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# EVALUATING THE PERFORMANCE OF THE MOTLEY FOOL'S STOCK ADVISOR™

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## ABSTRACT

Since March 2002, The Motley Fool's founders, David Gardner and Tom Gardner, have published monthly stock recommendations under Motley Fool's premium Stock Advisor service. In this paper, we examine the performance of these recommendations. We evaluate the announcement influence on share price corresponding to the publication of stock recommendations. Additionally, we examine holding period returns for a portfolio imitating the actions of Stock Advisor™. We find portfolios composed of recommendations through Stock Advisor add value, initially and across extended holding periods. Additionally, we find that the Stock Advisor sample outperforms other sample portfolios on a risk-adjusted basis over several periods.

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## Introduction

Analyst stock recommendations are exceedingly prevalent and accessible, which is attributable to the progression of the Internet and mobile devices. Searching for stock recommendations on Google generates approximately 151 million results. Although interest in stock recommendations has decreased significantly since peaking in 2004, according to Google Trends (2017), numerous sources remain that are dedicated to providing their input regarding the stock market. Popular online sources for recommendations include Barron's, TheStreet, J.P. Morgan, CNBC, Forbes, and Kiplinger. Additionally, web sources exist that compile and summarize overall analyst sentiment, such as Nasdaq.

Despite the substantial selection and lingering existence of analyst recommendations, contradicting viewpoints exist regarding the usefulness and superior performance of these recommendations compared to index funds. Altinkiliç, Hansen, and Ye (2016) assert that analysts' abilities to predict future long-term excess returns in terms of post-revision return drift was not significantly different than zero from 2003-2010. The authors attribute this conclusion to an increase in trading costs and the rapid assimilation of new information in the market. Bolster, Trahan, and Venkateswaran (2012) present data suggesting that recommendations proposed by analyst Jim Cramer generate significant excess returns. These recommendations are often absorbed quickly into security pricing for buy recommendations, but the authors discover excess returns for sell recommendations persisted. Regardless of any uncertainty concerning the performance of stock recommendations, a continuous supply and associated demand remain.

One popular investing website is The Motley Fool, which ranks fifth among finance websites in terms of monthly visits. The Motley Fool provides an extensive range of stock news and analysis on its free website, www.fool.com. Additionally, the website provides premium stock recommendation services, which includes its Stock Advisor™ service. Beginning in March 2002, brothers David and Tom Gardner, who founded The Motley Fool, began recommending stocks on a monthly basis. Each month, David and Tom recommend a stock to purchase and provide analysis of the securities in the form of a newsletter. They only propose sell recommendations for securities that they have previously endorsed. Additionally, the two each disclose their five favorite stocks each month, which are securities they have already recommended. David and Tom also collaborate to present their preferred starter stocks and place hold recommendations on active investments.

In this paper, we utilize a methodical approach to verify the proposed excess return-generating strategy of The Motley Fool's Stock Advisor service. We benchmark the performance of recommendations of the service using a matched sample of companies based on company size and book-to-market ratio as well as the overall market. Performance is analyzed through a variety of time periods and phases of the economic cycle. We find portfolios composed of recommendations through Stock Advisor add value, initially and across extended holding periods when compared to the market and matched sample. Additionally, we find that the Stock Advisor sample outperforms other sample portfolios on a risk-adjusted basis over several periods.

## Literature Review

Stock recommendations are utilized by numerous investors of varying skill level. Investors may rely on these recommendations to expand their portfolio by adding an active component. Can this confidence lower the investing performance of individuals who consider recommendations in their analysis? Kelly, Low, Tan, and Tan (2012) examine the potential overreliance of investors on analysts' stock recommendations. The authors conducted three studies, one with experienced retail investors as participants and two others with undergraduate students. Holding all other information constant, both the retail investors and undergraduate students considered a stock to have more growth potential when the stock possessed a corresponding buy recommendation as opposed to a sell recommendation. Additionally, disclosing the presence of potential bias while encouraging participants to formulate an independent recommendation only diminished the reliance on the buy recommendation. In the final experiment, undergraduate students were provided with the distribution of recommendations for a featured security. According to the authors, the distributions did not significantly influence the opinions of the participants, regardless of the overall optimism in the distribution. Similar to the previous experiment, providing a warning to participants regarding excessively skewed recommendation distributions and encouraging participants to execute their own recommendation reduced overreliance on analysts' buy recommendations.

For investors, additional information can increase the probability of an independent decision. Kelly et al. (2012) recognize that providing investors with the industry average distribution in addition to analysts' recommendations can help minimize the search effort of investors. If investors are not motivated to conduct their own research on recommendations, there is a potential for overreliance on analysts' recommendations, which may not consistently provide investors with added value.

Jacobsen (2011) discusses the added value to investors from an active management strategy and the incentive to invest passively. While passive investing is beneficial due to lower trading costs, Jacobsen states a necessity for some ignorance exists in the market so motivation exists to search for new information. This incentive creates a market for analyst recommendations, as investors desire information that can potentially increase their returns.

A common criticism of financial analysts is a lack of consistency in the performance of their security recommendations. After accounting for fees, increased expectations exist for experts in the field. Bein and Wander (2002) contemplate the presence of sheer luck in the returns obtained by money managers. They question if five years of experience is enough to predict future success. Realistically, it is difficult to differentiate between luck and skill, but certain factors should be considered. As luck is of a random nature while skill is often repeatable, the authors emphasize the importance of sample size in order to differentiate between the two. While it is necessary to evaluate a manager over several years, it is also essential to consider his actions comprehensively. Bein and Wander provide an example of a manager who heavily favored technology stocks in the late 1990s. The technology industry performed relatively well during this time period, which resulted in a positive alpha-generating portfolio. In this example, a single action resulted in the relative success of the money manager. The authors state it is more meaningful if a manager's alpha is not correlated with specific sectors or indices, which would be indicative of success in different environments.

Bein and Wander (2002) also discuss the significance of portfolio turnover in evaluating the success of money managers. While high portfolio turnover is not often viewed favorably due to greater transaction costs, it can display persistent performance by a manager. High portfolio turnover is associated with more active investment decisions. Therefore, given two similar, alpha-generating portfolios, the manager who utilizes more turnover in their strategy adds more value. This added value is due to the generation of net alpha over many investment decisions, even if there is higher volatility in the portfolio.

Additionally, Bein and Wander discount money manager performance due to irrationality. They consider a manager who may base his investment decisions on unrelated events, such as the outcome of the NFL Super Bowl. Even if a manager experiences success through this strategy, such success cannot be considered skillful generation of alpha. Ultimately, the authors consider both qualitative and quantitative factors necessary in evaluating the skill of money managers.

Many investors would argue that the generation of excess return is the primary goal for an investment portfolio. Amenc and Martellini (2012) contend that alpha is not the leading source of added value for investors. They state that most investors are concerned about achieving long-term return objectives relative to risk constraints. These constraints ultimately focus on balancing more efficient long-term exposure while still considering risk tolerance in the short-term. The authors characterize investment strategy, as opposed to risk management, as being more focused on alpha over the past fifty years. Alpha can be described as excess return over a given benchmark. Amenc and Martellini describe capitalization-weighted indices, such as the S&P 500 index, as being both inadequately diversified and inefficient. Therefore, alpha cannot be considered the sole source of analyst success. They endorse solutions that utilize more efficient benchmarks and enhanced long-term allocation strategies instead of simple investment products.

Amenc and Martellini (2012) evaluate the goals of both performance-seeking portfolios (PSP) and liability-hedging portfolios (LHP) and how they pertain to rewarding investment goals. PSPs in particular are focused on efficient risk exposure over a variety of asset classes. The authors state that in designing efficient benchmarks for asset classes, the significance of analysts/managers security selections is minimized. They argue that risk management is ultimately the central source of added value for investors. They assert that a tendency exists for investors to not take advantage of risk constraints in normal markets while overestimating risk tolerance during recessions. Amenc and Martellini maintain that basing analyst success on excess return over commonly used benchmarks may not be in the best interest of investors who are interested in maximizing long-term wealth.

