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A Short Note on the Potential for a Momentum Based Investment Strategy in Sector ETFs

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Abstract

The focus of this research is on the enhanced one-year average annual return performance of Select Sector SDPR EFFs with the highest average annual realized return over the previous five-year period [MaxRet strategy]. From 2004 through 2015, the MaxRet strategy generates a higher average annual total return than an equal weight portfolio [EW strategy] of the same sector funds. The average annual return for the MaxRet strategy is 14.13% compared to 9.75% for the EW strategy. In addition, the coefficient of variation [CV] for the MaxRet and EW strategies are 1.52 and 1.59 respectively. The MaxRet strategy, therefore, is a more efficient strategy in that it generates less standard deviation risk per unit of average annual return than the EW strategy over the study period. Measures of downside risk further support the enhanced out-of-sample performance of the MaxRet strategy.

JEL classification: G11

Keywords: momentum, performance enhancement, active management

1. Introduction

1.1. Passive vs. Active Investment Management Strategies

Many individual investors and financial planners, on behalf of their clients, often utilize a passive investment strategy approach when investing in sector funds by using an equal weight approach. This

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approach simply places an equal amount of money in all or a subset of the sector funds that are available for investment. A passive investment strategy is consistent with the efficient market hypothesis [EMH]. It should result in lower management fees and transaction costs due to limited ongoing buying and selling actions.[1] One example of a passive investment strategy is to invest in a professionally managed mutual fund or exchange traded fund [ETF] that is intended to replicate a large-cap index such as the Dow Jones Industrial Average [DJIA]. Another example would be to invest an equal amount in the Select Sector SPDR ETFs in order to create a passive fund of funds. The SPDR ETFs are unique ETFs that divide the S&P 500 into ten sector index funds. By investing an equal amount in the SPDR ETFs, investors gain exposure to an asset class portfolio of stocks at a relatively low cost.[2]

An active investment strategy, on the other hand, is the attempt to improve investment performance relative to an appropriate benchmark or index by changing the assets and/or asset weights in the benchmark or index portfolio over time. The argument for active management is that financial markets are not perfectly efficient. The sheer size of the investment analysis industry implies that financial markets are not perfectly efficient and that profit opportunities based on active management may exist for astute investors.

Long-only momentum investing is an active management system of buying stocks or other securities that have had high returns over a past period. Antonacci (2014) discusses the investment approach of Richard Driehaus who is sometimes considered the father of momentum investing. Antonacci explains that Driehaus believes "the momentum investor has confidence that a stock that is high can head even higher. The momentum strategy does not invest in stock because it's cheap and hope for a turnaround." The momentum strategy takes exception with the old stock market adage of buying low and selling high. Murphy (2004) quotes Driehaus as saying, "far more money is made buying high and selling at even higher prices."

The focus of this research is on the potential for an actively managed sector based ETF momentum strategy to provide an enhanced one-year average annual return performance relative to a more passive equal weight sector ETF strategy. The sector ETF momentum strategy in this research involves investing in the Select Sector SDPR EFF with the highest average annual realized return over the previous five-year period [MaxRet strategy]. From 2004 through 2015, the MaxRet strategy generates a higher average annual total return than an equal weight portfolio [EW strategy] of the same sector funds. The primary contribution of this research is in demonstrating the potential for an active management MaxRet strategy to provide enhanced performance relative to a more passive equal weight portfolio of the sector funds from which the MaxRet fund in chosen. The EW portfolio of funds is chosen as the passive benchmark portfolio because it is both investable and observable.

1.2. Literature Review

Since financial theory predicts that higher expected risk requires higher expected returns, if a security generates higher returns it could simply be due to a higher level of overall risk. The historical performance of different asset classes over the long term is indeed consistent with the theory that higher risk is associated with higher returns. What is important and sometimes overlooked, however, is the concept of

[1] The efficient market hypothesis [EMH] is an investment theory that states it is impossible to "beat the market" because stock market efficiency causes existing share prices to always incorporate and reflect all relevant information. According to the EMH, stocks always trade at their fair value on stock exchanges, making it impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices. As such, it should be impossible to outperform the overall market through expert stock selection or market timing, and that the only way an investor can possibly obtain higher returns is by purchasing riskier investments.

