



## **Quants at the Crossroads – Where Do We Go From Here?**

**By Acadian Investment Team**

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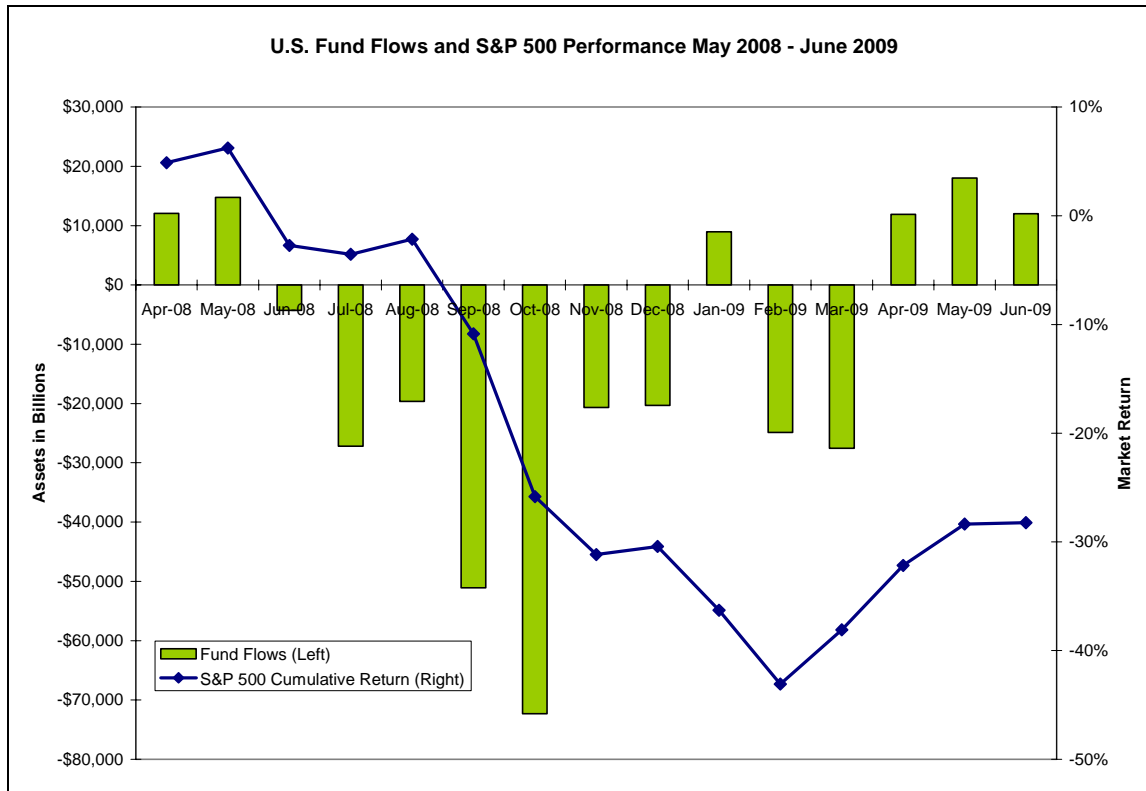
It has been a tough two years for quantitative approaches to investing. Most have underperformed their more traditional peers<sup>1</sup> in both the market downturn of 2008 and the subsequent rally of 2009. The *New York Times* recently commented that “you might ask whether quants have any idea at all what they are doing.”<sup>2</sup> This note seeks to present the counterargument, underscoring what we see as the core validity of quantitative approaches and the broad evidence for their continued long-term efficacy.

Acadian’s investment thesis is quite straightforward. People are hard-wired to make systematic mistakes in asset markets. Their brains push them towards the unprofitable combination of buying high and selling low. Because investors make behavioral mistakes, assets are mispriced, and it is possible to make excess returns by being on the other side of “greedy” buys and “panic” sells. In order to potentially capitalize on these mispricings, however, it is essential to build a process that limits cognitive errors. The best, indeed the only, means of doing this is to create a systematic process that is capable of making counterintuitive decisions. This is the key rationale for a quantitative approach.

### **Recognizing Cognitive Errors**

The last 30 years of behavioral research have produced convincing evidence that people make emotion-driven decisions in all domains of life, including investments. As one example, investors chase returns, and this tends to be costly. Consider the data below on fund flows into (and out of) U.S. long-term equity mutual funds.

