Value of Stock’s Screening and a Stock’s Rating to Investment Management

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ABSTRACT

In this study, we examine the value of implementing a combination of active investment management strategies in portfolio construction versus a passive strategy. In particular, we test whether a portfolio that is built using stock screening programs and ratings of stocks, outperforms an investment in the market index. In our stock screening process, we use a set of screening criteria commonly used in academic research and professional investment analysis to construct portfolios of stocks that are capable of outperforming the market. The results of our analysis show that the portfolio returns developed from the screening models significantly exceed the returns on the market, suggesting that efficient individual investors who can take advantage of the recent development in information technology can outperform the market. The findings also indicate that investors tend to invest in more stable large capitalization firms during periods of economic or financial crises. Based on the results of this study, we may argue that in addition to the fundamental indicators that are known to be effective in previous studies, technical indicators and analysts’ ratings are also successful in generating higher excess returns.

INTRODUCTION

Many professional portfolio managers and active investors are using stock screening programs that are available on the internet at little or no cost to investors. Some of these programs are highly sophisticated and provide over 300 screening variables that cover both fundamental and technical indicators. The stock screening programs make it easier and faster to build an investment portfolio that fits the desired style and preferences of the investor. The main objective of developing the screening programs is to find systematic patterns that will increase the performance of an investment portfolio.


However, many recent articles questioned the weak form efficiency hypothesis and provided evidence that support the notion that investors may generate stock market excess returns by using publicly available information. These studies include Gencay (1996), Fama and French(1995), Pesaran and Timmerman (1995) and Ferson and Harvey (1993). Some studies also provide evidence against the
efficiency of the U.S. stock market in its semi-strong form. Walker and Hatfield (1996) argue that security prices do not reflect all publicly available information. This suggests that investors may use computerized screening programs that take advantage of large databases and advances in information technology to efficiently select stocks. Some studies on the profitability of filter rules on exchange rates support this hypothesis (Levich and Thomas, 1993; Taylor, 1994).

The use of computerized screening programs to generate excess returns is also consistent with the weak form of the efficient market hypothesis offered by Jensen (1978). Jensen argues that prices of securities reflect information up to the point where the marginal benefits equal the marginal costs of the information. Due to advanced and low-cost computer technology, the marginal costs of making informed investment decisions declined significantly. This in turn, may account for the increase in short-term speculative trading by individual investors.

An emerging literature, however, suggests that excess returns can be realized by taking advantage of systematic patterns that seem to exist in the stock market, e.g., reaction and drift effects, earnings and forecast surprise effects, and performance persistence. The study by Jegadeesh and Titman (1993), for example, provides evidence that investors may generate significant positive returns over 3 to 12 month holding periods, if they buy stocks that have performed well in the past and sell stocks that have performed poorly in the past. Gold and Lebowitz (1999) document that investors may use computerized stock screening programs to develop stock selection strategies that significantly outperform market indices. Sahu and Kleiman (1998) provide evidence of superior stock selection ability among portfolio managers at bank trust departments. Rich and Reichenstein (1993) show that market timing based on the expected market risk premium, dividend yield, and the earnings-price ratio may enable the individual investor to beat the S&P 500. Badrinath and Kini (1992) show the positive potential of constructing portfolios from stocks selected on the basis of firm size, the earnings-price ratio, and the price-book ratio. Dennis, Perfect, Snow and Wiles (1995) finds similar results.

This study develops six screening models during the period January 1, 2012 to December 31, 2016. The models combine and implement a number of investment strategies for portfolio selection that have been shown to yield excess returns. The remainder of the paper is organized as follows: Section 2 describes the screening model criteria and in Section 3, we summarize the data and research method. The results of analysis are reported in Section 4 and in Section 5 we present the summary and conclusions.

SCREENING MODEL CRITERIA

The screening models in this study attempts to find portfolios of stocks that are undervalued and have relatively high potential for growth. We use fundamental and technical indicators in the screening models. We then assess the performance of each model relative to the S&P 500 market index. Recent literature identifies a number of variables that can predict excess return in the market. These variables include:

Price/earnings ratios and price/sales ratios

In their attempt to identify undervalued stocks and predict excess returns, many researchers have used relatively low values for price-to-earnings, price-to-book, and price-to-sales ratios. The researchers argue that these stocks are not currently popular with investors and create a potential for greater price increase. Recent finance literature also provides evidence that suggests that the sales-to-price ratio is a more reliable indicator than the price to earnings ratio. Barbee et al., (1996) argue that first, annual sales
historically are a better indicator of long-run expected profits than current reported profits; second, short term policies tend to have more effect on earnings than on sales revenues and sales figures are less subject to manipulation; third, sales-to-price cannot have negative values while P/E ratios can. We therefore use the price/sales ratio in the screening models in this study.

