Investing in Small Basket Portfolios of DJIA Low Return Stocks: The Potential for Losers to Become Winners

Professor Glen A. Larsen, Jr.
Indiana University Kelley School of Business
801 W. Michigan St.
Indianapolis, IN 46202, USA

Abstract

The focus of this research is on the performance of portfolios constructed on an annual basis from stocks that make up the Dow Jones Industrial Average (DJIA)using a long-only minimum realized return small-basket portfolio (MinRet SBP)strategy. The MinRet SBP is formed each year using those stocks in the DJIA that had the lowest realized returns in the previous five-years with the weight constraint that no more than 20% of the portfolio can be invested in a single security. Over the 20-year period from 1996 through 2015, the MinRet SBP strategy generates a higher average annual total return and a lower risk per unit of return measure than the DJIA. Perhaps even more importantly, measures of downside risk support the enhanced out-of-sample performance of the actively managed MinRet SBP strategy.

Keywords: small-basket portfolios, risk/return optimization, low-volatility, momentum, performance enhancement, active management

JEL classification: G11

The focus of this research is on the performance of portfolios constructed on an annual basis from stocks that make up the Dow Jones Industrial Average (DJIA) using a long-only minimum realized return small-basket portfolio (MinRet SBP) strategy. The results demonstrate the potential for this simple low return strategy to generate enhanced performance relative to the 30-stock DJIA. This research is different from the Dogs of the Dow approach to investing, which was popularized by Michael Higgins in his book, "Beating the Dow". The Dogs of the Dow are the 10 of the 30 companies in the Dow Jones Industrial Average (DJIA) with the highest dividend yield. In the Dogs of the Dow strategy, the investor must continually adjust his or her portfolio so that it is always equally allocated in each of these 10 stocks. Typically, such an investor might need to completely rid his or her portfolio of all holdings every year and replace them with different ones. Stocks in the Dogs of the Dow portfolio must be replaced because their dividend yields have fallen out of the top 10, or occasionally, because they have been removed from the DJIA altogether. In this research, we construct long-only small-basket portfolios of DJIA stocks using the stocks in the DJIA that have shown the lowest returns over the previous 5 years. The weight of each of the low return stocks is constrained to be no more than 20% of the actively managed portfolio that is held for the next one-year period. An active investment strategy 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. That is, if markets are not perfectly efficient and active management is a viable portfolio strategy, it may be possible for portfolios constructed from a smaller well-chosen set of stocks to show a consistent pattern of improved performance relative to larger benchmark or index portfolio of similar stocks. The MinRet SBP strategy investigated in this research is an active management strategy that only requires an investment in five stocks. It is recognized that the MinRet SBP strategy in this research conflicts with the argument that the loss of diversification from constructing a portfolio from a small number of stocks will not improve the risk/return performance relative to a well-diversified portfolio constructed from a large number of stocks.

While it is true in the context of modern portfolio theory that limiting the pool of available investments cannot result in an ex-post (based on realized returns) efficient frontier that provides a lower risk/return ratio (coefficient of variation) than the market portfolio, actual investment portfolios are formed on an ex-ante basis and the true market portfolio is not observable. The primary contribution of this research is in demonstrating the potential for the relatively simple MinRet SBP strategy to provide enhanced performance relative to the 30-stock DJIA. Further, given the instructions that are provide in this research, it is relatively easy for individual investors and investment managers to utilize the low return SBP strategy in their personal or client accounts. The organization of the paper is as follows. Section I provides a review of the literature. Section II discusses the database and the ex-ante techniques for constructing the SBP portfolios. Section III compares the performance results for the MinRet SBP strategy to the performance of the DJIA. Section IV presents an interpretation of the results and the conclusion.

