

# Behavioral Portfolio Management

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# **Behavioral Portfolio Management**

- Abstract-

Behavioral Portfolio Management (BPM) is presented as a superior way to make investment decisions. Underlying BPM is the dynamic market interplay between emotional crowds and behavioral-data investors. BPM's first basic principle is that emotional crowds dominate the determination of both prices and volatility, with fundamentals playing a small role. The second basic principle is that behavioral-data investors earn superior returns. I present evidence supporting these first two principles. The third basic principle is that investment risk is the chance of underperformance. It is important to distinguish between emotions and investment risk so that good decisions are made. In order to achieve the best results using BPM, investment professionals should redirect their own emotions, harness behavioral price distortions, and mitigate the impact of client cognitive errors on their portfolio.

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## Behavioral Portfolio Management

Capital market theory has passed through two distinctly different paradigms in the past 80 years and is experiencing the rise of a third. Each paradigm has attempted to better explain the movement of market prices. The currently ascendant paradigm, based on new research in the field of behavioral finance, promises to offer superior guidance to investors and advisors who hope to harness the pricing distortions created by widespread cognitive errors.

The first paradigm in this progression was launched by Graham and Dodd (GD) in 1934 with publication of their now seminal book, *Securities Analysis*, which provided the first systematic approach to analyzing and investing in stocks. GD argued that it was possible to build superior stock portfolios using careful fundamental analysis and a set of simple decision rules. These rules were based on the collective cognitive errors made by the market that could be identified via fundamental analysis. The success of GD is all the more impressive because their book appeared in the depths of the Great Depression, when stocks were crashing and market volatility was reaching levels not seen before nor since.

GD's dominance lasted 40 years, until the ascendancy of modern portfolio theory (MPT) in the mid-1970s. MPT agreed that investors made cognitive errors, but there were enough rational investors to arbitrage away pricing mistakes. Therefore market prices were "informationally efficient." A consequence of this theory was that it was not worth conducting a GD-type of analysis, or any analysis for that matter. Instead, an investor should simply buy and hold an index portfolio.

MPT immediately ran into problems with the publication of two studies, with Basu (1977) demonstrating that stocks with low price-to-earnings ratios outperformed high PE stocks and Banz (1981) showing that small stocks outperformed large stocks. MPT had no answer for these anomalies. In order to save the model, the two were sucked into MPT as “return factors.” It has been downhill for MPT ever since, with study after study uncovering one anomaly after another.

As MPT rose to prominence, a parallel research stream explored how individuals actually made decisions. The conclusion of this behavioral science research was that emotions and heuristics dominate decision-making. It is amazing how little rationality was uncovered in these studies!

Because of the many problems facing MPT and the growing awareness of the provocative behavioral science results, we are currently witnessing the decline of MPT and the rise of behavioral finance. Among other things, this transition brings back Graham and Dodd as an important way to analyze the market’s faulty pricing mechanism.

### Introducing behavioral portfolio management

Successful investing is emotionally difficult. It often requires waiting for long-term results when your portfolio was recently pummeled, recommending an investment when others think it is a dog, investing when volatility is high and, in general, looking and acting different from the crowd. To be a successful investor, you must make a conscious decision to redirect your natural impulses and focus on careful and thoughtful analysis. Staying disciplined in an emotionally charged, 24-hour-news-cycle world is a challenge.

Behavioral portfolio management (BPM), a concept within the broader paradigm of behavioral finance, assumes most investors make decisions based on emotional reactions and shortcut

heuristics. It posits that there are two categories of financial market participants: emotional crowds and behavioral-data investors (BDIs). Emotional crowds are made up of investors who base decisions on anecdotal evidence and emotional reactions to unfolding events. Human evolution hardwires us for short-term loss aversion and social validation, which are the underlying drivers of today's emotional crowds.

Investors make their decisions based on what Daniel Kahneman (*Thinking, Fast and Slow*, 2012) refers to as System 1 thinking: automatic, loss-avoiding and quick, with little or no effort and no sense of voluntary control. On the other hand, BDIs make their decisions using thorough and extensive analysis of available data. BDIs use what Kahneman refers to as System 2 thinking: effortful, high-concentration and complex. BPM is built on the dynamic interplay between these two investor groups.

### BPM as an alternative to MPT

MPT posits that even though there are numerous irrational investors, rational investors quickly arbitrage away any price distortions. This implies that prices fully reflect all relevant information, that active investing lacks excess returns and that indexed portfolios are superior to their actively managed counterparts. In short, MPT contends that rational investors dominate the financial pricing process.

But what if it is the other way around? That is, what if investor cognitive errors dominate? If this were the case, then price distortions would be common and could be used to build portfolios that are superior to the corresponding index. Active management could generate superior returns. In fact, we would see the impact of investor errors in every corner of the market, and they would have to be taken into account when managing investment portfolios.

There is now ample evidence, which I will review shortly, supporting the argument that emotional crowds dominate market pricing and volatility. Emotional crowds drive prices based on the latest pessimistic or optimistic scenarios. Because stock trading is virtually free, there is little natural resistance to stocks moving dramatically in one direction or the other, amplifying these price movements. The market's mantra is: "If anything is worth doing, it is worth overdoing."

Rational investors, or what I call BDIs, react to the resulting distortions by taking positions opposite the emotional crowd. But they are not of sufficient heft to keep prices in line. As a consequence, the resulting distortions are measurable and persistent. BDIs are able to build portfolios that take advantage of these distortions as they are eventually corrected by the market, either rationally or simply because the crowd is now moving in another direction.

The events that trigger crowd responses may be short lived, but the subsequent emotions are long-lasting. As a result, price distortions are both measurable and persistent. This provides BDIs an opportunity to identify distortions and build portfolios benefiting from them. Even though a BDI portfolio will outperform, building such a portfolio is emotionally difficult, because the BDI is forever going against the crowd. The need for social validation acts as a powerful deterrent for most investors. Given the difficulty of behavior modification, there is little reason to believe that this situation will change any time soon. So BPM contends that BDIs will have a return advantage relative to crowds into the foreseeable future.

Viewing the world through the lens of BPM reveals that the decisions made by market professionals are often based on faulty analysis. It appears that much of what passes as MPT-

based professional analytics and due diligence is a way to rationalize this faulty decision-making.

For the remainder of this paper, I will focus on managing equity portfolios as a way to illustrate BPM's three basic principles, with the proviso that these principles apply to managing portfolios in other markets as well. In Section I, BPM's first basic principle, that emotional crowds dominate market pricing and volatility, is presented along with supporting evidence. In Section II, the second basic principle, that BDIs earn superior returns, is presented, along with evidence from the active equity mutual fund research stream. I also discuss the evidence regarding average equity fund performance and reconcile these two results. In Section III, the third basic principle, that investment risk is the chance of underperformance, is presented, as well as the argument that investor emotional reactions need to be carefully distinguished from investment risk. In Section IV, the steps for implementing BPM are discussed, including portfolio construction, selecting the best funds and the best stocks, and identifying the best markets. Concluding remarks are provided in Section V.

