

# Behavioral Measures of Expected Market Return

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# **Behavioral Measures of Expected Market Return**

- Abstract-

The impact of investor behavior on equity pricing has been extensively investigated. The conclusion is that investor behavior significantly impacts individual as well as market-wide equity returns. In this study, I add to the behavioral investing literature by introducing Strategy Market Barometers that are based on the extent to which investors are currently rewarding one equity strategy over another. I find that combining US and International Strategy Market Barometer measures with Baker & Wurgler's (2006) Sentiment Index, and other variables, explains 13% to 30% of subsequent S&P 500, Russell 2000, and EAFE annual return variability. Results are statistically and economically highly significant. In several cases, the annual subsequent return advantage of the top 16% over the bottom 16% sentiment and strategy index values reaches an astonishing 37% per annum. These results cannot be explained by trailing market returns nor changing economic conditions. Thus Strategy Market Barometer and Sentiment Index behavioral measures are predictive of future market returns and therefore provide a measure of expected market returns.

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## **Behavioral Measures of Expected Market Return**

The concept of a rational investor was first proposed by Bernoulli in 1738. Since then, rationality has played a central role in numerous social, economic, and financial theories, including Modern Portfolio Theory. But over the last few decades, rationality has come under withering attack and, as a result, many are questioning MPT. The assault on rational decision making by investors began with articles by Kahneman and Tversky (1972, 1973, and 1979). They show that investors (and others) use shortcuts and heuristics in making decisions, particularly those involving risk and long investment horizons. Consequently, investors make irrational decisions that, collectively, bias individual security as well as market-wide prices. One of the conclusions of this research is that it is hard to believe that security prices fully reflect all relevant information, as proponents of the Efficient Market Hypothesis contend.

The Behavioral Finance and Behavioral Investing literature has grown rapidly in recent years, as Baker and Nofsinger (2010) document in their excellent summary. Montier (2007) shows practitioners how to use behavioral investing in order to improve investment decisions. Shefrin (2008) provides the first systematic analysis of how behavioral assumptions impact the pricing kernel that lies at the heart of modern asset pricing theory. The book provides a unified behavioral treatment of the pricing of equities, options, fixed income securities, and mean-variance portfolios.

Using Shefrin's model as the theoretical foundation, this paper shows that objective measures of investor behavior are predictive of subsequent market returns. Shefrin posits a world in which

investors begin with unequal wealth endowments, have different probability assessments of future events (some are pessimistic, some are optimistic, and some are overconfident, these changing over time), and have different risk preferences. A “typical” investor does not exist, but instead a “representative” investor can be constructed based on a wealth weighted composite of individual investor probabilities and risk preferences. The result is a composite probability distribution of future events which is likely multimodal and differs in important respects from the true probability distribution. The differences between composite and true probabilities leads to the mispricing of individual securities as well as to overall market mispricing. This is captured by Shefrin’s pricing kernel model (PKM), which incorporates changes in both fundamentals and composite probabilities. As investment returns redistribute wealth and as individual probability assessments and risk aversion change, the extent of mispricing varies over time. Individual securities, as well as market-wide indices, can go from being undervalued to overvalued and back again as relative wealth weights change across those who are pessimistic, optimistic, overconfident, and rational (i.e. informed investors who hold the true probabilities). One of the model’s predictions is that actual prices will fluctuate more than will the underlying fundamentals, because investor behavior driven composite probabilities will fluctuate more than will the fundamentally driven true probabilities. Another prediction of the model is that expected market returns will vary considerably over time. These two model predictions are tested in the empirical tests that follow.

### Expected Market Returns

Traditional researchers posit that changing expected market returns are driven by time varying risk premium resulting from ever evolving economic (i.e. changing fundamentals) and market conditions. A number of studies have attempted to relate economic variation to changes in

expected returns, but not much has come of these efforts. The most successful is the line of research focused on dividend yield/payout (dividends + share repurchase – share issuance) yield which documents a positive relationship between market payout yield and future returns. For example, Boudoukh et. al, (2007) find that 10% of annual market return variability can be explained by a time varying market payout yield. They also confirm that individual stock payout yields are positively related to subsequent returns. But since both dividend and payout yields involve market prices, which are impacted by investor behavior, it is not possible to say whether these relationships are the consequence of changing fundamentals, risk, or investor irrationality.

In a parallel research stream, behavioralists have identified a number of decision mistakes made by investors. These include prospect theory, disposition effect, representativeness, anchoring, framing, and social validation, among others<sup>1</sup>. Other researchers have attempted to detect equity pricing errors that result from the widespread incidence of these mistakes<sup>2</sup>. In general, the evidence from these “bottom-up” studies has been weak. One of the few exceptions is a study by Frazzini (2006) who, using mutual fund holdings, uncovers strong evidence supporting the disposition effect.

A “top-down” approach is taken by Baker and Wurgler (BW 2006, 2007) who attempt to identify broad measures that capture investor sentiment and thus make it possible to predict future stock returns. They show that their resulting “Sentiment Index”, based on 6 individual measures, is predictive of individual stock as well as market-wide returns. So rather than trying to link individual micro decisions to pricing errors, BW link macro variables to future stock returns.

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<sup>1</sup> See Baker and Nofsinger (2010) for a comprehensive review of the Behavioral Finance literature.

<sup>2</sup> See, for example, Brown and Cliff (2004,2005), Kent et. al. (1998), Gloshkov (2006), Goetzmann et. al. (2000), Kamstra et. al. (2003), Lee et. al. (1991), Lemmon and Portniaguina (2006), Ljungqvist et. al. (2006), Neal and Wheatley (1998), Qiu and Welch (2006), Whaley (2000), and Zweig (1973).

This paper starts with the BW Sentiment Index and adds three other macro measures, two of which are based on the investment strategy being pursued by active equity managers and a third based on market cap – book to equity (MCBE) portfolios.

Equity managers in a particular strategy peer group pursue a specific approach to making money that differs from the approach followed by managers in other peer groups. For example, there are managers who focus on finding the best companies in each industry, as measured by management quality, ability to innovate, defensible market position, and strong company fundamentals. On the other hand, there are managers who attempt to buy undervalued stocks regardless of the quality of the company. The performance of each approach will vary as investors favor one over the other through time. If the range of strategies span all return factors driving equity returns, then strategy performance ranks provide a picture of how investors are responding to the full range of return factors. Some factor patterns are favorable for market-wide returns going forward, while other factor patterns are not. The question I address in this paper is whether current strategy performance ranks are predictive of subsequent market returns. The empirical tests that follow reveal that they are.

I view MCBE portfolio performance ranks in a similar manner to that of strategy performance ranks. MC and BE were tapped 30 years ago as a way to understand the return factors driving stock prices. If MC and BE proxy for important return factors, then changing performance ranks of MCBE constructed portfolios might reveal whether the current factor pattern is favorable or unfavorable for future market returns. For example, if small cap value is outperforming mid cap growth which is outperforming large cap blend and so on, is this set of MCBE performance ranks favorable or unfavorable for subsequent market returns. The evidence that follows reveals that MCBE performance ranks are not predictive.

The remainder of this paper is organized as follows. In Section I, the BW Sentiment Index is discussed. In Section II, the equity strategy identification and Strategy Market Barometer methodology is introduced. In Section III, the method for estimating MCBE portfolio ranks is described. In Section IV, the behavioral measure empirical results are presented and analyzed. Finally, Section V provides conclusions and suggestions for future research.

## **I. Sentiment Index**

The Sentiment Index (SI) was first proposed by BW (2006) and further elaborated upon in BW (2007). Rather than estimate the pricing impact of specific investor behaviors, such as the disposition effect, BW take a top-down approach, which is built on two critical assumptions of behavioral finance: 1) time varying investor sentiment and 2) limits to arbitrage. They use these to explain which stocks are likely to be most affected by investor sentiment.

They view investor sentiment as simply optimism or pessimism about stocks in general, and allow the limits to arbitrage to vary across stocks. As a first step in constructing SI, they consider a range of possible sentiment measures, from surveys to market-wide variables, that are thought to be affected by changing market sentiment. Many of these possible measures were discarded, some because they were believed to be unreliable, such as survey data, and some because of data unavailability over the entire time period they wished to test their concepts (1963-2001).

BW settled on six measures for constructing SI (see BW (2006) for more details):

- closed-end fund discount,
- detrended log of share turnover,
- number of IPO's,
- first-day return on IPO's,

- dividend premium, and
- equity share in new issues.

Each of these six measures are standardized, with the effect of macroeconomic conditions removed. The resulting SI is a weighted, principal component combination of the six proxies. BW hypothesize that a low (high) SI implies low (strong) investor sentiment which leads to stock undervaluation (overvaluation) and in turn is predictive of higher (lower) returns going forward. BW's empirical tests focus on those companies most susceptible to sentiment mispricing (i.e. younger, smaller, more volatile, unprofitable, non-dividend paying, distressed, or extreme growth potential companies). They postulate a "sentiment seesaw" in which the companies opposite from the above (i.e. "bond-like" companies) underperform (outperform) when SI is high and the reverse when SI is low. BW present empirical evidence supporting the sentiment seesaw. BW also provide limited evidence that SI is predictive of overall market returns. I build on this latter result and provide evidence that SI is indeed predictive of future market returns.

