \$1.37 | \$2.03 | \$ 0.93 |
| 8/31/2002 | \$1.37 | \$2.04 | \$ 0.93 |
| 9/30/2002 | \$1.22 | \$1.82 | \$ 0.83 |
| 10/31/2002 | \$1.27 | \$1.82 | \$ 0.90 |
| 11/30/2002 | \$1.43 | \$1.78 | \$ 0.96 |
| 12/31/2002 | \$1.27 | \$1.59 | \$ 0.90 |
| 1/31/2003 | \$1.23 | \$1.54 | \$ 0.87 |
| 2/28/2003 | \$1.12 | \$1.40 | \$ 0.86 |

| | | | |
|------------|--------|--------|----------------|
| 3/31/2003 | \$1.15 | \$1.44 | \$ 0.87 |
| 4/30/2003 | \$1.29 | \$1.61 | \$ 0.94 |
| 5/31/2003 | \$1.05 | \$1.75 | \$ 0.98 |
| 6/30/2003 | \$1.07 | \$1.81 | \$ 0.99 |
| 7/31/2003 | \$1.10 | \$1.87 | \$ 1.01 |
| 8/31/2003 | \$1.19 | \$2.02 | \$ 1.03 |
| 9/30/2003 | \$1.25 | \$2.12 | \$ 1.02 |
| 10/31/2003 | \$1.43 | \$2.44 | \$ 1.07 |
| 11/30/2003 | \$1.43 | \$2.97 | \$ 1.08 |
| 12/31/2003 | \$1.40 | \$2.91 | \$ 1.13 |
| 1/31/2004 | \$1.54 | \$3.20 | \$ 1.15 |
| 2/29/2004 | \$1.50 | \$3.23 | \$ 1.17 |
| 3/31/2004 | \$1.57 | \$3.37 | \$ 1.15 |
| 4/30/2004 | \$1.32 | \$3.44 | \$ 1.13 |
| 5/31/2004 | \$1.17 | \$3.32 | \$ 1.14 |
| 6/30/2004 | \$1.24 | \$3.51 | \$ 1.16 |
| 7/31/2004 | \$1.21 | \$3.42 | \$ 1.12 |
| 8/31/2004 | \$1.11 | \$3.13 | \$ 1.13 |
| 9/30/2004 | \$1.17 | \$3.46 | \$ 1.14 |
| 10/31/2004 | \$1.30 | \$3.55 | \$ 1.15 |
| 11/30/2004 | \$1.32 | \$4.10 | \$ 1.20 |
| 12/31/2004 | \$1.10 | \$4.64 | \$ 1.24 |
| 1/31/2005 | \$1.12 | \$4.97 | \$ 1.21 |
| 2/28/2005 | \$1.12 | \$5.18 | \$ 1.23 |
| 3/31/2005 | \$1.06 | \$4.87 | \$ 1.20 |
| 4/30/2005 | \$1.03 | \$4.73 | \$ 1.18 |
| 5/31/2005 | \$1.06 | \$4.87 | \$ 1.22 |
| 6/30/2005 | \$1.04 | \$4.76 | \$ 1.22 |
| 7/31/2005 | \$1.21 | \$5.52 | \$ 1.26 |
| 8/31/2005 | \$1.20 | \$5.58 | \$ 1.25 |
| 9/30/2005 | \$1.20 | \$5.58 | \$ 1.25 |
| 10/31/2005 | \$1.22 | \$5.69 | \$ 1.23 |
| 11/30/2005 | \$1.66 | \$7.74 | \$ 1.27 |
| 12/30/2005 | \$1.64 | \$7.63 | \$ 1.27 |
| 1/31/2006 | \$2.49 | \$8.71 | \$ 1.31 |
| 2/28/2006 | \$2.27 | \$7.95 | \$ 1.31 |
| 3/31/2006 | \$2.34 | \$8.19 | \$ 1.32 |
| 4/30/2006 | \$2.50 | \$7.92 | \$ 1.34 |
| 5/31/2006 | \$2.14 | \$8.11 | \$ 1.30 |

