Evans and Partners Asset Management

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Human Error

Introduction

Our focus in this paper is on human psychological biases and the detrimental role they play in investment judgements. Psychological biases or "heuristics" are decision-making shortcuts that generally make life more manageable – for instance, in choosing a restaurant in an unfamiliar city we are drawn to the full one in preference to the empty one in the expectation that its popularity reflects its quality.

Our cognitive biases, though, can lead us to systematically err in our judgements and render us subject to influence, a reality that is exploited across the spectrum of society from product marketing to politics and to court rooms. In investing these biases can be costly. Investing is a process by which individuals make judgements, deal with uncertainty, and respond to new information, often under conditions of stress and through the lenses of their own personal histories and experiences. We are not the homogenous, rational participants envisaged by the creators of the efficient markets hypothesis. While we can't "unwire" our cognitive biases we can make better investment decisions if we understand the ways in which these behavioural heuristics work.

In this Review we examine how our psychological biases can impede our ability to:

- think independently - leading to dangerous crowd-following investment behaviour;
- think flexibly - constraining our capacity to change our minds after making an investment;
- think accurately – causing us to misinterpret the data that forms the basis of our investment decisions; and
- think and act conservatively – causing us to overpay, overtrade, and take excessive investment risk.

We then look at techniques that we use to counter these biases and how we incorporate them into our investment process.

Independent thinking

We will make better investment decisions if we make them independently, as opposed to mimicking the actions of others. Asset markets are infamous for their destructive crowd behaviour, creating bubbles and crashes such as tulips in the 1630s, shares of Poseidon Mining in Australia in 1969, technology stocks in the late 1990s, and residential housing in America in the mid 2000s. We will avoid the wealth destruction that comes with bursting bubbles if we can stay outside the herd. However, our ability to make investment decisions independent of others is undermined by social proof, envy, and authority.

- Social proof – conforming to the behaviour of those around us is a shortcut that works well in many facets of life. Generally, we will make fewer mistakes by acting in accordance with social norms than by acting contrary to them. The more uncertain we are, and the more stressful the conditions, the more we defer to the actions or judgement of others. Social proof is most powerful when we are observing the behaviour of people we perceive to be like ourselves. For most participants, financial markets embody a great deal of both uncertainty and stress, and it is easy to assume that others have superior knowledge.
- Envy – psychologists have demonstrated that most people measure their income and wealth in absolute terms and relative to their peers. Seeing your friends getting wealthier through riding a bull market makes you feel poorer. Nothing spoils a dinner party like hearing other guests talk about much money they are making from their investments and how foolish is anyone who is missing out. In order to have what they have, we will do what they have done and buy what they have bought.
- Authority – the pressure to respectfully defer to an authority figure is immensely powerful, famously demonstrated by the experiments of Stanley Milgram in 1961 where participants were asked by an experimenter to administer to a "learner" apparent electric shocks of rising intensity despite the latter's seeming pain. Market commentators, investment newsletters, and other market participants such as hedge funds are all seen as "experts" whose judgements or prognostications should be heeded - the financial market equivalent of a white coat. We are disinclined to challenge their perceived authority or to view it through the prism of their vested interests. We take their authority at face value rather than first substantiating their role as expert through an examination of their track record.

It may be an investment maxim to "buy low, sell high", but the heuristics of social proof, envy, and authority incline us to do the opposite. A study by Dalbar, a Boston-based consultant, found that over the period 1992-2011 while the average US equity fund rose by 8.2% pa the average investor in a US equity

fund experienced gains of only 3.5%. Dalbar refers to the gap between the two as the "investor penalty", and it captures the impact of investors chasing sectors of the market that have already significantly appreciated, such as technology shares in 1999, and abandoning those same sectors after they have crashed – buying high and selling low.

Flexible thinking

Once we have made an investment decision and acted on it our interests are best served if we maintain the flexibility to reverse course, perhaps in response to disconfirming evidence or a reassessment of the original thesis. However, our psychological biases make this very difficult. Changing one's mind opens us up to uncomfortable cognitive dissonance. Admitting a mistake may undermine one's sense of self-worth and competence, a threat which is amplified if the original decision was publicly made. We use a variety of different psychological biases to preserve cognitive consistency - the consequence of which is denial, mental intransigence, and path dependency.