[2] One ETF that tracks the DJIA is the SPDR Dow Jones Industrial Average ETF [DIA]. Diamonds, so-called because of the symbol "DIA," invest in all of the Dow stocks with the same weighting as the index.

risk-adjusted returns. In this research, we investigate risk-adjusted performance to include downside risk measures.

The positive feedback-trading hypothesis [PFTH] favors an active investment strategy and it is gaining increasing support among researchers as an explanation for momentum in securities markets. Momentum Investors attempt to take advantage of the PFTH. DeLong, Shleifer, Summers, and Waldmann (1990), show in a theoretical framework that the presence of positive feedback trading can cause prices to diverge from fundamental levels even if all other trading is rational. Divergence from fundamentals leaves the door open for excess returns. The premise is that at times traders may buy a security simply because it is going up in price. If a large number of traders buy the security, their combined buying pressure drives the price even higher, inducing even more traders to buy. The PFTH is of particular interest to equity-market traders because the theory allows market prices to diverge from any normal valuation of the securities if markets were perfectly efficient. Said another way, if markets were perfectly efficient then momentum profits in excess of normal returns would not be possible.

The buying frenzy is rational because people buy securities to make money, and with rising prices, they are making money. Jegadeesh and Titman (1993) reported that a momentum strategy based on individual stocks gave average returns of 1% per month for the following 3–12 months. This rational bubble can burst and prices can collapse precipitously. People begin to sell because the prices are falling, and prices fall because people are selling. For example, in 2009, Barroso and Santa-Clara (2015) reports that a momentum strategy based on individual stocks experienced a crash of -73.42% in three months. In short, there can be both momentum up and momentum down due to the behavioral traits of investors as describe by Shefrin and Statman, (2000).

Henning (2010) outlines three strategies for picking stocks—a technical-momentum model, a fundamental-value model, and a "hybrid" technical-fundamental model. Henning's research found that his technical-momentum model performed best during bull markets, but lagged his fundamental-value model during bear markets. Lee (2011) compares risk-based asset allocation strategies that focus portfolio construction only on risk and diversification rather than on estimating expected returns. Lee believes that these portfolios come with various potential challenges, and most importantly, there is no theory to predict their performance relative to the market or appropriate benchmark portfolios. The ex-ante portfolio input parameter estimation techniques developed by Jobson, Korkie and Ratti (1980), Jobson and Korki (1981a, 1981b) and Jorion (1985, 1986) established that the expected return vector is the critical input for successfully constructing ex-post efficient portfolios. The sector ETF momentum strategy studied in this paper is based on using historical returns of sector ETFs as being good predictors of future returns.

2. Data and Methodology

2.1. Procedure

In this research, we construct a passive equal weight [EW] portfolio of sector funds and compare its return performance to a more active strategy of investing in the sector fund with the highest annual return [MaxRet] over the previous five years. The MaxRet strategy is viewed as a type of momentum strategy. Given investor interest in active management momentum strategies, this research investigates the potential for an active management sector fund MaxRet strategy based on momentum to enhance portfolio performance relative to a more passive management EW sector fund portfolio strategy.

The EW portfolio of sector funds is a proper benchmark for the MaxRet strategy because it satisfies the requirements for a valid benchmark, as stated in the CFA Institute Certificate in Investment Performance Measurement [CIPM] program of study. These requirements stipulate that the benchmark be unambiguous, investable, measurable, appropriate, reflective of current investment opinion, specified in advance and owned.

Monthly total return data for the individual sector funds in the SPDR family of sector funds are obtained from Yahoo finance. Sector SPDRs carve the S&P 500 into sector exchange-traded funds [ETFs] that conveniently, efficiently and affordably provide sector exposure while giving investors the unique ability to customize the S&P 500 to meet specific investment objectives. As a collective group, return data for the nine principal ETFs begins in 1999. The Adjusted Closing prices on Yahoo finance, which take into account dividends and stock splits, are used to calculate annual total returns for each sector fund.