I. Literature Review

There are individual investors and active portfolio managers who take an active approach to investing by constructing portfolios using a limited number (small basket) of stocks. Williams (2012) describe one example of a successful small-basket approach to portfolio construction in his Barron's article, "A Small Basket of Big Stocks." J. Dowe Bynum, a co-portfolio manager of the Birmingham, Alabama-based Cook and Bynum Fund (ticker: COBYX), and his partner Richard Cook, often hold fewer than 10 stocks at any given time and are willing to stake 20 percent or more of the portfolio on a single stock. Conway (2012) provides another professional viewpoint that supports the small-basket concept in terms of a small number of stocks driving fund performance in his Barron's article, "Keeping It Simple." Matthew Reiner of Wela Strategies was quoted in the article as saying that in analyzing a fund for investment he wants to see the top 10 or 15 holdings (in any fund) and how many of those holdings compose the top 50 percent of the fund. Reiner stated, "You have to look at composition first everything else is what I call contamination. It (analyzing a fund) comes down to composition and contamination … you need to figure out if you want to hold the top holdings because the other 200 to 500 positions are nothing more than 1-percenters that contaminate the returns of the big drivers." More recently, Kimmel (2015) states that "A portfolio with only 25 positions is considered a concentrated portfolio in the institutional world. I believe, however, that an individual investor who is willing to accept more volatility can work with a portfolio of seven to 10 stocks. It may not be easy or always achievable for everyone, but higher returns are possible…anybody looking for higher-than-index returns needs to avoid the very thing that keeps most investors mired in mediocrity: over-diversification."

Some investors prefer to invest in stocks that are generating high returns rather than in stocks that are generating low returns, which is the focus of this research. Investors who prefer to invest in high return stocks are momentum investors. Momentum Investors attempt to take advantage of the positive feedback-trading hypothesis (PFTH). DeLong, Shleifer, Summers, and Wildman (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 idea is that at times traders may buy a security simply because it is going up in price, which is referred to as the momentum effect. 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 buying frenzy is rational because people buy securities to make money, and with rising prices, they are making money. Eventually this rational bubble bursts, and prices collapse precipitously. People begin to sell because the prices are falling, and prices fall because people are selling. Momentum up, momentum down. Momentum investing, however, often works only in bull markets. 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. Henning (2010) also suggests that momentum investing can lead to higher return volatility relative to a benchmark. In the MinRet SBP strategy, the target stocks for investing have the lowest realized returns over the previous five years. In this regard, the MinRet SBP strategy is contrary to a momentum strategy. The premise of MinRet SBP strategy investment style is that the DJIA low return stocks are temporarily out-of-favor with investors, but are still good companies. Once these companies rebound in price due to revised investor expectations, the average annual returns from these stocks may outpace the average annual returns of the DJIA.

II. Data and Methodology

In this research, we construct long-only small-basket portfolios from those DJIA stocks that have shown the lowest returns over the previous 5 years. The weight of each of the low return stocks is constrained to be no more than 20% of the actively managed portfolio that is held for the next one-year period. We investigate the potential for the MinRet SBP strategy to enhance portfolio performance relative to the DJIA. The DJIA is aproper benchmark for the MinRet SBP 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 files for the individual stocks in the DJIA are obtained from The University of Chicago Center for Research in Security Prices (CRSP). The CRSP total monthly return data files are used to calculate the compounded annual rate of return for each of the stocks in the DJIA and MinRet SBP strategy. We use an in-sample estimation period of five yearsof return data to solve for the set of individual stocks used to construct the MinRet SBP portfolio for the next out-of-sample one-year in holding period. For example, the ex-ante MinRet SBP portfolio for 1996contains those stocks in the DJIA that had the lowest realized returns over the previous five years from 1991 to 1995. The ex-ante portfolio for 1997 is constructed based on the ex post return data from 1992 to 1996, and so forth. As such, there is no forward-looking bias in the MinRet SBP strategy. In addition, no short sales are allowed in the MinRet SBP strategy, as there are no stocks held short in the DJIA. Because individual stock weights in the MinRet SBPs are constrained to be no greater than 20%, the number of stocks in each SBP is limited to the five stocks with the lowest returns over the previous five years. As such, the MinRet SBP strategy does not depend on owning all (or a large number) of the stocks in the DJIA. This research does not attempt to optimize weight constraints. We acknowledge that weights constraints of other than 20%and over a period other than the previous 5 years could provide better performance than is reported in this research. The intent of this research is to test the potential for the MinRet SBP strategy to enhance performance relative to passive investment in an index fund comprised of a larger number of securities.