## Investors Chase Returns



Source of data: Investment Company Institute, Standard & Poors, FactSet  
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The conclusion is that investors have shown an uncanny ability to make themselves poorer by selling after declines and buying after rallies. In the year culminating in the March 2009 equity market low, U.S. investors removed a quarter of a trillion dollars from long-term equity mutual funds. They returned to buying equities only after markets began to rise.

When Nobel laureate Daniel Kahneman was asked to identify his most important discovery, he responded with “loss aversion.” Professor Kahneman and his collaborator Amos Tversky (and many others subsequently) have documented an almost irrational hatred of losses. This universal human trait manifests itself in laboratory experiments where subjects show they value losses at roughly three times the equivalent of gains (*e.g.*, they would require the prospect of a \$15 gain in order to accept the risk of a \$5 loss).<sup>3</sup>

Hating losses may seem smart, but it is costly, as many profitable opportunities are not taken because of fear. In the stock market, investors tend to sell only positions that are profitable, and avoid selling losing positions<sup>4</sup>. These tendencies turn out to be very detrimental to maximizing investment returns.

What sort of people exhibit loss aversion when it comes to investments? Almost everyone, including, apparently, the Secretary of the Treasury, Timothy Geithner. Secretary Geithner recently decided to remove the “For Sale” sign from his Larchmont, NY home, and to rent the

house out because he could not sell it for more than its purchase price.<sup>5</sup> When loss-averse sellers pull their houses off the market, this reduces the immediate downward pressure on housing prices. However, an overhang of unsold houses is created, and this is likely to cause future price declines. The result for the seller is increased losses, incurred later. At an aggregate level this process creates momentum, where price declines in one period are followed, on average, with future price declines.

How does one potentially profit in a world of loss-averse people? Answer: take the other side of the trade. In the housing and stock markets this can take the form of using momentum strategies, among others. When housing prices decline, a momentum investor predicts future declines. Similarly, a momentum-based stock picking strategy favors winning stocks over losing stocks. In the U.S. stock market, a simple momentum strategy has produced an average return of 10.2% per year over the period of 1927 – 2009<sup>6</sup>.

Acadian's investment process includes a momentum component because we believe we understand the mistakes being made by our counterparties. We have a similar underpinning for the other aspects of our investment process, which include valuation, earnings and financial quality measures. In each case, we have a working hypothesis, consistent with the data, on the behavioral errors that we believe produce opportunity.

It is not the purpose of this note to review the evidence for the full array of documented behavioral anomalies in detail, but more information can be found in Acadian's earlier papers (listed in the Appendix) as well as in the academic work of Tversky, Shiller, DeBondt, Thaler and many others. Suffice to say, there is now widespread agreement that investors exhibit a range of irrational and costly behaviors including not only loss-aversion but also such errors as:

- Local bias (favoring the stocks of your home country regardless of how they measure up against global alternatives)
- Underreaction (slowness to respond to news and information that does not fit with expectations)
- Anchoring (the tendency to rely too heavily on limited pieces of information when making decisions)
- Agency effects (risk aversion arising from the asymmetrical consequences of being wrong about best ideas versus sticking to safe bets)
- Herding (the tendency of investors to pile into recent "winners" and out of "losers")
- Extrapolation (assuming the future will be like the recent past).

