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The South African investor behaviour tax and helping investors count what counts

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Paul Nixon, Martiens Barnard, Ronnie Bornman and Dirk Louw

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Executive summary

This paper begins by using popular balanced fund flows to show how investors migrate between these funds in the pursuit of recent performance, ultimately to their detriment. We then examine how this behaviour affects individual South African investors in respect of imposing a "behaviour tax" on their investment portfolios that tends to vary according to the dominant market cycle. The conclusion is that investors should consider four main factors when constructing an investment portfolio to reach a specific investment outcome. We show how these factors should be considered to give the right balance between reaching the desired outcome and a palatable investment journey, thereby minimising the negative effect of irrational behaviour on the investment.

Paul Nixon, Martiens Barnard, Ronnie Bornman and Dirk Louw

RORSCHACH TEST

Popularly known as the “Inkblot” test, the Rorschach technique, or Rorschach Psychodiagnostic Test is the most widely used projective psychological test. The Rorschach is used to help assess personality structure and identify emotional problems. Similarly personality traits and emotion can contribute to the defined behavioural tax in investment performance.

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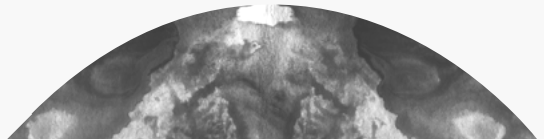

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About the authors

Paul Nixon, CFP® MBA

Head of Technical Marketing and Behavioural Finance

Paul was partly responsible for institutionalising the client advisory framework from Barclays in the UK as part of the Absa relationship from 2011 to 2016. Barclays were pioneers in applied behavioural finance and demonstrated the value of gauging and managing investor behaviour. Paul set out to understand South African investor behaviour when he joined Momentum Investments in 2017. He established and now chairs a South African first – a behavioural finance research group – with leading universities and institutions locally and abroad. Paul is an Investment Management examiner for the University of the Freestate and completed his MBA with distinction at Edinburgh Business School in 2017.

Martiens Barnard

Marketing Actuary, Momentum Investments

Martiens started his career in investments as a business development manager for Absa Financial Services in 2005. He then joined Discovery Invest when it was launched in November 2007, as part of the Invest technical marketing team. He headed up the Invest technical marketing team for the last part of his stint at Discovery Invest before joining Momentum. Martiens was part of the team that pioneered the Momentum OBI Score. The Momentum OBI Score provides an innovative way to compare how well funds were able to achieve a set outcome.

Ronnie Bornman, CFA®

Portfolio Manager, Momentum Investments

Ronnie Bornman is a portfolio manager with Momentum Investments, responsible for various multi-asset funds in the retail environment, including co-management of the flagship Momentum Focus Fund of Fund range. Prior to joining Momentum Investments he was an integral part of the Momentum Advice & Wealth Management team, overseeing house view investment strategies, risk profile design as well as research and quantitative modelling, predominantly for the retail and franchise segments under license. He holds a BSc in Mathematical Statistics & Operations Research as well as the CFA designation.

Dirk Louw

Actuarial Analyst, Transaction Capital

Dirk Louw completed his Actuarial Science degrees (BCom and Honours), after which he did a Master's Degree in Business Mathematics and Informatics (BMI) at the North-West University. As part of his Master's degree he completed an industry-directed research project at Momentum Investments entitled: "Investigating and quantifying the retail investor behaviour gap in South Africa (2018)". Continued interest in behavioural finance inspired him to keep investigating investor behaviour. Dirk is currently working as an actuarial analyst at Transaction Capital Recoveries.

Foreword

Greg B Davies, Phd

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Greg is a globally recognised expert in applied decision science, behavioural finance, and financial wellbeing, as well as a specialist in both the theory and practice of risk profiling. He started the banking world's first behavioural finance team as Head of Behavioural-Quant Finance at Barclays, which he built and led for a decade from 2006. During this time, Greg was the architect of Barclays' industry leading behavioural profiling and suitability tools, a holistic wealth philosophy, and a novel approach to impact investing and philanthropy.