- Confirmation bias – this is the tendency to seek out information that confirms our existing beliefs and to dismiss or favourably interpret information that contradicts or is inconsistent with them. Fox News in America has built a highly successful broadcasting business based on this principle. We set a much lower threshold for believability for data that supports our views than data that contradicts it - confirmatory evidence is taken at face value, while potentially disconfirming evidence is subjected to highly critical scrutiny. In investing, the vast quantity of information that we are exposed to makes this is a powerful and dangerous effect - there is no shortage of economic, corporate, financial and political news that can be construed in a way that reinforces our belief in our existing investment positions.

- Sunk-cost fallacy – the essence of the sunk cost fallacy is captured in the expression "throwing good money after bad". It is a way of dealing with the cognitive dissonance that occurs when faced with evidence that contradicts a prior decision. A company CEO or government minister may justify continuing a failing project "because we have invested too much to quit now". A military commander may continue with a failing strategy "because we have sacrificed so many lives already". Gamblers will stay at the table "to get back what I have lost". Investors double-down on a losing investment because "it is even cheaper at this price". Instead of changing course we escalate our commitment as a way to affirm the wisdom of our original decision.

- Endowment effect – we value things more highly once we own them. This was demonstrated in a 1990 study by Kahneman, Knetsch, and Thaler where participants were given a mug and then offered the chance to sell it. The study found that the compensation that participants were willing to accept for the mug, once ownership was established, was approximately twice as high as the price they were willing to pay for it. The fact that you own a stock doesn't change what it is worth. By distorting our sense of value ownership can create inertia against rational action.

- Regret aversion and status quo bias – a decision to do something imparts a higher degree of responsibility than decisions to do nothing. Therefore, we default to the status quo. Furthermore, the more choices we have the less likely we are to make one because we fear the regret of having made a sub-optimal choice. This was illustrated by American psychologist Barry Schwartz in his book "The Paradox of Choice" where he showed that shoppers in a supermarket were much less likely to buy a jar of jam if there were 20 to choose from than if there were only six. In an investment context we have many options yet choosing from them can feel burdensome. This can keep us from making sensible changes to a portfolio.

This collection of heuristics act, often in interrelated ways, to constrain our mental flexibility. They limit our ability to identify an investment mistake when we have made one, and to take corrective action when one has been identified.

Accurate thinking

The informal rules and mental short cuts we employ to help us process information frequently lead us to draw erroneous conclusions.

- Availability bias – we overweight the importance of recent or easily recalled information. The probability of events such as plane crashes and shark attacks is generally grossly overestimated because they are vivid and easily recalled. In investing our expectations of future returns are highly correlated with recent experience, and the perceived likelihood of asset price bubbles, crashes, and recessions is heavily influenced by what has occurred recently. Availability and bias also often causes investors to overreact to company earnings announcements. Availability and believability is enhanced through narratives.

- Incremental information – we overweight the value of additional information. In a 1973 study Paul Slovic measured how the confidence and accuracy of bookmaker predictions changed as they were provided with additional information on which to assess the likely winner in a race, such as weight carried and recent form. As more information was added beyond a base level their confidence rose commensurately but their accuracy did not change. Similarly (and somewhat disturbingly) in a 1991 book "The Psychology of Judgment" Scott Plous showed that the confidence of doctors in their diagnosis rose with the quantity of information but their accuracy did not. In our data-rich world the desire of investors for more and more information is easily satisfied, but often it

creates a false sense of “edge” and insight.

- Representativeness – our natural inclination is to believe that causes resemble their effects i.e. big effects should have big causes, and complex effects should have complex causes. Some big effects, such as an epidemic may be caused by minor events, such as a virus, and some complex effects, such as the alteration of a region’s ecological balance, may have simple causes, such as the introduction of a pesticide. The non-linearity between cause and effect is sometimes called “the butterfly effect”. People look for large causes to explain significant moves in the stock market, major changes in an economy, or large deviations from normal in the operating performance of a company, often leading to a misinterpretation of events.

- Sample size bias - people naturally believe that the behaviour of a small sample will be representative of the large population from which it is drawn. When investing analysts often make excessive adjustments to their long term earnings expectations of a company from financial results that cover short time periods.

- Randomness – people chronically misconstrue random events, and have faulty intuitions about what chance sequences look like. Chance is mistakenly viewed as self-correcting, demonstrated at casino tables every day when gamblers say they are “due” some winnings after experiencing a bad run. Human nature abhors a lack of predictability and the absence of meaning, leading to a natural tendency to see order and patterns. We strive to achieve a coherent interpretation of events, and this leads us to imagined cause-effect relationships. In investing every price change is accompanied by an explanation or a story – you are never likely to hear a financial commentator report that “the market rose by half a percent yesterday for no particular reason”.

