

The impact that behavioral biases exhibit on the financial markets have been well documented over the years and studied by Nobel Prize recipients and scholars throughout numerous white papers. These papers often read somewhere between a cross section of high-level financial math and a psychiatry evaluation ultimately proving that behavioral tendencies can be found in market prices (the boom and busts phenomenon). These findings tend to arrive to similar conclusions after all that mathematical foreplay with two of the most common themes as follow: 1) value investing (buying low multiple stocks based on some financial ratio of market price to fundamental factor) outperforms over market cycles; and 2) momentum is a positive contributor to various investment styles.

Language like “fear” and “greed” are universally understood by market participants given their nature to arise at lows and highs of the market cycle. Other terms such as confirmation bias, anchoring, and recency bias are also well examined in these papers but are less understood given their ephemeral qualities. While these papers explore several lucid points on behavioral investing they can also create behavioral misconceptions when theory intersects practice creating a black hole where the high-level math breaks down. These well thought out white papers have led to the development of several mental (academic?) models and have shaped a perception of how value “should” work and in what markets value investing “should” outperform. Are these perceptions correct or do they just create additional biases? Have the studies created a fallacy of their own when it comes to the expectations of real world value investing – a whitepaper expectation fallacy?

This paper is not an attempt to rehash all of those studies nor will it go into great statistical detail on the merits of value investing, momentum and the more elusive quality factor since the public material supporting these factors is robust. Instead it will attempt to expose a few nuggets of information that can lead to a deeper understanding of how the Fundamental Team at Foundry Partners deals with behavioral biases through their investment process, avoids the potential shortcomings of pure mental models, and resets expectations of how value performs through a market cycle.

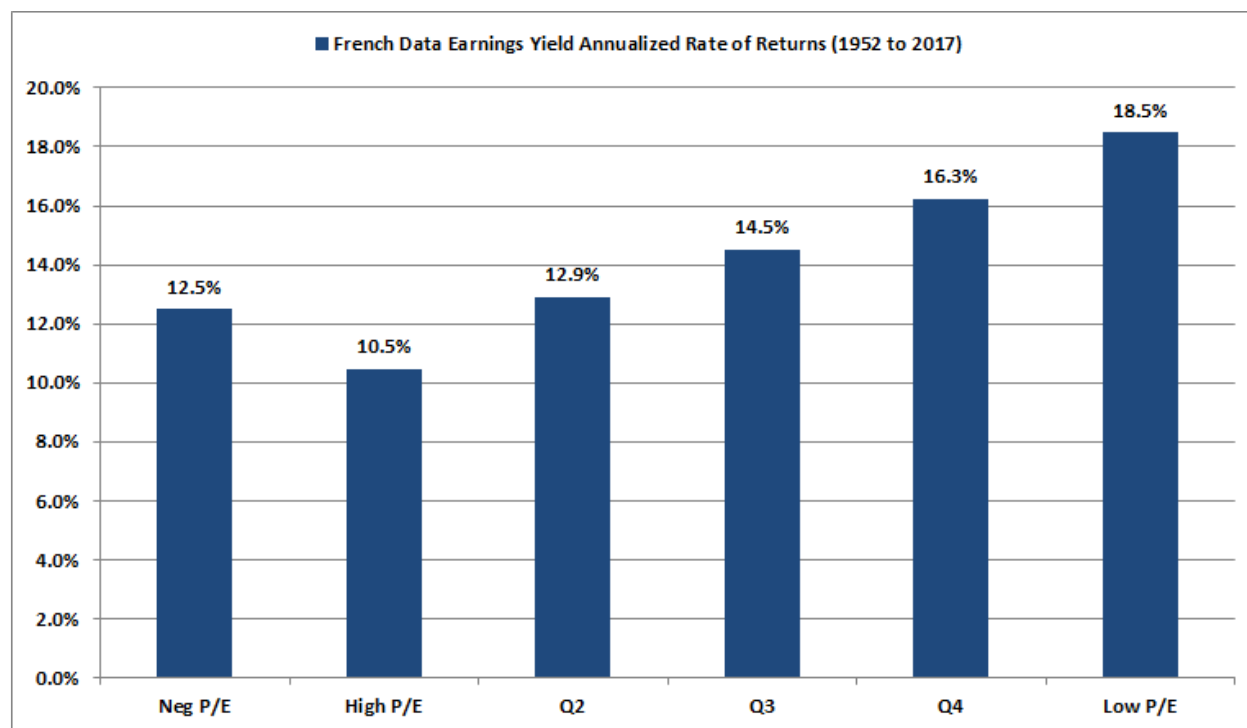
Greed, for the lack of a better word, is Good...But so is Fear!

We all have emotions with some more pronounced than others. All of these emotions are learned traits passed down through generations and hardwired in our DNA in order to improve the odds of survival. Unfortunately, or fortunately depending on the environment, these emotions can cause reactions or behaviors to emerge. On the plains of the Serengeti a flight or fight response can help you live another day. Within the world of investing, however, these same behavioral reactions can lead to decisions that are less than optimal. So how does the Foundry Team deal with these all too familiar behavioral tendencies? Let’s tackle them one at a time starting with the most visceral - fear.