## **II. Strategy Market Barometers**

Equity strategy is the way an active manager goes about analyzing, buying and selling stocks. Put more succinctly, it is the way a manager goes about earning excess returns. In developing a strategy, a set of return factors are identified that the manager can take advantage of. The return factors focused upon differ from manager to manager. The manager then develops a strategy around the identified return factors and fashions a methodology for implementing the strategy. For example, a manager pursuing a Competitive Position strategy (more details shortly) will develop a methodology for gauging the quality of a company's management team, the defensibility of their product market position, and the level of company adaptability. The fund

company for which the manager works assembles the resources needed to execute this methodology. The equity strategy is at the core of the investment process and shapes the business and investment decisions of the fund company. The consistent pursuit of a narrowly defined equity strategy, along with taking high conviction positions, is the key to earning excess returns.<sup>3</sup>

AthenaInvest has strategy identified 2800 US and International active equity open end mutual funds domiciled in the US. This was accomplished by gathering 50,000 pieces of strategy information from fund prospectuses and organizing this information into strategy elements (the specific things a manager does to implement a strategy, such as determining the quality of the company's management team), grouping this information into 40 elements, and assigning elements to one of 10 equity strategies. The 10 equity strategies are described in Table 1. Each active equity fund is then identified as pursuing a Primary and Secondary strategy and becomes a member of a single strategy peer group.<sup>4</sup>

[Place Table 1 about here]

The resulting peer groups are based on self declared strategy. Many researchers question the reliability and usefulness of such information. To address this issue, a series of statistical reliability strategy peer group tests were conducted and the results are reported in Howard (2010). The three main conclusions:

- Based on cross-fund correlation analysis, funds within a strategy peer group are more alike, on average, than those across strategies.

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<sup>3</sup> The importance of consistently pursuing a strategy and taking high conviction positions for earning excess returns is confirmed by a number of studies. See, for example, Howard (2010) and Cohen et. al. (2009).

<sup>4</sup> Designating elements and strategies was accomplished over a 2 year period and a series of iterations involving professional manager input, data gathering, and trial element/strategy combinations. Once the element/strategy framework was decided upon, the data gathering and identification algorithm was built as a computer platform. In 2010 the computer based strategy identification algorithm was granted a US Patent and in 2011 it was granted a Singapore patent. For more details, visit [www.athenainvest.com](http://www.athenainvest.com).

- Based on cross-fund correlation cluster analysis, forming fund peer groups based on strategy is statistically superior to forming groups randomly or forming them based on style boxes.
- Each strategy peer group pursues a statistically different set of return factors.

Figure 1 is a representation of which strategy investors are rewarding, with the darker arrows signifying greater returns. Strategies are arranged (from the top of Figure 1 clockwise) in their long-term performance order (based on 1988 through 2007 returns).<sup>5</sup> That is, Future Growth is the top performing long-term strategy, Competitive Position is the next, and so forth on down to Risk, which is the worst long-term performer. Figure 1 presents the situation in which relative strategy performance, as represented by varying arrow shades, matches long-term strategy performance. Strategy performance fluctuates over time, resulting in time periods in which strategies in the lower left of Figure 1 are favored by investors. The empirical question addressed in this paper is whether the ever changing pattern of strategy performance ranks are predictive of market returns.

[Place Figure 1 about here]

Several relationships must hold for this to be the case. First, the set of strategies must span the full set of factors driving individual and overall market returns. Second, each return factor should be associated, to the greatest extent possible, with a specific strategy, with as few multiple strategy associations as possible. Finally, managers should pursue the same strategy and not

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<sup>5</sup> Strategy performance is calculated as the simple average return across all funds in that strategy that month.

change strategies over time.<sup>6,7</sup> If these relationships hold, strategy performance ranks will be reliably associated with the return factors driving market returns.

### III. MCBE Portfolio Ranks

Market cap (MC) and book to equity (BE) have been used for many years as a way to organize and think about stock behavior over time. It is not unusual to hear market participants say things like “Small cap stocks are expected to outperform large cap stocks over the coming months” or “Value (high BE) stocks are expected to outperform growth stocks over the next year”. In fact, MC and BE are two of the best known stock market “factors”. The supposition is that MC and BE proxy for underlying, but unobservable stock market return factors.<sup>8</sup> This begs the question of whether the relative performance of MCBE portfolios is predictive of future market returns. If portfolios comprised of various levels and combinations of MC and BE stocks capture the full range of return factors, then changing MCBE portfolio performance ranks may help in determining whether the current set of return factors driving market returns is favorable or unfavorable.

Based on these ideas, a set of 9 MCBE portfolios are created. I begin with the 5x5 MCBE portfolios created by Fama and French, which are available on Ken French’s website, and then eliminate the 16 portfolios based on the 2<sup>nd</sup> and 4<sup>th</sup> MC and BE quintiles. The remaining 9

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<sup>6</sup> Each manager has selected a specific strategy to pursue, most often because they feel strongly that it will allow them to earn excess returns. The fund company then assembles the considerable resources needed to implement this strategy. Over time the portfolio managers and analysts devote considerable time to refining the investment process. Given the large investment of time and money by the manager and the fund company, it is unlikely that the fund will incur the cost of switching to a new strategy.

<sup>7</sup> Note that it is not necessary to assume active equity managers are superior stock pickers. It is only important that they consistently pursue the same strategy over time, successful or not.

<sup>8</sup> MC, BE, and other stock characteristics are often referred to as return factors and, in fact, the current four and six factor risk models are based on this convention. But this is technically incorrect. The premise is that observable stock characteristics proxy for important but unobservable return factors. It is clear that stock characteristics are not the return factors themselves. Thus the technically correct designation is “factor proxy model”.

portfolios are the 4 corner portfolios, the 4 outside middle portfolios, and the very center portfolio. These 9 portfolios provide the broadest cross-section of possible MCBE portfolios. I used 9 portfolios since this number is close to the number of equity strategies underlying the US and International SMBs, which is each 10.

## VI. Empirical Tests

### An Initial Eyeball Test

In order to understand the time pattern of behavioral measures, the beginning of the month trailing 6 month averages for June 1981 through December 2012 are graphed in Figure 2. Red shaded time periods represent major S&P 500 bear markets and green shaded time periods represent major bull markets. There were three major bear markets (Jun 81-Jul 82, Aug 00- Sep 02, Nov 07-Feb 09) for a total of 60 (16%) of the 372 months over this time period, while there were three major bull markets (Aug 82-Jul 00, Oct 02-Oct 07, Mar 09-Dec 11) for a total of 312 (84%) of the months.

[Place Figure 2 about here]

[Place Table 2 about here]

An eyeball test of the predictive power of each behavioral measure is conducted by examining the level of each during the three major bull and three major bear markets<sup>9</sup>. The results of this examination are presented in Table 2. These reveal that US SMB and SI are the two best predictors of S&P 500 returns, while MCBE is the worst. Intl SMB falls somewhere in between. Of great interest to many market participants is the ability to predict painful events, such as the 2008 market crash. The only behavioral measure that successfully predicted this crash was US SMB. On the other hand, SI was a better predictor of the August 2000 – September 2002 bear

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<sup>9</sup> Baker and Wurgler (2007) provide their own SI eyeball test over a time period extending back to 1963.

market. The conclusion based on the eyeball test is that both US SMB and SI are good predictors of subsequent S&P 500 market returns, while MCBE is a very poor predictor. Intl SBM falls somewhere in between.

A striking feature of Figure 2 is that behavioral measures vary widely over time. US SMB ranges from a high of 22% to a low of -2%. SI's ranges from a high of 18% to a low of -4%. We will see in the regression tests that follow that indeed these ranges represent the actual span in subsequent annual market returns. Thus it appears that expected market returns vary widely over time as is predicted by the PKM.

The eyeball test that I have just presented involves considerable judgment that might very well be called into question. To provide greater rigor, I now present time series regression results. In spite of the subjective nature of the eyeball test, the regressions produce the same general conclusions: US SMB and SI are best at predicting subsequent market returns, while MCBE has little or no predictive power, with Intl SMB falling somewhere in between.

#### Regression Tests of Behavioral Measure Predictive Power

The PKM model predicts that expected market turns will vary over time more than dictated by changing fundamentals. The PKM behavioral component varies over time as investment returns redistribute wealth and as individual probability assessments and risk aversion change. Market-wide indices experience heightened volatility as relative wealth weights constantly change across those who are pessimistic, optimistic, overconfident, and rational. In order to test PKM predictions, both behavioral and fundamental measures are included in the regressions that follow.