These cognitive biases suggest that the amount and immediacy of information available to investors today may be more of a curse than a blessing - worse than adding no value, it may detract from the accuracy of our thinking. Likewise, our tendency to over interpret small amounts of data and draw erroneous cause-effect linkages may lead us to misdiagnose events and impair our understanding of what is happening.

Risk-seeking behaviour

Investors have a bias towards taking risk due to a combination of overconfidence in their own ability; an over-optimistic assessment of the future; and an aversion to recognising and realising a loss.

- Overconfidence bias – overconfidence is human nature, not simply the preserve of teenage males. If people are asked to answer a factual question or provide a forecast with a 98% confidence interval the answer should lie outside the bounds only 2% of the time. However, across many studies the correct answer or outcome typically lies outside the given range 30-40% of the time. In investing overconfidence causes us to underestimate risk and overestimate our edge, which may lead to excessive trading and risk taking.

- Optimism bias – optimism is generally an attractive characteristic in individuals. It also makes life more bearable for many of us – we think that good things are more likely to happen to us than they really are and vice versa. Optimism bias in investors is borne out in inflated expectations for equity returns and earnings growth. In a McKinsey study of five year EPS forecasts for US companies over the period 1985-99 expected growth was 12% pa, almost double the 7% pa rate actually achieved. Furthermore, consensus forecasts for earnings growth are never negative, whereas corporate profitability on average declines every three years. Upwardly-biased forecasts for future earnings will cause us underestimate risk and to overpay for our investments.

- Loss aversion – this refers to the asymmetry in the way people treat losses and gains. Psychologists estimate that people feel the pain of a loss 2 to 2.5x as strongly as they do the pleasure from a gain of the same magnitude. As a consequence we are willing to take more risk if it means the possibility of avoiding a sure loss and be more conservative given the opportunity to lock in a sure gain.

- Self-attribution bias – we attribute successes to our own ability while losses are counted as “near wins” or bad luck or explained away by other external factors. Favourable self-attribution hinders our ability to learn from our mistakes and perpetuates the effect of the above biases on our appetite for risk.

Our hardwired tendencies towards overconfidence and optimism lead us to over-pay and over-trade. The feedback mechanism through which we would otherwise learn to counter these biases is weakened by self-attribution bias.

Investor myopia

For some reason most people are content not to have a daily valuation of their residential property but love to see daily prices of their share portfolio - and they can. However, the greater the frequency with which we observe investment returns the less information we see but the more discomfort we inflict on ourselves. To illustrate, if we assume an expected annual return from equities of 10% and an expected volatility of 13%, we can be 80% confident of a result greater than zero over one year. The “signal to noise” ratio over the one year period is 77%, meaning the outcome is dominated by the expected return, with only 23% attributable to volatility. However, as we shorten the time period the probability of gain declines towards 50% and an increasing proportion of the price change is explained by randomness – we are observing “noise”.

Time period	Probability of profit	Signal to noise ratio
1 year	80%	77%
6 months	72%	53%
1 quarter	65%	37%
1 month	60%	21%
1 day	53%	4.5%

If we look at our returns every day we can expect to have 138 pleasant investment experiences and 122 unpleasant ones over a one year period. However, loss aversion tells us that the down days will produce far greater pain than the pleasure we derive from the daily gains of roughly the same magnitude. So we can turn a good annual outcome into a miserable experience through the high frequency with which we observe our returns. This creates stress, as a consequence of which we may sell shares after a period of declines, or avoid equities altogether to the detriment of our long term returns.

Techniques that we use for managing biases

Over the last decade or so there has been a growing awareness of the role played by cognitive biases in investment markets. For instance, Daniel Kahneman, one of the pioneers in the field of heuristics, was awarded the Nobel Prize in Economics in 2002, and Behavioural Finance is now an academic discipline in its own right. However, there is no evidence that this has being matched by an improvement in the quality of investment decision making, as demonstrated by the bubbles and crashes in credit markets, US residential property, and some emerging equity markets over the last five years. As an investor an awareness of behavioural biases is not enough – you need to have tools to counter them and as much as possible codify these tools into your process. Below we discuss some approaches we find useful and the ways we formalise them into our investment process.

More independent thinking

- Mindset - it certainly helps to be “wired” as a contrarian or someone who doesn’t need the constant comfort and reassurance of being with the crowd. Be wary of listening to financial market commentators – if you must, do so with a sceptical filter. Beware of popular investment themes – ice hockey legend Wayne Gretzky said “I skate to where the puck is going to be, not where it has been”.
- Objective valuation – having a valuation approach tied to a variable such as the market aggregate or interest rates is a sure way to surrender independence of thought. We have an absolute valuation for each stock that doesn’t rise or fall with movements in the broader market.