### **I. Basic Principle I: Emotional Crowds Dominate Pricing**

BPM posits that the emotional crowd usually dominates the price discovery process. This means that prices infrequently reflect true underlying value. Even at the overall market level, price distortions are the rule rather than the exception.<sup>1</sup>

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<sup>1</sup> Shefrin (2008) introduces the concept of "knife edge" market efficiency which exists only with the occurrence of a rare combination of wealth and investor expectations. Thus he argues stock prices rarely reflect underlying fundamentals.



For many market participants, this principle is uncontroversial. The chaotic nature of the stock market shows little outward signs of rationality. Prices swing wildly based on the latest events or rumors. For many investors, the contention that prices are emotionally determined is consistent with their own market experiences. But it is necessary to examine stock price data to truly grasp the importance of emotional cognitive errors in the price discovery process.

There is considerable evidence that stock prices are not driven by fundamentals and that emotions play a major role. 2013 Nobel Laureate Robert Shiller, in a 1981 article, highlighted excess market volatility, which has been hotly debated ever since. But after 30 years of empirical efforts to explain excess volatility and prove the efficiency of markets, Shiller (2003) stood by his initial assertion:

“After all the efforts to defend the efficient markets theory there is still every reason to think that, while markets are not totally crazy, they contain quite substantial noise, so substantial that it dominates the movements in the aggregate market. The efficient markets model, for the aggregate stock market, has still never been supported by any study effectively linking stock market fluctuations with subsequent fundamentals.”

The fact that noise, rather than fundamentals, dominates market price movements is clear evidence that crowds dominate stock pricing.

Research on the so-called equity premium puzzle provides additional evidence that emotions play a prominent role. The long-term equity risk premium should be associated with the long-term fundamental risks. Mehra and Prescott (1985, 2003) report that the U.S. stock market has generated a risk premium averaging around 7% annually from the 1870's to the present. They argue that this premium is too large, by a factor of 2 or 3, relative to fundamental market risk, so they coined the term “equity premium puzzle.” Over the last 25 years, there have been numerous attempts to find a fundamental explanation of this puzzle, but with little success.

Benartzi and Thaler (1993), however, provide an alternative explanation.

“The equity premium puzzle refers to the empirical fact that stocks have outperformed bonds over the last century by a surprisingly large margin. We offer a new explanation based on two behavioral concepts. First, investors are assumed to be “loss averse,” meaning that they are distinctly more sensitive to losses than to gains. Second, even long-term investors are assumed to evaluate their portfolios frequently. We dub this combination “myopic loss aversion”. Using simulations, we find that the size of the equity premium is consistent with the previously estimated parameters of prospect theory if investors evaluate their portfolios annually.”

The observed 7% equity premium is thus the result of short-term loss aversion and the investor ritual of evaluating portfolio performance annually, rather than the result of fundamental risk.

Putting Shiller’s research together with Benartzi and Thaler’s analysis, it is reasonable to conclude that both stock market volatility and long-term returns are largely determined by investor emotions.

Numerous other stock market pricing distortions have been uncovered. Many of these have been linked to the cognitive errors documented in the behavioral science literature. Hirshleifer (2008) provided three organizing principles to place price distortions into a systematic framework.

- People rely on heuristics (i.e. short-cut decision rules) because people face cognitive limitations. Because of a shared evolutionary history, people might be predisposed to rely on the same heuristics, and therefore be subject to the same biases
- People inadvertently signal their inner states to others. For this reason, nature might have selected for traits such as overconfidence, in order that people signal strong confidence to others.
- People’s judgments and decisions are subject to their own emotions as well as to their reason.

Shefrin (2010) provides an excellent aggregation of four behavioral finance summaries: including Hirshleifer, Barberis and Thaler (2003), Baker et al. (2007) and Subrahmanyam (2007). He also presents a comprehensive behavioral finance bibliography.

### The ineffectiveness of arbitrage

A key difference between BPM and MPT is the extent to which arbitrage is effective in eliminating stock price distortions. Research over the last 40 years has shown that arbitrage has not been able to eliminate price distortions. There are three possible reasons for this lack of effectiveness: the difficulty in identifying arbitrage opportunities, the costliness and riskiness of arbitrage and the limited number of market participants willing to engage in arbitrage.

Clearly stocks are difficult to value and so there is validity to the first reason. But even when the price distortion can be accurately estimated, such as with closed-end funds, the distortions persist. Cost and risk clearly make arbitrage difficult. But one would think that there would be sufficient incentive to attract a large number of arbitrageurs into the stock market.

Recent results by Cornell et al. (2011) are discouraging in this regard. They find a tendency for both mutual funds and sell-side analysts to exacerbate sentiment-driven price movements, rather than dampen them, as one would expect of supposedly rational investors. In other words, institutional professionals tend to join the emotional crowds rather than act as BDIs. It appears that arbitrage plays a small role in stock pricing. Indeed, investor emotional reactions overpower arbitrage.

Finally, Shefrin's (2010) insightful observation is of interest:

“Finance is in the midst of a paradigm shift, from a neoclassical based framework to a psychologically based framework. Behavioral finance is the application of psychology to financial decision making and financial markets. Behavioralizing finance is the process of

replacing neoclassical assumptions with behavioral counterparts. ... the future of finance will combine realistic assumptions from behavioral finance and rigorous analysis from neoclassical finance.”

Thus Basic Principle I – that emotional crowds dominate pricing – is a logical first step in building an effective decision process for investing.

## **II. Basic Principle II: Behavioral Data Investors Earn Superior Returns**

Emotional crowds dominate pricing, the first basic principle just discussed. This would seem to indicate that BDIs earn superior returns by taking positions opposite the crowds. But this is not necessarily the case. Though there is little doubt emotions increase volatility, the resulting distortions might be random and unpredictable, making it difficult, if not impossible, to take advantage of them. So beyond proving the fact that emotions drive prices, it is necessary to show that the resulting distortions are measurable and persistent.

The behavioral finance literature is full of examples of measurable stock price distortions.<sup>2</sup> It would seem easy to build superior performing portfolios, but doing so would mean taking positions that are opposite the crowd. The powerful need for social validation acts as a strong deterrent for many investors, discouraging them from pursuing such an approach. It is tough to leave the emotional crowd and become a BDI. Though we find price distortions to be measurable and persistent, building a portfolio benefiting from them is emotionally challenging.