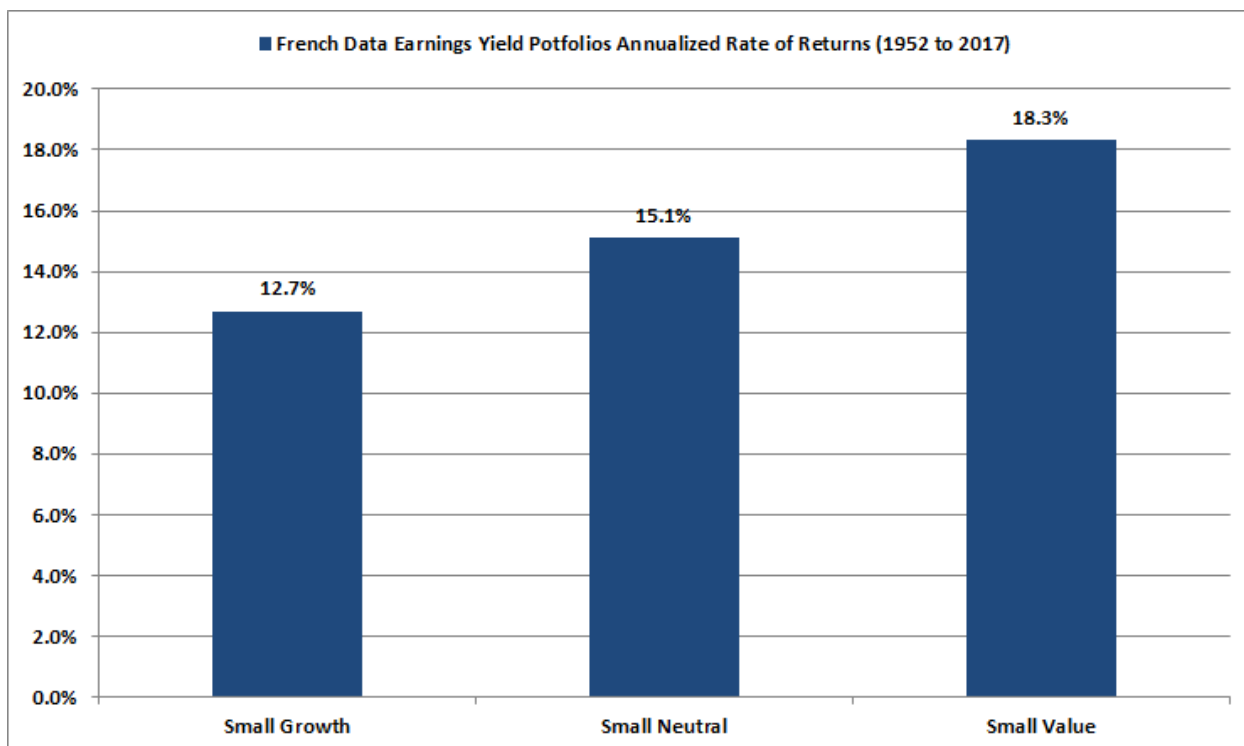
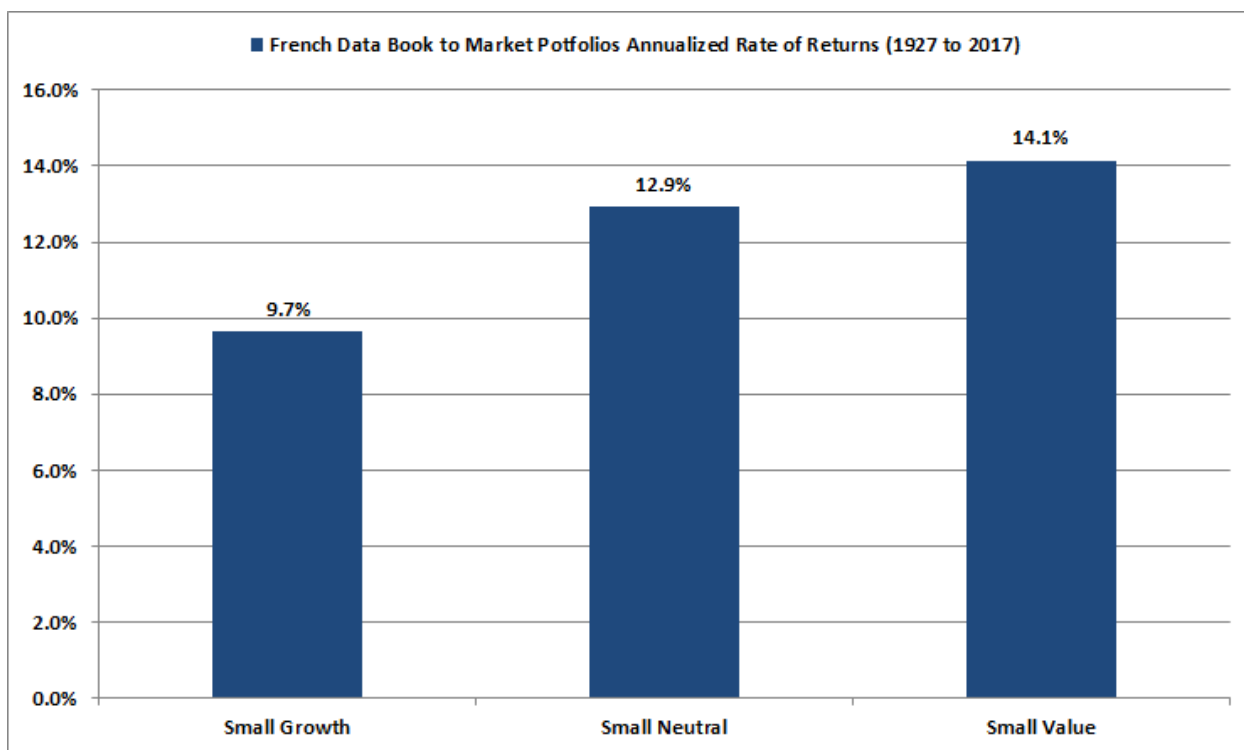
Whether it is fear of failure, fear of rejection, or fear of loss we all tend to extrapolate the worst outcome at the highest point of fear. It is at these moments that we abandon rational thinking for irrational behavior regardless if the source of the fear is real or perceived. In the market place this level of fear when associated with a company can drive the stock price down beyond the long-term fundamental prospects of that company. If the fear is acute and prolonged enough it can lead to a panic and when this panic spreads across industries and/or sectors it can cause second derivative effects on tangential companies – the proverbial throwing out the baby with the bath water. The first question is how do we measure the fear and the second is how do we know if this level of fear is real or perceived? The former can be answered with some simple math, while the latter will be explored a little later in this paper.