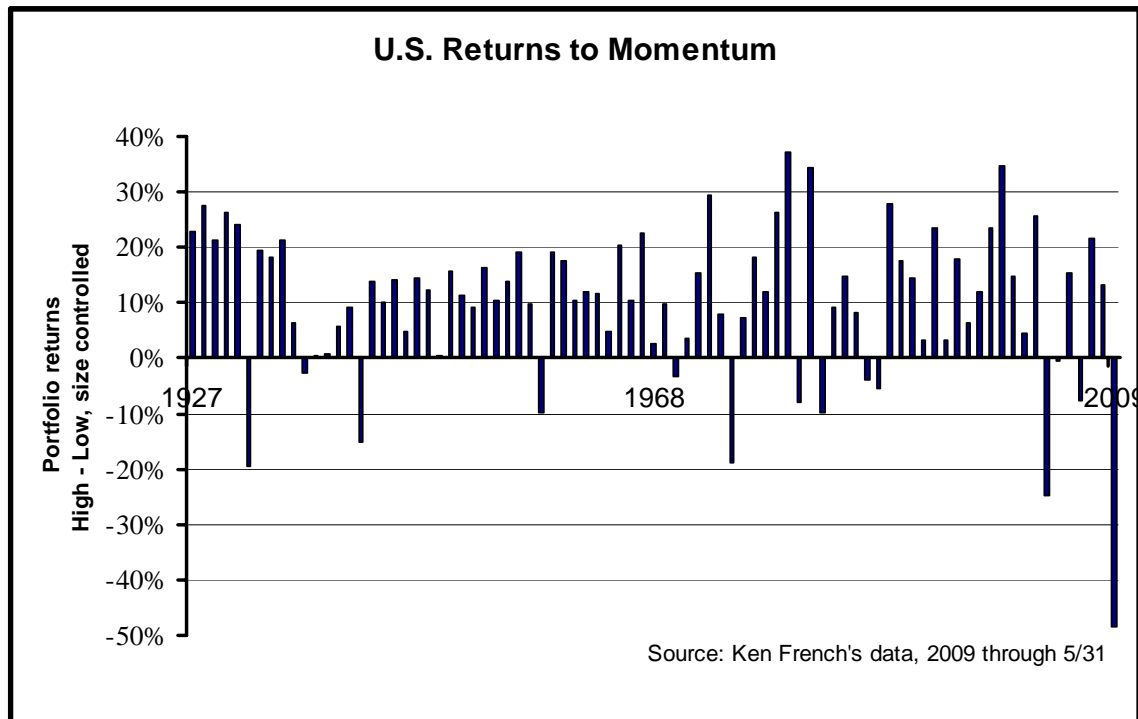
There is also no disputing the fact that, up until recently, it had been possible to generate strong investment performance using a process that seeks to systematically capitalize on these behaviors. So what has happened in the recent past to undermine quants' long-term success?

### **Erased by Arbitrage?**

One open question is whether market conditions have changed, specifically whether smart investors have identified all behavioral mistakes and are acting in perfect concert with the market to erase their impact. This theory proposes that while investors will continue to make mistakes,

hyper-rational arbitrageurs will pick up on mispricings so quickly that assets will be priced efficiently.

Arbitrage works extremely well in theory, but is difficult to reconcile with the data. As an example, the chart below shows a more detailed look at the returns to price momentum in U.S. stocks.



Source of data: See Endnote 6

Does this data suggest that arbitrage is removing the returns to momentum? Such a pattern is hard to perceive in the data. While no one has articulated a testable pattern to arbitrated strategies, one might expect that over time returns would gradually decline to zero. No such outcome has occurred.

Another clue to the presence or absence of arbitrage is the fact that the first rigorous modern momentum paper was published in 1993<sup>7</sup>. We might expect to see a reduction in momentum returns following the broad recognition of this powerful stock anomaly. However, active returns to momentum actually *rose* in the years following the publication of the paper, through the end of 2008.

Time period	Average Annual Return to Momentum
1927-1992	10.8%
1992-2008	11.5%

Source of data: See Endnote 6

## **Caught Flat-Footed?**

We cannot leave the subject of momentum without focusing on 2009. Momentum has had good periods and bad, averaging 10.2% of return over the past 82 years through May 2009. Over the first five months of 2009, however, momentum lost over 48% -- a return roughly twice as bad as the worst annual return in the prior 80 years<sup>8</sup>.

Clearly the 2009 period has been exceptional, and many quantitative strategies have not functioned well. Amid a deep global recession, equity markets have been roiled by high volatility and intense waves of investor sentiment. From extreme risk aversion early in the year, investors suddenly switched in March to the riskiest assets, buying up the cheapest and lowest-quality stocks. Momentum strategies, not surprisingly, underperformed severely in this environment. While other typical quantitative factors such as valuation performed well in theory, the low quality of the value stocks that drove the rally meant that many institutionally oriented quantitative managers avoided them. In sum, the environment posed unprecedented challenges for disciplined quantitative strategies.

We do not want to overemphasize price momentum as a quantitative factor since good quant managers also employ a broad selection of other variables with long-term efficacy. Typical of these would be valuation, earnings and quality attributes. The abrupt shift toward more risky assets in March 2009 led to short-term pressures on the efficacy of earnings and quality factors as well as price momentum.