In order to demonstrate that it is possible to earn superior returns, I turn to the active equity mutual fund research. This group of investors is one of the most studied in finance because of the availability of extensive data over long time periods. One stream within this large body of

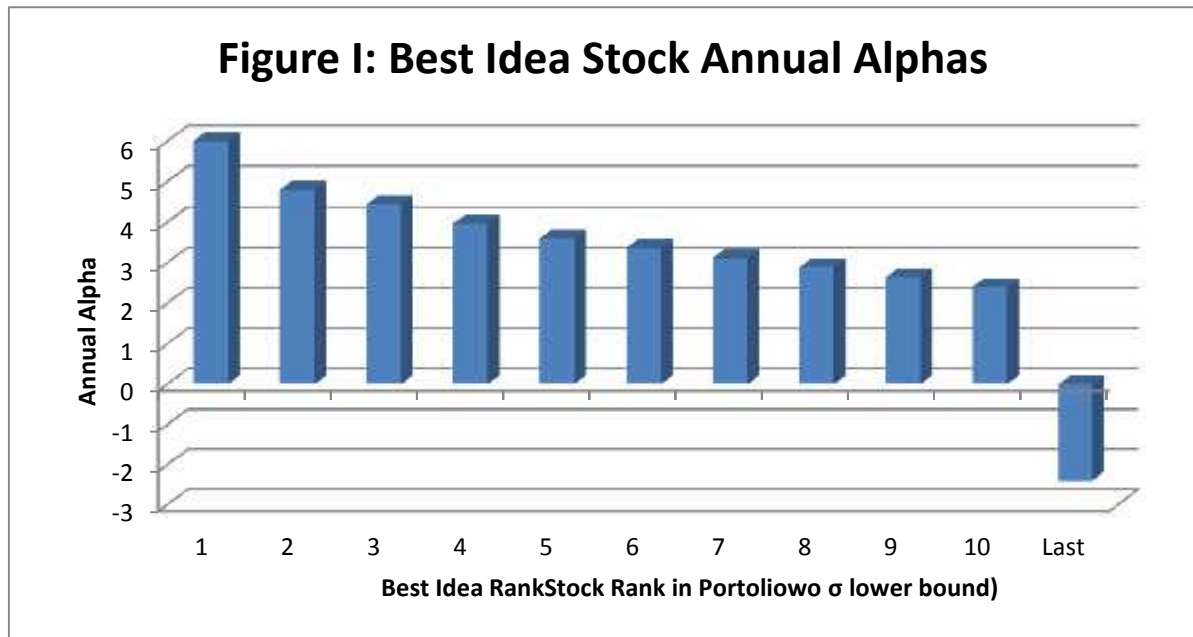
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<sup>2</sup> See the behavioral finance summaries in Shefrin (2010), Hirshleifer (2008), Barberis and Thaler (2003), Baker et al. (2007) and Subrahmanyam (2007).

research reveals that active equity funds are managed by successful stock pickers.<sup>3</sup> These studies examined individual fund characteristics and holdings and confirmed that a significant number of funds outperformed, as did their top stock picks.<sup>4</sup>

The most compelling results were reported by Cohen, Polk and Silli (CPS, 2010), which are reproduced in Figure I. This graph reveals that a fund’s best idea stock, as measured by the largest relative portfolio weight, generated an average risk-adjusted after-the-fact alpha of 6%.

What is more, the next best idea stocks also generated positive alphas. This demonstrates that it is possible to build a superior stock portfolio.



Based on Graph 3 in Cohen, Polk and Silli (2010). The graph shows, over the subsequent quarter, the average six-factor adjusted annual alpha for the largest relative overweighted stock in a mutual fund portfolio, the next most overweighted and so forth. Based on all active U.S. equity mutual funds 1991-2005.

<sup>3</sup> See recent articles by Alexander, Cici, and Gibson (2007); Baker, Litov, Wackter and Wurgler (2004); Chen, Hong, Jegadeesh, and Wermers (2000); Cohen, Polk and Silli (2010); Collins and Fabozzi (2000); Frey and Herbst (2013); Kacperczyk and Seru (2007); Kacperczyk, Myers, Poterba, Shackelford, and Shoven (2001); Keswani and Stolin (2008); Kosowski, Timermann, Wermers, and White (2006); Pomorski (2009); Sialm, and Zheng (2008); Shumway, Szeter, and Yuan (2009); and Wermers (2000).

<sup>4</sup> There is another research stream that shows truly active managers are able to earn superior returns. See Amihud and Goyenko (2008); Brands, Brown, and Gallagher (2006); Cremers and Petajisto (2009); Kacperczyk, Sialm, and Zheng (2005); and Wermers (2012).

CPS did not explore the source of these returns, but it is reasonable to conjecture that much of the return is the result of BDIs (i.e., buy-side analysts and portfolio managers) taking positions opposite the crowd. This conjecture could indicate that the investment team's ability to accumulate superior information about the stocks in which they invest is less important. It is difficult to untangle these two return drivers. For now, we are left with the plausible supposition that behaviorally driven price distortions are the most important source of excess returns for fund managers.

### Reconciling two stock-picking skill research streams

A better known conclusion from this line of research is that the average active equity mutual fund earns a return that is less than or, at best, equal to the index return.<sup>5</sup> That is, the average fund earns a zero or negative alpha. This leads to the oft-stated conclusion that equity fund managers lack stock-picking skill, just the opposite of the evidence I presented above.

One would think that professional investors, such as mutual funds, hedge funds and institutional managers, would be BDIs. And indeed, the analysts within such organizations are most often BDIs. But the further up one goes in the organization and the larger the fund, the more like the crowd it becomes. This is because in order to grow assets under management, funds must attract and retain investors, which means catering to client emotions and taking on the features of the crowd. As the fund grows in size, it increasingly invests in those stocks favored by the crowd, since it is easier to attract and retain clients by investing in stocks to which clients are emotionally attached. A fund might also mimic the index to lock in a past alpha or become a

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<sup>5</sup> See Bollen and Busse (2004); Brown and Goetzmann (1995); Carhart (1997); Elton, Gruber and Blake (1996); Hendricks, Patel, and Zeckhauser (1991); Jensen (1968); Fama and French (2010), and Jones and Wermers (2011).

closet indexer to avoid style drift and tracking error. Each of these represents a different way of catering to investor emotions.

So, what may start out as a fund managed by BDIs taking positions opposite the crowd often ends up morphing into something that is acceptable to the crowd. As argued by Berk and Green (2004), such behavior is rational on the part of the fund, as revenues are based on assets under management. Consistent with this argument, others have found that returns decline as funds grow large.<sup>6</sup>

The combination of the many documented price distortions and the excess returns earned by active equity mutual funds on their best idea stocks provides empirical support for basic principle II. But many investors will find it more difficult to assimilate principle II than principle I, since the behavioral barrier of social validation must be overcome in order to build a successful BDI portfolio.