One of the most common ways to measure fear is by using valuation metrics via a price to some fundamental value such as; market value to sales, market value to book value, or price to earnings per share. There are several more valuation ratios that give an investor a good indication of whether or not the market is favorable or

unfavorable on a particular company, with some providing a better explanatory relationship than others depending on the industry or sector. To keep it simple we will focus on price to earnings per share and book to market value from the highly cited Fama & French factor portfolios found at the Kenneth French Library online. The one we chart below is the portfolio formed on an earnings yield broken out into quintiles with negative earners separated into their own bucket for all market capitalizations in the U.S. from 1952 to 2017.** (Note: For comparison purposes we have labeled the high earnings yield companies as low P/E and the low earnings yield ones as high P/E)

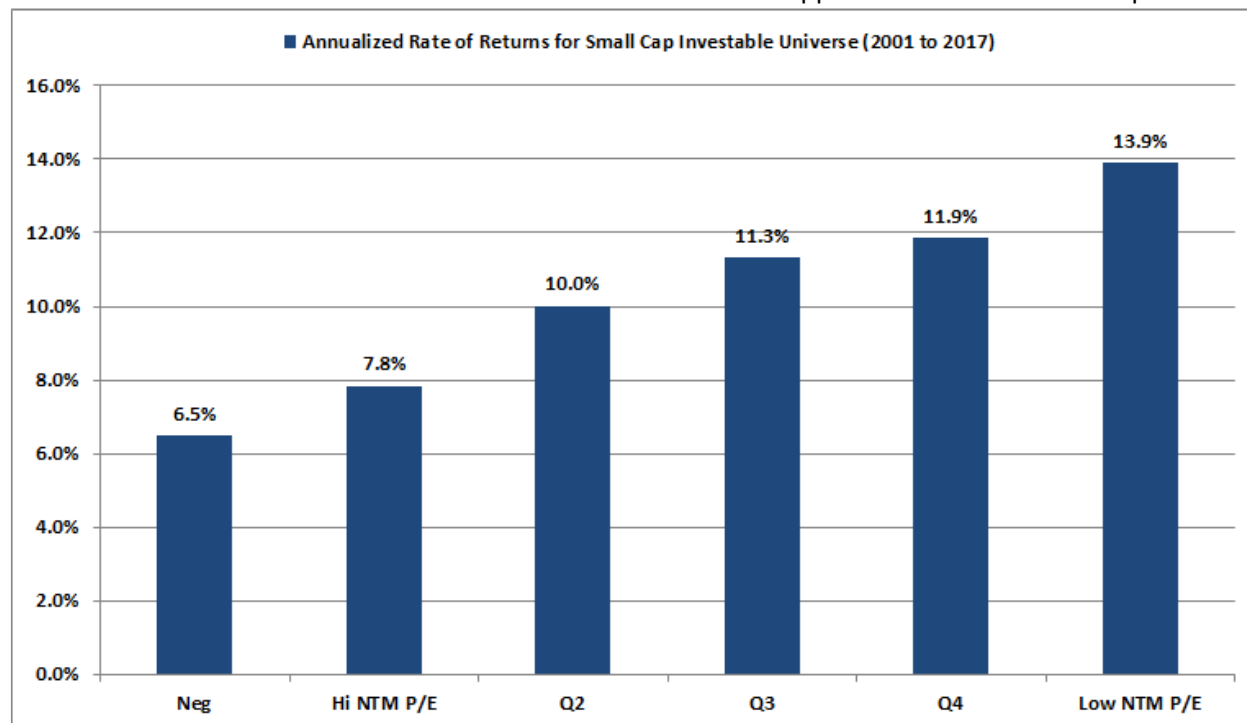


To make it more relative to our small cap universe we examine the Fama and French book to market and earnings yield portfolio that are broken down into value, core and growth categories. The book to value provides a longer sample as it goes back as far as the 1920s. As the chart illustrates below, the trend of value outperforming growth is also true in the small cap space when utilizing a price to book or earnings yield metric.



We have recreated something similar for our investable small cap universe (defined as companies with a market cap range of \$80 million to \$2.5 billion at time of purchase with a days to fill* ratio of less than 75 days), with some variations however. Instead of a trailing twelve-month earnings yield or book to market metric, we utilize a price to next twelve-month earnings ratio (NTM PE) based on up-to-date prices. Additionally, we rank these securities within their proprietary industry groupings so as to compare companies with similar homogenous

return profiles and then bucket those stocks within quintiles. While the data is over a shorter time horizon, the chart below tells a similar story. The lowest quintile value group outperforms the highest quintile and negative earners over a seventeen year time period. This lowest quintile is our fishing pond and the area of the market where we believe fear has created opportunities to capture alpha.



The alter ego of fear is greed. Just as fear has the power to drive stock prices lower, greed has the same power to drive stock prices to elevated levels. Once again, we rely on valuation levels to measure the greed in a specific security with companies trading at higher valuation metrics versus their peers indicative of investors willing to pay up for future earnings. One caveat, there are cyclical companies that may appear expensive (cheap) on depressed (peak) earnings and the NTM PE factor may not be the best judge of greed (fear) for that specific company requiring other various valuation metrics to confirm that investors are overpaying for earnings. Conversely there are some instances where high valuation and negative earning companies might be true value, but those are the exceptions to the rule and tend to be flushed out during our fundamental process. For the most part, however, a high multiple tends to signify a higher level of greed.

