



Schroder Investment Horizons

Tapping into behavioral biases can create repeatable returns

Classical economics assumes the existence of a group of perfectly rational human beings who carefully weigh up the pros and cons of any financial decision. But these mythical beings have been hard to find in real life. In truth, people take sometimes irrational short cuts to help them make financial choices. This realization has led to the development of alternative theories aimed at identifying these short cuts or ‘heuristics’ – speedy ways of solving difficult problems.

Although heuristics have long been known about, it has never been clear how investors can profit from them. This article draws on the work of behavioral economists to identify three groups of heuristic biases – prospect theory, extrapolation and herding, and ambiguity aversion and availability bias – and then looks at the financial strategies that may be able to profit from these hard-wired behavioral patterns.

1. Prospect theory

The systematic inconsistencies that individuals bring to their decision-making processes have led to the development of prospect theory¹. One key finding from this has been that investors are loss averse², suggesting that there ought to be excess demand for insurance strategies that reduce downside risk. In other words, the average investor theoretically is willing to pay over the odds to protect themselves from harm. If the behaviorists are right, it ought therefore to be possible to extract an excess risk premium over time for a disciplined strategy that underwrites that risk.

We believe there are two distinct types of investment themes that can be used to exploit this psychological intuition:

a. Shorting volatility on equity markets

The average investor not only tends to exhibit loss aversion, but also to overestimate the probability of extreme events. This leads to anxiety about a possible loss of capital. As a result, there has been consistently high demand for financial assets which can avoid the discomfort caused by significant capital losses. One example is the equity put option. There has tended to be a greater demand for puts than for calls as most investors are natural holders of risk assets (like equities). Risk aversion means they would prefer to protect these assets from falls, rather than provide themselves with the opportunity for further upside by buying calls.

The heavy demand for this insurance means investors have a tendency to overpay. Consequently, we believe a strategy that systematically underwrites the insurance they seek should earn a positive premium over the long term. On the other hand, the underwriters are themselves likely to suffer losses in the event of a macro shock.

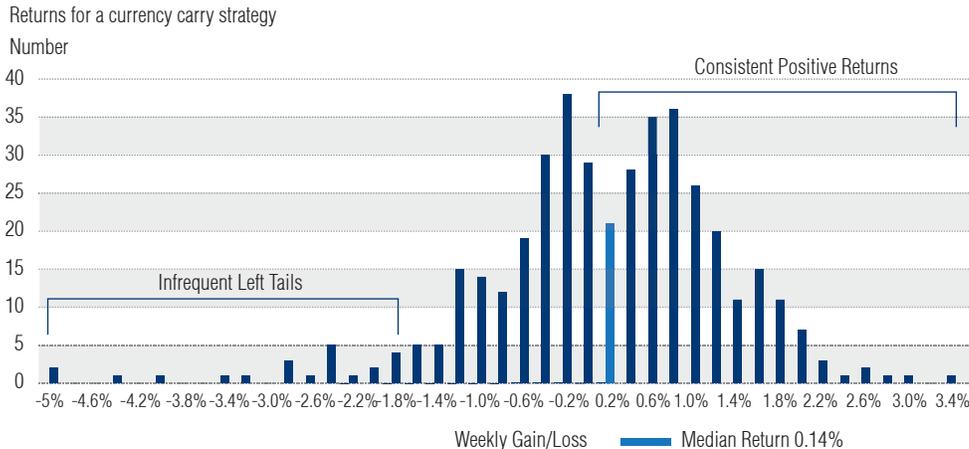
¹ David Kahneman and Amos Tversky, ‘Judgment under Uncertainty: Heuristics and Biases’, *Science*, vol. 185, no. 4157 1974; and D. Kahneman and A. Tversky, ‘Prospect theory: an analysis of decision under risk’, *Econometrica* 47. ² A simple example of loss aversion (and framing) is that it is easier to encourage people to pay a bill by penalizing late payment than by offering them a discount for early payment. Loss aversion is in fact equivalent to the traditional concept of the diminishing marginal utility of wealth.