Jarrow (2010) examines the presence of positive alpha in active portfolio management and questions the ability of managers to generate “true” positive alpha. He acknowledges positive alpha generation as the driving force for professional investment management. Jarrow describes positive alpha as the condition in which the expected return of an asset exceeds its equilibrium risk-adjusted return, which requires an inefficient market. Based on the complexity of the market, Jarrow suggests there is a general belief among investors which assumes inefficiencies do exist. However, Jarrow and Protter (2009) demonstrate that under the standard asset pricing model assumptions, a positive alpha is synonymous with the presence of an arbitrage opportunity, which seldom occurs. According to Jarrow, the presence and persistence of an arbitrage opportunity requires that the opportunity continue despite the actions of those exploiting the mispricing and that wealth can continually be extracted by the arbitrageurs.

Jarrow (2010) states that false positive alphas exist when unobservable risk factors exist. He characterizes unobservable risk factors as factors with minimal variance, fairly constant return series, and high risk premiums. He provides the period leading up to the housing bubble burst predicting the financial crisis of 2007-2008 as an example of unobservable risk factors, as losses were not realized until the systematic event officially materialized. While professionals often claim they achieve positive alpha, the phenomenon is not as likely as the author would suggest.

Security analysts often compare their performance to a benchmark to measure the added value of their recommendations. Elnekave (2011) investigates the relationship between active investing and passive investing in an index fund, such as the S&P 500 index. Active managers have historically experienced difficulty in attempting to outperform benchmark indices. According to Elnekave, the S&P 500 index has outperformed about 62 percent of actively managed large-cap U.S. equity funds from 2006 through 2010. Additionally, only 4.27 percent of actively managed large-cap funds sustained a top-half position over five consecutive years ending in September 2009.

He also notes that the performance difference between active and passive investing is significant given the unconventional nature of the S&P 500 index as a portfolio benchmark. He discusses the criteria that are used by the S&P Index Committee for inclusion, which comprises market capitalization, financial viability, adequate liquidity and reasonable price, sector representation, and company type. He indicates a lack of price trajectory consideration for companies included in the S&P 500 index. Elnekave also discusses alternatives to the standard capitalization-weighted S&P 500 index. The FTSE RAFI 1000 Fundamental Index, S&P 500 Equal Weighted Index, FTSE EDHEC Risk Efficient Index, and MSCI Minimum Volatility

Index, outperformed the cap-weighted S&P 500 index from January 1999 through January 2010 while providing less risk and more consistency. These alternative indices can provide unconventional weighting solutions to active managers who are attempting to outperform the traditional S&P 500 index while offering new performance benchmarks.

Altınkılıç et al. (2016) analyze post-revision drift, or PRD, following the revision of stock recommendations by sell-side security analysts. PRD describes the phenomenon in which analysts' recommendation changes predict returns that follow the same direction as the change in the long-term. PRD is supported as investors underreact when recommendation changes occur. Some researchers attribute the occurrence of PRD to analysts' discoveries of information from non-public sources, such as insiders. Altınkılıç et al. reference a sample from 2003 through 2010 which asserts average PRD is relatively close to zero. They discuss the impact of lower transactions costs and market efficiency in the minimization of PRD. According to the authors, high transaction costs create inefficiencies which attract arbitrage-seeking investors. Before algorithmic trading, inside information was very valuable to exploit arbitrage opportunities associated with an inefficient market. The presence of high-frequency trading has led to investors quickly reacting to recommendations which minimizes PRD and arbitrage opportunities.

They also reference tests which analyze the hypothesis of better-informed analysts' abilities to discover inefficiencies with new information. These tests do not support the concept that analysts supply new information which predict future returns. With less contemporary information to evaluate, analysts may allot less time for researching new information. Altınkılıç et al. describe the tendency for analysts to piggyback on recent news and the events of covered firms. It is difficult to attribute analyst success when recommendations are magnified through investor reactions to recent events.

In addition to updated earnings reports, security analysts often consider qualitative factors. Zhang, Lin, and Shin (2010) analyze the impact of S&P 500 index inclusions on the forecast of analysts. Through the examination of 194 index additions between 1991 and 2005, the authors discovered that analysts tend to overreact to the announcement of additions to the S&P 500 index. Overall, the percentage of optimistic forecasts increased 19 percent while the percentage of pessimistic forecasts decreased 20 percent after the date of addition. Additionally, analysts' forecast accuracy generally decreased as disparity in the forecasts of analysts increased. Zhang et al. contribute analyst optimism to increased firm visibility and the presence of new information. Although the inclusion of firms in the S&P 500 index generally corresponds with a positive earnings history, the authors warn investors of overly optimistic analyst forecasts, which may be less accurate.

The characteristics and personal interests of analysts can certainly impact their forecasting trends and create potential bias. Jiang, Kumar, and Law (2016) consider the personal traits of analysts based on their political contributions and the subsequent impact on forecasting behavior. They find that analysts who lean primarily toward the Republican Party tend to possess more conservative traits, which affect their forecasting. These traits are apparent through forecast revisions, as conservative analysts generally are less likely to be bold while being careful with the presence of new information. Furthermore, the authors acknowledge that conservative analysts produced higher quality research in empirical tests due to a lack of extreme optimism. They also find the results to persist over the analysis of many firms. When analyzing the market's reaction to conservative analysts' revisions, Jiang et al. discovered that information is not quickly and efficiently reflected in market pricing.

Numerous studies have been conducted which analyze the performance of stock recommendations made by financial analysts. Barber, Lehavy, McNichols, and Trueman (2001) examine the ability of investors to profit from security analysts' recommendations. While the semi-strong form of market efficiency would suggest that public information cannot be used for profit, they analyzed studies that suggest otherwise. They utilized consensus data from 1985 to 1996 that consists of over 360,000 recommendations from 4,340 investment analysts. For this study, investors were assumed to follow any changes in the consensus recommendation at the end of the trading day. Based on the study results, investors who followed the consensus for recommended securities earned an annualized geometric return of 18.8 percent, while stocks that were given the least favorable outlook earned 5.78 percent. As a reference, investors who maintained a value-weighted market portfolio earned an annualized geometric return of 14.5 percent. Using the market portfolio as a benchmark over this time frame yields an annual excess return over four percent. Additionally, purchasing the most favored securities and selling the least favored securities during this period resulted in an excess return of 75 basis points per month, or nine percent per year. According to the authors, returns were most significant for smaller firms.

Barber et al. (2001) illustrate another scenario in which investors are not as likely to re-balance portfolios in a timely manner. Interestingly, the excess return on the most favored securities diminished significantly to around two percent while securities that are least favored by the consensus possess a near four percent negative alpha. This data displays the smaller impact of fairly reactive portfolio re-balancing on lowly considered stocks.

When the authors considered transaction costs, excess returns significantly decreased. A large amount of portfolio turnover in these studies resulted in abnormal returns relatively close to zero. While the data indicates minimal net excess returns, the authors still consider analyst recommendations to be helpful to investors who are considering buying or selling a particular security.

Barber, Lehavy, McNichols, and Trueman (2003) perform a similar evaluation of sell-side analysts' stock recommendations during the years 2000 and 2001. The performance of the recommended securities in these years is drastically different than recommendations made between 1985 and 1996. Analysts' most favored stocks (strong buys) actually underperformed the least favored stocks (strong sells). According to the authors, the most highly recommended securities underperformed the market by 7.06 percent, while the least favored securities earned an average annualized market-adjusted return of 13.44 percent. These results persisted with both technology and nontechnology stocks.