**Market capitalization and price/book ratios**

Many studies in the finance literature document an inverse relationship between small firm size or market capitalization and stock returns. Lo and MacKinlay (1988) find positive relationship between stock weekly returns and stock portfolios grouped by size. Dennis et al., (1995) find a significant relationship between firm size, book-to-market value and excess returns. The study shows that the optimal portfolios are those with the smallest firm’s size and highest book-to-market value. While the portfolios with the largest firms and smallest book-to-market equity underperformed the market.

**Earnings Growth**

Many researchers consider the earnings growth as an important indicator of stock returns. Vandell (1986) finds that screening on low price-to-earnings values would be successful in predicting returns only if earnings-per-share expectations are high. Kiang, and Chi (1991)also find that changes in quarterly earnings as one of the driving variables predicting the potential for excess returns. Earnings momentum in this study is measured as the EPS growth over past 5 years.

**Moving average rules**

Moving average rules are among the mostly used technical indicators to predict stock prices movements by technical analysts. They argue that if the current price moves above the moving average (or some band about the average), the technical analysts believe that the mood has changed from a declining to a rising stock pattern and a buy signal is generated. On the other hand, if the current price falls below the moving average (band), a sell signal occurs. Advances in computer technology have increased the sophistication and use of moving average models and new evidence by Gencay (1996) shows substantial gains in forecast accuracy through the use of such models with a forecast horizon of 20 days. Studies by Haugen and Jorian, (1996) and Cutler, Poterba, and summers, (1991) also report evidence of systematic patterns in daily, weekly, and monthly returns. The length of the period used in the moving average is commonly between 20 and 200 days.

**DATA AND RESEARCH METHOD**

The Finviz.com database is used to develop the screening models. The database universe consists of over 6500 listed stocks on NYSE, AMEX and NASDAQ exchanges. The data base offers over 120 fundamental and technical screening variables. The indicators that are used to develop the screening models are

a) Market capitalization is less than $2 billion
b) Market capitalization is more than $2 billion
c) Price/sales is less than 1
d) Price/Book value is less than 3
e) EPS Growth Past 5 Years is more than 20%
f) Current price is above 50 day moving average
g) Analyst’s rating is buy or better
We list the six models that are developed using a combination of the indicators above in table 1. We test the hypothesis that the portfolios constructed using the screening models outperform the broad market.

Two alternative measures of performance are used in this study to compare the performance of the screening models portfolios relative to the market index. The Jensen’s alpha, $\alpha_p$, and the Sharp information ratio, $S_p$. Jensen’s alpha depends on beta as a measure of the risk of the portfolio. We estimate the Jensen’s alpha $\alpha_p$ from the estimated equation for:

$$r_{pt} = \alpha_p + \beta_p r_{mt} + \epsilon_{pt}.$$  

Where $r_{pt}$ is the excess return (i.e., the observed return minus the risk free rate) on the portfolio $p$ in month $t$, $r_{mt}$ is the excess return on the benchmark or market portfolio in month $t$, $\beta_p$ is portfolio $p$’s beta, and $\epsilon_{pt}$ is the residual term during period $t$. The latter error term is normally distributed $(0, \sigma_e)$.

The adjusted monthly return data for individual firms and market indexes that are used in estimating the Jensen alpha are extracted from the yahoo finance data base. The return on the three month Treasury bill is obtained from the online Federal Reserve Banks data base.

The second measure of investment performance is the Sharp information ratio. This statistic measures the portfolio’s average return in excess of a benchmark portfolio divided by the standard deviation of this excess return. The information ratio is calculated as

$$IR = (R_p - R_b)/\sigma_{ER}$$  

Where:

$IR_j = $ the information ratio for portfolio $j$
$R_j = $ the average return for portfolio $j$ during the specified time period
$R_b = $ the average return on the benchmark or market portfolio during the period
$\sigma_{ER} =$ the standard deviation of the excess return during the period

(Goodwin, 1998) shows that if excess portfolio returns are estimated with historical data using the same single factor model used to estimate Jensen’s alpha, the IR simplifies to

$$IR_j = \alpha_j/\sigma_e$$  

where $\sigma_e$ is the standard error of the regression in equation 1.