### **III. Basic Principle III: Investment Risk is the Chance of Underperformance**

The measures currently used within the investment industry to capture investment risk are really mostly measures of investor emotion. In order to deal with what is really important, let's redefine investment risk as the chance of underperformance. The suggestion that investment risk be measured as the chance of underperformance is intuitively appealing to many. In fact, this measure of risk is widely used in a number of industries. For example, in industrial applications, the risk of underperformance is measured by the probability that a component, unit or service will fail. Natural and manmade disasters use such a measure of risk. In each situation, the focus

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<sup>6</sup> See Chen, Hong, Huang, and Kubik (2004); Han, Noe, and Rebellio (2008); and Pollet and Wilson (2008).

is on the chances that various final outcomes might occur. In general, the path to the outcome is less important and has little influence on the measure of risk.

Earlier I reviewed the evidence regarding stock market volatility and argued that most volatility stems from crowds overreacting to information. Indeed, almost no volatility can be explained by changes in underlying economic fundamentals at the market and individual stock levels.

Volatility measures the impact of investor emotions on prices, not necessarily investment risk.

This is also true of other measures of risk, such as downside standard deviation, maximum drawdown and downside capture.

But unfortunately, the investment industry has adopted this same volatility as a risk measure that, rather than focusing on the final outcome, focuses on the bumpiness of the ride. A less bumpy ride is thought to be less risky, regardless of the final outcome. This leads to the unintended consequence of building portfolios that result in lower terminal wealth and, surprisingly, higher risk. This happens because the industry mistakenly builds portfolios that minimize short-term volatility relative to long-term returns, placing emotion at the very heart of the long-horizon portfolio construction process. This approach is popular because it legitimizes the emotional reaction of investors to short-term volatility.

Thus risk and volatility are frequently thought of as being interchangeable. However, focusing on short-term volatility when building long horizon portfolios can have the unintended consequence of actually increasing investment risk. Since risk is the chance of underperformance, focusing on short-term volatility will often lead to investing in lower



expected return markets with little impact on long-term volatility.<sup>7</sup> Lowering expected portfolio return in an effort to reduce short-term volatility actually increases the chance of underperformance, which means increasing risk.

A clear example of this is the comparison of long-term stock and bond returns. Stocks dramatically outperform bonds over the long run. By investing in bonds rather than stocks, short-term volatility is reduced at the expense of decreasing long-term wealth. Equating short-term volatility with risk leads to inferior long horizon portfolios.

The cost of equating risk and volatility can be seen in other areas as well. Many investors pull out of the stock market when faced with heightened volatility. But research shows this is exactly when they should remain in the market and even increase their stock holdings, as subsequent returns are higher on average.<sup>8</sup> It is also the case that many investors exit after market declines only to miss the subsequent rebounds. Following the 2008 market crash, investors withdrew billions of dollars from equity mutual funds during a period in which the stock market more than doubled.

The end result is that investors frequently suffer the pain of losses without capturing the subsequent gains. Several studies confirm that the typical equity mutual fund investor earns a return less than the fund return because of poorly timed movements in and out of the fund. Again, these are the dangers of not carefully distinguishing emotions from risk and thus allowing emotions to drive investment decisions.

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<sup>7</sup> Higher return variance lowers an investment's long-term compound return, but this impact is small compared to the impact of investing in lower expected return markets.

<sup>8</sup> See French, Schwert, and Stambaugh (1987).

### Measuring underperformance

In order to measure investment risk, it is necessary to properly define underperformance.

Underperformance depends on both the time horizon of the investment and the goal of the investor. For example, if the goal is to have \$100,000 in two years, risk is measured as the chance of ending up with less than \$100,000 in two years. In this case, short-term volatility is an important contributor to risk.

In those cases where there is no specific time horizon, the appropriate benchmark is the highest expected return investment being considered. The actual return should approximate the expected return over long time periods, due to the law of large numbers. Most long-term investment situations fall into the this category.

Note that short-term volatility plays an ever-smaller role as the time horizon lengthens. This is because the short-term emotionally and economically driven price changes tend to offset one another over the long run by means of time diversification. Markets experience about one third to one quarter of the volatility over the long-term as compared to the short-term.

### Sources of investment risk

The sources of investment risk are well known. At the micro level, events such as default, company failure and company mistakes contribute to risk. Diversification can mitigate these to a large extent. At the macro level, the economy and government policies contribute to systematic risks. These risks are more difficult to address since they impact a large number of industries and companies. These micro and macro risks are generally taken into consideration by BDIs but are not necessarily well understood by the emotional crowd.

There is another risk component that actually grows over time, what I call foundational risk, which is often overlooked. This is the risk of countrywide economic or stock market failure. History reveals that this risk is real, with numerous economic and market failures occurring though the centuries. Foundational risk increases over time, just as the risk of an earthquake increases as the time period lengthens. One must account for this risk when making investment decisions.

Behavioral science confirms that individuals either underestimate or overestimate foundational risk. The probability of such an event happening is low (neither has happened in the U.S. during its 235+ year history), so many assume this probability to be zero, which of course it is not. On the other hand, if a low-probability event has happened recently, individuals tend to overestimate these risks. The recession of 2008, while not an economic or market failure, was a reminder that such occurrences are possible even in a country as economically advanced as the U.S. So now many investors overestimate this risk by building portfolios as if such failures are imminent. It takes real discipline to properly estimate this risk in light of emotionally charged events like 2008.

I just described fundamental and foundational contributors to risk. But investors have a hard time estimating the probabilities of such events and this is where cognitive errors enter.<sup>9</sup> The result is that what is often referred to as risk is mostly a measure of the impact of investor emotions. Case in point is volatility, which in the short run is almost all emotion and in the long run is mostly fundamental and foundational. The emotional component of “risk” is either something that

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<sup>9</sup> Shefrin (2008) provides the first systematic analysis of how behavioral assumptions impact on prices, which leads to a unified behavioral treatment of the pricing of equities, options, fixed income securities, and mean-variance portfolios. Specifically he models the difference between market wide investor driven probabilities and true probabilities and the resulting impact on prices.

should be considered when building a portfolio to meet short-term goals, is something that can be used to build a superior portfolio (e.g. staying invested in the stock market when experiencing heightened volatility while others are fleeing) or is something to largely ignore when building a long horizon portfolio. The bottom line is that it is important to carefully distinguish between the emotional reaction of investors and investment risk when constructing portfolios.

### Assimilating basic principle III

This principle is the most difficult for investors to assimilate. It involves redirecting the powerful behavior of short-term loss aversion and acting contrary to the hard-wired need for social validation. For a number of investors, this may simply be too much to ask. But for others, progress may be possible.