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This tends to result in a low, even distribution of results with larger tails (“high kurtosis”), particularly to the left (‘negative skew’). Despite these infrequent outside losses, we believe the strategy should still generate a small and generally consistent performance overall. A similar pattern of returns has been seen with currency carry trades (Figure 1).

Figure 1: Positive overall returns despite the occasional fat left tail



Our current basket is constructed by investing in the seven highest yielding currencies within a 32 currency universe (and funding those long exposures via the seven lowest yielding currencies). Each selected currency in the basket has the same notional weight (14.29%) and the overall universe comprises developed as well as emerging markets FX pairs. Weekly returns from January 7, 2007 to October 29, 2014. Source: Bloomberg and Schroders. Past performance is no guarantee of future results. The value of an investment can go down as well as up and is not guaranteed.

b. The foreign exchange carry trade

Currency carry is the return an investor can get from borrowing in low yielding currencies – those where interest rates are low – and investing the proceeds in higher yielding ones³. On the basis that investors generally dislike inflation, they theoretically would require a lower premium (interest rate) for holding a currency managed by a central bank with a more credible record on containing inflation. Conversely, higher yielding currencies would naturally be perceived as riskier.

It follows that an investment strategy that systematically withdraws liquidity from safe assets (in this case, currencies associated with low interest rates) and allocates it to more risky assets (currencies carrying a higher rate) is equivalent to an insurance policy that underwrites a broad systemic risk. This is because, at times of market stress, it will provide liquidity for investors in risky assets who wish to sell and seek safety in higher quality assets. The expected currency carry therefore becomes the risk premium offered to the provider of insurance against that systemic risk.

The principal risk of this strategy is that it is sensitive to liquidity shocks and therefore subject to significant drawdowns. It also exposes the investor to idiosyncratic country risk, which can increase in the event of any big slowdown in global growth (Figure 1). Even so, as with the previous strategy, despite the occasional large loss, we believe an investor should still enjoy a consistently positive return overall.

2. Extrapolation and herding

Extrapolation leads people to believe that recent positive outcomes will be repeated in the future. The dramatic increase in property values ahead of the global credit crisis was a clear example of this heuristic: people thought that rising prices were unstoppable. This ‘hot hand’ fallacy can be compounded by herding, or faith in the wisdom of crowds⁴, where a wrong view shared by everyone is preferred to a correct but dissenting view.

³ This is an uncovered interest rate arbitrage, which should not exist in theory since the currency with the higher interest rate ought to depreciate relative to the currency with the lower rate. This, however, ignores the actions of central banks and governments which may see it as in their interest to ensure that this trade rewards investors.

⁴ Aristotle is often credited as the first person to note the phenomenon in his *Politics*. It was also discussed by Charles Mackay in his *Memoirs of Extraordinary Popular Delusions and the Madness of Crowds*, London, 1841.

Momentum

Extrapolation and herding create the momentum premium. Momentum investing is an approach that seeks to profit from autocorrelation, the tendency of price patterns to repeat themselves – essentially, it is the belief that somebody knows something you don't.

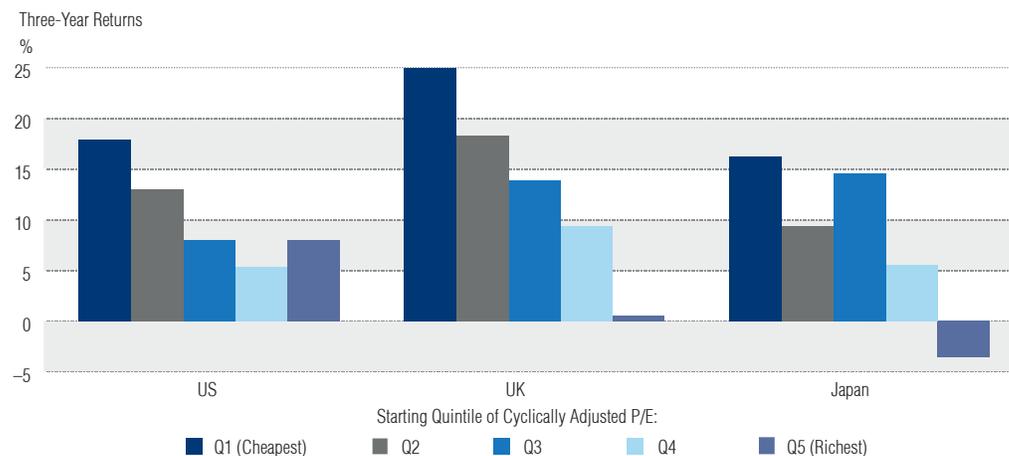
Let's take the example of a recently floated, hot technology stock. Despite the limited price history, its presence in a 'glamorous' industry can lead to an immediate price rise. Extrapolation bias may then consolidate the trend, the recent price action implying that the appreciation can continue. Witnessing this, many other investors will join the bandwagon, fearing that they may miss what they perceive as the 'easy profits' that others are making.