Past performance is not a reliable guide to the future. Every investor, potential investor, and casual passer-by of an investment advert has seen this message innumerable times, and ignored it on every one of them. Every regulator, adviser, and investment institution knows that such disclosures serve only to tick boxes, not to change investor behaviour. Yet just as past performance remains the primary factor in deciding to start a new investment, or make a change to an existing one, the warnings that this may not be wise remain the same. Chasing past performance represents the sacrifice of future performance in exchange for current comfort.

The reason investors make decisions that harm their long-term investment returns is rarely a lack of knowledge. Investors do not seek the poor outcomes they often end up with when they deviate from their 'optimal' plans. What they are seeking is comfort and confidence with their finances. However, in the clouds of emotional turbulence, the best course is often harder to see, and even harder to stick to. It's not the reward that needs changing: we just need a more effective (and far less costly) means of sticking with the discomfort we'll need to ensure to achieve it.

By viewing investing in a more holistic way – acknowledging that investments are not inherently good, but instead good for a particular investor for their particular goals and aspirations – we move beyond a narrow view of what it means to own a good investment portfolio, to a wider view of what it means to be a good investor. Investments that stand alone are harder to engage with than ones with a more obvious personal relevance, with the resultant emotional comfort with investing that comes with that. Changing investor behaviour is hard. While the underlying psychological drives may be relatively few, the circumstances in which those drives express themselves are anything but. And while investors are wired the same way worldwide, subtle cultural nuances can mean what works in one place

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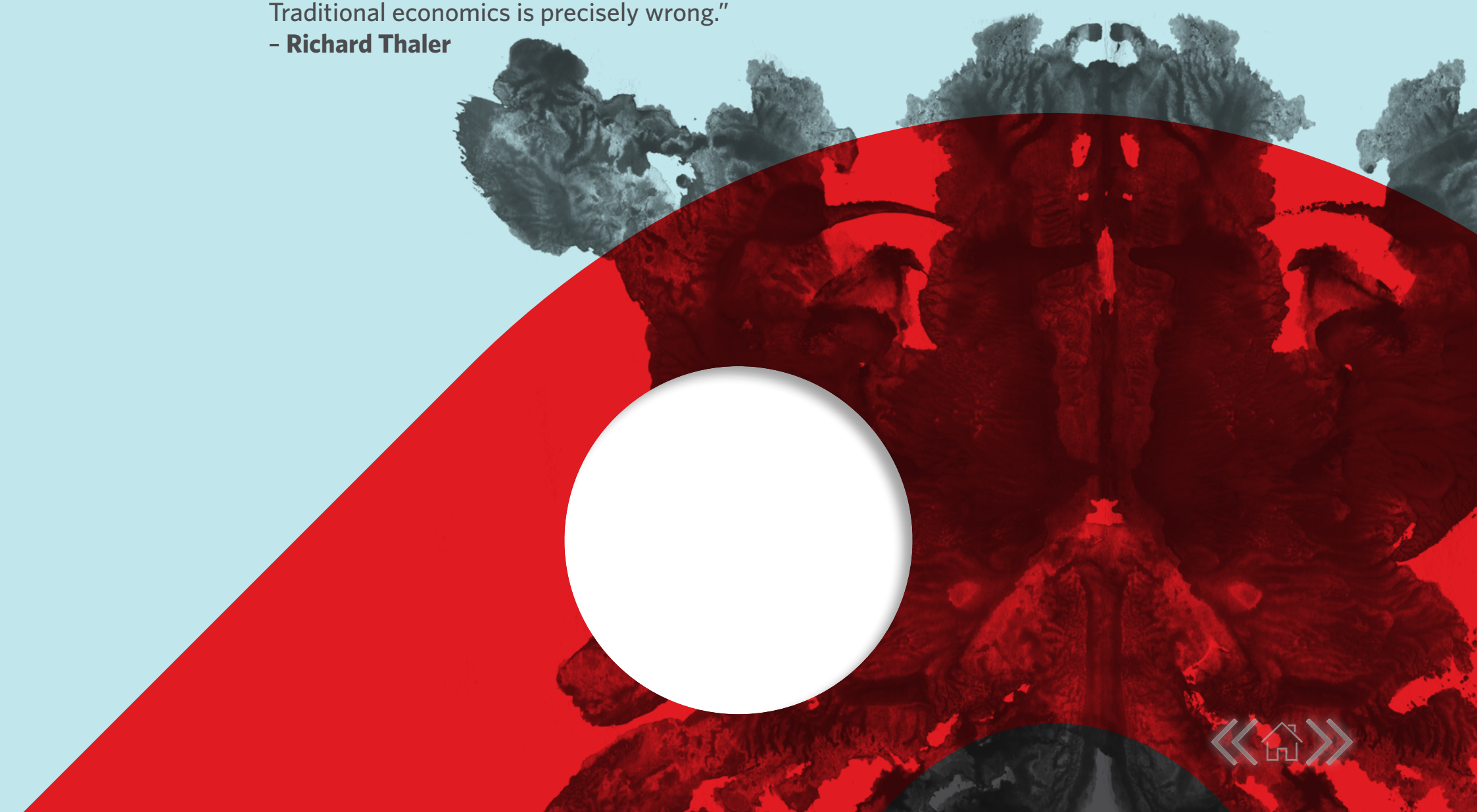
doesn't work in another. It's not always obvious where the cultural fault lines lie. The key to unlocking these puzzles is data. Well-designed digital collection of data (of which this report is a valuable example) from the advisers and institutions that are the guardians, shapers, and trackers of investor behaviour can lead to a deeper understanding of behaviours in the face of changing circumstances. This does not happen without effort; however, with the right tools that work with advisers' and institutions' broad base of existing skills and knowledge to help refine and interpret this data, the task becomes achievable.