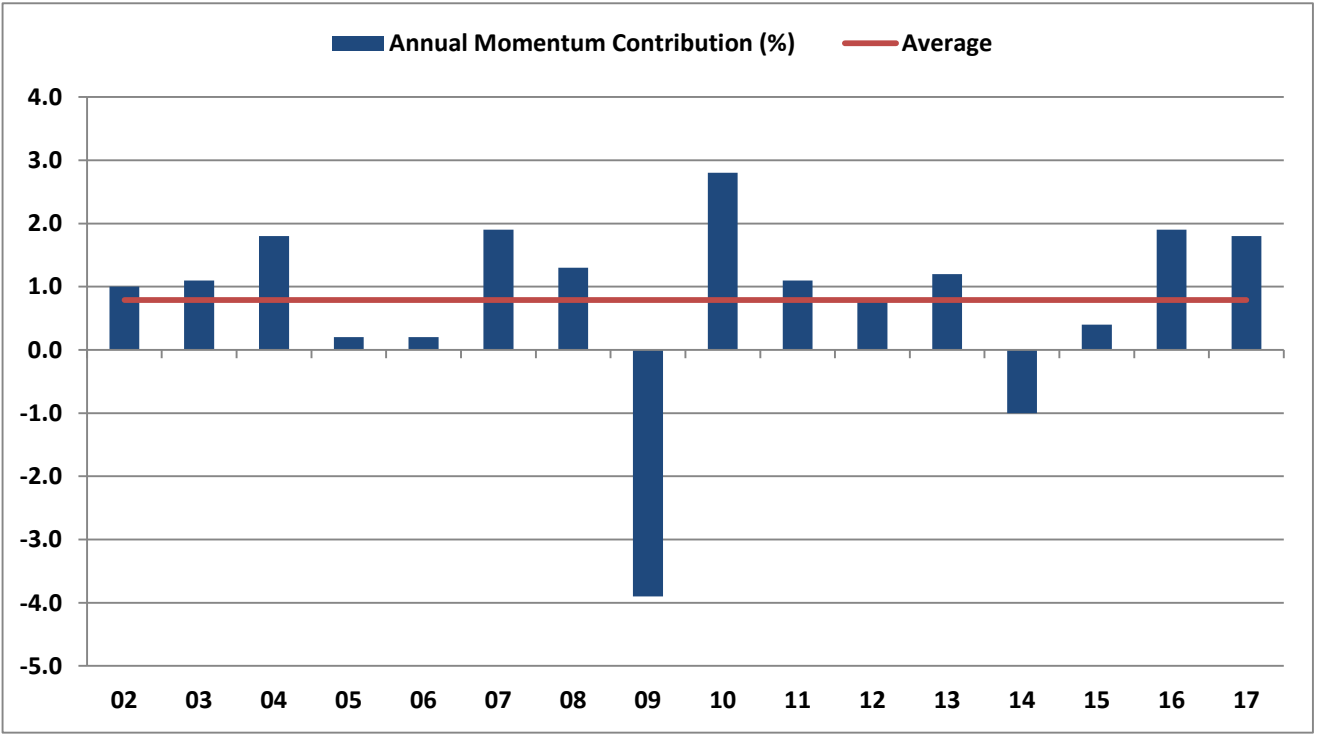
We capitalize on this behavior by trimming or selling stocks that rises above the median valuation of the industry and then recycling the proceeds into another “value” opportunity. It is that straight forward; buy a low value stock at the bottom and then gradually exit as it becomes more expensive reinvesting into another low value stock. Rinse and Repeat. That is the ideal. However, we do not live in nor invest in an ideal world. In real time it is difficult to step into and buy low valuation stocks and it is not always the right call to sell the more expensive one for a less expensive one. As the emotions of fear and greed start churning, other biases creep into the system and one in particular is known as recency bias. Wait – recency who? Recency bias relates to remembering and reacting to the most recent news versus what happened a few months or quarters ago. We are biased into overweighting events that happened in the near past versus those that occurred in the distant past and then using this misinformation to project trends into perpetuity. This can lead to doubts about an investment creating undue pressure on a security leading to further weakness or could lead to driving shares of a security higher without consideration for the risks that remain or the price being paid to take on that risk. Recency bias leads to positive or negative sentiment on a stock (or industry) given recent events depending on

the level of fear or greed surrounding that stock (or industry) at that given time. When it comes to negative sentiment, it is most present in the value pool we are fishing in and can lead to two dangerous outcomes; 1) buying too early and 2) exposure to structurally impaired companies (or value traps).

The stocks concentrated in the lowest valuation quintile tend to be unloved by the markets. Typically they have been underperformers and more recently they may have reported negative news such as; missing EPS estimates, lowering guidance, or margin compression etc. This weighs heavily on investor sentiment. So how do we separate between the stocks that are cheap for a reason, think structural issues, versus those stocks that are just temporarily undervalued. For this we utilize a momentum factor. I know, I know there are a ton of papers explaining how standalone momentum works. They even have one that shows it working over a 200 year period! We find it most useful, however, in avoiding value traps.

Our momentum factor is simple and tries to quantify what we are seeing in the charts. We decile rank the performance of all the stocks on a 49-week moving average relative to the entire universe with decile ones being the best (setting higher highs) and decile tens the worst (setting lower lows). It is these tails that provide the most useful information. We avoid the decile tens with the thought that while the stock is inexpensive, it has yet to bottom and perhaps there is more downside. Or it could signify that the stock is impaired and if we already own shares than further due diligence is required to determine the extent of negative sentiment weighing on the stock. Regardless of the reason we like to see a momentum factor that is improving and not in the bottom decile.

In the chart below we show how utilizing a momentum factor can add value through a market cycle. Each year we start with a portfolio of the lowest value quintile stocks (called the static portfolio) and each month replace stocks that become decile tens by randomly selecting a new name from the lowest value quintile pool for that month that is not a decile ten (this becomes our dynamic portfolio). We then compare the annual performance between the static and dynamic portfolios for that year. A positive spread indicates that momentum is adding alpha.