Including the four behavioral measures US SMB, Intl SMB, SI, and MCBE in a single regression allows for determining the relative predictive power of each. SMB is based on the sum of the absolute difference of each strategy's trailing one year rank from its long-term (i.e. 1988-2007) performance rank.<sup>10</sup> For each SMB, two monthly indicator variables are calculated. The indicator variable US SMB 1 is set equal to 1 if the monthly US SMB is one of the smallest 16% (i.e. one standard deviation below the US SMB mean, representing the largest deviation from long term ranks) and is 0 otherwise, while US SMB 4 is set equal to 1 if the US SMB is among the largest 16%. Intl SMB 1 and 4 indicator variables are calculated similarly using International strategy ranks. Using monthly indicator variables, rather than the actual SMB values, enhances the power of the following statistical tests.

Two SI indicator variables are created. SI 1 is set equal to 1 if the month beginning SI is among the largest 16% of all monthly values, zero otherwise, and SI 4 is set equal to 1 if the month beginning SI is among the smallest 16%, zero otherwise.<sup>11</sup>

The first step in estimating the MCBE behavior measure was to calculate the long term (1988-2007) performance ranks for the 9 MCBE portfolios.<sup>12</sup> Similar to the SMB methodology, the month beginning MCBE measure was calculated by averaging, over the trailing 12 months, the monthly sum of the absolute current, long term portfolio rank deviations. MCBE 1 (4) is set equal to 1 if the monthly value is one of the highest 16% (largest differences from long term

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<sup>10</sup> The out-of-sample (before 1988 and after 2007) SMB prediction performance is better than is the in-sample performance. This supports the contention that SMB's predictive power is not unique to the long-term estimation period.

<sup>11</sup> Recall that a large SI implies that investors are overly optimistic, which leads to overpriced securities and lower future returns.

<sup>12</sup> For 1988-2007, "small cap value" was the top MCBE performing portfolio, while "small cap growth" was the worst.

ranks), zero otherwise, and MCBE 4 is set equal to 1 if it is one of the lowest 16%, zero otherwise.<sup>13</sup>

The next set of variables included are four return variables: trailing 1, 3, 6, and 12 month compound, non-annualized returns. These account for the well documented short-term momentum, longer-term mean reversion of market returns to ensure that other variables are not proxying for these time patterns.

To account for fundamental changes, four US economic variables are included. Following the suggestion of BW (2006), trailing annual growth in US Industrial Production, US total civilian employment growth, and real US Personal Consumption Expenditures along with the current month NBER Recession Indicator (1 if in recession) are included.

Time series regressions are run to test the ability of US SMB, Intl SMB, SI, and MCBE to predict subsequent market returns for the US stock market, the US small cap stock market, and the developed (non-US) international stock markets. The predictive relationships can then be used for estimating expected market returns.

Monthly total returns, January 1981 through December 2011, are gathered for the S&P 500, the Russell 2000, and the Morgan Stanley Capital International's Europe, Australia and Far East index (EAFE). The four behavioral measures are included as month beginning values.

Compound, un-annualized subsequent market returns, used as the dependent variables, are calculated for 1, 3, 6 and 12 month time periods. The advantage of the longer time periods is a reduction in monthly noise that can obscure existing relationships. The disadvantage is

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<sup>13</sup> There is not an obvious way to determine if larger (i.e. current ranks differ from long term ranks) or smaller values are predictive of higher returns. The approach above (i.e. the closer the current ranks are to long term ranks the better) was selected since in most regressions it produced a positive relationship between MCBE and subsequent market returns.

overlapping time periods, with adjacent 12 month returns, for example, having 11 months in common. This reduces the effective sample size. These limitations should be kept in mind when considering the reported results.

Three sets of regressions are run. The first set includes only behavioral variables as dependent variables. In the second set, the four trailing market return variables are added. In the third set, the four US economic variables are added.

R-squared for each regression is reported in Table 3 (bold values are statistically significant based on a 5% F-test). The results are strong, with the 12 month R-squareds ranging from a low of 13% to a high of 30%. All but four (all one month regressions) of the 36 regressions are significant at a 5% level and, in most cases, are highly significant. Looking left to right across the regression sets, the R-squareds increase when trailing returns are added and again when economic variables are added.<sup>14</sup> However, the increases are small, with the behavioral measures accounting for 75% of the explained variability.<sup>15</sup> This result is consistent with the PKM prediction that both behavioral and fundamental changes contribute to expected return volatility. Based on much previous evidence, it is not surprising that investor behavior contributes more than does changing fundamentals.

[Place Table 3 about here]

The behavioral return advantage (RA) for each regression set and each subsequent return period is reported in Tables 4-6 (S&P 500, Russell 2000, and EAFE, respectively). RA is the difference

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<sup>14</sup> Trailing 12 month return was consistently significant with a negative coefficient, thus capturing longer term mean reversion in market returns. The short term trailing variables were rarely significant indicating that short term momentum was not present. US Industrial Production growth was the most consistently significant economic variable.

<sup>15</sup> Of course it is possible that including other variables drives behavioral coefficients to insignificance, while increasing R-squared. We will see shortly that is not the case and indeed behavioral coefficients actually strengthen when other variables are included.

between the 4 coefficient (the average of subsequent market returns associated with the highest 16% behavior measure, greater than one standard deviation above the mean) and the 1 coefficient (lowest 16%). RA measures the return advantage of high behavioral measures over lower values. Based on the number of significant coefficients, US SMB (33 of the 36 RA's in Tables 4-6 are significant at a 5% level)<sup>16</sup> outperforms SI (30 of 36), which in turn outperforms SI Intl SMB (17 of 36). Many of the RA's exceed 20% annually, with the largest being an astonishing 37%. MCBE is the weakest measure, with only 9 of 36 RA's statistically significant. It appears the MC and BE provide little or no insight into future market performance. The three behavioral measures that are predictive of subsequent market returns should be taken into consideration when estimating expected market returns. This means that expected market returns fluctuate over a wide range as indicated by the large RA's. Table 7 reveals that the behavioral measures are largely independent of one another, so US SMB, Intl SMB, and SI are complementary return predictors.

[Place Tables 4-7 about here]

In general, RA's increase as trailing returns and economic variables are added to the regression equations. This means that the SMB's and SI represent something different from what is being captured by trailing returns and economic variables. This confirms the earlier observation that investor behavior makes up a majority of the explained return variability.<sup>17</sup> Based on R-squareds,

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<sup>16</sup> Statistical significance (bold value in tables) is based on a 5%, two tail t-test of the unannualized returns using the standard error of the difference, calculated as the square root of the sum of the squared SE's of the two coefficients minus 0.2 (correlation of the 4 and 1 index variables) times the product of the two SE's.

<sup>17</sup> It is well known that the stock market is a leading economic indicator, so it is possible that some of RA is really a forecast of future economic activity and not strictly behavior driven. To test this, I reran the time series regressions using future economic variables (three month ahead one year growth rates) rather than current economic variables. As expected, with perfect economic foresight, R-squareds increase, to 0.50 for 12 month returns. The RA's decreased a bit, but remained economically and statistically highly significant. So RA's are capturing investor behavior, which appears to be largely independent of both current and future economic conditions.

behavior accounts for 75% of explained variability and 88% if trailing returns are included in the investor behavior bucket.

To gain an appreciation of behavioral measure predictive power, Figure 3 presents the average RA's for each behavioral measure in each of the three markets. The results reveal both US SMB and SI are strongly predictive in all three markets, with annual return advantages ranging from 17% to 25%. These advantages are similar to what was observed in Figure 2, which was used for the earlier eyeball test.<sup>18</sup> Intl SMB was predictive of the S&P 500 and the EAFE, but was not predictive of the Russell 2000. Finally, MCBE provides essentially no predictive help for the S&P 500 and little for the Russell 2000 or EAFE. It is puzzling that MCBE works best for predicting international markets. These results confirm the earlier conclusion: US SMB and SI are strong predictors, MCBE is weak, and Intl SI falls somewhere in between.

[Place Figure 3 about here]

I have just shown that explained market return variation is mostly due to changes in behavioral measures and, to a much lesser extent, changes in fundamentals. Using these predictive relationships, expected market returns can be estimated. Figures 4-6 present both expected and subsequent annual returns for the S&P 500, Russell 2000, and EAFE, respectively. Monthly expected returns are estimated based on beginning of the month US SMB, Intl SMB, SI, trailing 12 month S&P 500 returns, and trailing US Industrial Production annual growth.<sup>19</sup> The resulting range of expected and actual returns are reported in Table 8. On average, the range of expected returns is 50%, while the range of actual returns is 125% over these three markets. The range of

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<sup>18</sup> As the reader probably suspects, I used the regression results to scale behavioral measures when creating Figure 2. Scaling did not impact the eyeball test summarized in Table 2. But the scaling did lead to what I believe is a plausible representation of the ever changing drivers of expected returns portrayed in Figure 2. The return advantages reported in Figure 3 provides empirical support.