Innovative advances in technology, data analytics, and behavioural design can allow advisers and institutions to turn every interaction with their investors – across every type of market conditions in every country – into a source of data enriching investor profiles, and ultimately providing better behavioural prescriptions for everyone, both at the start of an investment journey, and along its course.

Contrary to fund performance, when it comes to improving investor behaviour, poor past performance is all-too-often a reliable guide to poor future performance. Initiatives and research like this conducted by Momentum Investments that encourage a more holistic, personal, approach and that move beyond ticked boxes and crossed fingers are an important change of direction: better financial outcomes from better investor behaviour and decisions.

01 | **The two sides of human** economic behaviour

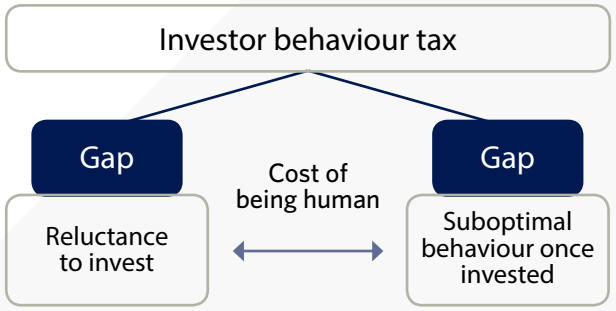
"So, behavioural economics is messy.
Traditional economics is precisely wrong."
– **Richard Thaler**



Introduction

Many studies have been conducted globally on the behaviour of investors. Most of them have found that there exists some form of gap between the actual return on investment (ROI) investors achieved and the ROI investors would have achieved by following a simple buy-and-hold strategy (Clare and Motson, 2010) (Davies, 2013) (Dalbar, 2016)(Morningstar, 2019). In essence this is a quantification of the underperformance that tends to follow when investors change the plan (or switch or change funds) as a result of fear or wanting more. Since this performance gap results in lower investment returns over time, it is referred to as a "behaviour tax" in this paper. The investor behaviour tax is the result of two main investor behaviour phenomena, namely the reluctance to invest, and suboptimal behaviour when invested. For all investors the first obstacle to overcome is the reluctance to invest, but after an investor has finally overcome this reluctance, the second cause of the behaviour gap, suboptimal behaviour, comes into play almost immediately.