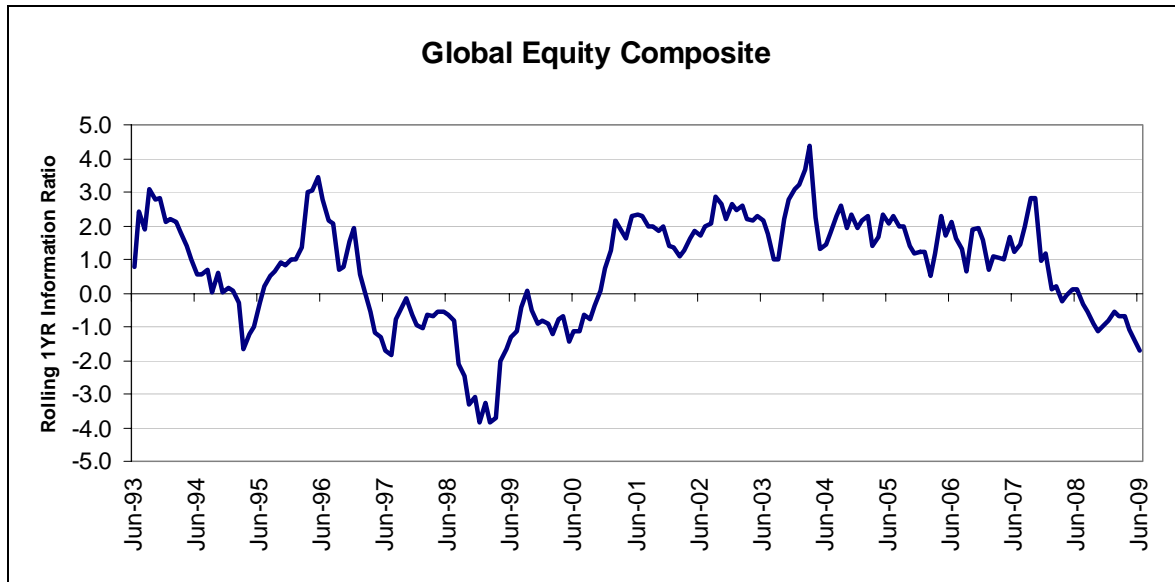
## **Buoyed by a Bubble?**

We would also like to address another common question about quant strategies – whether their generally excellent returns over the 2000-2007 period was primarily the result of a quant “bubble,” in which similar investment styles chasing similar stocks created its own upward momentum.

Our best appraisal is that this is partially true; there was a significant tailwind behind most quantitative strategies during much of this period. Value, momentum and other well-known factors performed unusually well. This almost certainly was helped by the significant move of assets into structured strategies.

Just because there was a tailwind, however, does not mean there would have been no forward motion without it. Over the long term, Acadian seeks an information ratio of 0.5. Studies have shown this level of value-added to be consistent with top-quartile success. The ten-year information ratio of Acadian’s global equity composite, for example, is still 0.7, even after the recent downturn in performance. For much of the 2001-2007 period, however, it was in the range of 2.0 and even exceeded 4.0 for a brief time.

## Acadian Rolling 12-Month Information Ratio June 1993-June 2009



*Source: Acadian. The performance history of all Acadian managed strategy composites is available upon request. Past performance is no guarantee of future returns.*

We believe our “excess” IR (*i.e.*, periods where IR is above 0.5) was clearly influenced by the increased flow of assets into quantitative strategies. This tailwind does not explain all of the excess return achieved by the global strategy, however. This return has been positive and consistent for a period much longer than the so-called quant bubble. Nor do the cash flows in and out of quantitative strategies provide any evidence to undermine the essential argument as to why these approaches have historically worked over the long term.

### **The Power of Performance Cycles**

There is no perfect investment process that will work consistently in every equity market environment. The goal of active management is simply to create a process that will add more value than the alternatives over the long term. All active processes go through cycles of being rewarded and punished. All good managers have periods of good and poor performance. Numerous studies have shown that the best approach is to apply a rational, steady and consistent style, and ride out the inevitable periods of difficulty in order to achieve the best possible risk-adjusted long-term returns.

For example, a recent study by the Brandes Institute<sup>9</sup> demonstrated that the top decile of global mutual funds for the ten years ending December 2008 underperformed the MSCI World index by over 1000 basis points on average in their worst one-year periods, and also underperformed the index, on average, in their worst three-year periods. Successfully holding the best-performing global funds of the decade, in other words, would have required suffering through some extended periods of underperformance. We believe this observation will continue to be true of most successful managers.