<sup>19</sup> MCBE as well as the other trailing return and economic variables are excluded because they did not provide predictive power (i.e. were not statistically significant).

expected returns is stunningly large. But even with these wide ranges, the actual return range is over twice as large in each of the three markets. An inspection of Figures 4-6 reveal expected returns pick up the general pattern of subsequent returns, but not the extremes, such as those in the early 1980's, late 1990's, early 2000's, and 2008-09. Some would argue that picking up such extreme returns (i.e. tail events or "black swans") is not possible or even desirable. The overall conclusion is that expected market returns vary dramatically over time and that behavioral measures are the most important drivers of this variability.

[Place Figures 4-6 about here]

[Place Table 8 about here]

## **V. Concluding Comments**

I test two PKM predictions: expected market returns vary considerably over time and are driven by both behavioral and fundamental variables. I test these by examining the predictive power of Baker and Wurgler's (2006) Sentiment Index, which they hypothesize captures the extent to which investors, as a whole, are either optimistic or pessimistic, and the predictive power of Strategy Market Barometers, which capture performance ranks for various equity strategies. Also included are MCBE portfolio ranks, which provide a direct test of the return factor capturing ability of these portfolios; trailing market returns, which account for the well documented short term momentum, long term mean reversion features of the market; and economic variables to account for changing fundamentals. I find that 13% to 30% of subsequent annual S&P 500, Russell 2000, and EAFE return variability is explained by these variables. The US Strategy Market Barometer and the Sentiment Index provide the greatest predictive power, while MCBE (market cap – book to equity) portfolio ranks provide the least. The International SMB falls

somewhere in between. The Sentiment Index and Strategy Market Barometers are essentially uncorrelated, so their predictive contributions are additive.

The behavioral measure return advantages (RA's) are large (as high as 37% per annum) and statistically and economically highly significant. Since behavioral measures are predictive of subsequent market returns, they are important measures of expected market returns. I find that the range of expected annual market returns averages 50% over these three markets and behavioral measures account for 75% to 88% of the explained variability, with changes in fundamentals accounting for the rest. Thus my results are consistent with the two PKM predictions.

Only 9 of the 36 BCME RA's were significant, which means that BCME provides little predictive help. Cohen et. al. (2010), among others, come to a similar conclusion regarding fund manager stock picking skill. They find that managers do not rely on stock characteristics, such as MC and BE, in picking stocks that subsequently outperform. The implication is that MC and BE are not good proxies for the return factors of interest to active managers. It appears that the poor return factor proxy performance of MC and BE at the stock picking level holds as well at the overall market level.

The fact that the Barometers add significant predictive power to that of the Sentiment Index raises the question of whether there are other investor based measures that, if included, could improve predictive power. The Sentiment Index is based on 6 objective measures which are thought to capture the level of optimism/pessimism among equity investors. The open question is whether there are other measures, whether behavioral or fundamental, capable of further

enhancing predictive power. Obvious candidates are the payout yield as proposed by Boudoukh et. al, (2007) and improved predictions of future economic activity.

RA magnitudes are hard to ignore, as many exceed 20% per annum. For corporate finance, this means firms face dramatically different equity capital costs over time and it seems important to consider such wide variations when making business investment decisions. In addition, the market “premium”, which is part of the standard firm level cost of equity calculation, is far from constant and thus frequent re-estimation is called for.

For investment management, there is a case to be made for market timing. This study suggests the possibility of superior returns when markets are timed on a monthly basis. The combination of superior stock picking skill, as documented by Cohen (2009) and others, and Sentiment and Barometer based market timing could lead to superior portfolios. The question always asked in such situations is whether skill/timing portfolios can continue to generate superior returns going forward. For those who believe in informationally efficient markets, this statement would be summarily dismissed as there is a belief that rational investors will quickly arbitrage away such opportunities. But in view of the growing body of behavioral and manager skill research, it is harder to dismiss such possibilities out of hand. Whether investor arbitrage is sufficient or whether such opportunities will persist over extended periods will be a hotly debated for years to come.

So why do market expected returns vary dramatically over time? The traditional response is that expected returns change due to time varying risk premium. But with the introduction of investor behavior, it is increasingly difficult to identify and measure the separate impact of risk on expected returns. Breaking the market return premium into the separate components driven by

risk, investor behavior, and economic fundamentals remains an open and incredibly challenging research question, made more so by the lack of a credible model of risk.<sup>20</sup>

Finally, this study focuses on equity markets, since this is the only market for which the strategy being pursued by active managers has been identified and, in turn, used to form strategy peer groups, the basis for Market Barometers. But there is no reason why we have to limit ourselves to equity markets, as the strategy identification and peer group formation process is applicable to any asset class in which active managers are attempting to beat a market index. Once completed, Barometers unique to each asset class can be constructed and then tested to determine if they are useful for predicting market returns. Thus investment strategy can become the unifying concept across all markets in which active managers operate and the resulting Barometers may make it possible to anticipate expected returns within each of these markets. Much remains to be done before such a structure emerges.

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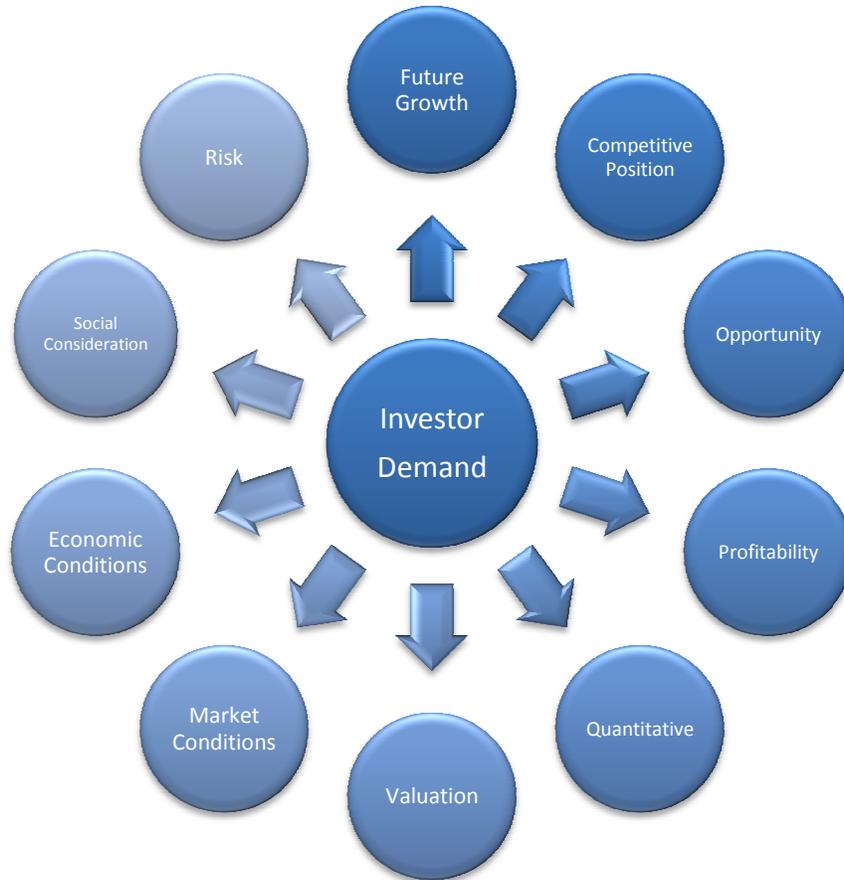
<sup>20</sup> See, for example, Fama and French (2004) for a dreary assessment of the usefulness of the CAPM as a risk model.