Figure 1: Components of the behaviour tax



Source: Momentum Investments, 2019.

The default position for many investors is to sit on the sidelines while waiting for the "right time" to invest their money. In the interim stale cash balances build up in low-risk bank accounts instead of gaining growth by investing it in more risky assets (Davies, 2013). People are generally risk averse, which means that they tend to fear taking on even the slightest amount of risk. Their fear of making wrong decisions is greater than their fear of missing out on additional returns. The easiest time to overcome reluctance is when the economy is booming and investments perform well. In this case reluctant investors might be influenced by the high investment returns and their fear of missing out on these returns might surpass their fear of losses (Jefferies, 2015). Unfortunately this leads to most investors jumping in when the market is close to its peak, and when the market starts to fall these investors' optimism may change into pessimism.

One of the most natural emotions that humans experience when assets fall in value is anxiousness. In a study conducted by Davies (2013), significant economic events such as the period of stagflation during the 1970s, the internet bubble in the early 2000s and the financial crisis of 2008 seem to have caused periods of high anxiety. Such events cause investors to panic and shift their investment choices away from risky assets into lower-risk, more stable assets (Rizzi, 2014). Momentum Investments replicated this element of the Davies' paper for the South African equity market from 2006 until 2019 (see figure 2 to follow). The results and message are very similar, even though the timeframe is much shorter. The evidence is conclusive – stay invested in the general equity market for six years and odds are that you will not experience a nominal loss. Change the plan (sell

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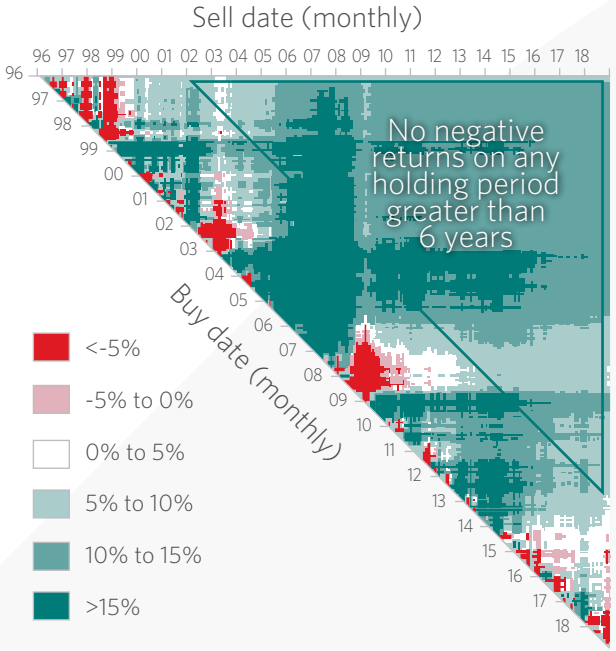
or switch to other funds) especially during a time of market crisis or even during a flat or fluctuating market like South Africa has experienced since 2014, and you are going to incur losses or a behaviour tax that could be significant. Figure 2 shows buy times (from the year 1996 to end of 2018) on the diagonal and what the return was at corresponding sell times on the horizontal axis. The "hotspots" coincide exactly with major market events. Once again, the Asian crisis of the late 1990's, the emerging market spillover in the early 2000s when interest rates hit 17%, the

Figure 2: Investor anxiety hotspots (1996 - 2018)



Original Paper: Davies, G.B. 2013. Barclays White Paper: Overcoming the cost of being human

global financial crisis and South Africa's recent stagnation. Despite all the evidence, however, our DNA predisposes us to take mental shortcuts and this exposes us to flawed thinking when we evaluate our investments. For example, the representativeness bias suggests that people tend to believe that past and current experience will continue into the future (Fisher, 2014). The occurrence of past events may therefore still cause anxiety, especially when the market seems to behave in similar ways, or if rumours are suggesting that similar events may happen. Additionally, some investors believe that good past performance will continue into the future and as a result they switch to funds or portfolios that performed in the past. Various studies have shown that chasing past performance does not guarantee future results (Kennon, 2018) (Lamprecht, 2016) (Maymin and Fisher, 2011).