Numerous studies have documented the existence of momentum effects across different asset classes⁵ which may be captured in trend-following strategies. While this effect can occur in both upward and downward markets, it has typically been more pronounced during falling markets, potentially making the strategy a good diversifier for risky assets. The main risks are of a trend reversal, which occurs when valuation is pushed to an extreme level and fundamentals take over, or of a range-bound market, where no particular trend is evident.

Value

Since cognitive biases can underpin the initial formation of market price trends, these trends may ultimately detach the price from the intrinsic value of the underlying assets. Using the previous example, when our technology company cannot fulfill the expectations of investors, the momentum driving the shares will run out of steam, prompting momentum buyers to sell. This is the point where the value discrepancy becomes too large to be ignored. Of course, this can also work the other way, where the share price falls to a level that fails to properly reflect the company's assets or earnings power, creating a value premium. So, trend premia originating in behavioral biases may ultimately lead to the creation of value which can reward the holders of out-of-fashion and unloved stocks (Figure 2).

Figure 2: Undue pessimism can create value



Cyclically adjusted P/E ratios calculated using Graham/Dodd methodology with five-year look-back period. Indices used: US = S&P 500, 1871–2013; UK = FTSE All-Share, 1962–2013; Japan = TOPIX, 1956–2013. Rebalanced monthly. Source: Global Financial Data and Schroders, as of July 31, 2013. Past performance is no guarantee of future results. The value of an investment can go down as well as up and is not guaranteed. Countries shown for illustrative purposes only and should not be viewed as a recommendation to buy/sell.

One of the risks to this approach is that overvalued markets can continue to rise, taking them ever further from underlying values. In this context, the tech bubble of 1999–2000 has been etched into the memory of any value investor. Value is also susceptible to liquidity shocks that can make cheap assets cheaper. It can

⁵ 'Value and Momentum Everywhere', Clifford Asness, Tobias Moskowitz and Lasse Pedersen, *Journal of Finance*, vol. 68, no. 3, June 2013; 'Time Series Momentum', Tobias Moskowitz, Yao Ooi and Lasse Pedersen, *Journal of Financial Economics*, 104 2012; and *Expected Returns: An Investor's Guide to Harvesting Market Returns*, Antti Ilmanen, John Wiley & Sons, 2011. The low correlation of trend opportunities in different asset classes helps to smooth out the strategy's volatility.

also be subject to crowded positions, where many investors buy the same assets for similar reasons. An example of where this can go wrong was the brutal de-leveraging in the summer of 2007, which saw a massive reversal of relative value trades, when the many quantitative investors who crowded into the same trades suffered substantial losses. Another risk is the so-called 'value trap', when a stock's low value is justified by its deteriorating fundamentals, although this can be diversified away in a wider portfolio.