A first step is calling things as they are. Rather than labeling everything risk, be careful to identify and separate that portion which is really the emotional reaction of investors. There are risks that must be taken into account when making investment decisions. But don't muddy the water by carelessly lumping emotions and investment risk together into a single number, as is the case for many currently popular risk measures.<sup>10</sup> Rather than carefully separating risk from emotions, the investment industry provides a mixed bag of risk measures that exacerbate the emotional aspects of investing. So advisors, in allaying the fears of clients, find it necessary to

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<sup>10</sup> A flying analogy illustrates this separation process. All of us who fly have experienced turbulence, which can range from unnerving to downright frightening. When asked about their flights, many travelers will comment on the amount of turbulence they encountered. But we know from years of FAA research that turbulence rarely causes injury or death. Instead, pilot error and other human errors are the leading causes of plane crashes. What if the FAA had listened to passengers to determine the risk of flying? Rather than meticulously studying each accident and uncovering the true cause, the FAA would have spent considerable time trying to reduce turbulence, as requested by passengers, thus missing the critical role of human error in accidents. By focusing on short-term turbulence, they would have actually made flying more dangerous. But they did not and as a result we have just experienced the safest year in commercial flight since the dawn of the jet age. We are not so fortunate in the investment industry.

disregard conventional wisdom. Thus they must confront both clients and the investment establishment in order to successfully overcome the challenges of successful investing.

#### Volatility and advisor/fund business risk

Short-term emotional volatility is potentially more of a problem for the advisor/fund than is investment risk. Advisors and funds see revenues decline when client short-term investment performance is poor, and in the extreme case, investors may leave to invest elsewhere. This is an important reason why the industry lumps the emotional reaction of investors into currently popular risk measures.

So when an advisor or fund states that an investment is risky, based on currently popular measures, they are actually saying three distinctly different things:

1. There is considerable emotionally-charged volatility with this investment.
2. Because of this, there is substantial business risk for my firm.
3. Oh, by the way, there is some amount of investment risk.

Only investment risk matters for making decisions, particularly for long horizon portfolios. But these three types of risk are interconnected and it requires considerable effort to pull them apart. The first step is to correctly label each component: client emotional reaction to volatility, advisor or fund business risk and investment risk.

### **IV. Implementing Behavioral Portfolio Management**

Now that the three basic principles underlying BMP have been presented, let's turn to the issue of implementation. There are three key steps to implementing BMP: redirecting your emotions, harnessing price distortions and mitigating the damage of client cognitive errors on their portfolios. The first and third steps must be accomplished in order to successfully implement the

second step. Many investment firms provide excellent materials to aid advisors in helping clients avoid cognitive errors and improve the investment decision process. But beyond an inventory of common mistakes and antidotes, not much is available regarding how to harness price distortions. This is an important omission. Distortion-harnessing portfolios are key to earning superior returns. This section illustrates one way to create them.

### BPM-based asset allocation and portfolio construction

The standard approach to portfolio construction, as proposed by Markowitz (1952), is to maximize return for a given level of volatility. This is often referred to as a risk-return analysis. I argued earlier that the typical measure of risk – volatility – is really a measure of emotion. So risk-return analyses are really emotion-return analyses. To avoid placing emotionally charged volatility at the center of asset allocation, we need to sideline it to the greatest extent possible.

One approach is to build portfolios using an endowment concept . Endowments are faced with the dual charge of providing an annual income stream to a university or other institution as well as growing the portfolio over a long-term horizon. To a large extent, endowment managers are insulated from the short-term performance pressures facing many other investment managers. For this reason, they are able to construct the best portfolios for meeting the dual charge of regular income and long-term growth. Endowment fund behavior provides the basis for this approach to BPM-based asset allocation.

The first step is to divide the client portfolio into three buckets: short-term income and liquidity, capital growth, and alternatives. The short-term bucket is invested in low- or no-volatility

securities that are sufficient to meet the client's short-term needs with virtual certainty. This helps remove volatility from conversations regarding this bucket.

The capital growth bucket is built to maximize long-term wealth. Since the investment horizon is long for this bucket, the focus should be on expected and excess returns. Endowment funds do this by overweighting the asset classes with the highest expected returns. For example, currently endowments heavily weight equities, with very little invested in bonds.

A significant challenge is that investors have difficulty thinking long-term, as they are hardwired for short-term loss aversion. Instead of a 30-year horizon, for example, they see a series of 30 one-year time frames or a series of 120 one-quarter time frames. In each period, they apply short-term loss-aversion criteria. Investors have difficulty staying the course with high-return, volatile investments such as stocks. Short-term loss aversion can undermine capital growth portfolio performance, as it can lead to decisions based on current market volatility.

The obvious answer is to discuss investment performance infrequently. But regular meetings are an important part of client service, so the challenge is to talk to clients without triggering the emotional reactions associated with unavoidable market gyrations. Two possible remedies are making investment performance a small part of the regular client meeting and emphasizing the long-term nature of the capital-growth portfolio. Another is to phase in and out of investments, so that a single price or total value does not become an anchor upon which the client focuses.

The alternative bucket contains those investments that do not fit into the other two, such as houses, favorite stocks, illiquid investments, jewelry and artwork. These are managed based on the unique features of the assets and as directed by the client.

The major benefits of breaking the portfolio into three buckets are sidelining volatility as an issue and being able to construct each bucket to meet specific needs. Volatility, correlations and other commonly used statistical measures, such as downside risk, play a diminished role in BPM-based asset allocation and portfolio construction. Instead, expected and excess returns are most important.

### BPM-based fund selection: strategy, consistency and conviction

Once asset allocation decisions have been made, the next step is to select the funds in which to invest. The most common criterion for selecting equity funds is past performance. Funds that have performed well in the past feed on the cognitive error that they will perform well in the future. In fact, the most popular fund-rating system, Morningstar's star system, is based on 3-, 5-, and 10-year past performance. There is a big problem, however: past performance is not predictive of future performance. This has been confirmed by numerous statistical studies.<sup>11</sup> The fact that nearly everyone in the industry continues to use past performance, in the face of overwhelming evidence against its usefulness, is a testament to its powerful appeal.

Counterproductive cognitive errors are difficult to break.

Rather than using past performance, BPM focuses on important manager behaviors: strategy, consistency and conviction. Strategy is the way a fund goes about earning superior returns through analysis, buying and selling. The strategy should be pursued consistently through time. The fund will move about the investment universe (based on its asset class mandate) in order to identify the most attractive securities in response to ever-changing economic and market

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<sup>11</sup> See Bollen and Busse (2004); Brown and Goetzmann (1995); Carhart (1997); Elton, Gruber and Blake (1996); Hendricks, Patel, and Zeckhauser (1991); Jensen (1968); Fama and French (2010), and Jones and Wermers (2011).