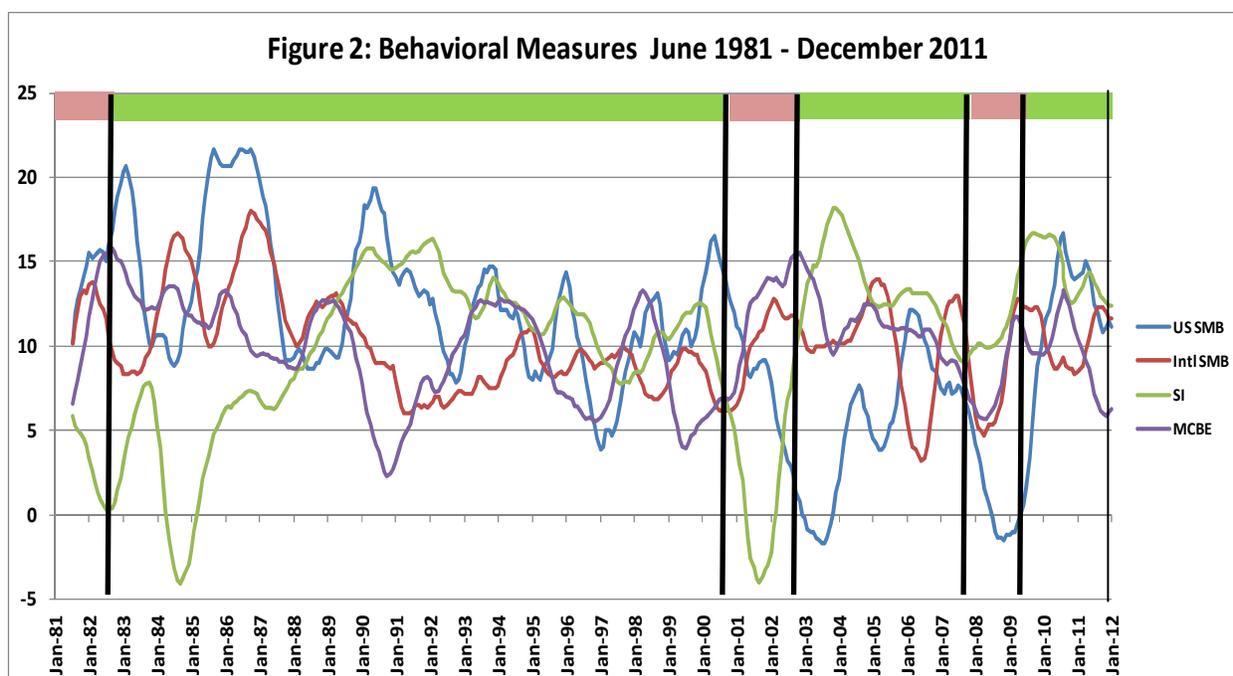
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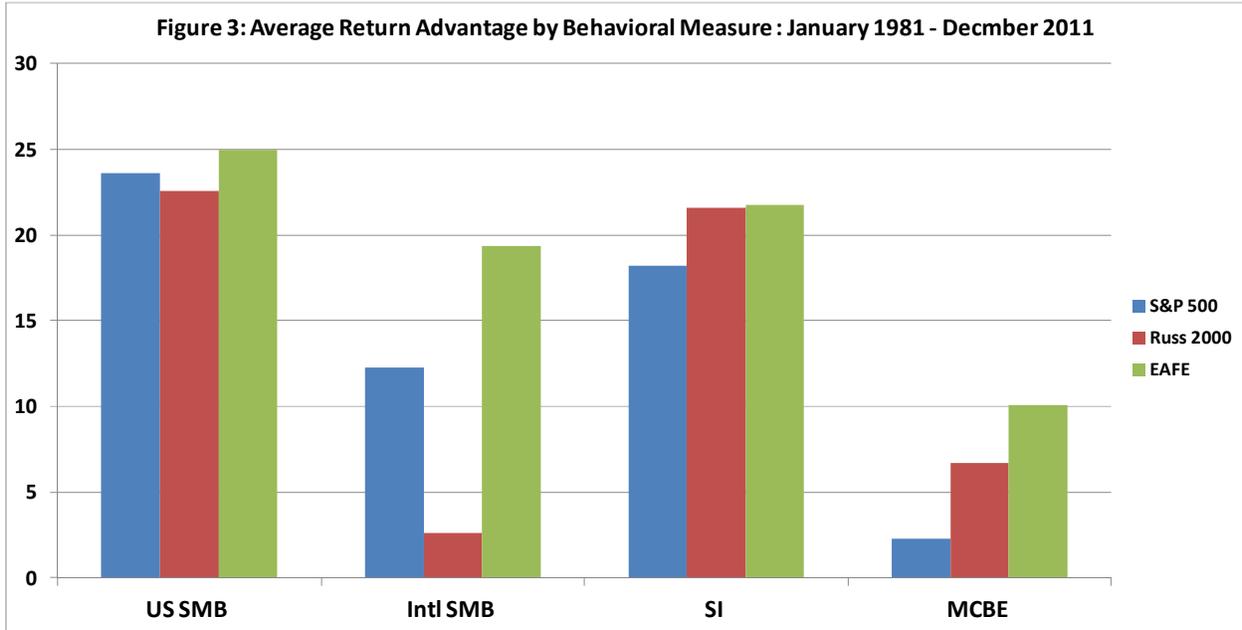
**Figure 1: Investor Strategy Demand Dynamics**





This figure reports the beginning of month, trailing 6 month average for the four behavioral measures US Strategic Market Barometer (US SMB), International Strategy Market Barometer (Intl SMB), Sentiment Index (SI), and market cap – book to equity portfolio rank (MCBE). The US SMB and Intl SMB are based on the trailing 12 month performance ranks for the 10 US and International strategies, respectively. SI is the inverse of the Baker & Wurgler’s (2006) sentiment index and, for comparison purposes, is scaled to a mean of 10% and standard deviation of 5%, similar to the corresponding values for US SMB. MCBE is based on the 12 month trailing performance ranks of nine market cap – book to equity portfolios as created by Fama & French and, for comparison purposes, is scaled to a mean of 10% and standard deviation of 3%, similar to the corresponding values for Intl SMB. The green shaded time periods represent major S&P 500 bull markets while the red shaded time periods represent major bear markets.

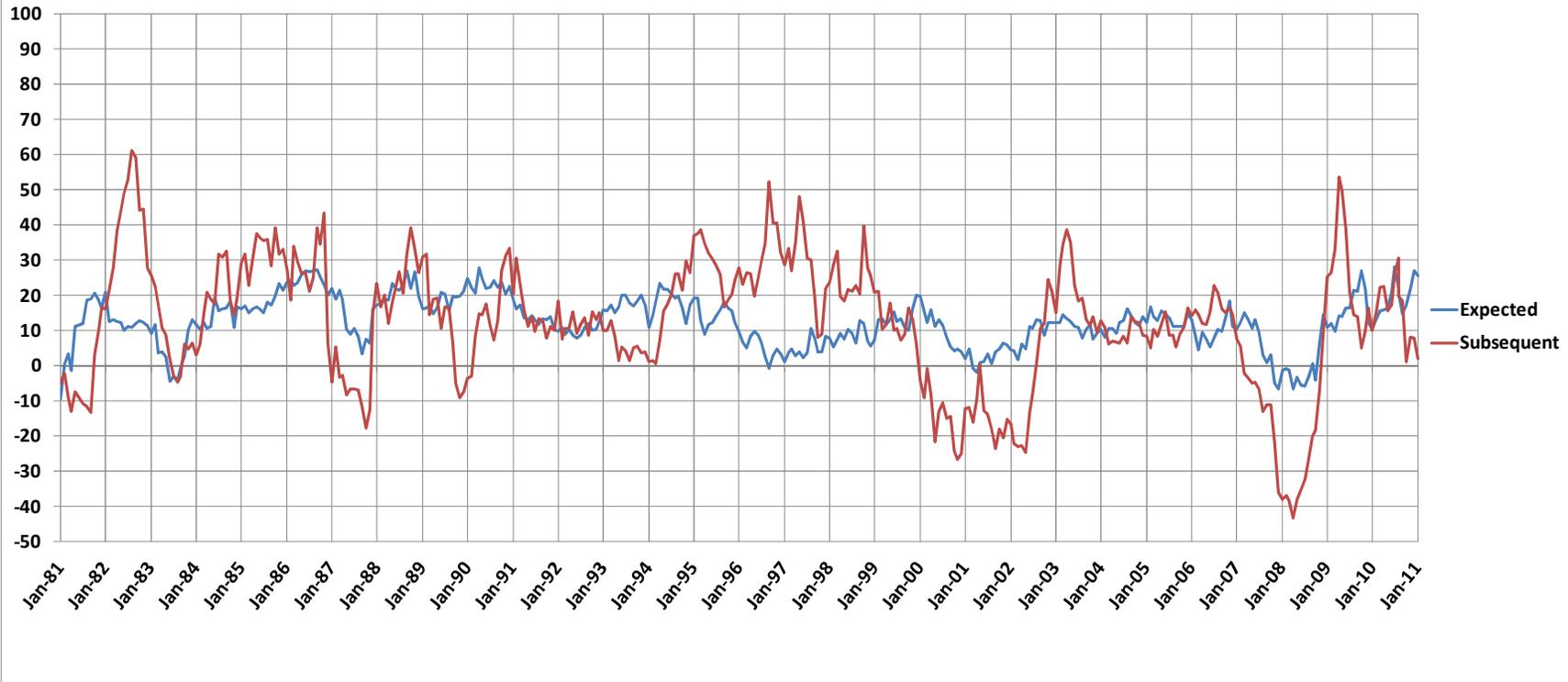
Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French’s web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.



This figure reports the average return advantage (RA) across the 1, 3, 6, and 12 month return regressions for reported in Tables 4 through 6. An index 4 (1) month has a US SMB, a Intl SMB, a SI, or a MCBE that is one standard deviation above (below) the mean at the beginning of the month. The 6, 3 and 1 month RA's are annualized for comparison purposes. US SMB (Intl) 1 (4) is equal to 1 if the US (International) strategy rank composite was in the lowest (highest) 16% at the beginning of the month, zero otherwise. SI 1 (4) is 1 if the Baker & Wurgler (2006) unadjusted Sentiment Index was in the highest (lowest) 16% at the beginning of the month, zero otherwise. MCBE 1 (4) is equal to 1 if the value is in the highest (lowest) 16%, zero otherwise.