| | | | |
|------------|--------|---------|----------------|
| 6/30/2006 | \$2.07 | \$7.92 | \$ 1.30 |
| 7/31/2006 | \$2.18 | \$8.34 | \$ 1.30 |
| 8/31/2006 | \$2.22 | \$8.43 | \$ 1.33 |
| 9/30/2006 | \$2.29 | \$8.08 | \$ 1.36 |
| 10/31/2006 | \$2.42 | \$8.51 | \$ 1.41 |
| 11/30/2006 | \$2.53 | \$8.80 | \$ 1.43 |
| 12/31/2006 | \$2.39 | \$9.23 | \$ 1.45 |
| 1/31/2007 | \$2.76 | \$8.57 | \$ 1.47 |
| 2/28/2007 | \$2.76 | \$8.57 | \$ 1.44 |
| 3/31/2007 | \$2.79 | \$7.99 | \$ 1.45 |
| 4/30/2007 | \$2.79 | \$8.40 | \$ 1.51 |
| 5/31/2007 | \$3.18 | \$9.57 | \$ 1.56 |
| 6/30/2007 | \$3.10 | \$9.53 | \$ 1.53 |
| 7/31/2007 | \$3.18 | \$9.76 | \$ 1.48 |
| 8/31/2007 | \$2.85 | \$8.74 | \$ 1.50 |
| 9/30/2007 | \$2.99 | \$8.89 | \$ 1.56 |
| 10/31/2007 | \$3.45 | \$9.03 | \$ 1.58 |
| 11/30/2007 | \$3.06 | \$8.00 | \$ 1.51 |
| 12/31/2007 | \$3.02 | \$7.92 | \$ 1.50 |
| 1/31/2008 | \$2.59 | \$7.27 | \$ 1.41 |
| 2/29/2008 | \$2.46 | \$6.90 | \$ 1.36 |
| 3/31/2008 | \$2.55 | \$7.14 | \$ 1.35 |
| 4/30/2008 | \$2.65 | \$7.43 | \$ 1.41 |
| 5/31/2008 | \$2.76 | \$7.80 | \$ 1.43 |
| 6/30/2008 | \$2.66 | \$7.53 | \$ 1.31 |
| 7/31/2008 | \$2.55 | \$7.19 | \$ 1.29 |
| 8/31/2008 | \$2.85 | \$8.06 | \$ 1.31 |
| 9/30/2008 | \$2.59 | \$7.32 | \$ 1.19 |
| 10/31/2008 | \$2.14 | \$6.06 | \$ 0.99 |
| 11/30/2008 | \$2.20 | \$6.21 | \$ 0.91 |
| 12/31/2008 | \$2.29 | \$6.47 | \$ 0.92 |
| 1/30/2009 | \$2.09 | \$6.47 | \$ 0.84 |
| 2/28/2009 | \$1.95 | \$6.05 | \$ 0.75 |
| 3/31/2009 | \$1.95 | \$6.05 | \$ 0.81 |
| 4/30/2009 | \$2.43 | \$6.64 | \$ 0.89 |
| 5/31/2009 | \$2.72 | \$7.43 | \$ 0.94 |
| 6/30/2009 | \$3.80 | \$10.39 | \$ 0.94 |
| 7/31/2009 | \$4.43 | \$12.10 | \$ 1.01 |
| 8/31/2009 | \$4.45 | \$12.17 | \$ 1.04 |