## **Is Quantitative Investing Dead?**

No one without a crystal ball can answer this question with certainty, but, in conclusion, consider the following points in favor of a disciplined quantitative approach.

First, people are irrational. They use built-in heuristics to navigate the world, and their behavior is frequently driven by emotional and unconscious psychological responses to situations and events. Second, people make systematically flawed decisions in financial markets, decisions that cost them money. We believe that these anomalies are recognizable and exploitable. Third, while arbitrage has the potential to mitigate the effect of investors' financial mistakes, there is little evidence that this is occurring significantly in markets.

Acadian's investment process has been designed based upon key principles that we believe are rooted in human nature and thus immutable and highly likely to persist over time. We strongly believe that markets are inefficient, behavioral anomalies exist, and a structured, disciplined and objective process is the best way to capture the market's available alpha.

Two years of adversity, in the context of a multi-decade record of evidence, is not proof to us that a multi-factor quantitative approach has failed or will not prove effective again in the future. We see this as an unwelcome but not entirely unexpected cyclical downturn in the efficacy of such processes, in the context of an unprecedented global financial crisis. We do not see a world that has permanently turned away from the key stock drivers quantitative managers seek to capture.

Mid-2009 has recently seen some stabilization of factor payoffs and a return to more typical relationships between stock prices and company fundamentals, including valuation, earnings trends and expectations, financial quality and other factors. While there is no guarantee that quantitative approaches will recover and perform as they have in the past, we can look to history for similar patterns where a period of deep dislocation from company fundamentals was followed by a sharp upswing in relative performance. This happened with small-cap stocks in the 1990s and value stocks in the early 2000s. Based upon our experience, the most profitable investment decisions can be counter-intuitive and at times difficult. We believe quantitative approaches represent such an opportunity today.

## **Appendix -- Related Articles by the Acadian Team**

*Copies of these papers are available upon request to qualified investors.*

- *Behavioral Finance at 25*, by Terry Burnham -- July 2009
- *Investor Sentiment and Stock Returns*, by Acadian team -- May 2008
- *Why We Get Risk Wrong*, by Terry Burnham – December 2006
- *Benefits of Acadian's Quantitative Approach to Global Equity Investing*, by Acadian team -- June 2002
- *Barriers To Meeting Investment Objectives--Ourselves? Behavioral Finance Insights Into Apparent Market Irrationalities*, by Ron Frashure – August 2000

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## Endnotes

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<sup>1</sup> For the year to date through June 2009, an analysis based upon data from the eVestment Alliance eASE manager universe showed the median quantitative global equity manager returned 4.7%, versus a return of 9.4% for the median traditional global manager. For the trailing year the performance differential was approximately 1.0%.

<sup>2</sup> *New York Times*, "They Tried to Outsmart Wall Street," March 9, 2009.

<sup>3</sup> Kahneman, D. and Tversky, A. "Prospect Theory: An Analysis of Decision under Risk " *Econometrica*, 1979, 47(2), pp. 263-92. The three to one ratio is a summary of the research in this area.

<sup>4</sup> Shefrin, H. and Statman, M. "The Disposition to Sell Winner Too Early and Ride Losers Too Long: Theory and Evidence." *Journal of Finance*, 1985, 40(3), pp. 777-90. Odean, T. "Are Investors Reluctant to Realize Their Losses?" *Journal of Finance*, 1998, 53(5), pp. 1775-98. Feng, L. and Seasholes, M. "Do Investor Sophistication and Trading Experience Eliminate Behavioral Biases in Financial Markets?" *Review of Finance*, 2005, 9(3), pp. 305-51.

<sup>5</sup> *US News and World Report*, "Tim Geithner Can't Sell Home," July 14, 2009.

<sup>6</sup> We base our chart and this analysis on publicly available data from Kenneth French's website ([http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)). Acadian has proprietary versions of momentum that are more efficacious.

<sup>7</sup> Jegadeesh, N. and Titman, S. "Returns to Buying Winners and Selling Losers: Implications for Market Efficiency." *Journal of Finance*, 1993, 48(1), pp. 65-91.

<sup>8</sup> Kenneth French, *ibid*.

<sup>9</sup> The information is from a Brandes Institute study which may be found in full here: [http://www.brandes.com/Institute/Documents/Death\\_Taxes%20STU\\_Global%201208.pdf](http://www.brandes.com/Institute/Documents/Death_Taxes%20STU_Global%201208.pdf)