The MaxRet fund selected for investment in each year is the fund that has the highest realized average annual return in the previous five-year period. That is, the MaxRet fund for investment in 2004 is the sector fund that had the highest realized average annual return from 1999 to 2003, the MaxRet fund for investment in 2005 is the sector fund that had the highest realized average annual return from 2000 to 2004, and so forth. As such, there is no forward-looking bias in the MaxRet strategy. We acknowledge that the results of the MaxRet strategy may change if a period of other than the previous five years is used to select the sector fund with the highest average annual returns. It is not the intent of this research to calculate the MaxRet return results by considering all of the possible estimation periods. The intent of this short research note is to test the potential for the MaxRet strategy to enhance performance relative to more passive investment in an equal weighted portfolio of sector funds.

2.2. Performance Measurement

Rather than show risk/return measures, such as the Treynor or Sharpe measures, which are subject to capital market assumptions, the risk/return ratio (coefficient of variation) and several downside risk measures are used to compare the performance of the MaxRet strategy to the EW strategy. The coefficient of variation is an acceptable performance measure as long as investors equate the variability in returns around the mean return with risk. Downside risk measures focus on the returns that fall below a certain value and can be important to investors who want to minimize market swings.

Downside risk measures address the criticisms of standard deviation as the correct measure of risk. First, downside risk measures set the reference point according to the investment strategy of the fund rather than by using the mean return. Second, only the return deviation below this target return is included in the measurement of risk. Downside risk statistics focus on the concept of partial, or semideviation rather than the standard deviation of returns.

In a strict statistical sense, semideviation is the standard deviation of the returns that fall below the mean return. For stock portfolios, however, a target return can replace the mean return in the calculation of semideviation. Such a substitution may appeal to investors who are concerned about the potential for realizing a loss in their portfolio. Examples of target returns are zero (the return required to maintain principal), the risk-free return, a projected or an expected rate of return, the return used to forecast portfolio values to meet investment goals, the return of a valid benchmark or the return earned by competing portfolio managers. If the reference point changes from the historical mean to a target return, the percentage of returns falling below the target value is measured.

Downside deviation, like semideviation from the mean, eliminates from the calculation of risk the returns that contribute to positive volatility. To calculate downside deviation, one must identify the security or portfolio returns less than the target, take the difference of these returns to the target, square the differences, add the squared differences then divided by the total number of returns. This gives the downside variance, or below-target semivariance. Taking the square root of the downside variance yields the downside deviation, which is measured in return units.

When risk is defined relative to a target return, it is appropriate to use the downside risk measures in the denominator of the reward to risk ratio. The *Sortino ratio* uses downside risk as a denominator and the target return as the hurdle rate in the numerator. It is a modification of the Sharpe ratio but penalizes only those returns falling below a user-specified target or required rate of return, while the Sharpe ratio penalizes both upside and downside volatility equally. Sortino and Rice (1994) introduced the Sartino

ratio, which is calculated by taking the annual average difference of the fund and the target returns and dividing by the annualized downside deviation of the fund. This measure is associated with Frank Sortino, Ph.D., of the Pension Research Institute.

In this study, we use two target returns. First, the return of the EW is used as the target return for calculating the Sortino ratios for the MaxRet strategy relative to the EW strategy. Second, we use a target return equal to zero (not incurring a loss) so that a Sortino ratio for the MaxRet strategy can be calculated relative to not incurring a loss. The larger the Sortino ratio, the greater is the annual average difference of the fund and the target returns per unit of downside risk.

An additional measure of relative performance is the *information ratio*. This ratio is a measure of the benchmark relative return gained for taking on benchmark relative risk. The measure of differential return over the benchmark that is used in the information ratio is the average annual value added, which is the average annual differential return between the MaxRet and the EW strategies. The information ratio is calculated by estimating the value added and dividing it by standard deviation of the difference between returns of the MaxRet and the returns of the index or target (tracking error).