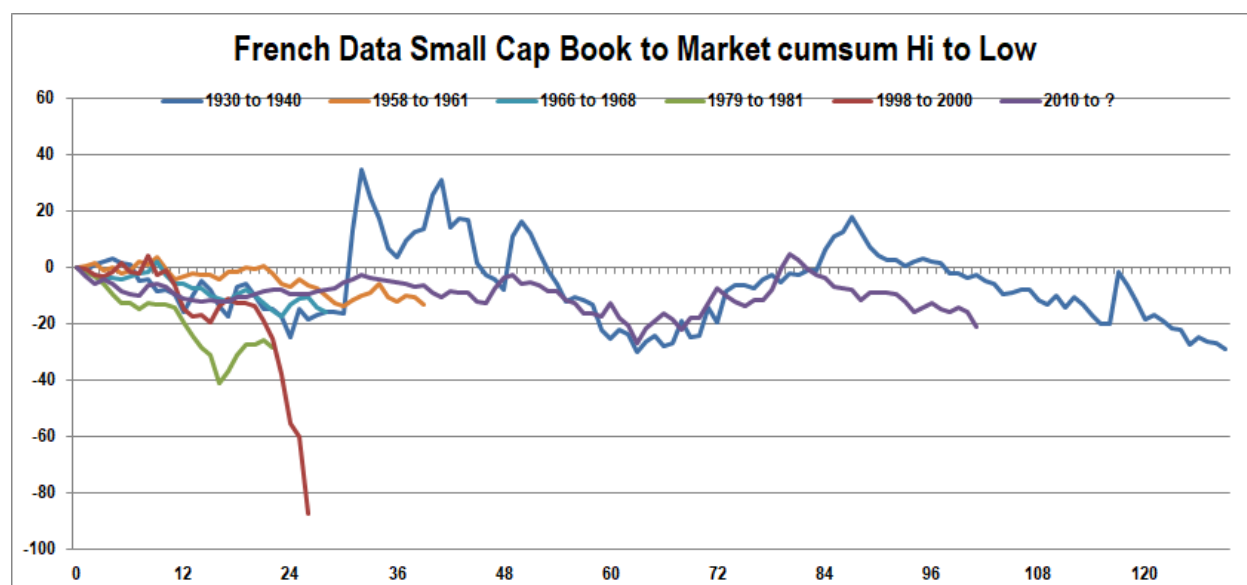
As in anything, there are exceptions to the rule and for momentum 2009 was that exception. The events leading up to the credit crises were indiscriminate as correlations approached one. During these markets there is not much to be gleaned from sentiment as captured in a momentum factor and focusing in on value becomes more imperative. A concept we call episodic investing and in which we elaborate further in the paper.

The Whitepaper Expectation Fallacy

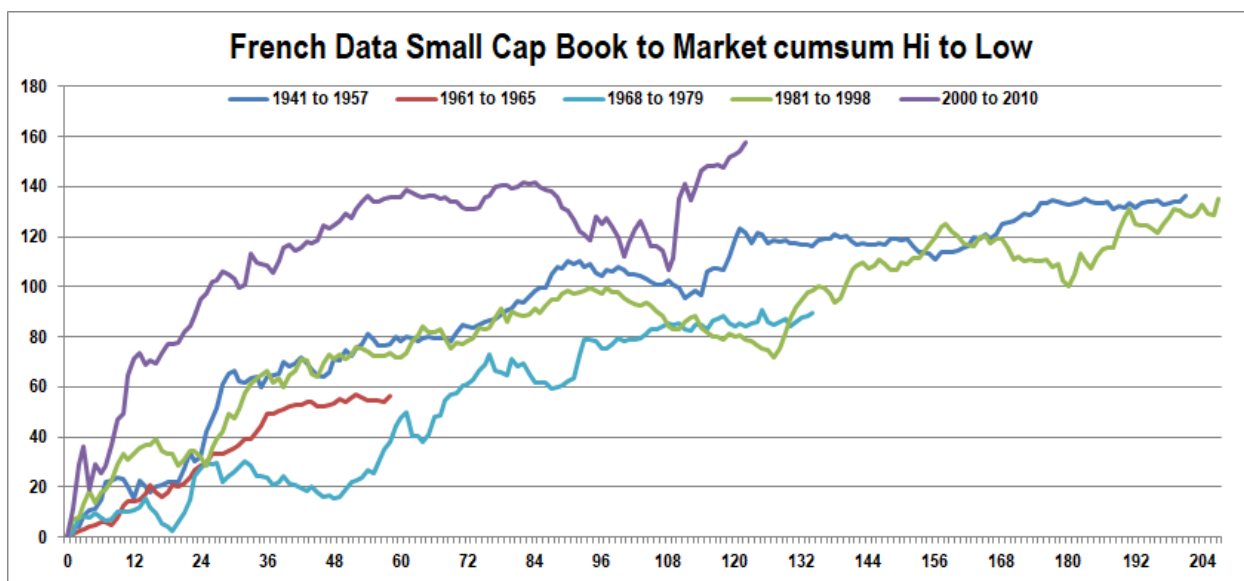
I know what you are thinking – “great, all you have proven thus far is that value works over a long term time horizon, that it can be replicated in the small cap space, and momentum can add negative correlated alpha just like every other paper since the dawn of modern investing”. Valid, but then why is it so hard to replicate and why has it not been arbitrated away by every value investor? Just like anything in this world the devils in the details or more accurately in this instance the downside risk is in the details. We propose a few reasons why the charts on value investing outline above can be misleading at times when taken at face value and create a disconnect between perception and reality.