Barber et al. (2003) attribute these abnormal returns to a few phenomenon. First, the market peaked and fell during 2000 while the fraction of sell recommendations became smaller. The number of sell recommendations increased in 2001, but the performance of the least favored stocks largely remained the same. Additionally, the authors reference the confidence of analysts in small-cap growth stocks, which continued through 2000 and 2001. These stocks considerably underperformed the market while value stocks experienced more success. Barber et al. highlight the excess return of highly recommended stocks during 1986-2001, which was still an annualized 2.44 percent greater than the market. They indicate that changing market conditions could impact the performance of analysts' security recommendations, as the outlier in performance occurred while the market entered a recession. Performance can be dependent on the ability of analysts to adjust their strategies through various market cycles.

Analyst performance is often impacted by surrounding signals in the market. Jha, Lichtblau, and Mozes (2003) evaluate the usefulness of analysts' stock recommendations with consideration to outside forces. They discover that analysts add more value when their recommendations are supported by other short-term signals like price momentum and earnings revisions. Additionally, investors are unlikely to consider recommendations that do not align with other firm signals. The authors also found changes in analysts' recommendations to be more useful than the specific price level of the recommendations. Jha et al. specifically consider earnings momentum and price momentum while evaluating analyst recommendations. They utilize the Russell 3000 index to illustrate the impact of recommendations on the market.

Their findings reveal that analysts' recommendation changes produced more beneficial results in down markets compared to up markets. The authors theorize that the collaboration of recommendations with other signals is more useful in periods of recession. In regard to firm size, recommendations added more value for small-cap stocks. Recommendation changes for smaller firms resulted in an annualized geometric average 30-day return of 9.2 percent in excess of the Russell 3000 index compared to an excess return of 7.0 percent for large firms. When combining recommendation changes with concurring price and earnings momentum over the previous 30 days, the excess return of smaller firm recommendations increased to 19.3 percent while the excess return for large-cap stocks was 5.0 percent. Furthermore, the authors discover that recommendation signals traditionally add more value for small-cap tech stocks than large-cap tech stocks. However, when simply considering recommendation changes, the excess return of large-cap tech stocks outperformed small-cap tech stocks by 0.4 percent. Ultimately, Jha et al. suspect analysts build off publicly available information instead of supplying new information.

The market for security analysts includes individuals and entities who have a significant presence. Bolster, Trahan, and Venkateswaran (2012) evaluate the performance and impact of Jim Cramer, who is the host of CNBC's *Mad Money* and one of the more well-known security analysts. They collected Jim Cramer's buy and sell recommendations from July 28, 2005 through December 31, 2008, and created a portfolio utilizing a buy and hold strategy with his recommendations. Cramer only issues sell recommendations for stocks that he has previously encouraged viewers to purchase. Over the span of this study, 1,542 buy recommendations and 700 sell recommendations were analyzed. Buy recommendations resulted in an average abnormal return of 0.38 percent on the day *Mad Money* was broadcasted and 1.88 percent on the day following the buy recommendations. Bolster et al. indicate that the average excess return of Cramer's buy recommendations over the 30 days prior to his announcements was 3.90 percent, which displays Cramer's tendency to pick up on prior momentum. Over the 2 to 30-day post-announcement window, the average excess return was -2.10 percent for buy recommendations.

According to the authors, Cramer's sell recommendations experienced abnormal returns of 0.01 percent on the day of the announcement and -0.73 percent on the day following the announcement. The average excess return of sell recommendations over the 30 days leading up to Cramer's announcement was -3.24 percent and -2.39 percent from day 2 to 30 post-announcement. The returns of Cramer's sell recommendations persisted while his buy recommendations generated negative alpha over time.

Cramer's recommendations over the sample period generated a dollar-weighted portfolio return of -22.90 percent, which was nearly 4 percent greater than the S&P 500 index. Bolster et al. (2012) suggest the portfolio's excess return was not significantly greater than zero and was driven by beta exposure, smaller stocks, growth-oriented stocks, and momentum.

Desai, Liana, and Singh (2000) examine analyst security selections in the *Wall Street Journal (WSJ)*, another significant source for investment news. They consider the selections recommended by *WSJ*'s "all-star" analysts. These senior analysts earned the all-star title by being a top five performer in a respective industry over the previous calendar year. The top three all-stars in each industry were interviewed for their latest recommendations, which was then published in the *WSJ*.

The authors utilize buy-and-hold returns and holding periods ranging from 10 to 500 days with annual rebalancing to measure the performance of the *WSJ*'s published recommendations. To measure excess return, they consider matching companies that possessed the same four-digit SIC code and similar market value. 1,242 recommendations published between 1993 and 1996 were analyzed by the authors.

According to Desai et al. (2000) recommendations possessed abnormal returns of 0.42 percent on the day of publication, which displays a positive market reaction to these recommendations. Additionally, the holding-period abnormal return after 250 days was 4.02 percent, while the abnormal return after 500 days was 6.04 percent. The t-statistics, 1.96 and 2.03 for each period, respectively, displays statistical significance. Abnormal returns in the 10 days leading up to announcement were -0.44 percent. The authors also indicate that abnormal returns for small-cap stocks over 250 days are 1.04 percent and insignificant, and abnormal returns for large-cap stocks are 4.78 percent and significant. The results obtained by Desai et al. indicate security selections from *WSJ*'s all-stars are superior to other securities within similar industries. Additionally, quality performance existed for large-cap stocks in addition to small-cap stocks.

In addition to herd-leading analysts present in print and televised media, the presence of analysts has increased on the web. Hirschey, Richardson, and Scholz (2000) explore the advent and increasing popularity of analyst recommendations available on the Internet. The Motley Fool, which was launched on August 4, 1994, routinely attracted 1.5 million investors to its online investment advice in 1999. According to the authors, the Motley Fool's Rule Breaker Portfolio is a very popular source of published stock recommendations. The Rule Breaker Portfolio considers a mix of Internet stocks, technology stocks, and struggling DJIA stocks. Hirschey et al. consider the impact of Motley Fool's Rule Breaker Portfolio on pricing and trading volumes. The authors utilize buy announcements for the Rule Breaker Portfolio from August 5, 1994, to December 31, 1998. They calculated market-adjusted returns by using the Russell 2000 Index as a benchmark, as the portfolio is focused on small-cap growth stocks but considered the S&P 500 index and Wilshire 5000 index as well.

The cumulative average returns of the buy recommendations were 3.72 percent greater than the Russell 2000 index on the day of announcement. Abnormal returns the day after the announcement were equivalent to 0.99 percent, which indicates quick integration into the security price of the recommendation. According to the authors, abnormal returns before the day of announcement were about 2.15 percent, which could potentially be due to knowledge of the announcement, or the recommendations are simply relying on price momentum. In regard to trading volume, total volume was 568.12 percent higher than expected volume over a period extending from the day before announcement to the day after announcement (-1, +1). Hirschey et al. (2000) highlight the significance of Internet stock recommendations, specifically those made by the Motley Fool. Their study reveals the ability of online stock recommendations to notably impact the market.

Stock recommendations also have a role outside the U.S. market. Cai and Cen (2015) analyze the value of analysts' industry-specific stock recommendations in the Chinese stock market. They question the ability of investors to profit by following analyst recommendations and whether buying or selling based on recommendations could yield excess return over the Chinese market (combined index of SSE and SZSE) during the same period. For this analysis, they utilize 32,440 analyst recommendations from Chinese brokerage houses between 2011 and 2013. Performance was evaluated one day, one week, one month, half a year, and a year after the release of the recommendations. Cai and Cen organize these recommendations into four portfolios, with Portfolio 1 containing the most favorable recommendations (buy/accumulate holding) and Portfolio 4 containing the least favorable recommendations (sell/reduce holding). The authors indicate that analysts' recommendations were weighted toward buy/accumulate from 2011 to 2012 despite the Chinese stock market declining in 2011. Sell recommendations were also less frequent due to short selling being restricted during the sample period.