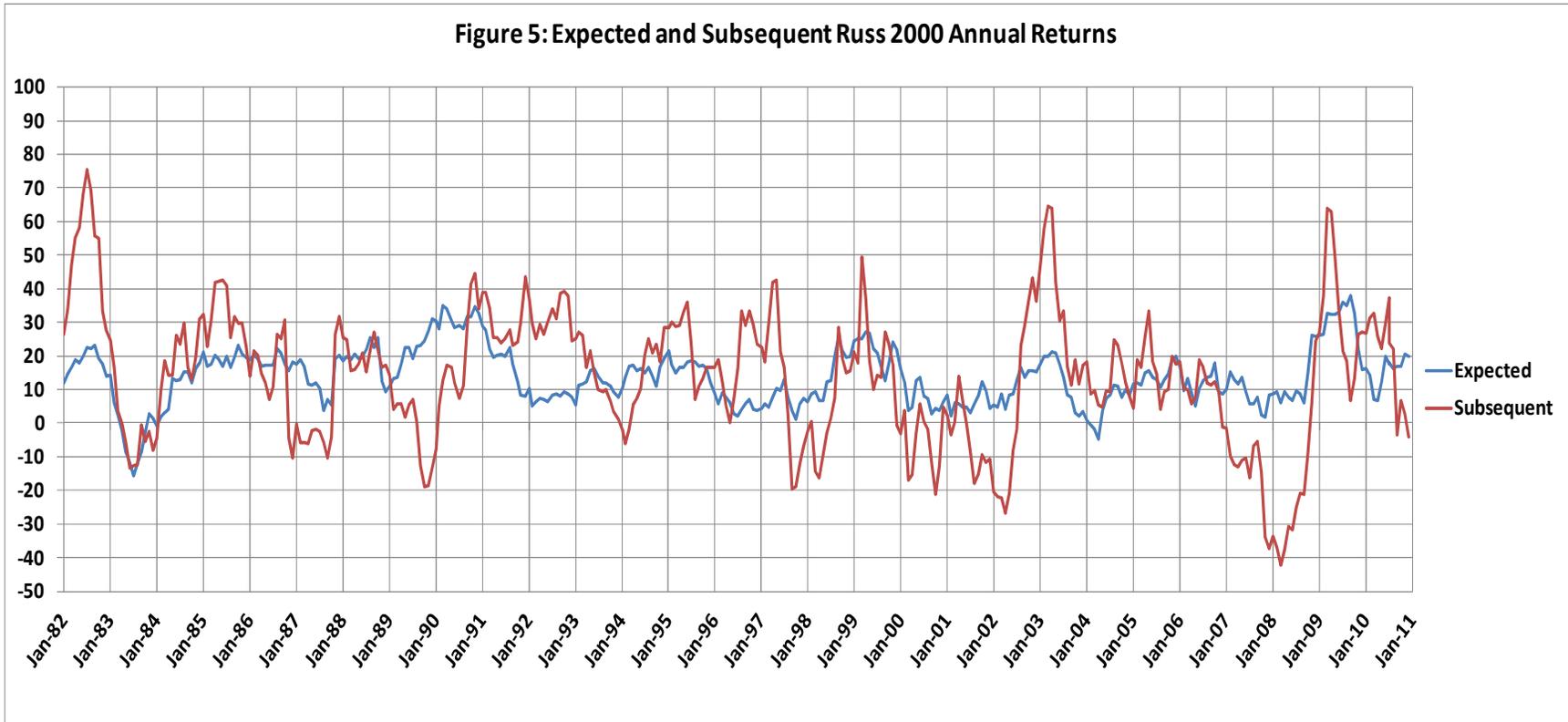
Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French's web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.

Figure 4: Expected and Subsequent S&P 500 Annual Returns



The expected annual S&P 500 return is based on beginning of the month US Strategic Market Barometer (US SMB), International Strategy Market Barometer (Intl SMB), negative Sentiment Index (SI), 12 month trailing S&P 500 return, and 12 month trailing US Industrial Production growth regressed on beginning of the month, subsequent S&P 500 annual total return for the 361 months January 1981 through January 2011. The US SMB and Intl SMB are based on trailing 12 month performance ranks for the 10 US and International strategies, respectively. Negative SI is the negative of the Baker & Wurgler’s (2006) sentiment index. The subsequent return is the month beginning 12 month subsequent compound total S&P 500 return.

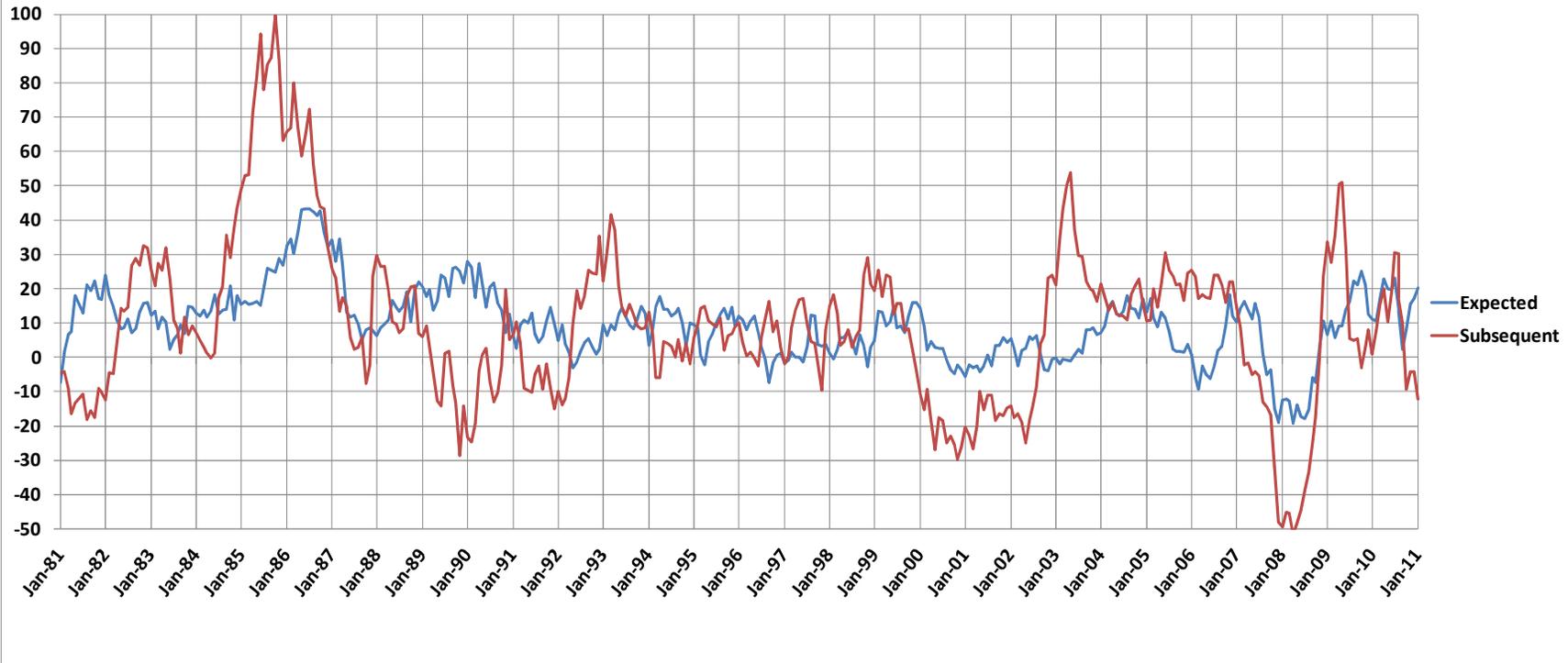
Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French’s web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.



The expected annual Russell 2000 return is based on beginning of the month US Strategic Market Barometer (US SMB), International Strategy Market Barometer (Intl SMB), negative Sentiment Index (SI), 12 month trailing Russ 2000 return, and 12 month trailing US Industrial Production growth regressed on beginning of the month, subsequent Russ 2000 annual total return for the 349 months January 1982 through January 2011. The US SMB and Intl SMB are based on trailing 12 month performance ranks for the 10 US and International strategies, respectively. Negative SI is the negative of the Baker & Wurgler’s (2006) sentiment index. The subsequent return is the month beginning 12 month subsequent compound total Russ 2000 return.

Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French’s web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.

Figure 6: Expected and Subsequent EAFE Annual Returns



The expected annual EAFE return is based on beginning of the month US Strategic Market Barometer (US SMB), International Strategy Market Barometer (Intl SMB), negative Sentiment Index (SI), 12 month trailing EAFE return, and 12 month trailing US Industrial Production growth regressed on beginning of the month, subsequent EAFE annual total return for the 349 months January 1982 through January 2011. The US SMB and Intl SMB are based on trailing 12 month performance ranks for the 10 US and International strategies, respectively. Negative SI is the negative of the Baker & Wurgler’s (2006) sentiment index. The subsequent return is the month beginning 12 month subsequent compound total EAFE return.

Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French’s web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.

## Table 1: US and International Equity Strategies

**Competitive Position:** Business principles, including quality of management, market power, product reputation, and competitive advantage. Considers the sustainability of the business model and history of adapting to market changes.