To convert the information ratio that is based on a periodic returns measured T times per year to an annualized information ratio the following formula is used:

$$\text{Annualized } IR = (T)\alpha_j/(T^{0.5})\sigma_e = (T^{0.5})IR$$  

(Grinold and Khan, 2000) suggest that a reasonable information ratio should fall between 0.50 and 1.0. Annualized Information ratio of 0.5 indicates good performance and an IR of 1.0 indicates exceptional performance.

**RESULTS**

The Finviz.com and yahoo finance databases are used to develop six screening models and test for their ability to outperform the S&P 500 market index. Model 1 and 2 uses four fundamental indicators that have been effective in generating excess returns in previous studies; size, price to sales ratio, price to book ratio and earnings per share growth. Model 1 is for small cap firms and model 2 for large cap firms. Model three and model four use the same fundamental variable used in model 1 and 2 and add a technical indicator the moving average. Model 5 and model 6 uses the same indicators used in model 3 and model 4 and add the analysts rating indicator.
Table 2 provides descriptive statistics (mean monthly return, market capitalization, price/sales ratio, price/book value and earnings per share growth in the past 5 years) for each of the screening model portfolio. The average market cap for the small firms ranges between $385 million and $526 million and the average market cap for large firms are between $4.47 billion and $8.63 billion. The average price to sales ratio is between 0.52 and 0.62, the average price to book is between 1.28 and 1.70 and the earnings per share growth are between 32% and 47%. The mean monthly return ranges between a low of -0.11% for model 1 and a high of 0.82% for model 6.

Table 3 reports the estimated beta from the regressions and the performance measures (Jensen’s alpha and Sharp IR) for each of the six models. The Jensen alpha was computed from equation (1) using the S & P 500 index from as a benchmark. The estimation period runs from January 1, 2008 to December 31 2012. Sharp IR is calculated by dividing the estimated alpha from the regression in equation (1) by the regression standard error. This statistic is then annualized by multiplying the monthly IR by the square root of 12.

The alpha estimates for model 1 is -0.0011 and 0.0054 for model 2. These results suggest that while model 2 outperformed the market by generating positive excess returns, model 1 underperformed the market by generating negative excess returns. This conclusion is also supported by the results from the estimated annualized sharp information ratio. The estimated annualized information ratio is -0.1158 for model 1 and 0.3976 for model 2. The two models used the same three fundamental indicators; the only difference is the size of the firms in each portfolio. Model 1 portfolio contains small size firms and model 2 portfolios consist of large size firms. These results support the notion that investors tend to invest in more stable large cap firms during bad economic times. The period of analysis in this study includes the last recession. The National Bureau of Economic Research (NBER), which determines when recessions in the United States officially “begin” and “end”, has declared Dec 2007-June 2009 as the dates for the latest recession.

The alpha estimates for model 3 and model 4 are both positive suggesting that they both generated excess returns over and above the market return. But model 4 provided higher excess return (0.63%) than model 3 (0.03%). This again supports the notion that investors tend to reward larger firms during bad times. This finding is also supported by information ratio results. The information ratio is .028 for model 3 and 0.44 for model 4. The size of estimated alpha in model 3 and 4 are greater than the corresponding estimated alphas in models 1 and 2. The same is true for the estimated information ratio. This finding suggest that technical indicator (current price of the stock is over the 50 days moving average) added to the prediction value of model 1 and 2 and increased the excess return.

The alpha estimates for model 5 and model 6 are also positive suggesting that they both generated excess returns for investors. Model 6 that contains large firms provided higher excess return (0.90%) than model 5 excess returns (0.53%). The estimated information ratio for model six is also higher for model 6 than model 5. These findings suggest that large firms tend to outperform small firms during bad times. The estimated alpha and information ratio in model 5; and is greater in size than the corresponding estimated alphas and information rations in models 1 and 2 and models 3 and 4. These results indicate that the additional analyst rating indicator increased the superiority of the screening models and generated higher excess returns.
CONCLUSION

The recent developments in communication and technology made it easy and less expensive for portfolio managers and individual investors to use powerful screening tools to search large databases and select stocks that best meet their investment goals. In this study, we use the Finviz.com and yahoo finance databases to construct six screening models and test for their ability to outperform the S&P 500 market index. The results of the study show that, without considering any tax consequences, the portfolio returns of all six screening models significantly exceed the returns on the market. The success of the screening model in this study could be explained by the following: First, the results are consistent with delayed price reactions to firm-specific information. Institutional investors due to high costs (both direct and indirect) are slow in reacting, leaving an opportunity for the efficient individual investor who can take advantage of the recent development in information technology to move more rapidly. Second, we selected the indicators in this study based on a review of the empirical literature and included only indicators that were successful in previous studies. Finally, we combined fundamental and technical filters in some of the models to take advantage of synergistic effects. Although the results are encouraging, the study may have its limitation since it is covering the five years that include the most recent recession and international financial crises. More work is needed to confirm the results of the study.