Based on the value-weighted returns of recommended industries, Cai and Cen state that investors could not profit in a bear market by following analysts' recommendations. During improving market conditions, the authors suggest a relatively stable return may result when following buy or accumulate recommendations from highly considered industries. When considering the performance of the Chinese market, favorable recommendations outperformed the indices while the least favored recommendations underperformed. According to the authors, the portfolio consisting of favorable recommendations (Portfolio 1) possessed a mean market-adjusted return of 5.01 percent and 7.85 percent after a half-year period and one-year period, respectively. Portfolio 4, which contained the least favorable recommendations produced mean market-adjusted returns of -2.48 percent and -2.43 percent during the same time periods.

Ultimately, Cai and Cen propose analysts' recommendation possess value after 6 to 12 months, and investors could profit from these recommendations in the long-run.

Stephan and Nitzsch (2013) compare the performance of stock recommendations between a larger population and a subset of more experienced investors within an online community. They evaluated over 60,000 stock recommendations, which includes both German and U.S. stocks. These stock recommendations were published on an online, German-speaking community between January 2008 and May 2011. Cumulative abnormal returns based on the capital asset pricing model were evaluated by the authors before and after a recommendation was published.

When considering stocks traded on CDAX, the larger population possessed alpha-generating sell recommendations. The CDAX stocks referenced in these sell recommendations produced abnormal returns of -2.0 percent twenty days after the date of recommendation. However, abnormal returns were minimal when considering transaction costs. The larger population struggled with buy recommendations in terms of abnormal returns. The abnormal returns of these recommendations were below zero and significant ten days after the date of recommendation. The authors indicate an increase in abnormal returns of about 0.5 percent from a period five days before announcement to the day of announcement, which displays a dependency on price momentum.

Investors in the online community with more experience slightly outperformed the entire community. According to the authors, investors with at least 100 previous recommendations generated small (non-significant) positive abnormal returns within ten days after the recommendation date. Sell recommendations experienced small negative abnormal returns during the same time period, but these results were not significant as well. Overall, investor experience had an impact on recommendation performance but any positive excess return was primarily insignificant. Due to the small sample size of experienced investors in the community (33), the authors assert the results should be considered carefully.

In addition to securities, recommendations are present for mutual additions. Krueger and Chang (2013) conduct an analysis of *Consumer Reports*' recommendations of mutual funds. In 2005 and 2007, *Consumer Reports* published a list of recommended mutual funds. In March 2005, 70 mutual funds were recommended, 66 of which still existed at the time of analysis, and in February 2007, 46 new mutual funds were proposed, with 44 being evaluated for the study. The authors evaluate the mutual fund sets over a 3-year period beginning in April 2007 and lasting until March 2010. The performance of these recommended funds is compared with their respective Morningstar category.

Krueger and Chang analyze the alpha-generating performance of these funds among a few other statistics. Regarding the 2005 selections, the average alpha across all CR funds was 3.17 percent, which exceeded the Morningstar category averages alpha of 2.27 percent. The 2007 CR funds earned an excess return of 1.78 percent, which surpassed the 0.64 percent excess return earned by Morningstar category averages over the 3-year period. *Consumer Reports*' leading alpha performance was within the natural resources category for both 2005 and 2007 mutual funds.

In terms of Sharpe ratio, both of *Consumer Reports*' mutual fund sets outperformed the Morningstar category averages. The 3-year Sharpe Ratio for the 2005 funds was -0.02 while the category average was -0.08. In addition, the ratio for the 2007 recommendations was -0.06 while the category average was -0.14. Overall, Krueger and Chang (2013) indicate a superior performance for *Consumer* Reports' selections leading up to the market advance in April 2009, after which the performance of the funds was not significantly different. They attribute this down-market success to relatively lower beta values in both the 2005 and 2007 sets.

## Hypothesis

The general purpose of this research is to compare the performance of The Motley Fool's Stock Advisor service with the market and a sample consisting of matching companies. With the presence of the Internet and the growth of online financial services companies, such as The Motley Fool, investment advice has not been more accessible. We aim to assess the existence of added value from premium investment advice, such as Stock Advisor™.

Through the analysis of literature regarding the performance of analyst recommendations, our primary hypothesis is that security recommendations do not generate long-term returns in excess of the market. We seek to test this hypothesis and determine if it can be rejected. After considering trading costs related to active trading strategies, alpha is typically close to zero or not significant. However, some research suggests positive alpha that is statistically significant when considering a more concise period of time. We anticipate similar results through our research.

Our null hypothesis, which states that recommendations from The Motley Fool's Stock Advisor do not exceed performance of the S&P 500 index, is tested using matched samples, risk-adjusted performance analysis, and event studies. The first hypothesis that we seek to investigate examines announcement effects associated with The Motley Fool's Stock Advisor buy recommendations:

> $H_{0a}$: Security recommendations from The Motley Fool's Stock Advisor service do not produce statistically significant announcement effect returns in excess of the S&P 500 and matched sample.

$H_{1a}$: Security recommendations from The Motley Fool's Stock Advisor service produce statistically significant announcement effect returns in excess of the S&P 500 and matched sample.

The second hypothesis investigates whether buy recommendations from The Motley Fool's Stock Advisor produce longer-term holding period returns in excess of the benchmarks:

$H_{0b}$: Security recommendations from The Motley Fool's Stock Advisor service do not produce statistically significant returns in excess of the S&P 500 and matched sample

$H_{1b}$: Security recommendations from The Motley Fool's Stock Advisor service produce statistically significant returns in excess of the S&P 500 and matched sample

## Data

The data for this study is obtained from The Motley Fool's Stock Advisor service. Stock Advisor™, a monthly security recommendation service, was introduced in March 2002 when David Gardner recommended Charles Schwab Corporation and Tom Gardner recommended Moody's Corporation. Stock Advisor is described as:

> [An] investment service that helps any level of investor beat the market, no matter how much time or money they have. Inside, Motley Fool co-founders David and Tom Gardner hand you great stocks and the winning investment philosophy that's given their readers massive returns.

Since inception, David and Tom have made 360 buy recommendations as of December 16, 2016 and subsequent sell recommendations for 151 of their buy recommendations. For the purpose of this study, 20 securities are excluded due to unavailability of data, which results in 340 recommendations. These recommendations cover a variety of sectors and companies. Stock Advisor prides itself in its ability to generate significant excess returns through above-average stock-picking ability.

## Methodology and Results

First, standard event methodology is utilized to produce abnormal returns regarding the announcement of stock recommendations through Motley Fool's Stock Advisor™. To be included in the sample, the recommended firms must meet the following criteria:

1. The sample firms must have return records on the Center for Research on Stock Prices (CRSP) Daily Combined Return File 326 trading days immediately prior to the announcement date.

2. The sample firms must have return records on the CRSP Daily Combined Return File after the announcement date until the next press release date of next survey.

3. The firm must have complete data on Standard and Poor's (S&P) Research Insight®.

A total of 340 buy recommendation announcements are evaluated in the event study. We consider t=0 as the publication of the recommendation newsletter.

We report the share price reaction to the publishing of the newsletter beginning five days prior to the actual event "date." The market model is used to approximate expected returns, and expected returns are estimated during the interval (–5, 5).

Second, we investigate whether longer-term effects are present by comparing holding period returns of the Stock Advisor recommendations to the performance of a matched benchmark portfolio and the S&P 500 Index.