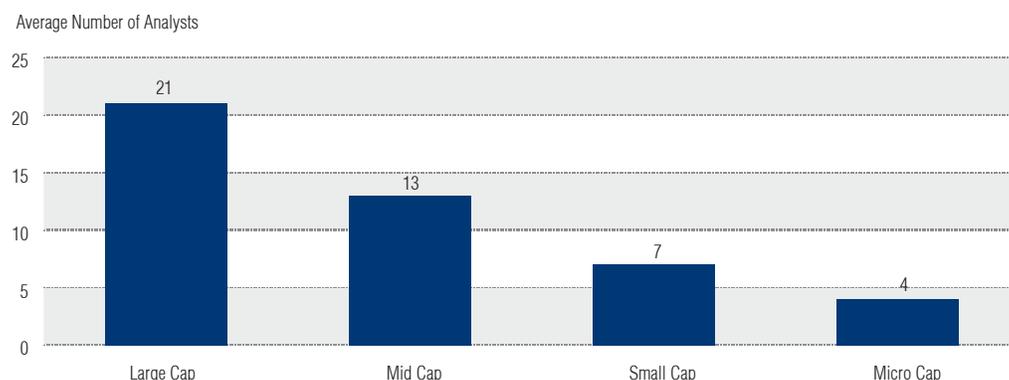
3. Ambiguity aversion and availability bias

Studies have shown that individuals have tended to favor options with fewer unknown quantities, preferring, for example, a lottery with known probabilities to a similar lottery with unknown probabilities. This concept is generally referred to as the Ellsberg paradox⁶. People dislike ambiguity so, to help them make decisions, they typically deploy what is called the 'availability heuristic', preferring to rely on easily available information rather than trying to weigh up the problem in an unbiased fashion.

Small cap versus large cap

Ambiguity aversion and availability bias mean that investors have a tendency to overweight large-capitalization stocks at the expense of smaller-capitalization ones. The former tend to be companies that are familiar and so, disliking ambiguity, investors will tend to prefer what is better known. Moreover, the news flow generated by analysts and the press is likely to be skewed towards larger-capitalization stocks, making it more available to the investing public (Figure 3).

Figure 3: Analysts and investors tend to cluster around large-cap stocks



Micro cap: \$50 million to \$250 million (126 companies), small cap \$250 million to \$2 billion (651 companies), mid cap: \$2 billion to \$10 billion (733 companies), large cap \$10 billion and above (474 companies), as at 3 November 2014. Source: Bloomberg estimates for companies listed on the New York Stock Exchange. Sectors shown for illustrative purposes only and should not be viewed as a recommendation to buy/sell.

Taken together, this theoretically would encourage the overvaluation of large-cap assets, leading to the formation of a small-cap premium⁷. And it would follow that tomorrow's large-cap returns would be relatively depressed in light of today's excessive demand. The underlying drivers of the small-cap strategy are, however, highly sensitive to the economic cycle, with the main risk coming from an economic slowdown.

⁶ In the (1961) paradox, individuals were presented with two urns: one that contained 50 black balls and 50 red balls and one that contained 100 black and red balls, but in an unknown ratio. Offered a prize for drawing a red ball (blindfolded), the strong preference was to choose from the urn with the known ratio of balls even though, statistically, there is no difference. ⁷ For early proponents of a small-capitalization premium see Eugene Fama and Kenneth French, 'Multifactor explanations of asset pricing anomalies', *Journal of Finance* 1996. ⁸ *Thinking Fast and Slow*, by Daniel Kahneman, Farrar, Straus & Giroux (2011). Daniel Kahneman, winner of the Nobel prize in economic science, discusses how we make choices in business and personal life. He describes two fundamentally different modes of thought: System 1, which is fast and intuitive, and System 2, which is deliberate and involves effort. Each has its own strengths and weaknesses. ⁹ Analyzing how these risk premia can be combined in a portfolio extends beyond the scope of this article.

Conclusions

Although behavioral biases and heuristics have become the subject of a best-selling book⁸, their practical application has mainly been restricted to ways to influence the individual in his or her decision-making. In this article we have set out to show that there may be financial applications of these insights that move beyond popular science and descriptive models of the way people make decisions. These applications can involve a wide range of investments, including derivatives, currencies and equities. If well understood and smartly applied, we believe they can be used to construct non-market directional portfolios of 'strategy' risk premia which can deliver a positive and stable total return over the medium term⁹.

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