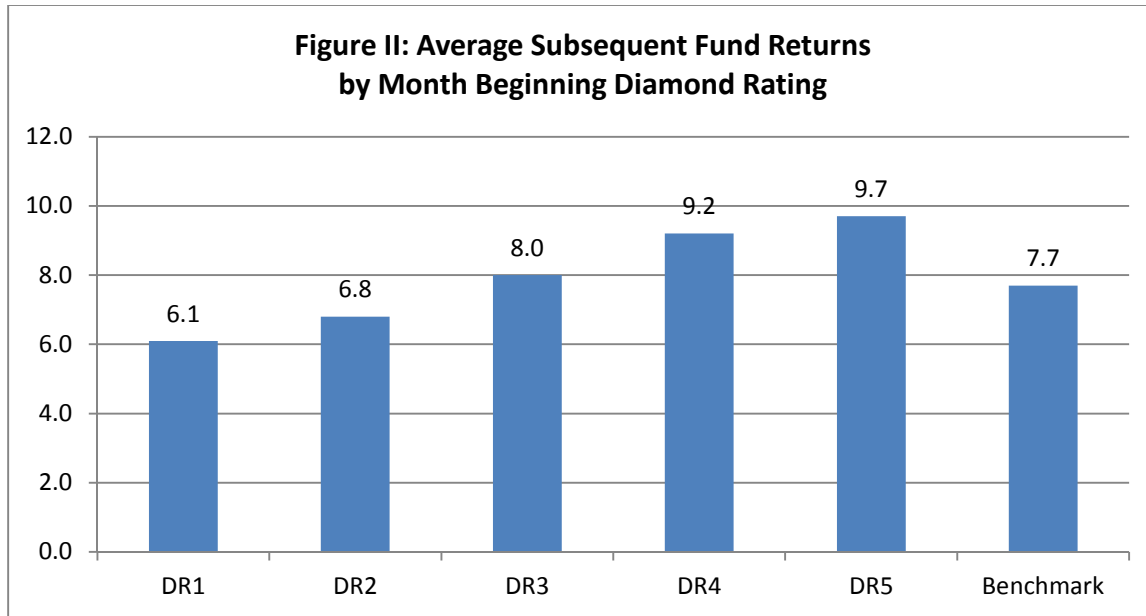
conditions. Finally, the fund should take high-conviction positions in its best investment ideas.<sup>12</sup> These fund behaviors can be objectively measured and used to identify best-performing funds going forward.<sup>13</sup>

I have computed these measures for about 3,000 U.S. and international active equity mutual funds domiciled in the U.S. Average fund returns, since 1997, are reported in Figure II, based on *a priori* diamond rating (DR). The two highest-rated fund groups, those with the highest level of consistency and conviction, each outperformed the benchmark, while the two lowest-rated fund groups each underperformed and the middle-rated funds generated benchmark-equaling returns. The top diamond ratings are comprised of the most active funds, while the bottom is made up of closet indexers. On average, there is a gain of 1% in annual performance per diamond rating as we move from closet indexers to truly active managers. Figure II provides evidence that active equity manager behavior is predictive of performance, while past performance is not.

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<sup>12</sup> Overconfidence is a well-known cognitive error in which investments are made based on an unjustified assessment of future prospects. No doubt a fund's high conviction positions contain some portion of the overconfidence bias. However considerable research, as cited earlier in footnote 3, reveals that high conviction positions do indeed generate superior returns. So it appears that overconfidence is more than offset by the stock picking skill of active equity managers.

<sup>13</sup> Funds are identified as pursuing one of 10 equity strategies and assigned to a peer group. Holdings data is then appended and the favorite stocks held by each strategy peer group are identified. Strategy consistency is measured monthly as the percent of own strategy stocks held by the fund, with the higher the better. Strategy conviction is measured monthly by the extent to which the fund differs from its benchmark, with the greater the differences the better. Visit [athenainvest.com](http://athenainvest.com) for more details regarding these calculations.



Based on subsequent monthly returns for beginning of the month U.S. and international strategy identified, Diamond Rated (DR) active equity mutual funds April 1997-March 2012. DR is based on strategy, consistency and conviction, with DR5 being the highest on both scales and DR1 being the lowest. Fund returns are net of automatically deducted fees. The benchmark is the MSCI All Country World Index. Data sources: AthenaInvest and Thomson Reuters Financial.

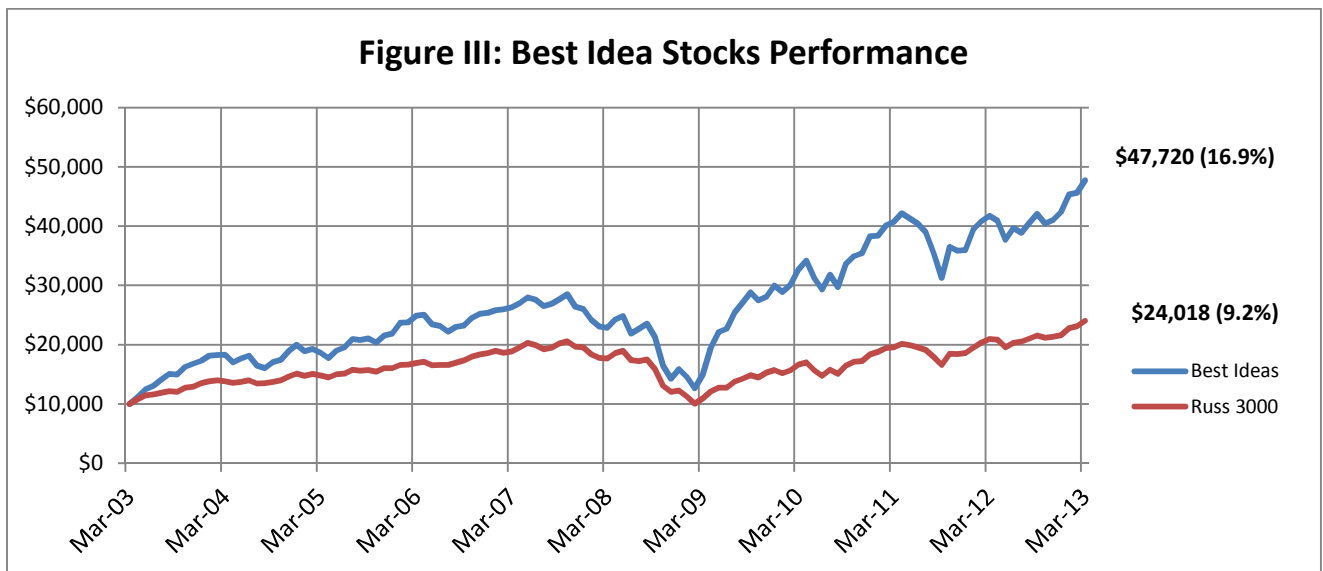
### BPM-based stock selection: best ideas of the best managers

Earlier I presented evidence that the top picks of active equity mutual fund managers earned superior returns. I argued that these were the result of fund managers (i.e., BDIs) taking high-conviction positions in stocks that were mispriced due to price distortions. The direct way to tap into these behaviorally driven returns is to develop an investment strategy and manage a portfolio based on it, as active equity managers do. The evidence regarding individual investing success is mixed, though it is compelling for a mutual fund's best idea stocks.