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 for the MinRet SBP strategy and the DJIA. 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 the volatility of returns. 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 semi deviation rather than the standard deviation of returns.

In a strict statistical sense, semi deviation 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 semi deviation. 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 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.

Shortfall risk is a downside risk measure the gives the percentage of periodic returns that fall below the target return over the study period. That is, shortfall risk is the number of returns that fall below the target return over the period divided by the total number of returns and reported as a percentage. As such, shortfall risk represents the relative frequency of a fund earning a return below the specified target rate of return. *Downside deviation*, like semi deviation from the mean, eliminates from the calculation of risk the returns that contribute to positive volatility. To calculate downside deviation, one must identify the fund 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 semi variance. 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. The Sortino ratio 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 DJIA is used asthe target return for calculating the Sortino ratios for the MinRet SBP strategy relative to the DJIA where the return of the MinRet SBP is the actively managed fund return. Second, we use a target return equal to zero (not incurring a loss) so that a Sortino ratio for the DJIA can be calculated and compared to the Sortino ratio for the MinRet SBP strategy relative to not incurring a loss. The larger the Sorhino 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 benchmarks that is used in the information ratio is the average annual value added, which is the average annual differential return between the MinRet SBP and the DJIA. The information ratio is calculated by estimating the value added and dividing it by standard deviation of the difference between returns of the MinRet SBP and the returns of the indexor target(tracking error).

III. Results

Table 1shows that the MinRet SBP strategy generates a higher average annual return and a lower coefficient of variation of annual returns than the DJIA over the study period. Furthermore, the results are based on only rebalancing once a year and holding five stocks, which does not take a great deal of work for the individual investor. The average annual returns for the MinRet SBP andthe DJIA are 16.98% and 10.01% respectively. The standard deviation of returns for the Min Ret SBP and the DJIAare 17.32% and 15.73% respectively. Even after allowing 50 basis points per year in transaction costs, the MinRet SBP average annual return is 6.47% per year greater than the 30-stock DJIA. Rather than show risk-return measures such as the Trey nor or Sharpe measures, which are subject to capital market assumptions, we show the coefficient of variation, which is the standard deviation divided by the average annual return for each of the portfolios. The coefficient of variation (CV) for the MinRet SBP and DJIA are 1.02 and 1.57 respectively. The CV for the MinRet SBP is far lower than for the DJIA. In short, the MinRet SBP is a much more efficient portfolio over the 20-year period from 1996 through 2015in that it generated less standard deviation risk per unit of average annual return than the DJIA.
Table 1alsolists the *shortfall risk, downside deviation, information ratio, Sortino ratio* and the *Beta* of the MinRet SBP relative to the DJIA. These values are 15.00%, 7.29%, 1.13, .97 and 1.03 respectively. The shortfall risk value of 15%indicates the relative frequency of a fund earning a return below the DJIA rate of return. The downside deviation value of 7.29% is measured in units of return and is lower than the overall standard deviation of 17.32%. The lower downside deviation indicates a lower volatility below the target DJIA returns. The information ratio of 1.13 indicates a measure of the relative return gained for taking on benchmark relative risk. A positive ratio of 1.13means a positive level of differential return over the benchmark. The Sortino ratio of .97 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 MinRet SBP strategy relative to the DJIA. Empirical beta is a measure of the volatility, or systematic risk, of a security or a portfolio, in comparison to a specific market index. In this study, beta is presented as the tendency of a portfolio's returns to respond to swings in the DJIA. The fact that the beta for the MinRet SBP strategy is1.03over the study period indicates the MinRet SBP provides a similar level of systematic risk relative to the DJIA from which it is derived while providing higher overall average annual returns, less risk per unit of return (coefficient of variation) and less downside risk. In order to insure that the overall enhanced performance of the MinRet SBP strategy was not driven by only few years in the 1996-2015 study period, various performance measures are given for each of the 5-year sub periods. Table 2 shows that the MinRet SBP strategy generates higher average annual returns than the DJIA in all four five-year sub periods and a lower coefficient of variation in all four of the five-year sub periods. The average annual sub period returns for the MinRet SBP are 27.00% (1996-2000), 10.50% (2001-2005), 14.19% (2006-2010) and 16.25% (2011-2015).