**Economic Conditions:** Top down approach based on economic fundamentals; can include employment, productivity, inflation, and industrial output. Gauges where overall economy is in business cycle, the resulting supply and demand situations in various industries, and the best stocks to purchase as a result.

**Future Growth:** Companies poised to grow rapidly relative to others. The Future Growth and Valuation strategies are not mutually exclusive and can both be deemed important in the investment process.

**Market Conditions:** Consideration of stock's recent price and volume history relative to the market and similar stocks as well as the overall stock market conditions.

**Opportunity:** Unique opportunities that may exist for a small number of stocks or at different points in time. May involve combining stocks and derivatives and may involve use of considerable leverage. Many hedge fund managers follow this strategy, but a mutual fund manager may also be so classified.

**Profitability:** Company profitability, such as gross margin, operating margin, net margin and return on equity.

**Quantitative:** Mathematical and statistical inefficiencies in market and individual stock pricing. Involves mathematical and statistical modeling with little or no regard to company and market fundamentals.

**Risk:** Control overall risk, with increasing returns a secondary consideration. Risk measures considered may include beta, volatility, company financials, industry and sector exposures, country exposures, and economic and market risk factors.

**Social Considerations:** Company's ethical, environmental, and business practices as well as an evaluation of the company's business lines in light of the current social and political climate. A manager can look for these criteria or the lack of in selecting an stock.

**Valuation:** Stocks selling cheaply compared to peer stocks based on accounting ratios and valuation techniques. The Valuation and Future Growth strategies are not mutually exclusive and can both be deemed important in the investment process.

<b>Table 2: Eyeball Test of Behavioral Measure Prediction of S&amp;P 500</b>				
<b>Bull/Bear</b>	<b>US SMB</b>	<b>Intl SMB</b>	<b>SI</b>	<b>MCBE</b>
<b>Bear: Jan81-Jul82</b>	Poor	Poor	Good	Poor
<b>Bull: Aug82-Jul00</b>	Good	Poor	Good	Poor
<b>Bear: Aug00-Sep02</b>	Good	Poor	Good	Poor
<b>Bull: Oct02-Oct07</b>	Poor	Good	Good	Good
<b>Bear: Nov07-Feb09</b>	Good	Good	Poor	Good
<b>Bull: Mar09-Dec11</b>	Good	Good	Good	Poor

This table reports the ability, as judged by examining Figure 2, to predict the S&P 500 for the four behavioral measures US Strategic Market Barometer (US SMB), International Strategy Market Barometer (Intl SMB), Sentiment Index (SI), and market cap – book to equity portfolio rank (MCBE). The US SMB and Intl SMB are based on the trailing 12 month performance ranks for the 10 US and International strategies, respectively. SI is the inverse of the Baker & Wurgler’s (2006) sentiment index and, for comparison purposes, is scaled to a mean of 10% and standard deviation of 5%, similar to the corresponding values for US SMB. MCBE is based on the 12 month trailing performance ranks of nine market cap – book to equity portfolios as created by Fama & French and, for comparison purposes, is scaled to a mean of 10% and standard deviation of 3%, similar to the corresponding values for Intl SMB. The green shaded time periods in Figure 2 represent major S&P 500 bull markets while the red shaded time periods represent major bear markets.

Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French’s web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.

<b>Table 3: Regression R-squared: January 1981 - December 2011</b>			
<b>(Bold statistically significant)</b>			
	<b>Behavior Only</b>	<b>Behavior &amp; Trailing Return</b>	<b>Behavior, Trailing Return, &amp; Economic Variables</b>
<b>12 month</b>			
<b>S&amp;P 500</b>	<b>0.15</b>	<b>0.16</b>	<b>0.19</b>
<b>Russ 2000</b>	<b>0.13</b>	<b>0.22</b>	<b>0.23</b>
<b>EAFE</b>	<b>0.25</b>	<b>0.25</b>	<b>0.30</b>
<b>6 month</b>			
<b>S&amp;P 500</b>	<b>0.11</b>	<b>0.13</b>	<b>0.14</b>
<b>Russ 2000</b>	<b>0.06</b>	<b>0.12</b>	<b>0.16</b>
<b>EAFE</b>	<b>0.18</b>	<b>0.18</b>	<b>0.25</b>
<b>3 month</b>			
<b>S&amp;P 500</b>	<b>0.07</b>	<b>0.07</b>	<b>0.09</b>
<b>Russ 2000</b>	<b>0.04</b>	<b>0.09</b>	<b>0.14</b>
<b>EAFE</b>	<b>0.11</b>	<b>0.11</b>	<b>0.16</b>
<b>1 month</b>			
<b>S&amp;P 500</b>	0.04	0.04	<b>0.06</b>
<b>Russ 2000</b>	0.03	<b>0.07</b>	<b>0.09</b>
<b>EAFE</b>	<b>0.05</b>	0.06	<b>0.09</b>
<b>Average</b>	<b>0.12</b>	<b>0.14</b>	<b>0.16</b>

This table reports regression R-squared over the time period January 1981 - December 2011 for three sets of regressions: behavioral measures alone, behavioral measures plus trailing market returns, and behavioral measures plus trailing market returns and trailing economic variables. The subsequent 12, 6, 3, and 1 month market returns that are the dependent variables are compound, overlapping returns for each month in the sample. The 1 month market returns are 372 non-overlapping returns. Two indicator variables are created for each behavioral measure. US (Intl) SMB 1 (4) is equal to 1 if the US (International) Strategy Market Barometer was in the lowest (highest) 16% at the beginning of the month, zero otherwise. SI 1 (4) is 1 if the Baker & Wurgler (2006) unadjusted Sentiment Index was in the highest (lowest) 16% at the beginning of the month, zero otherwise. MCBE are beginning of the month trailing 12 month average sum of absolute rank differences, versus 1988-2007 performance ranks, for nine market cap - book to equity portfolios. MCBE 1 (4) is equal to 1 if the average absolute sum was in the highest (lowest) 16% at the beginning of the month, zero otherwise. One, three, six, and twelve month trailing returns are beginning of the month trailing unannualized compound returns. The four economic variables are beginning of the month, trailing annual growth in US Industrial Production Index, total US civilian total employment, and real US Personal Consumption Expenditure, as well as the current month NBER US recession index (1 if in recession). Statistical significance (bold value) is based on a 5%, F-test.

Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French's web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.

<b>Table 4: S&amp;P 500 Return Advantage: January 1981 - December 2011</b> (Bold statistically significant)			
	<b>Behavior Only</b>	<b>Behavior &amp; Trailing Return</b>	<b>Behavior, Trailing Return, &amp; Economic Variables</b>
<b>US SMB</b>			
12 Month	<b>13.0</b>	<b>16.6</b>	<b>19.0</b>
6 Month	<b>19.2</b>	<b>25.2</b>	<b>26.0</b>
3 Month	<b>19.3</b>	<b>24.3</b>	<b>24.8</b>
1 Month	<b>28.0</b>	<b>33.2</b>	<b>34.7</b>
<b>Intl SMB</b>			
12 Month	<b>14.5</b>	<b>14.5</b>	<b>14.6</b>
6 Month	<b>16.2</b>	<b>16.2</b>	<b>14.3</b>
3 Month	<b>14.4</b>	<b>14.4</b>	11.4
1 Month	6.2	6.4	3.9
<b>SI</b>			
12 Month	<b>9.2</b>	<b>10.6</b>	<b>11.7</b>
6 Month	<b>16.6</b>	<b>18.7</b>	<b>21.4</b>
3 Month	<b>19.3</b>	<b>21.0</b>	<b>25.9</b>
1 Month	19.3	21.8	23.0
<b>MCBE</b>			
12 Month	<b>8.4</b>	<b>7.4</b>	6.9
6 Month	4.8	3.1	2.8
3 Month	-0.1	0.2	-1.0
1 Month	0.4	-0.9	-4.7

This table reports the annualized return advantage (RA) over the time period January 1981 - December 2011 for three sets of regressions: behavioral measures alone, behavioral measures plus trailing market returns, and behavioral measures plus trailing market returns and trailing economic variables. Two indicator variables are created for each behavioral measure. US (Intl) SMB 1 (4) is equal to 1 if the US (International) Strategy Market Barometer was in the lowest (highest) 16% at the beginning of the month, zero otherwise. SI 1 (4) is 1 if the Baker & Wurgler (2006) unadjusted Sentiment Index was in the highest (lowest) 16% at the beginning of the month, zero otherwise. MCBE are beginning of the month trailing 12 month average sum of absolute rank differences, versus 1988-2007 performance ranks, for nine market cap - book to equity portfolios. MCBE 1 (4) is equal to 1 if the average absolute sum was in the highest (lowest) 16% at the beginning of the month, zero otherwise. RA is the 4 (i.e. high behavioral measure) indicator variable coefficient minus the 1 coefficient. The subsequent 12, 6, 3, and 1 month S&P 500 returns that are the dependent variables are compound, overlapping returns for each month in the sample. The 1 month market returns are 372 non-overlapping returns. One, three, six, and twelve month trailing S&P 500 returns are beginning of the month trailing unannualized compound returns. The four economic variables are beginning of the month, trailing annual growth in US Industrial Production Index, total US civilian total employment, and real US Personal Consumption Expenditure, as well as the current month NBER US recession index. Statistical significance (bold value) is based on a 5%, two tail t-test of the unannualized returns using the standard error of the difference, calculated as the square root of the sum of the squared SE's of the two coefficients minus 0.2 (correlation of the 4 and 1 index variables) times the product of the two SE's.

Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French's web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.

<b>Table 5: Russ 2000 Return Advantage January 1981 - December 2011</b> (Bold statistically significant)			
	<b>Behavior Only</b>	<b>Behavior &amp; Trailing Return</b>	<b>Behavior, Trailing Return, &amp; Economic Variables</b>
<b>US SMB</b>			
12 Month	6.9	<b>17.4</b>	<b>18.9</b>
6 Month	<b>12.9</b>	<b>25.4</b>	<b>26.7</b>
3 Month	14.6	<b>28.4</b>	<b>29.0</b>
1 Month	23.7	<b>33.6</b>	<b>33.1</b>
<b>Intl SMB</b>			
12 Month	6.6	4.2	4.5
6 Month	8.5	5.6	3.1
3 Month	7.5	4.3	-0.3
1 Month	-1.8	-3.4	-7.2
<b>SI</b>			
12 Month	<b>10.6</b>	<b>16.3</b>	<b>13.8</b>
6 Month	<b>15.8</b>	<b>22.6</b>	<b>21.1</b>
3 Month	<b>19.6</b>	<b>28.2</b>	<b>30.8</b>
1 Month	20.1	<b>29.1</b>	<b>30.8</b>
<b>MCBE</b>			
12 Month	<b>9.8</b>	<b>12.5</b>	<b>11.1</b>
6 Month	6.4	9.3	8.9
3 Month	-0.3	-1.4	7.3
1 Month	2.0	8.6	6.2

This table reports the annualized return advantage (RA) over the time period January 1981 - December 2011 for three sets of regressions: behavioral measures alone, behavioral measures plus trailing market returns, and behavioral measures plus trailing market returns and trailing economic variables. Two indicator variables are created for each behavioral measure. US (Intl) SMB 1 (4) is equal to 1 if the US (International) Strategy Market Barometer was in the lowest (highest) 16% at the beginning of the month, zero otherwise. SI 1 (4) is 1 if the Baker & Wurgler (2006) unadjusted Sentiment Index was in the highest (lowest) 16% at the beginning of the month, zero otherwise. MCBE are beginning of the month trailing 12 month average sum of absolute rank differences, versus 1988-2007 performance ranks, for nine market cap - book to equity portfolios. MCBE 1 (4) is equal to 1 if the average absolute sum was in the highest (lowest) 16% at the beginning of the month, zero otherwise. RA is the 4 (i.e. high behavioral measure) indicator variable coefficient minus the 1 coefficient. The subsequent 12, 6, 3, and 1 month Russ 2000 returns that are the dependent variables are compound, overlapping returns for each month in the sample. The 1 month market returns are 372 non-overlapping returns. One, three, six, and twelve month trailing Russ 2000 returns are beginning of the month trailing unannualized compound returns. The four economic variables are beginning of the month, trailing annual growth in US Industrial Production Index, total US civilian total employment, and real US Personal Consumption Expenditure, as well as the current month NBER US recession index. Statistical significance (bold value) is based on a 5%, two tail t-test of the unannualized returns using the standard error of the difference, calculated as the square root of the sum of the squared SE's of the two coefficients minus 0.2 (correlation of the 4 and 1 index variables) times the product of the two SE's.

Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French's web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.

<b>Table 6: EAFE Return Advantage January 1981 - December 2011</b> (Bold statistically significant)			
	<b>Behavior Only</b>	<b>Behavior &amp; Trailing Return</b>	<b>Behavior, Trailing Return, &amp; Economic Variables</b>
<b>US SMB</b>			
12 Month	<b>21.2</b>	<b>19.8</b>	<b>16.8</b>
6 Month	<b>24.4</b>	<b>25.8</b>	<b>21.4</b>
3 Month	<b>26.3</b>	<b>26.1</b>	<b>22.4</b>
1 Month	<b>33.8</b>	<b>32.7</b>	<b>28.6</b>
<b>Intl SMB</b>			
12 Month	<b>20.9</b>	<b>20.1</b>	<b>19.6</b>
6 Month	<b>24.8</b>	<b>25.4</b>	<b>22.7</b>
3 Month	<b>22.4</b>	<b>21.9</b>	<b>19.6</b>
1 Month	12.8	11.1	10.9
<b>SI</b>			
12 Month	8.3	7.2	<b>14.3</b>
6 Month	<b>17.7</b>	<b>18.7</b>	<b>26.3</b>
3 Month	<b>22.3</b>	<b>22.5</b>	<b>31.8</b>
1 Month	<b>26.9</b>	<b>28.1</b>	<b>37.0</b>
<b>MCBE</b>			
12 Month	<b>15.0</b>	<b>15.2</b>	<b>16.5</b>
6 Month	9.6	9.6	<b>12.1</b>
3 Month	-1.9	-2.0	9.9
1 Month	11.4	12.2	13.2

This table reports the annualized return advantage (RA) over the time period January 1981 - December 2011 for three sets of regressions: behavioral measures alone, behavioral measures plus trailing market returns, and behavioral measures plus trailing market returns and trailing economic variables. Two indicator variables are created for each behavioral measure. US (Intl) SMB 1 (4) is equal to 1 if the US (International) Strategy Market Barometer was in the lowest (highest) 16% at the beginning of the month, zero otherwise. SI 1 (4) is 1 if the Baker & Wurgler (2006) unadjusted Sentiment Index was in the highest (lowest) 16% at the beginning of the month, zero otherwise. MCBE are beginning of the month trailing 12 month average sum of absolute rank differences, versus 1988-2007 performance ranks, for nine market cap - book to equity portfolios. MCBE 1 (4) is equal to 1 if the average absolute sum was in the highest (lowest) 16% at the beginning of the month, zero otherwise. RA is the 4 (i.e. high behavioral measure) indicator variable coefficient minus the 1 coefficient. The subsequent 12, 6, 3, and 1 month EAFE returns that are the dependent variables are compound, overlapping returns for each month in the sample. The 1 month market returns are 372 non-overlapping returns. One, three, six, and twelve month trailing EAFE returns are beginning of the month trailing unannualized compound returns. The four economic variables are beginning of the month, trailing annual growth in US Industrial Production Index, total US civilian total employment, and real US Personal Consumption Expenditure, as well as the current month NBER US recession index. Statistical significance (bold value) is based on a 5%, two tail t-test of the unannualized returns using the standard error of the difference, calculated as the square root of the sum of the squared SE's of the two coefficients minus 0.2 (correlation of the 4 and 1 index variables) times the product of the two SE's.

Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French's web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.

	<b>US SMB</b>	<b>Intl SMB</b>	<b>SI</b>	<b>MCBE</b>
<b>US SMB</b>	1.00			
<b>Intl SMB</b>	0.08	1.00		
<b>SI</b>	-0.18	-0.36	1.00	
<b>MCBE</b>	-0.03	0.30	-0.37	1.00

This table reports the monthly correlations over January 1981 through December 2011 for the four behavioral measures US Strategic Market Barometer (US SMB), International Strategy Market Barometer (Intl SMB), Sentiment Index (SI), and market cap – book to equity portfolio rank (MCBE). The US SMB and Intl SMB are based on the trailing 12 month performance ranks for the 10 US and International strategies, respectively. SI is Baker & Wurgler’s (2006) sentiment index. MCBE is based the 12 month trailing performance ranks of nine market cap – book to equity portfolios as created by Fama & French.

Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French’s web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.

Market	Expected Return			Actual Return		
	Min	Max	Range	Min	Max	Range
<b>S&amp;P 500</b>	-9.3	28.1	37.4	-43.3	61.2	104.5
<b>Russ 2000</b>	-15.5	37.8	53.3	-42.4	75.5	117.9
<b>EAFE</b>	-19.3	43.3	62.6	-51.8	99.5	151.3
<b>Average</b>	-14.7	36.4	51.1	-45.8	78.7	124.6

Based on Figures 4-6. The expected annual returns are based on beginning of the month US Strategic Market Barometer (US SMB), International Strategy Market Barometer (Intl SMB), negative Sentiment Index (SI), 12 month trailing EAFE return, and 12 month trailing US Industrial Production growth regressed on beginning of the month, subsequent annual total returns for the months January 1982 through January 2011. The US SMB and Intl SMB are based on trailing 12 month performance ranks for the 10 US and International strategies, respectively. Negative SI is the negative of the Baker & Wurgler's (2006) sentiment index. The average return is 12 month compound total return.

Data Sources: AthenaInvest, Thomson-Reuters, CRSP, Ken French's web site, and St. Louis Federal Reserve Bank FRED data base. I would like to thank Jeffery Wurgler for providing the BW Sentiment Index data and Jay Ritter for providing the IPO data.