Stock-selection skill can be captured by investing in the best ideas of the best managers. The best funds are those that are most strategy-consistent while at the same time taking high-conviction positions – the DR4 and DR5 funds described above. The stocks most held by those top funds are designated the best ideas of the best managers. The best idea results are reported in Figure

III. The best idea stocks, based only on data available at the beginning of each month, generated an ex post annual return that was 7.7% higher than the Russell 3000 index return (16.9% versus 9.2% from April 2003 to March 2013). The best-idea stock portfolio (made up of approximately 400 best ideas out of a DR universe of 5,000 stocks) represented the full range of market capitalizations, justifying the Russell 3000 as the benchmark.

The 7.7% best-idea return advantage exceeds the 2% return advantage of the best funds (i.e. DR5 funds), indicating that even the best funds hold a large number of non-best-idea stocks. Part of the difference is attributable to the average fund fees of 1.3%. But even accounting for these fees, best-idea stocks clearly outperformed the rest of the stocks held by the fund (a result confirmed by CSP). This is further evidence that fund managers are superior stock pickers compared to the average investor and that BDIs are able to take positions in stocks characterized by behaviorally driven price distortions.



Includes month beginning DR5 U.S. stocks for April 2003-March 2013, resulting in an average of roughly 400 U.S. stocks being held out of the DR universe of approximately 5,000 U.S. stocks. Subsequent monthly returns are simple averages across the stocks held. DR5 stocks are the best idea stocks of the best managers. Data sources: AthenaInvest, Thomson Reuters Financial, and Lipper

It may seem puzzling that active equity managers are superior stock pickers on the one hand, while on the other hand, they hold large numbers of non-best-idea stocks. The combination of incentives and investor behavior explain this inconsistency. Funds are strongly encouraged to grow, as they are paid a fee based on AUM. When they are small, it is easier for funds to hold concentrated portfolios of best-idea stocks, but as they grow, it becomes harder to stick with best-idea stocks and they run into trading liquidity problems. Many funds transition from BDI strategies to catering to investor emotions. Berk and Green (2004) argue that this is rational profit-seeking behavior on the part of funds.

### BPM-based market selection: Which strategies are investors rewarding?

It is well known that returns from being in the right market at the right time dramatically exceed the returns from even the most successful stock-selection strategy. Along with investor's short-term loss aversion, this explains why tactical market funds are so popular these days. Many of these are based on short-term price momentum and mean reversion. These patterns tend to be transitory in nature and thus are challenging to implement successfully. Another problem is that they appeal to investor's short-term loss aversion, so it may be hard to determine if they are really generating superior returns or simply represent emotional catering.

When investors make cognitive errors that impact the market as a whole, the resulting price distortions are often measureable and persistent. A key is to identify objective measures of these distortions rather than relying on survey data, which is notoriously unreliable. One must understand what investors are doing, rather than what they are they saying. One of the first such measures was Baker and Wurgler's (2006, 2007) sentiment index. The index is based on six objective measures of investor sentiment, such as the closed-end fund discount. The index is

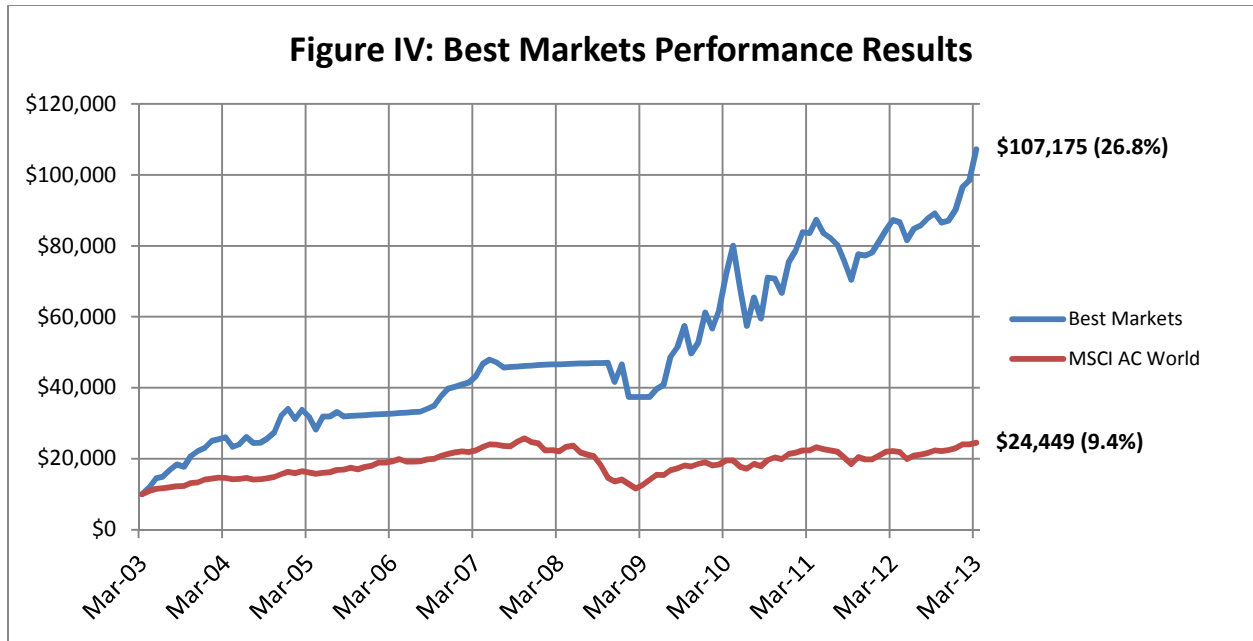
predictive of when small-capitalization stocks will outperform large-capitalization stocks and vice versa. Baker and Wurgler find that the more pessimistic investors are, the better it is for small stocks and the market as a whole. Investor optimism is a stock market return killer.

I have created two other measures of investor sentiment. Using the returns for each of the 10 U.S. and international equity strategies, I created a predictor of future U.S. and international market returns, dubbed market barometers. Both barometers are based on recent relative strategy return ranks versus long-term return ranks. Based on these comparisons, the U.S. and international markets are each separately rated strong, normal or weak.<sup>14</sup>

By combining the sentiment index with the U.S. and international market barometers, it is possible to implement a global tactical model that trades among U.S. large-cap, U.S. small-cap and international stocks, as well as cash. I have implemented the best markets methodology using a 100% investment in long or double-long S&P 500, Russell 2000, EAFE exchange-traded funds or Treasury bills for cash investments.