The average annual sub period returns for the DJIA are 18.82%, 2.97%, 6.55% and 11.71% respectively. The coefficient of variation (CV) for the MinRet SBP in the sub periods are .42, 1.85, 1.43 and .70.The coefficient of variation (CV) for the DJIA in sub periods are .66, 4.85, 3.02 and .83.

Table1.Minimum Return Small-Basket Portfolio (MinRet SBP) Strategy Performance Results 1996 - 2015
Portfolio Average Annual Total Returns

Year	**MinRet SBP**	**DJIA**
1996	39.39%	28.71%
1997	39.75%	24.90%
1998	22.12%	18.13%
1999	24.28%	27.21%
2000	9.45%	-4.85%
2001	-3.16%	-5.44%
2002	-10.49%	-15.01%
2003	45.93%	28.28%
2004	11.96%	5.31%
2005	8.26%	1.72%
2006	34.45%	19.05%
2007	20.44%	8.88%
2008	-24.85%	-31.93%
2009	21.68%	22.68%
2010	19.24%	14.06%
2011	1.76%	8.38%
2012	23.30%	10.24%
2013	32.32%	29.65%
2014	18.63%	10.04%
2015	5.22%	0.21%

Traditional Measures of Return and Risk:

Average Annual Return	16.98%	10.01%
Standard Deviation	17.32%	15.73%
Coefficient of Variation	1.02	1.57
Beta	1.03	1.00

Measures of Downside Risk of MinRet SBP Relative to the DJIA:

Shortfall risk	15.00%
Downside Deviation	7.29%
Information Ratio	1.13
Sortino Ratio	0.97

Table2Minimum ReturnSmall-Basket Portfolio MinRet (SBP) Strategy Sub-Period Performance Results 1996 - 2015

Sub period	MinRet SBP	DJIA
1996-2000		
Average Annual Return	27.00%	18.82%
Standard Deviation of Annual Return s	11.45%	12.38%
Coefficient of Variation	.42	.66
Beta SBP vs. DJIA	.78	1.00
2001-2005		
Average Annual Return	10.50%	2.97%
Standard Deviation of Annual Returns	19.44%	14.43%
Coefficient of Variation	1.85	4.85
Beta SBP vs. DJIA	1.34	1.00
2006-2010		
Average Annual Return	14.19%	6.55%
Standard Deviation of Annual Returns	20.27%	19.79%
Coefficient of Variation	1.43	3.02
Beta SBP vs. DJIA	0.98	1.00
2011-2015		
Average Annual Return	16.25%	11.71%
Standard Deviation of Annual Returns	11.36%	9.70%
Coefficient of Variation	0.70	0.83
Beta SBP vs. DJIA	.96	1.00

Table 3lists the shortfall risk, downside deviation, information ratio and the Sortino ratio relative to a target return of 0%(no loss) for the MinRet SBP and DJIA. Previous tables showed the shortfall risk, downside deviation, information ratio and the Sortino ratio for the MinRet SBP strategy relative to the DJIA. For the MinRet SBP strategy relative to a target return of 0% (a negative return or loss), these values are 15.00%, 7.29%, 1.03and 2.41 respectively. The shortfall risk value of 15% indicates the percentage of annual returns of the MinRet SBP that fall below an annual return of 0% (a negative return or loss). The downside deviation value of 7.29% is measured in units of return. A lower downside deviation indicates a lower volatility below the target return. The information ratio of 1.03 indicates a measure of the benchmark relative return gained for taking on benchmark relative risk. The high Sortino ratio of 2.41 indicates that there is more of a positive annual average difference of the MinRet SBP and the target return of 0% per unit of downside risk.For the DJIA, these values are 20.00%, 8.06%, .64 and 1.24 respectively. The shortfall risk value of 20% indicates the percentage of annual returns of the DJIA that fall below an annual return of 0% (a negative return or loss). This value is higher than that for the MinRet SBP strategy. The downside deviation value of 8.06% is measured in units of return. Since this value is higher than the MinRet SBP strategy, it indicates a higher downside volatility for the DJIA below the target return, which once again suggests that the MinRet SBP strategy can reduce downside risk by investing in a small basket of DJI stocks relative to the entire index.