3. Results

3.1. Statistics and Data Analysis

Table 1. The performance of the MaxRet sector fund strategy compared to the EW portfolio sector fund strategy from 2004 through 2015

Year	Average Annual Total Returns	
	EW Strategy	MaxRet Strategy
2004	14.12%	13.49%
2005	8.00%	40.18%
2006	15.76%	18.07%
2007	10.37%	36.89%
2008	-35.37%	-38.96%
2009	27.43%	21.76%
2010	15.92%	21.78%
2011	3.16%	-10.92%
2012	14.59%	5.21%
2013	30.91%	42.73%
2014	13.48%	9.46%
2015	-1.30%	9.90%
Traditional Measures of Return and Risk:		
Average Annual Return	9.75%	14.13%
Standard Deviation	15.48	21.44%
Coefficient of Variation	1.59	1.52
Measures of Downside Risk:		
Downside Deviation	14.17%	
Information Ratio	0.33	
Sortino Ratio	0.31	

Table 1 shows that the MaxRet strategy generates not only a higher average annual return, but also a higher standard deviation of annual returns than the EW strategy over the study period. The results are based on investing in the MaxRet strategy at the beginning of the year and holding for the entire year. The average annual returns for the MaxRet and the EW are 14.13% and 9.75% respectively. The standard deviation of returns for the MaxRet and the EW are 21.44% and 15.48% respectively. Even after allowing 50 basis points per year in transaction costs, the MaxRet average annual return is 3.88 % per year greater than the EW strategy. The coefficient of variation [CV] for the MaxRet and EW are 1.52 and 1.59 respectively. The CV for the MaxRet is lower than for the EW. In short, the MaxRet is a much more efficient strategy in terms of the risk adjusted returns over the 12-year period from 2004 through 2015 in that it generates less standard deviation risk per unit of average annual return than the EW strategy.

Table 1 also lists the downside deviation, information ratio and the Sortino ratio of the MaxRet relative to the EW. These values are 14.17%, 0.33, and .31 respectively. The downside deviation value of 14.17% is measured in units of return and is lower than the overall standard deviation of 22.44%. The lower downside deviation indicates a lower volatility below the target EW returns. The information ratio of .33 indicates a measure of the relative return gained for taking on the EW portfolio benchmark relative risk. A positive ratio of .33 means a positive level of differential return over the benchmark. The Sortino ratio of .31 indicates that there is a positive annual average difference of the fund and the target returns per unit of downside risk. All of these downside risk measures support the enhanced performance of the active MaxRet strategy relative to the more passive EW strategy.

Table 2 lists the downside deviation, information ratio and the Sortino ratio relative to a target return of 0% (no loss) for the MaxRet strategy. For the MaxRet strategy, these values are 11.68%, .65 and 1.21 respectively. The downside deviation value of 11.68% is measured in units of return. A lower downside deviation indicates a lower volatility below the target return. The information ratio of .65 indicates a measure of the MaxRet strategy relative return gained relative to a target return of 0%. The Sortino ratio of 1.21 indicates that there is more of a positive annual average difference between the MaxRet strategy and the target return of 0% per unit of downside risk.

Table 2. Downside Risk Measures for MaxRet Fund with Target Return = 0 from 2004 through 2015

Downside Deviation	11.68%
Information Ratio	0.65
Sortino Ratio	1.21

4. Conclusions

In this short research note, the out-of-sample annual average return performance of the MaxRet fund in the SPDR family in the previous five years is compared to the return performance of an EW portfolio of SPDR family sector funds. The empirical results demonstrate the potential for the Max Ret strategy to enhance performance relative to the more passive EW strategy over the period from 2004 through 2015.

The average annual returns for the MaxRet and the EW are 14.13% and 9.75% respectively. The standard deviation of returns for the MaxRet and the EW are 21.44% and 15.48% respectively. Even after allowing 50 basis points per year in transaction costs, the MaxRet average annual return is 3.88 % per year greater than the EW strategy. The coefficient of variation [CV] for the MaxRet and EW are 1.52 and 1.59 respectively. The MaxRet is a much more efficient strategy over the 12-year period from 2004 through 2015 in that it generated less standard deviation risk per unit of average annual return than the EW strategy. Further, all of the downside risk measures calculated in this research support the enhanced performance of the MaxRet strategy relative to the more passive EW portfolio strategy.

It is important to realize that the results of this research depend on the period analyzed and may not be realized in the future. The time period used for collecting investment returns can and will affect the results the analysis. Knowing the limitations of this kind of portfolio analysis is just as important as what the analysis might tell you.

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