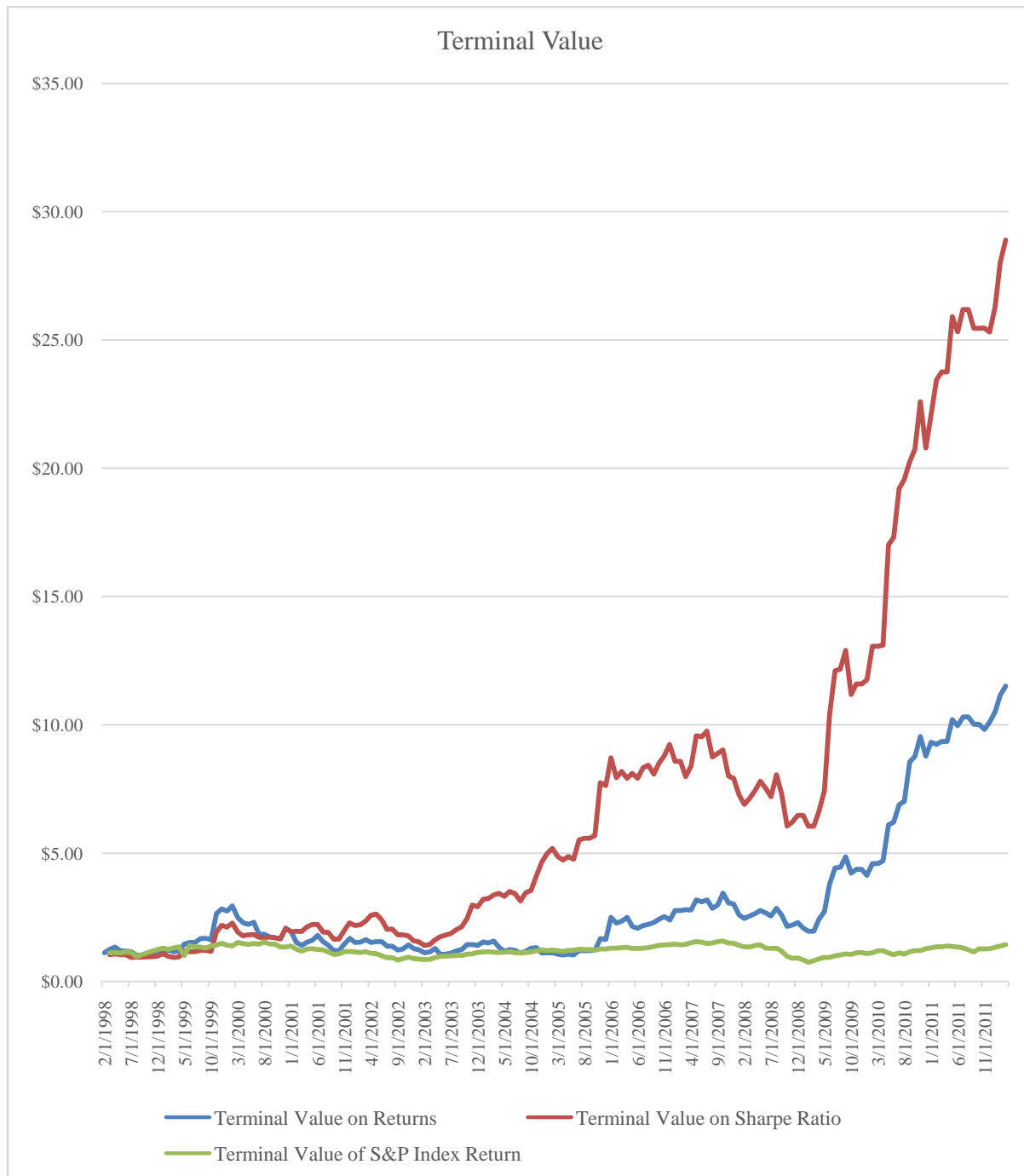
| | | | |
|------------|---------|---------|----------------|
| 9/30/2009 | \$4.86 | \$12.90 | \$ 1.08 |
| 10/31/2009 | \$4.22 | \$11.19 | \$ 1.06 |
| 11/30/2009 | \$4.37 | \$11.60 | \$ 1.12 |
| 12/31/2009 | \$4.37 | \$11.60 | \$ 1.14 |
| 1/31/2010 | \$4.13 | \$11.76 | \$ 1.10 |
| 2/28/2010 | \$4.59 | \$13.06 | \$ 1.13 |
| 3/31/2010 | \$4.59 | \$13.06 | \$ 1.19 |
| 4/30/2010 | \$4.70 | \$13.11 | \$ 1.21 |
| 5/31/2010 | \$6.10 | \$17.01 | \$ 1.11 |
| 6/30/2010 | \$6.20 | \$17.30 | \$ 1.05 |
| 7/31/2010 | \$6.89 | \$19.21 | \$ 1.12 |
| 8/31/2010 | \$7.02 | \$19.57 | \$ 1.07 |
| 9/30/2010 | \$8.56 | \$20.26 | \$ 1.16 |
| 10/31/2010 | \$8.76 | \$20.75 | \$ 1.21 |