More flexible thinking

- Delay commitment – don’t rush to a point of view. There is value in being in “neutral” because it minimises path-dependency and commitment bias. We will generally follow a company for at least a year prior to making an investment.
- Multiple scenarios – before you are emotionally invested in a position map out a range of possible outcomes and the milestones along the way you will view as confirming or disconfirming evidence. This gives you valuable emotional cover and helps to avoid commitment bias.
- Seek out disconfirming evidence – Charles Darwin recognised the necessity of noting disconfirming evidence after he observed his tendency to easily remember evidence in support of a theory but to quickly forget contrary evidence. We actively seek data that may falsify our investment thesis, and reduce the weight in our managed portfolios of a stock when the data is not supportive of our hypothesis.
- Mental agility – John Maynard Keynes famously said “when the facts change, I change my mind. What do you do, sir?” George Soros is well known for this. We try to have an investment culture that puts a premium on mental flexibility.
- Think in reverse – we ask how someone who is short a stock that we have an investment in might view a certain item of news. We counter confirmation and status quo bias by trying to disprove our hypothesis.
- Investment alternatives – having a “cab rank” of stocks which you are happy to buy makes it far easier to sell a stock than if you have no ready alternatives. We maintain an “A-list” of 25 portfolio candidates on which we have completed due diligence and have a clear, objective valuation.

We know that not every investment will work out as anticipated. Having a flexible mindset and an appetite for disconfirming evidence helps us to minimise the cost of investment mistakes.

More accurate thinking

- Checklists – author Atul Gawande has chronicled the power of basic checklists to improve outcomes in fields from emergency medicine to commercial aviation. Checklists help reduce to human errors that arise from forgetting steps due to stress, familiarity and repetition. We use a pre-decision checklist in our investment process to ensure that proper

due diligence has been completed and the portfolio candidate satisfies our demanding investment criteria. We also use a checklist when dealing with a negative event, such as a profit warning, to ensure we analyse the situation objectively and thoroughly.

- Quality and quantity of information – one needs to think carefully whether an additional piece of information will improve our understanding of a situation, perhaps by mitigating sample size bias, or add only to our confidence. One way to do this is to look for information sources that are uncorrelated – we don't want five pieces of data all of which originate from the same source.
- Randomness – having a basic familiarity with the principles of randomness can help us avoid seeing false patterns and illusory cause-and-effect relationships.
- Probability – having a basic understanding of probability theory gives us a greater awareness of low-probability events, and helps us to think in terms of a range of possibilities rather than in absolutes.

More risk-aware behaviour

- Take out forecast risk – valuing a business on forward earnings "hardwires" optimism bias into the valuation process. The discounted cash flow approach is the ultimate expression of this. To mitigate optimism bias we value businesses by applying a multiple to trailing, not prospective earnings.
- Manage position size – it is natural when making a new investment to focus on the company's wonderful attributes and only become more aware of its inevitable challenges or shortcomings over time. We attempt to compensate for overconfidence by introducing a new position with a below-average weight and then scaling up over time.
- Use post-mortems – we know we will make investment errors. We have a formal post-mortem process that helps us to learn from them and mitigates self-attribution bias.
- Distinguish between risk and consequence – if the consequence is unacceptable then the risk, however small, is too.
- Dangerous combinations – we pay special attention to ways in which different risks can combine to create toxic effects. Adding debt will amplify whatever operational risks a business faces. We have an aversion to financial risks, only owning companies with strong balance sheets and avoiding inherently geared businesses such as banks.

Conclusions

We have shown that natural human psychological biases can undermine sound investment decision making. Heuristics impede our ability to think and act independently; make it difficult for us to accurately and objectively interpret the information we use to form an investment decision; create enormous barriers to changing course once a decision has been made; and generate an excessive appetite for risk. A measure of the cost to investors these biases extract is the "investor behaviour penalty", which shows investors in US equity funds achieved returns less than half that of the average equity fund over the last two decades.

Achieving good investment results requires both a sound process, and disciplined application of that process through well-reasoned judgements. Investor psychology is where what you say becomes what you do; it is how the rubber meets the road. It is why different investors who say the same thing do very different things, respond to the same news and events differently, and achieve very different results.

In applying our investment approach we have an acute awareness of our natural biases and the dangers they pose, and we hardwire into our process measures to counter them. We know the foundation for investment success is the mistakes you don't make, so we strive for conservatism, independence, and mental agility.

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