Table3Downside Risk Measures for MinRet SBP and DJIA- Target Return = 0%

Measures of Downside Risk MinRet SBP vs Target = 0%	
Shortfall risk	15.00%
Downside Deviation	7.29%
Information Ratio	1.03
Sortino Ratio	2.41
Measures of Downside Risk DJIA vs Target = 0%	
Shortfall risk	20.00%
Downside Deviation	8.06%
Information Ratio	0.64
Sortino Ratio	1.24

IV. Conclusions

In this research, long only, small-basket portfolios of DJIA stocks are constructed based on the lowest realized returns (MinRet) in the previous five-year period. The potential for the MinRet SBP strategy to enhance performance relative to the larger index from which the small-basket portfolio is constructed is investigated.

At the beginning of each year from 1996 through 2015, the MinRet strategy is employed over the previous five years of the compounded annual historical total return data to solve for the MinRet SBP set of ex-ante stocks where the weight in each of the stocks is constrained to be no greater than 20%. The stocks selected in the five-year construction period are used to construct the portfolio for the next ex post one-year holding period. The average annual returns for the MinRet SBP strategy and the DJIA over the 1996 through 2015 study period are 16.98% and 10.01% respectively. The coefficient of variation (CV) for the MinRet SBP and DJIA are 1.02 and 1.57 respectively. The CV for the MinRet SBP is lower than for the DJIA. In short, the MinRet SBP is a much more efficient portfolio over the 20-year period from 1996 through 2015 in that it generated less standard deviation risk per unit of average annual return than the DJIA. Further, all of the downside risk measures calculated in this research support the enhanced performance of the MinRet SBP relative to the larger DJIA.

The potential benefit of the MinRet SBP strategy for investors who want to hold small basket portfolios of DJIA stocks and improve the risk/return performance of investing in a DJIA index portfolio is supported by looking at the downside risk measures relative to a target return of 0% for the MinRet SBP and the DJIA. These results support the enhanced risk/return performance potential for the MinRet SBP strategy. Perhaps most importantly, the relatively simple active management MinRet SBP strategy presented in this research can be easily implemented by individual investors or by professional portfolio managers on behalf of their clients. It is important to realize that the results of this research depend on the period analyzed and rest on the assumption that historical relationships between individual assets and asset classes will hold 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. Nevertheless, constructing low volatility portfolios is of great interest to investors.

References

Ang, Andrew, Robert J. Hodrick, Yuhang Xing & Xiaoyan Zhang, 2006, The cross-section of volatility and expected returns,*Journal of Finance* 61,59-299.

DeLong, J. Bradford, Andrei Shleifer, Lawrence H. Summers, and Robert J. Waldmann (1990), Positive-Feedback Investment Strategies and Destabilizing Rational Speculation,*Journal of Finance* 45, 374-397.

Conway, Brendan, 2012, Keeping It Simple,*Barron's* November 19.

Costa, B. and K. Jakob, 2011, Are Mutual Fund Managers Selecting the Right Benchmark Index?, *Financial Services Review* 20, 2-129.

Henning, Grant, 2010,*The Value and Momentum Trader*, John Wiley & Sons.

Kimmel, Jordan, 2015, How Much Diversification Is Right for You?*AAII Journal*, May 27-30.

Larsen, Jr., G. and B. Resnick, 2001, Parameter Estimation Techniques, Optimization Frequency, and Portfolio Return Enhancement, *Journal of Portfolio Management* 27, 1-8.

Lee, W., 2011, Risk-based Asset Allocation: A New Answer to an Old Question, *Journal of Portfolio Management* 37, 11-28.

O'Higgins, Michael and J. Downes, 2000, Beating the Dow, Harper Collins Publishers, Inc.

Shefrin, Hersh and Meir Statman, 2000, Behavioral Portfolio Theory,*The Journal of Financial and Quantitative Analysis* 35, 127-15.

Williams, Grace L., 2012, A Small Basket of Big Stocks, Barron's, September 25.