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<sup>14</sup> A market barometer is a scaled value of the sum of the absolute differences between the short term performance rank and the long term performance rank for each of the 10 equity strategies. A barometer is calculated for both the US and international equity markets (EAFE), with a mean value of 10%, the long-term return on the stock market. Active equity managers provide an intelligent organization of the of the return factors driving the stock market, while investors collectively signal which set of factors are most important at the current time. So a combination of manager skill and investor behavior is predictive of the market's expected return.

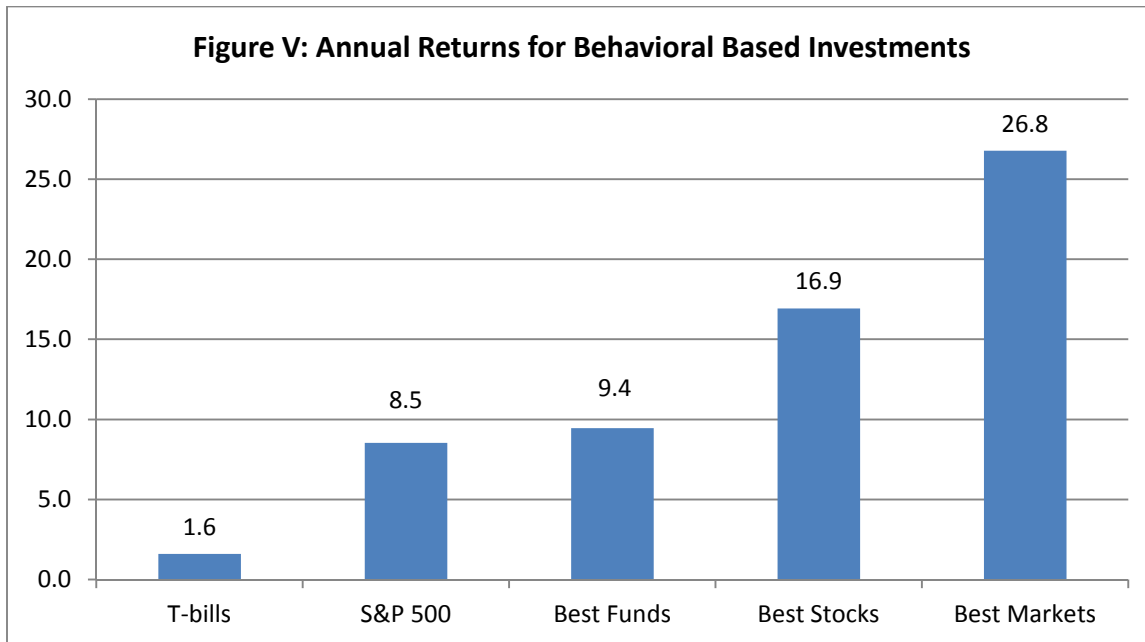


Trades into a 100% single-long or double-long exchange-traded fund for the S&P 500, Russell 2000, or MSCI EAFE or Treasury bills based on beginning-of-the-month U.S. and international strategy market barometers and modified sentiment index. Returns since September 2010 are GIPS-complaint actuals, with prior returns back-tested using the same month-beginning methodology as for the actual results. Data sources: AthenaInvest, Thomson Reuters Financial, and Lipper

The 10-year best-market results are reported in Figure IV. The best-market portfolio yields a 17.4% return advantage over the MSCI AC World Index return (26.8% versus 9.4%). This advantage is driven by being in the right market at the right time (of particular interest, it was invested in cash during most of the 2007-2009 downturn) as well as the timely use of leverage when behavioral measures signaled a strong market. As expected, the best-market return advantage is more than twice that of the best-idea stock advantage (17.4% versus 7.7%). The resulting portfolio is not traded very actively, by tactical standards, with a 100% trade every nine months on average. This reflects the measurable and persistent market-wide investor behavior currents being captured by these measures.

A summary of the best funds, stocks, and markets results is presented in Figure V for April 2003 through March 2013. They demonstrate the advantage of focusing on behavioral factors when

constructing long-term portfolios. The return advantage grows from 6.9% by staying in the stock market versus investing in Treasury Bills, increases another 0.9% by investing in the best (i.e. truly active) equity mutual funds, another 7.5% by investing in the fund's best-idea stocks and another 9.9% by investing in the best markets.



See footnotes in previous figures for more information on how each return is calculated. April 2003-March 2013. Data sources: AthenaInvest, Thomson Reuters Financial and Lipper

Each of the return enhancements just discussed is based on currently available data that allow for the measurement of persistent behavioral factors. This data has the potential for building superior portfolios. It seems the reward for harnessing these factors is worth the effort of redirecting emotions while mitigating the impact of client cognitive errors on their portfolios. This is the ultimate hope of behavioral portfolio management.

## V. Conclusions

I propose a model focusing on the behavioral aspects of financial markets in an attempt to help make better investment decisions. Behavioral portfolio management's (BPM) first basic principle is that emotional crowds dominate the determination of both prices and volatility, with fundamentals playing a small role. This means that more often than not prices reflect cognitive errors rather than underlying value, a consequence of arbitrage failing to keep prices in line with fundamentals. As a result, price distortions are the rule rather than the exception, making it possible for behavioral-data investors (BDIs) to build superior portfolios, the second basic principle. I present evidence supporting these first two basic principles.

Volatility and risk are not synonymous. In the case of meeting short-term financial goals, volatility is an important contributor to investment risk, as measured by the chance of underperformance, the third basic principle. On the other hand, volatility plays a much less important role when building long horizon portfolios. By focusing on short-term volatility when building long horizon portfolios, the investor injects emotions into the portfolio construction process. It is important to distinguish between emotions and investment risk so that the best decisions can be made.

The bottom line is that building successful investment portfolios is straightforward but emotionally difficult. Making decisions based on collective investor price distortions and ignoring short-term volatility when building long horizon portfolios presents significant challenges for investment professionals. This is because such a strategy is forever going against the crowd, thus depriving the client of social validation, and in turn asking them to set aside the strong emotions associated with volatile prices. Consequently, it is necessary to mitigate the



## Behavioral Portfolio Management

impact of client cognitive errors. Error mitigation is a fact of life in the investment industry and both advisors and investment managers should develop such skills. The goal is to be sensitive to the reactions of clients while minimizing the damage to their portfolios. Developing an approach that keeps clients in their seats while building superior portfolios is important for clients, advisors, and investment managers alike.

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