First, not all fear and greed are created equal and in some points of time fear and greed are more acute and prolonged than most value investors can imagine (or remain solvent for that matter). These extended periods of value underperformance can occur when investors flock to high flying growth stocks and shun value ones such as the late 90s or even in periods where long term rates are kept artificially low forcing investors into long duration assets such as this past decade.

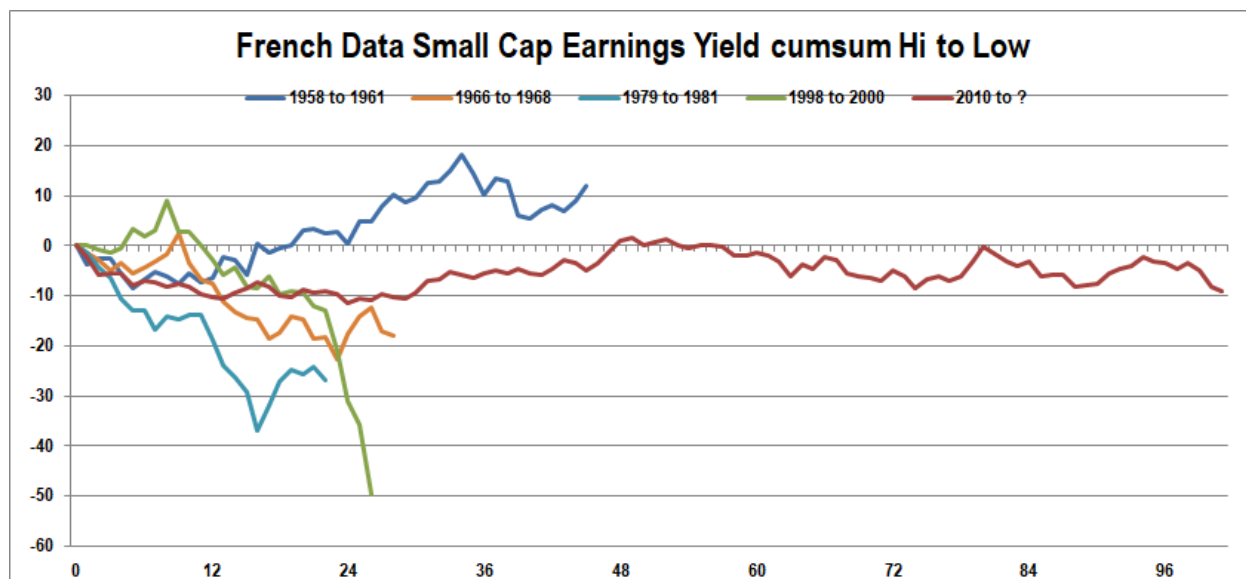
Below we graph four of the longest periods since the 1920s of value underperforming growth. We utilize the Fama & French small cap book to market data highlighted above and compare the rolling cumulative sum (cumsum) performance difference between value and growth stocks. A rising line means value is outperforming growth and vice versa. The chart depicts a few things: 1) currently we are in the second longest period of value underperforming growth, now in its 106 month; 2) it took more than a decade during the great depression for value to reemerge and to consistently outpace growth; and 3) while the late 90s is the most famous severe period of growth outpacing value given the tech boom, it was predominantly concentrated in a period of less than two years. But what happen after these periods of poor performance by value?

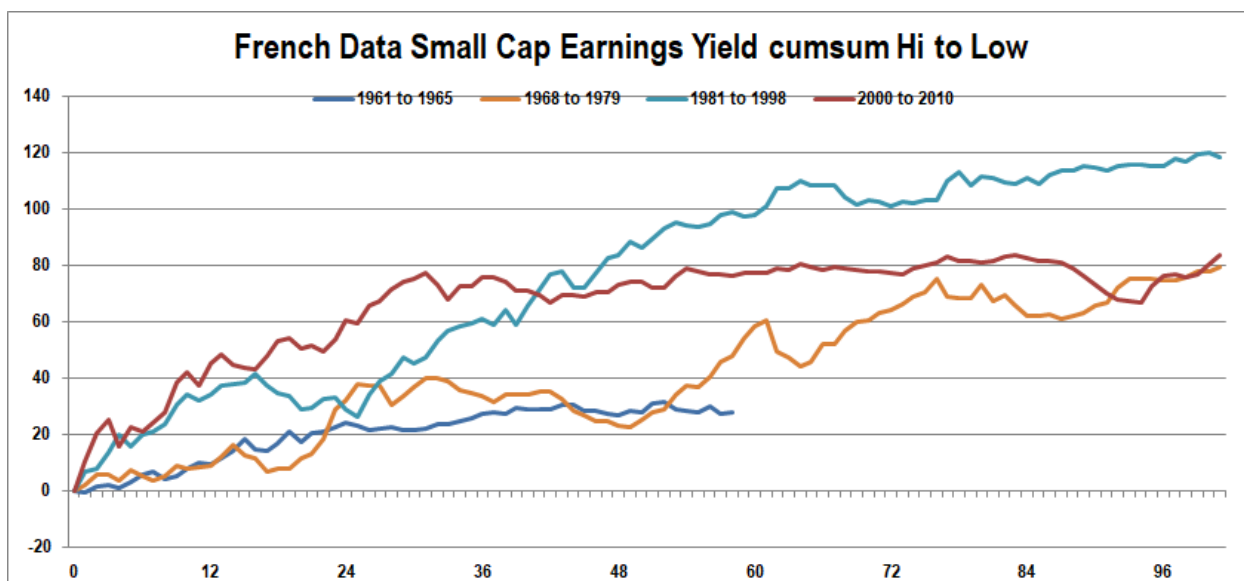


Value went on a tear outperforming growth by a wide margin recapturing all of the underperformance and then some with each period lasting between five years on the short end and nearly two decades on the long end. See graph below which charts the five periods after value underperformed growth.