In order to identify our match sample, we utilize prior year-end closing price and market capitalization of all stocks with available data from CRSP for each year. We characterize BE/ME ratios as the book value of common equity from Research Insight®, divided by the year-end market value of common equity of the prior year. For this study, we eliminate firms with negative book to common equity ratios. Potential selections for matching firms include securities that have not been recommended through Stock Advisor and have obtainable data from CRSP and Research Insight. To determine the most appropriate match for each firm in our Stock Advisor sample, we calculate the following matching score (MS) for each recommended stock against the remaining stocks:

$$MS = \left[ \frac{X_1^B - X_1^M}{(X_1^B + X_1^M)/2} \right]^2 + \left[ \frac{X_2^B - X_2^M}{(X_2^B + X_2^M)/2} \right]^2 , \qquad (1)$$

where:

$X_1$ represents the first matching characteristics: market capitalization
$X_2$ represents the second matching characteristics: BE/ME ratio
B refers to the Best Leader sample
M refers to the remaining stock universe

For every stock in Stock Advisor sample, we select the stock with the smallest MS. We utilize this process for each sample year in the study. Table 1 displays descriptive statistics for the Stock Advisor sample and matched sample. The table displays the similarity between both samples in terms of market capitalization and BE/ME ratio.

Security prices and dividend figures utilized to compute daily returns are acquired from CRSP/Research Insight. Annualized returns are calculated by geometrically compounding daily portfolio returns for the Stock Advisor and matched sample, as well as the S&P 500 Index from 2002 to 2016. For this study, we also calculate performance for subholding periods consisting of (1) the period from 2002 until 2016; (2) the period from 2002 until 2006; (3) the period from 2007 until 2011; and (4) the period from 2012 until 2016.

Subsequently, a paired difference test is utilized to compute a student t-test statistic with n – 1 degrees of freedom to determine the statistical significance of raw returns.

$$t \equiv \frac{\bar{d}}{s_d} \text{ x } \sqrt{n} \qquad (2)$$

where:

$\bar{d}$ = the mean difference between the market and portfolio return each day
$s_d$ = the standard deviation of the difference between the returns each day
n = equals the number of days corresponding to the annual holding period, pre and post periods or the entire time horizon

In addition to calculating raw return data, we also consider risk-adjusted measures to compare portfolios.

First, we compute the Sharpe (1966, 1994) Index measures for each portfolio. The Sharpe Index examines excess return per unit of total risk.

$$S = {}^{d}\!/_{s_d} \qquad (3)$$

where:

d = mean daily difference between the portfolio, or market, return and the T-bill return, calculated over various holding periods
$s_d$ = the sample standard deviation of the daily return differences

The Sharpe Index provides insight on the risk-adjusted return of investors who are following the recommendations of Stock Advisor, which may not always be as diversified as the overall market.

We also consider Treynor (1965) Index measures, which utilizes systematic risk. The measure is more suitable to consider when an investor has a diversified portfolio.

$$T = {}^{d}\!/_{\beta}\sqrt{n} \qquad (4)$$

where:

d = mean daily difference between the return on the portfolio of visionary or comparison group stocks and the T-bill return, calculated over respective holding periods
β = portfolio beta
n = number of days in the respective holding periods

Additionally, we calculate Jensen's (1968) Alpha, which assesses the differential return of a portfolio compared to the market. We compute Jensen's Alpha, α, which is the intercept term in a regression analysis, for the Stock Advisor portfolio (and matched portfolio) against excess market returns.

$$R_{pt} - R_{ft} = \alpha + \beta(R_{mt} - R_{ft}) + e_{pt}, \tag{5}$$

A positive (negative) Alpha reveals that a portfolio contains undervalued (overvalued) securities.

We also determine long-term abnormal returns by calculating buy-and-hold abnormal returns (BHARS) as outlined by Barber and Lyon (1997). BHARs are computed by subtracting simple buy-and-hold returns on the matched portfolio from simple buy-and-hold returns on the Stock Advisor portfolio. According to Barber and Lyon, this analysis eliminates potential bias from summing daily and monthly abnormal returns. In order to test the null hypothesis, which is that BHARs are equal to zero, we utilize the following t-test statistic:

$$\mathrm{t}_{\mathrm{BHAR}} = \overline{\mathrm{BHAR}}_{\mathrm{it}} / (\sigma(\mathrm{BHAR}_{\mathrm{it}}) / \sqrt{\mathrm{n}}) \tag{6}$$

where:

$\overline{\mathrm{BHAR}}_{it}$ = average buy-and hold abnormal return
$\sigma(\mathrm{BHAR}_{it})$ = cross-sectional standard deviation of the buy-and-hold abnormal returns
n = the number of matched comparisons

Additionally, we evaluate the long-run performance of the Stock Advisor sample utilizing the Fama-French 3-factor and 4-factor models. We apply the 3-factor model by regressing daily excess returns for the Stock Advisor portfolio on a size factor, market factor, and a book-to-market factor. The 4-factor model is formulated by merging the Fama-French (1993) 3-factor model with a supplementary factor taking into account the one-year momentum anomaly reported by Jegadessh and Titman (1993). The 3- and 4- factor models are defined respectively as:

$$R_{it} - R_{ft} = a + b(R_{mt} - R_{ft}) + s\, SMB_t + hHML_t + e_t; \tag{7}$$

$$R_{it} - R_{ft} = a + b(R_{mt} - R_{ft}) + s\, SMB_t + hHML_t + m\, UMD_t + e_t; \tag{8}$$

where:

$R_{it}$ = the simple return on the stock i of Best Leader sample

$R_{ft}$ = the return on one-month T-bills

$R_{mt}$ = the return on a value-weighted market index

$SMB_t$ = the return on a value-weighted portfolio of small stocks less the return on a value-weighted portfolio of big stocks

$HML_t$ = the return on a valued-weighted portfolio of high book-to-market stocks less the return on a value-weighted portfolio of low book-to-market stocks

$UMD_t$ = the return on the two prior high return portfolios less the returns on the two prior low return portfolios

If regression analysis produces a positive, *a*, this indicates that the portfolio securities have performed better than expected, even when considering the four factors defined above.

**Event Study Results**

The results from the event study for the publication of Stock Advisor security recommendations are shown in Table 2. Using the newsletter publication date as t = 0, we find that the announcement of recommendations through Stock Advisor generates a significant market reaction. While there is a negative abnormal return on date –1, which is statistically significant at the 5 percent level, abnormal returns on date 0 and date 1 are 0.64 percent and 0.46 percent, respectively, and statistically significant at the 1 percent level. Moreover, the Stock Advisor portfolio generates statistically significant positive abnormal returns over all evaluated intervals. Specifically, the portfolio produces a cumulative abnormal return of 0.41 percent from dates –1 to 0. Over the interval from dates –5 to 5, the portfolio earns cumulative abnormal returns of 1.51 percent. Both of these interval results are statistically significant at the 1 percent level. The matched sample does not produce any statistically significant cumulative abnormal returns over intervals identified in Panel B.

Overall, the event study results in Table 2 indicate that the Stock Advisor sample does generate statistically significant abnormal returns around the event dates, which suggests The Motley Fool, and, specifically Stock Advisor, possesses a substantial following of investors who value their analysis and react to new recommendations quickly.

**Holding Period Return Results**

Table 3 Panel A displays the results of the monthly geometric raw returns and Panel B displays the results of risk-adjusted performance measures for the Stock Advisor portfolio compared to the S&P 500 index and the matched sample. Comparing the holding period returns for the Stock Advisor portfolio with those of the S&P 500, the Stock Advisor sample produces higher monthly returns than the S&P 500 index over the whole period, and the difference is statistically significant at the one percent level. The Stock Advisor sample also yields higher monthly raw returns than the matched sample, but the results are not statistically significant. Overall, the Stock Advisor sample outperforms the S&P 500 index and the matched sample when considering both Sharpe and Treynor measures. Additionally, Jensen's alpha for the Stock Advisor sample (statistically significant at the 1 percent level) exceeds Jensen's alpha for the matched sample when both are compared to the S&P 500 index over the whole period.

During the period between 2002 and 2006, the Stock Advisor portfolio excels regarding monthly raw returns and risk-adjusted metrics. Returns for the Stock Advisor sample significantly exceed the S&P 500 index by 1.020 percent (statistically significant at the one percent level). The Sharpe and Treynor measures for the Stock Advisor portfolio exceed the S&P 500 index and matched sample by a substantial margin. Additionally, Jensen's alpha indicates superior performance for the Stock Advisor sample compared to the matched sample during this period and is statistically significant at the 5 percent level.