| 11/30/2010 | \$9.54 | \$22.60 | \$ 1.20 |
| 12/31/2010 | \$8.78 | \$20.79 | \$ 1.28 |
| 1/31/2011 | \$9.32 | \$22.07 | \$ 1.31 |
| 2/28/2011 | \$9.23 | \$23.45 | \$ 1.35 |
| 3/31/2011 | \$9.35 | \$23.75 | \$ 1.35 |
| 4/30/2011 | \$9.35 | \$23.75 | \$ 1.39 |
| 5/31/2011 | \$10.20 | \$25.91 | \$ 1.37 |
| 6/30/2011 | \$9.97 | \$25.32 | \$ 1.35 |
| 7/31/2011 | \$10.31 | \$26.19 | \$ 1.32 |
| 8/31/2011 | \$10.31 | \$26.19 | \$ 1.24 |
| 9/30/2011 | \$10.02 | \$25.46 | \$ 1.15 |
| 10/31/2011 | \$10.02 | \$25.46 | \$ 1.28 |
| 11/30/2011 | \$9.82 | \$25.47 | \$ 1.27 |
| 12/31/2011 | \$10.10 | \$25.30 | \$ 1.28 |
| 1/31/2012 | \$10.49 | \$26.28 | \$ 1.34 |
| 2/29/2012 | \$11.16 | \$28.03 | \$ 1.39 |
| 3/31/2012 | \$11.51 | \$28.90 | \$ 1.44 |