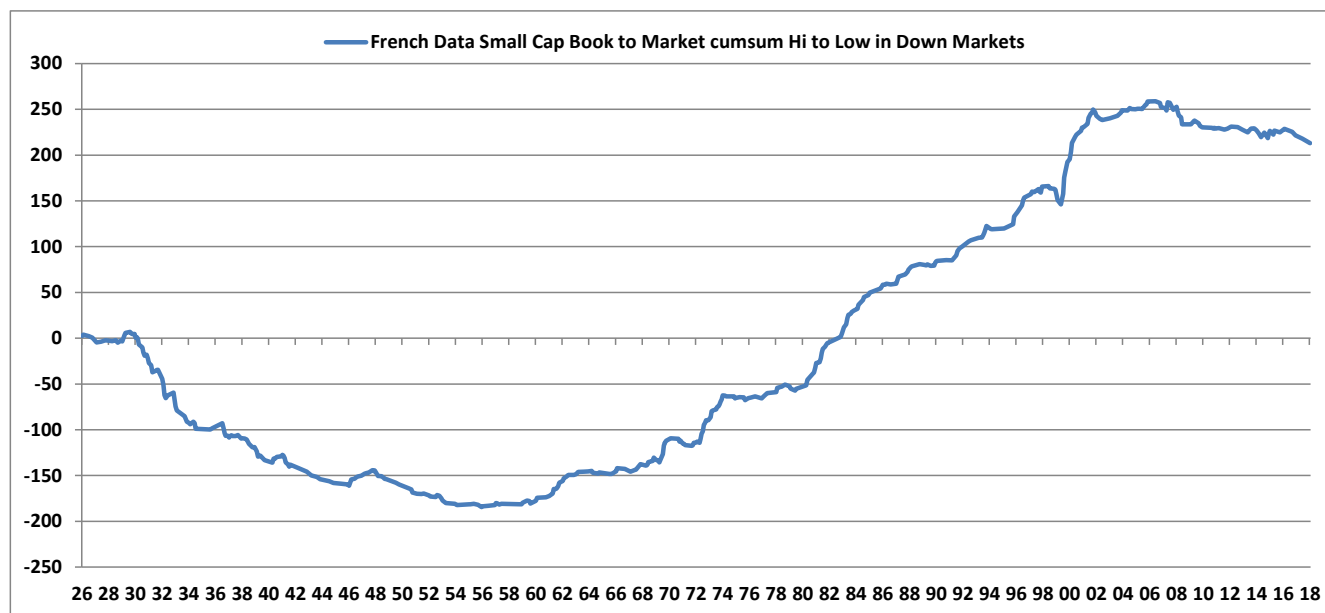
We also looked at the small cap space during these time periods from an earnings yield perspective to address any issues with the price to book measure given the rise of technology stocks. Additionally, the rise of share repurchases and the potential for understated intangible assets (i.e. brands) have distorted the true underlying value of book assets over the years for some companies. While the French data does not go back as far (only 1950s) it does tell a similar story during the periods outlined above, with the 1958 to 1961 one as the only exception.



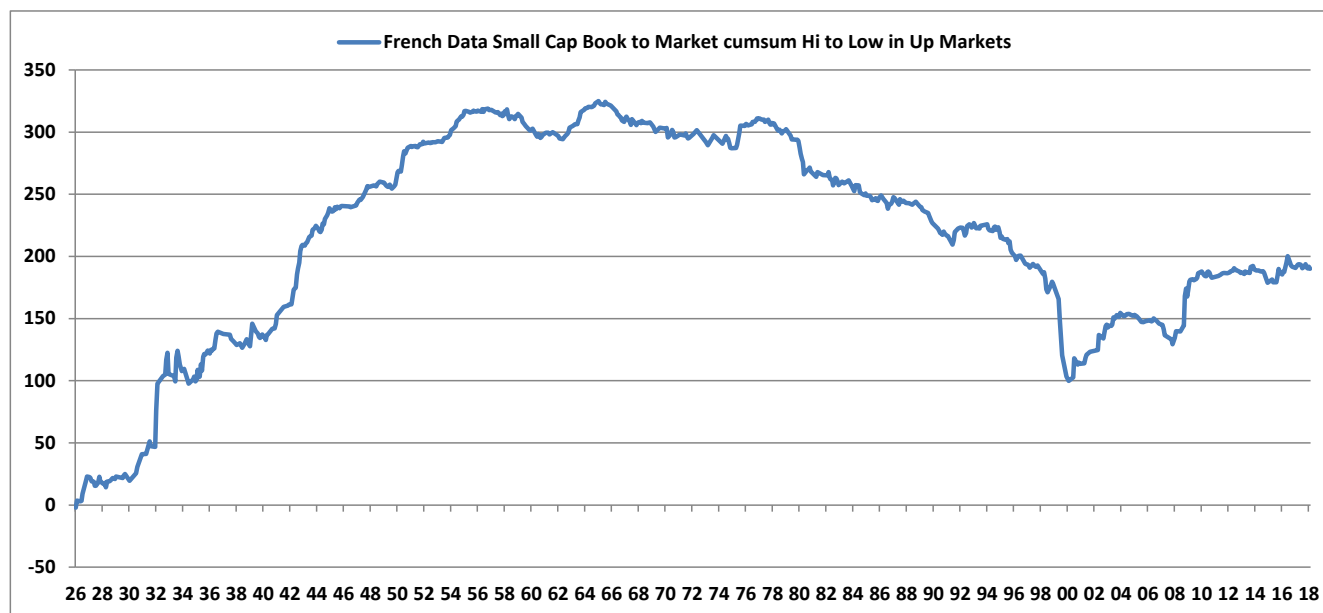


Second, not all value markets are created equal and pure value stocks can act differently (better upside or downside capture ratios) according to a multitude of economic and psychological factors impacting the market at that time such as; interest rate cycle, earnings cycle, and euphoria levels to name a few. The graphs below illustrate the shifting dynamics of value in both up and down markets.