From 2007 to 2011, the Stock Advisor portfolio outperforms the S&P 500 index by 0.665 percent with regard to monthly raw returns and is statistically significant at the 5 percent level. The Stock Advisor portfolio also outperforms the matched sample during this period, but the difference is not statistically significant. Furthermore, the Stock Advisor portfolio outperforms both the S&P 500 index and matched sample when considering Sharpe and Treynor measures. Jensen's alpha for the Stock Advisor portfolio exceeds the matched sample by a margin of 0.023 percent (0.685 percent to 0.662 percent) during this period, and this metric is statistically significant for both samples at the 5 percent level.

During the period between 2012 and 2016, the Stock Advisor sample surpasses the S&P 500 index and the matched sample in monthly raw returns and the Treynor measure, but no figures are statistically significant.

The performance of the Stock Advisor portfolio is superior when compared with the S&P 500 index and the matched portfolio in terms of both raw returns and risk-adjusted measures. Raw returns do not consider risk measures, so the Stock Advisor portfolio excels in recommending securities that yield higher returns than both the matched sample and the S&P 500 sample. Although raw returns of the Stock Advisor portfolio may be favorably impacted by remarkable performance during the period between 2002 and 2006, the portfolio still outperforms the other sample portfolios over each time period. The Sharpe and Treynor measures consider standard deviation and systematic risk, respectively, in the evaluation of performance while Jensen's alpha assesses returns in excess of expected returns using the capital asset pricing model. The risk-adjusted measures of the Stock Advisor portfolio indicate the portfolio's raw returns do not necessarily benefit from more volatile stocks, which have the ability to produce higher returns. The risk-adjusted measures of the Stock Advisor portfolio substantially outperform those of the matched sample and S&P 500 index between 2002 and 2006, which benefits the Stock Advisor sample's performance over the whole period. However, the risk-adjusted measures for the Stock Advisor portfolio still exceed the other samples in each period, with the exception of the S&P 500 index's Sharpe measure between 2012 and 2016. Combining the monthly raw returns with the risk-adjusted measures signify the ability of the Stock Advisor portfolio to consistently generate superior returns per unit of risk.

**Fama-French 3-Factor and 4-Factor Model Results**

Table 4 displays the results of the two regressions for four multi-year periods. Only the average regression intercepts are reported. T-statistics are used to confirm whether the regression intercept is significantly different from zero. The t-statistic is acquired by dividing the average coefficient by the cross-sectional standard deviation of the coefficient. During the whole period, the intercept term is 0.2817 percent and 0.3204 percent for the 3-factor and 4-factor model, respectively. Both of these figures are statistically significant at the 5 percent level. Similar to the event study, the Stock Advisor portfolio excels during the period between 2002 to 2006. The intercepts for the 3-factor and 4-factor are 0.6322 percent and 0.6343 percent, respectively, and both values are statistically significant at the 10 percent level. While the intercept value is positive for both models during the periods from 2007 to 2011 and 2012 to 2016, the value is not statistically significant.

The results in Table 4 indicate that the Stock Advisor sample does outperform the market during our period of analysis after controlling for market, size, BE/ME ratio and momentum factors. The Fama French 3- and 4-factor models account for the tendency of small capitalization stocks and stocks with high BE/ME ratios to outperform the market. The positive coefficient over each period for the Stock Advisor portfolio indicates the portfolio does not necessarily rely upon small cap stocks or high BE/ME ratio securities to outperform the market and matched sample. Futhermore, the 4-factor model accounts for momentum factors in addition to the previous factors. As the Stock Advisor coefficient is positive over all time periods using the 4-factor model, the portfolio does not ‘piggyback’ on recent stock performance. It is evident that the overall performance of the Stock Advisor sample benefits from a statistically significant abnormal performance during the period between 2002 to 2006, which is reflected in the coefficient for both models during the whole period.

**Buy and Hold Abnormal Returns Results**

Table 5 reports the buy and hold abnormal returns (BHARs) for the Stock Advisor sample. We test the null hypothesis that the mean BHARs (i.e., the differences between the buy-and-hold returns of the sample and its matched sample) are equal to zero using a parametric test statistic. The t-stat is calculated as the sample mean $BHAR_{iT}$ divided by the sample standard deviations of abnormal returns for the sample. Buy and hold abnormal returns are calculated for each year from 2002 to 2016 in addition to the four time periods referenced in the previous analyses. In each case, we have in place the matched samples according to the BHAR technique suggested by Barber and Lyon (1997).

The paired t-test results are displayed in Table 5. Over the whole period, BHARs for the Stock Advisor portfolio are equal to 1.258 percent and statistically significant at the 1 percent level. During the subperiod between 2002-2006, the Stock Advisor portfolio produces substantial BHARS equal to 3.398 percent, which is also statistically significant at the 1 percent level. Additionally, the Stock Advisor portfolio yields positive BHARs during the period between 2007 to 2011 and 2012 to 2016, but the results are not statistically significant.

When assessing the single-year performance of the Stock Advisor portfolio, the portfolio yields substantial BHARs during its initial years. In 2002 and 2003, the portfolio produces BHARs of 1.308 percent and 2.544, which are statistically significant at the 10 percent level and 5 percent level, respectively. In 2004, the Stock Advisor portfolio exceeds the matching sample by a notable margin of 10.001 percent, and this figure is statistically significant at the 10 percent level. Beyond the first few years of the sample, the Stock Advisor sample only produces a significant BHAR in 2008, which is statistically significant at the 10 percent level. After 2008, BHARs for the Stock Advisor portfolio are predominantly minimal with negative values in the years 2011, 2013, and 2015, but these figures are not statistically significant.

Altogether, the Stock Advisor portfolio generates significant BHARs over the whole time period, which signifies the exceptional stock-picking ability by the Stock Advisor service. Given that securities in the Stock Advisor sample and matched sample are similar in terms of market capitalization and BE/ME ratio, the service recommended the overachieving stock with relative consistency. This performance is attributable to exceptional performance during the initial sample years of the Stock Advisor service, specifically in 2004. The performance of the sample declined substantially from 2010 to 2016, as indicated by both low and negative BHARs values during this period.

## Conclusion

In this paper, we have examined the performance of securities recommended through Motley Fool's Stock Advisor service. We find that the Stock Advisor recommendations do statistically outperform the matched sample and S&P 500 index since the creation of Stock Advisor in 2002 regarding both short-term and longer-term holding periods. Event study results indicate a statistically significant market reaction on the day the recommendation is announced and the subsequent two days, which indicates a favorable reaction by investors to the recommendation. Over a longer holding period, The Stock Advisor portfolio repeatedly outperforms the S&P 500 index and matched sample in terms of monthly raw returns and risk-adjusted measures. Additionally, regression results for Fama-French 3- and 4-Factor Models reveal statistically significant added value for the Stock Advisor portfolio over the whole period. The performance of the Stock Advisor portfolio also exceeds the matched sample in generating buy and hold abnormal returns. Although the overall performance of the Stock Advisor portfolio benefits from remarkable recommendation performances between 2002 to 2006, the portfolio still exceeds the benchmarks regarding risk-adjusted measures during the subsequent period between 2007 to 2011. It is evident that investors who follow Stock Advisor's recommendations to build their portfolio outperform the S&P 500 index and the matched sample to an extent over the whole period, although the portfolio benefits from particularly favorable investments during the initial sample years. Additionally, the results indicate that investors react favorably to the release of recommendations through Stock Advisor. The results are interesting and provide clarification on the usefulness of analyst stock recommendations, but more analysis needs to be conducted beyond the scope of a single financial services firm to determine if security recommendations can add value to an investor’s portfolio.