5. Results

Figure 1 demonstrates that from early 1998 to March 2012, the terminal value of the initially invested \$1 based on the Sharpe momentum approach is significantly greater than the terminal value of both the return momentum approach and the S&P index over time (\$28.9 vs \$11.5 and \$1.44). The differences of the three portfolios are less discernable between 1998 and early 2003 than later period. The return based momentum trading method starts to outperform the S&P index since the end of 2005 and continues till the end of the

sample period, suggesting that investors' behavioral sentiments begin to influence the market. The excessive predictive power of the Sharped based momentum starts since early 2001 and overwhelmingly beats the returned based momentum approach and the S&P500 since early 2003.

Figure 1 – Comparative Terminal Value of Return Based Momentum, Sharpe Ratio Based Momentum, and S&P Index.

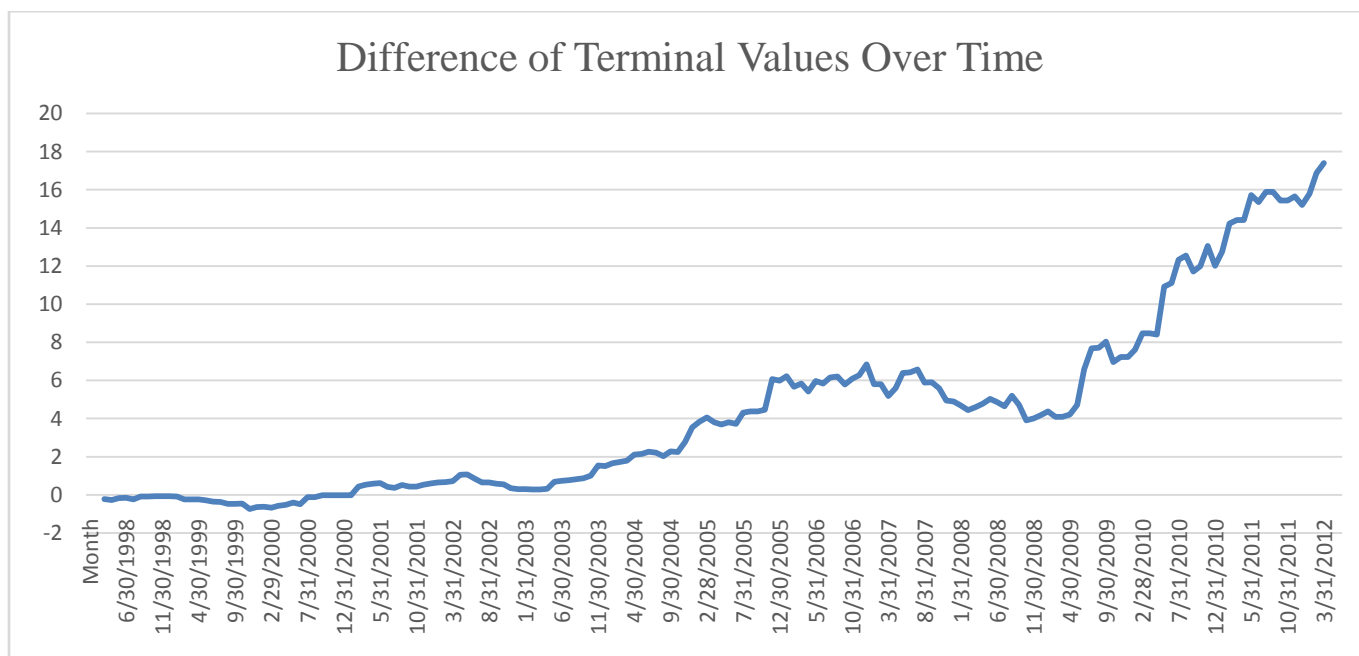


By comparing the differences in terminal value between the two momentum approaches over time in Figure 2, an overall increasing trend prevails, with an early period of negative values during 1998 and early 2001. It suggests that investors before 2001 are mainly composed of naïve investors who rely on the prior return in their investment consideration only. After 2001 till the end of the sample period, investors on average are more rational than before, as they start to incorporate the risk factor in the momentum trading, given the positive differences of terminal values between the Sharpe based approach and the return based approach.

During early 2007 and early 2009 the growth of the difference slows down reflected in the downward slope for that segment of time. It suggests that investors are growing more rationally but at a decreasing rate. The reason for the pattern is probably because more irrational investors join the market activities since 2007 after a long period of bull market cycle after the tech bubble in 2001, or because investors become more relaxed from risk assumption as time moves along away from the market crash in 2001 (A Chinese saying goes, people forget the pain after the scar heals)

After early 2009, a big jump in the gap of the two momentum effects appears and the gap continuously widens till the end of the sample period. Obviously, the financial crisis in 2008 and 2009 raises the awareness among investors on risk consideration.

Figure 2 – Difference in Terminal Values between Return Based and Sharpe Ratio Based Momentum Effects over Time (TV of Sharpe based momentum – TV of return based momentum, 1998 - 2012)



6. Conclusions

Our study find the existence of strong momentum effects of the AAI portfolios under both return based and Sharpe ratio based indicator. In addition, we find that the abnormal returns based on past Sharpe ratio of the AAI portfolios are significantly greater than those based on the past average return of the portfolios.

The fact that the risk adjusted consideration measured by Sharpe ratio is stronger in the momentum effects over time in these trading strategies shows that investors begin to include the risks factors into their decision making. This evidence suggests that either the investors become more sophisticated than before, or probably more sophisticated investors come to participate in the financial trading activities. Investors used to think on only one dimension of thought, i.e. the return only. Now investors have learned to base their judgment on two dimensions, both risk and return in their asset management.

The increasing trend continues and the gap in the momentum effects between the two approaches becomes wider and wider over the sample period, especially right after each major financial crisis. That the individual investors on average grow more rational as a group. The improved rationality of investor pool is a result of combined efforts from education and from lessons of financial losses. Our results confirms the proposition of behavioral finance theory on the momentum study, and sheds additional light on how the financial market should evolve in the future given the nature of investors thinking capacity.

Ultimately, the best returns and success for investors come from giving major consideration to risk of the overall portfolio. Our study also presents valuable implications from the perspective of academic researchers, educators, and practitioners.

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