We once again utilize the French small cap book to market portfolios and separate the monthly return periods into down and up markets based on the average performance of the group. We then cumsum the monthly performance difference between value and growth during each of those periods. Once again a rising line indicates value outperforming growth and a declining line the opposite. The first chart is values relative cumsum performance to growth during down markets. For most of the 60s, 70s, 80s, and 90s value provided downside protection relative to growth stocks as evidenced in the rising line. This is the time period utilized by most of those whitepapers in promoting values downside protection. If they only looked to the 20s, 30s, 40s and 50s they may have realized that this was not always the case.



If we look at up markets (graph below) we see an opposite trend. For most of the 20s, 30s, 40s, and 50s value had much better upside capture than growth while the 60s, 70s, 80s, 90s flipped that relationship on its head.

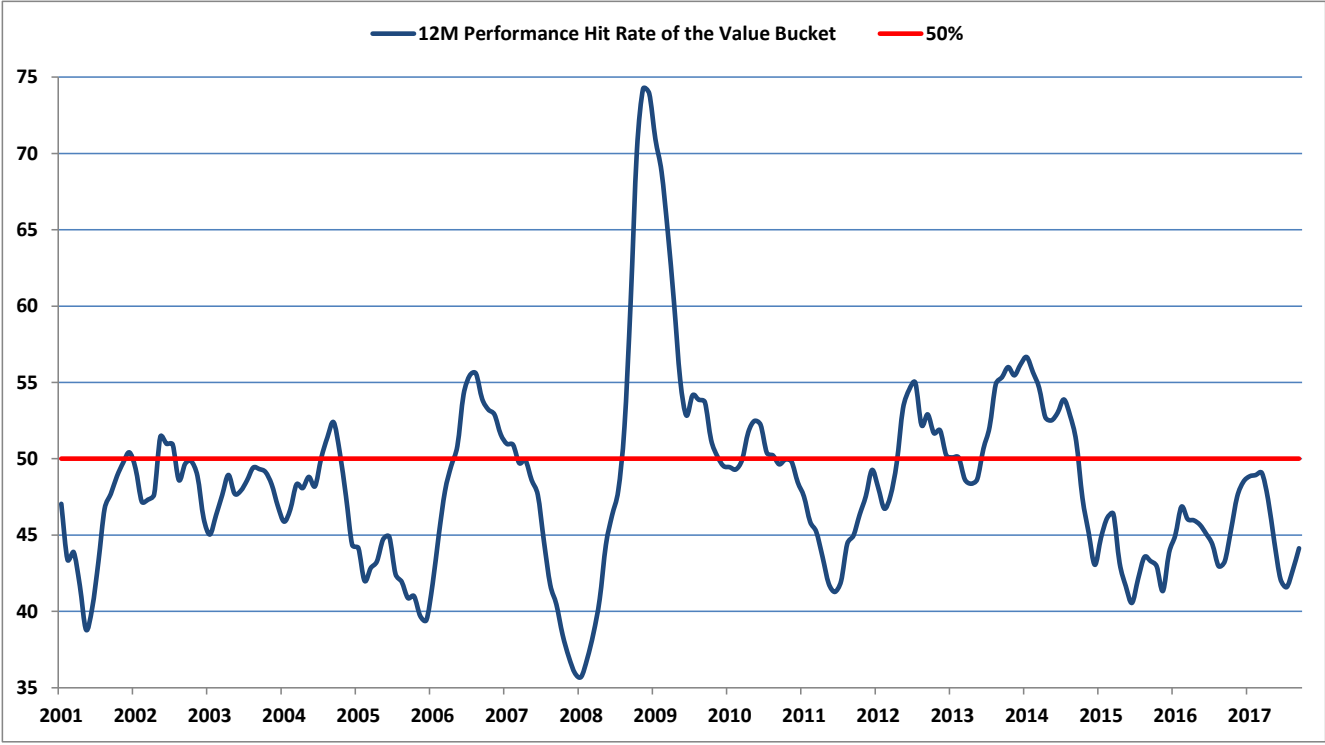


We are currently in a period more reminiscent of the earlier era when value stocks had a better upside capture ratio than downside one versus growth stocks. Time will tell if this dynamic will shift again or remain in the current trend. Regardless, being aware of these more realistic expectations on how our process will perform in given markets will only make us better suited and less susceptible to being corrupted by our behavioral biases when market forces shift the interplay between value and growth performance dynamics.

Third, not all hit rates are created equal. In order to capture the actual return of the cheapest quintile as cited by every whitepaper an investor needs to own all the stocks in the underlying quintile and consistently rebalance to that quintile to capture the true value in the market. Otherwise you may miss the few names that provide the entire alpha for that period. Aggregate returns are biased by star outperformers as the upside is unlimited while the downside is limited to 100% (i.e. a stock up 300% will impact the aggregate return more than a stock down 100%, assuming an equal weighted portfolio). Owning the entire group at the onset may not seem like an issue. Consistently turning over that portfolio in small cap land, however, to reflect the value in the market could potentially erode away any alpha given the turnover costs due to the illiquidity of the space

While the degree in the performance of individual value stocks matters (as is supported by the charts above), so does the chance of success when it comes to constructing a portfolio. To reflect this chance of success we focus on hit rates; the number of stocks that actually outperform the benchmark. A hit rate above 50% indicates that more stocks within a quintile are outperforming the benchmark increasing the odds of selecting winners.

Below we chart the next twelve month performance hit rate of the lowest quintile stocks for the investable small cap universe that we outlined above based on NTM PE versus the Russell 2000 Value Index. We have smoothed the line by taking the rolling three month average. When you buy value matters! The market provides pockets of opportunity and it is in those pockets that the value factor will provide a higher probability of picking winners. Episodic investing anyone?



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