# Tables

## Table 1 Descriptive Statistics for the Stock Advisor Sample and Matched Sample

Table 1 displays descriptive statistics for the Motley Fool Stock Advisor sample and matched sample. We calculate the prior year-end market capitalization and BE/ME ratio of each stock which has obtainable data from Research Insight for each year. We characterize market value of common equity (ME) as the prior year share price times the quantity of shares outstanding. We define the BE/ME ratio as the book value of common equity from Research Insight, divided by the year-end market value of common equity of the prior year.

| | | Standard | Percentile | | | | |
|---|---|---|---|---|---|---|---|
| Variable | Mean | deviation | Min | 25 | 50 | 75 | Max |
| Market capitalization (millions) | | | | | | | |
| Stock Advisor sample | 17,501 | 48,672 | 124 | 1,558 | 3,787 | 11,889 | 534,764 |
| Matched sample | 16,623 | 49,856 | 128 | 1,427 | 3,207 | 10,854 | 534,764 |
| BE/ME ratio | | | | | | | |
| Stock Advisor sample | 5.5142 | 8.1490 | 0.7959 | 2.4127 | 3.8392 | 6.1626 | 114.9276 |
| Matched sample | 4.3448 | 3.0755 | 0.8172 | 2.2286 | 3.5578 | 5.3338 | 20.4376 |

# Table 2 Abnormal Returns (ARs) and Cumulative Abnormal Returns (CARs) Around the Event Date for the Stock Advisor Sample and Matched Sample

Table 2 displays the outcome of the event study for the Motley Fool Stock Advisor sample and matched sample. We examine the reaction of the share price to the release of the recommendations beginning five days prior to the event date by calculating abnormal returns (ARs) and cumulative abnormal returns (CARs). Expected returns are approximated during the interval (-5, 5).

| | Stock Advisor Sample (n=340) | | Matched Sample (n=340) | |
|---|---|---|---|---|
| Panel A. Abnormal returns (%) around event date | | | | |
| Day | AR | Z-stat | AR | Z-stat |
| –5 | 0.23 | 1.84** | 0.13 | 0.98 |
| –4 | 0.06 | 0.42 | 0.19 | 1.12 |
| –3 | –0.03 | –0.26 | –0.03 | –0.54 |
| –2 | 0.13 | 1.14 | –0.02 | –0.05 |
| –1 | –0.22 | –2.02** | –0.15 | –0.77 |
| 0 | 0.64 | 5.39*** | –0.11 | –0.54 |
| 1 | 0.46 | 3.55*** | 0.06 | 0.39 |
| 2 | 0.28 | 1.32* | 0.26 | 2.91*** |
| 3 | 0.13 | 1.19 | 0.11 | 0.14 |
| 4 | –0.12 | –1.54* | –0.09 | –0.74 |
| 5 | –0.04 | –1.15 | –0.06 | –0.76 |
| Panel B. Cumulative abnormal returns (%) around event date | | | | |
| Interval | CAR | Z-stat | CAR | Z-stat |
| (–5, –2) | 0.39 | 1.57* | 0.28 | 0.75 |
| (–1, 0) | 0.41 | 2.41*** | –0.26 | –0.98 |
| (1, 5) | 0.71 | 1.49* | 0.29 | 0.82 |
| (–5, 5) | 1.51 | 2.94*** | 0.34 | 0.72 |

***, **, * indicate statistical significance at 0.01, 0.05 and 0.10 level, respectively.

# Table 3 Raw and Risk-adjusted Returns of the Stock Advisor Sample, Matched Sample and Subsamples Compared to the S&P 500

Table 3 displays the raw and risk-adjusted returns of the Stock Advisor sample compared to the matched sample and S&P 500. Panel A displays the monthly raw returns for the Stock Advisor sample, as well as matched sample returns and S&P 500 returns. For each stock in the Stock Advisor sample, we compare its raw returns to the matched sample and S&P 500 over the holding period and use the paired T-test to assess whether returns are significantly different from zero. Panel B calculates the three performance measures: Sharpe ratio, Treynor ratio and Jensen's alpha.

| | Whole period | Year 2002 - 2006 | Year 2007 - 2011 | Year 2012 - 2016 |
|---|---|---|---|---|
| Panel A. Monthly raw return (%) | | | | |
| Stock Advisor (1) | 1.130 | 1.513 | 0.614 | 1.276 |
| Matched (2) | 0.911 | 0.938 | 0.568 | 1.228 |
| S&P 500 Index (3) | 0.484 | 0.493 | -0.050 | 1.010 |
| (1) - (2) | 0.208 | 0.529 | 0.078 | 0.028 |
| (1) - (3) | 0.646*** | 1.020*** | 0.665** | 0.266 |
| Panel B. Risk-adjusted metrics | | | | |
| Sharpe measure | | | | |
| Stock Advisor (1) | 0.195 | 0.254 | 0.078 | 0.335 |
| Matched (2) | 0.138 | 0.128 | 0.062 | 0.313 |
| S&P 500 Index (3) | 0.092 | 0.083 | -0.029 | 0.336 |
| Treynor measure | | | | |
| Stock Advisor (1) | 0.902 | 1.081 | 0.449 | 1.151 |
| Matched (2) | 0.635 | 0.537 | 0.361 | 1.057 |
| S&P 500 Index (3) | 0.384 | 0.300 | -0.157 | 1.005 |
| Jensen's alpha | | | | |
| Stock Advisor (1) | 0.592*** | 0.953** | 0.685** | 0.161 |
| Matched (2) | 0.321* | 0.328 | 0.662** | 0.060 |

***, **, * indicate statistical significance at 0.01, 0.05 and 0.10 level, respectively.

# Table 4 Regression Results for Fama-French 3- and 4-Factor Model for the Stock Advisor Sample and Subsamples

Table 4 displays the regression results of Fama-French 3- and 4-factor models for the Stock Advisor sample and subsamples. The 3-factor model is applied by regressing the post-selection monthly excess returns for the Stock Advisor portfolio on a market factor, a size factor, and a book-to-market factor. The 4-factor model is constructed by integrating the Fama-French (1993) 3-factor model with an additional factor capturing the one-year momentum anomaly reported by Jegadeesh and Titman (1993).

| | | Whole period | Year 2002 - 2006 | Year 2007 - 2011 | Year 2012 - 2016 |
|---|---|---|---|---|---|
| Panel A. Regression Intercept for 3-factor model: $R_{pt} - R_{ft} = a_i + b(R_{mt} - R_{ft}) + s\,SMB_t + hHML_t + e_{it}$; | | | | | |
| Intercept | Coefficient | 0.2817 | 0.6322 | 0.2819 | 0.0254 |
| | t-stat | 2.06** | 1.89* | 1.38 | 0.13 |
| Panel B. Regression Intercept for 4-factor model: $R_{pt} - R_{ft} = a_i + b(R_{mt} - R_{ft}) + s\,SMB_t + hHML_t + mUMD_t + e_{it}$; | | | | | |
| Intercept | Coefficient | 0.3204 | 0.6343 | 0.2114 | 0.1490 |
| | t-stat | 2.44** | 1.88* | 1.18 | 0.76 |

***, **, * indicate statistical significance at 0.01, 0.05 and 0.10 level, respectively.

Table 5 Buy and Hold Abnormal Returns (BHARs) for the Stock Advisor Sample

Table 5 reports the buy and hold abnormal returns (BHARs) for the Stock Advisor sample. We test the null hypothesis that the mean BHARs (i.e., the differences between the buy-and-hold returns of the sample and its matched sample) are equal to zero using a parametric test statistic. The t-stat is calculated as the sample mean $BHAR_{iT}$ divided by the sample standard deviations of abnormal returns for the sample.