Table 1: Screening Models Using Fundamental and Technical Indicators,
January 1, 2012 to December 31, 2016

<table>
<thead>
<tr>
<th>Model</th>
<th>Market Capitalization</th>
<th>Price/Sales</th>
<th>Price/Book Value</th>
<th>EPS Growth Past 5 Years</th>
<th>50 Day Moving Average*</th>
<th>Analyst Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Less than $2bil</td>
<td>Less than 1</td>
<td>Less than 3</td>
<td>Over 20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Over $2bil</td>
<td>Less than 1</td>
<td>Less than 3</td>
<td>Over 20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Less than $2bil</td>
<td>Less than 1</td>
<td>Less than 3</td>
<td>Over 20%</td>
<td>Above</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Over $2bil</td>
<td>Less than 1</td>
<td>Less than 3</td>
<td>Over 20%</td>
<td>Above</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Less than $2bil</td>
<td>Less than 1</td>
<td>Less than 3</td>
<td>Over 20%</td>
<td>Above</td>
<td>Buy or Better</td>
</tr>
<tr>
<td>6</td>
<td>Over $2bil</td>
<td>Less than 1</td>
<td>Less than 3</td>
<td>Over 20%</td>
<td>Above</td>
<td>Buy or Better</td>
</tr>
</tbody>
</table>

*Current price of the security in comparison to its 50 Day Moving Average

Table 2: Descriptive Statistics of Screening Model Portfolios, January 1, 2012 to December 31, 2016

<table>
<thead>
<tr>
<th>Model</th>
<th>Mean Return</th>
<th>Mean Market Cap (Millions)</th>
<th>Mean P/S Ratio</th>
<th>Mean P/B Ratio</th>
<th>Mean EPS Growth, 5 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.0011</td>
<td>385.63</td>
<td>0.52</td>
<td>1.28</td>
<td>46.83%</td>
</tr>
<tr>
<td>2</td>
<td>0.0049</td>
<td>8638.57</td>
<td>0.60</td>
<td>1.47</td>
<td>32.41%</td>
</tr>
<tr>
<td>3</td>
<td>0.0004</td>
<td>432.23</td>
<td>0.52</td>
<td>1.39</td>
<td>47.12%</td>
</tr>
<tr>
<td>4</td>
<td>0.0063</td>
<td>6382.13</td>
<td>0.62</td>
<td>1.63</td>
<td>40.83%</td>
</tr>
<tr>
<td>5</td>
<td>0.0062</td>
<td>526.76</td>
<td>0.59</td>
<td>1.63</td>
<td>37.67%</td>
</tr>
<tr>
<td>6</td>
<td>0.0082</td>
<td>4747.23</td>
<td>0.57</td>
<td>1.70</td>
<td>40.80%</td>
</tr>
</tbody>
</table>

Table 3: Performance of portfolios using known Screening Model, January 1, 2012 to December 31, 2016

<table>
<thead>
<tr>
<th>Model</th>
<th>Sample Size</th>
<th>Beta</th>
<th>Alpha</th>
<th>Annualized IR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>128</td>
<td>1.417</td>
<td>-0.0011</td>
<td>-0.1158</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>1.579</td>
<td>0.0054</td>
<td>0.3976</td>
</tr>
<tr>
<td>3</td>
<td>79</td>
<td>1.369</td>
<td>0.0003</td>
<td>0.0284</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>1.552</td>
<td>0.0063</td>
<td>0.4498</td>
</tr>
<tr>
<td>5</td>
<td>44</td>
<td>1.427</td>
<td>0.0053</td>
<td>0.4868</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>1.73</td>
<td>0.0090</td>
<td>0.5236</td>
</tr>
</tbody>
</table>
The table provides the results of the two performance measures, the Jensen’s alpha and Sharp information ratio for six portfolios constructed using the screening models. Jensen alpha is computed from equation (1) using the S & P 500 index as a benchmark. The information ratio is annualized by multiplying the monthly IR calculated from equation (3) by the square root of 12 as shown in equation (4).

REFERENCES