| | $\prod (1+R_{it})$ | $\prod (1+E(R_{it}))$ | BHAR | T-stat |
|---|---|---|---|---|
| 2002 | 3.285 | 1.977 | 1.308 | 1.76* |
| 2003 | 3.761 | 1.331 | 2.544 | 2.53** |
| 2004 | 11.186 | 1.645 | 10.001 | 1.78* |
| 2005 | 1.953 | 1.430 | 0.581 | 0.88 |
| 2006 | 4.300 | 1.660 | 2.640 | 1.29 |
| 2007 | 2.809 | 1.256 | 1.735 | 0.84 |
| 2008 | 2.612 | 1.708 | 0.904 | 1.89* |
| 2009 | 2.426 | 2.242 | 0.184 | 0.45 |
| 2010 | 2.058 | 2.042 | 0.017 | 0.04 |
| 2011 | 1.339 | 1.875 | -0.540 | -1.31 |
| 2012 | 1.661 | 1.599 | 0.105 | 0.36 |
| 2013 | 1.361 | 1.587 | -0.190 | -0.90 |
| 2014 | 1.298 | 1.201 | 0.097 | 0.86 |
| 2015 | 0.912 | 1.009 | -0.066 | -0.69 |
| 2016 | 1.106 | 1.060 | 0.045 | 0.70 |
| 2002 - 2006 | 4.886 | 1.594 | 3.398 | 2.74*** |
| 2007 - 2011 | 2.234 | 1.823 | 0.444 | 1.03 |
| 2012 - 2016 | 1.267 | 1.286 | 0.001 | 0.02 |
| 2002 - 2016 | 2.771 | 1.567 | 1.258 | 2.88*** |

***, **, * indicate statistical significance at 0.01, 0.05 and 0.10 level, respectively.

# Bibliography


Altinkiliç, O., Hansen, R. S., & Ye, L. (2016). Can Analysts Pick Stocks for the Long-run? *Journal of Financial Economics, 119*(2), 371-398.

Amenc, N., & Martellini, L. (2012). Forget about Alpha! *Journal of Portfolio Management, 38*(4), 4-5.

Barber, B., Lehavy, R., McNichols, M., & Trueman, B. (2001). Can Investors Profit from the Prophets? Security Analyst Recommendations and Stock Returns. *The Journal of Finance, 56*(2), 531-563.

Barber, B., Lehavy, R., McNichols, M., & Trueman, B. (2003). Reassessing the Returns to Analysts' Stock Recommendations. *Financial Analysts Journal, 59*(2), 88-96.

Barber, B. and Lyon, J. (1997). Detecting Long-Run Abnormal Stock Returns: The Empirical Power and Specification of Test Statistics. *Journal of Financial Economics, 53*, 341-372.

Bein, D. M., & Wander, B. H. (2002). Luck Versus Skill: Evaluating an Investment Manager's Track Record. *Journal of Investing, 11*(4), 27-30.

Bolster, P., Trahan, E., & Venkateswaran, A. (2012). How Mad is Mad Money? Jim Cramer as a Stock Picker and Portfolio Manager. *Journal of Investing, 21*(2), 27-39.

Cai, R., & Cen, Z. (2015). Can Investors Profit by Following Analysts' Recommendations? An Investigation of Chinese Analysts' Trading Recommendations on Industry. *Economics, Management and Financial Markets, 10*(3), 11-29.

Desai, H., Liang, B., & Singh, A. K. (2000). Do All-stars Shine? Evaluation of Analyst Recommendations. *Financial Analysts Journal*, *56*(3), 20-29.

Elnekave, R. (2011). What Can the S&P 500 Index Teach Active Managers? *Journal of Investing, 20*(4), 7-15, 3.

Fama, E., and French, F. (1993). Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics, 33*, 3-56.

Google Trends (2017). Available at https://trends.google.com/trends/explore?date=all&q=stock%20recommendations.

Hirschey, M., Richardson, V. J., & Scholz, S. (2000). How "Foolish" are Internet Investors? *Financial Analysts Journal, 56*(1), 62-69.

Jacobsen, B. J. (2011). Does Active Management Provide Investor Surplus? *Journal of Portfolio Management, 38*(1), 131-139, 16.

Jarrow, R. A. (2010). Active Portfolio Management and Positive Alphas: Fact or Fantasy? *Journal of Portfolio Management, 36*(4), 17-22, 8.

Jegadeesh S. A., and Titman, S. (1993). Returns on Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *Journal of Finance, 48*, 65-91.

Jensen, M. (1968). The Performance of Mutual Funds in the Period 1945-1964. *Journal of Finance, 23 (2),* 389-416.

Jha, V., Lichtblau, D., & Mozes, H. (2003). The Usefulness of Analysts' Recommendations *Journal of Investing, 12*(2), 7-18.

Jiang, D., Kumar, A., & Law, K. K. F. (2016). Political Contributions and Analyst Behavior. *Review of Accounting Studies, 21*(1), 37-88.

Kelly, K., Low, B., Tan, H., & Tan, S. (2012). Investors' Reliance on Analysts' Stock Recommendations and Mitigating Mechanisms for Potential Overreliance. *Contemporary Accounting Research, 29*(3), 991-1012.

Krueger, T., & Chang, C. E. (2013). How Good Are Consumer Reports' Recommendations of Mutual Funds? *Journal of Investing, 22*(1), 88-103, 4.

Sharpe, W. (1966). Mutual Fund Performance. *Journal of Business, 39 (1),* 119-138.

Sharpe, W. (1994). The Sharpe Ratio, 1994. *Journal of Portfolio Management, 21(1),* 49-58.

Stephan, P., & von Nitzsch, R. (2013). Do Individual Investors' Stock Recommendations in Online Communities Contain Investment Value? *Financial Markets and Portfolio Management, 27*(2), 149-186.

Treynor, J. (1965). How to Rate Management of Investment Funds. *Harvard Business Review, 43 (1),* 63-75.

Zhang, J., Lin, E. C., & Shin, H. (2010). S&P 500 Index Inclusions and Analysts' Forecast Optimism. *Journal of Investing, 19*(4), 50-57, 3-4.

**Academic Vita**

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**EDUCATION**

**The Pennsylvania State University, The Behrend College, Erie, PA**
**The Schreyer Honors College**
B.S. Finance with Honors in Finance
B.S. Interdisciplinary Business with Engineering Studies

**PROFESSIONAL EXPERIENCE**

**Financial Planning & Analysis Intern**, Erie Insurance Group, Erie, PA (2016-present)

- Planned $25,000,000 total between postage and premium audit accounts for 2017 budget
- Assisted customer service division leadership through 2017 expense planning process
- Simplified extensive geographic expansion revenue model into an assumption and output tab
- Assessed feasibility of placing ERIE adjusters in states based on claim density

**ACADEMIC EXPERIENCE**

**Developing Product Proposal to Erie Insurance for Senior Design Project** (ongoing)

- Generating several concepts and down-selecting based on weighted selection criteria
- Assessing customer needs while considering product implementation costs
- Designing alternative product attributes based on customer revenue
- Researching life cycle, market share, and competitive forces within the insurance industry

**Collaborated with Finance and Engineering Students to Model Start-Up Business** (2016)

- Performed macroeconomic analysis to assess five-year operating environment
- Researched start-up costs while incorporating material costs to determine required capital
- Evaluated start-up viability through capital budgeting methods such as net present value
- Presented start-up proposal to simulated venture capitalist investors and fellow classmates

**Analyzed the Stock Price of Multiple Companies through Intrinsic Equity Valuation** (2016)

- Utilized dividend models, industry ratios, and free cash flows among various models
- Obtained model inputs through analysis of firm ratios and historic performance
- Provided purchase recommendation based on the cumulative model valuations
- Proposed updates and additional models to increase overall valuation accuracy

**ACTIVITIES**

- **Penn State Behrend Honors Program –** Assisting and informing incoming students (2016)
- **National Organization for Business and Engineering –** Founding member of chapter (2014)

**HONORS/AWARDS**

- Member of Beta Gamma Sigma (2016-present)
- The Lawrence and Elizabeth Held Scholarship Recipient (2013-present)
- Dean’s List (2013-present)
- Wegmans Scholarship Recipient (2013-2015)