Carl Richards (2012) suggests that investors should rather focus on their own behaviour, and not on the market's behaviour, because investors and financial advisers only know what the markets have already done, and not what they are currently doing or going to do next. So by looking at what had already happened, they try to predict what will happen next. According to Kinsley (2000) this is like trying to drive a car by looking only in the rear-view mirror. So rather than looking at the past, he suggests focusing on long-term goals or outcomes while acknowledging the risk of short-term losses so that these do not come as the surprise that leads to making irrational decisions.

This white paper sets out with a literature review that supports the root causes of our instinctual and often suboptimal behaviour. The remainder of the paper is

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practical and begins with clear evidence that the financial services industry is far from letting the old habit of chasing past performance die. The result of this is that investors impose a behaviour tax on their investments. This is quantified at a client level by discussing the investment behaviour of 17 994 South African investors on the Momentum Wealth platform that deviated from their original investment strategies from 2008 to 2018. This period offers sufficient data to examine one complete market cycle from bottom to top. The paper also compares an equivalent multi-asset investment strategy to ascertain if a well-diversified fund or investment portfolio of funds would have provided a better investment experience and outcome for the clients in question. In conclusion it presents the proprietary Momentum Investments Outcome-based Investing Score™ as a practical framework consisting of the four factors that we believe will help investors to keep on track to achieve their investment goals. In our view this framework presents the optimal balance between pursuing an investment outcome (required return) and due consideration to the investment journey in reaching this investment outcome.

This white paper offers the following insights:

1. Evidence that aggregate industry investment flows are predictable when looking at 12-month performance statistics. Investors are bargaining on the wrong thing, past performance, when they make investment decisions.
2. Evidence that this investor behaviour (chasing past performance or the "hot dot") results in a behaviour tax, and how this fluctuates with market cycles when chasing past performance.
3. A framework for evaluating investment funds or a portfolio of funds that gives due consideration to the outcome of the investment as well as the journey in reaching that outcome. This is demonstrated by the Momentum Investments Outcome-based Investing Score™.

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1.1 Spock versus Homer Simpson

Humans, being emotional beings, tend to get emotionally attached to their investments. This attachment results in some behavioural patterns that are inherently part of the human condition. According to Davies (2013) principles of good investing are based on the assumption that humans as investors are perfectly calm, unemotional beings and that they are only concerned with long-term financial objectives. Thaler and Sunstein (2009) refer to investors under this assumption as Homo economicus or "econs". According to them Homo sapiens or humans cannot fully adhere to these principles, and Davies (2014) indirectly refers to this as the "cost of being human". He explains that these so-called econs are purely focused on risk-adjusted returns, simply defined as the return that shows how an asset's performance compared to a benchmark asset with the same level of risk. This risk is usually based on volatility, calculated as the standard deviation in returns. Davies (2014) feels that humans, on the other hand, would rather be focused on "anxiety-adjusted" returns due to their emotional nature. This means that they want the best possible return relative to the amount of stress and discomfort that they have to endure during their investment journey (Davies, 2013). As a result these investors are more likely to make decisions that will provide emotional comfort rather than focusing on achieving their investment goal, resulting in a behavioural tax. In a humorous interview with Barry Ritholtz to contrast logic and emotion, Richard Thaler famously related "econs" to the character Mr. Spock from the popular television series Star Trek and contrasted him with the more human Homer Simpson (the protagonist of the American animation series The Simpsons).

Below is an extract from an interview between Nobel laureate, Richard Thaler and Barry Ritholtz in his "Masters of Business" series from 2015.

Barry Ritholtz: Let's start with an idea of yours from one of your more recent books that I found fascinating. It's what you call "econs versus people". Conventional economics assumes that people are highly rational and unemotional. They can calculate like a computer and have no self-control problems. That leads to two obvious questions. The first is how does this manifest itself in everyday economic choices?

Richard Thaler: Well, the main point is that we're not econs. We have a theory based on fictional characters. Think of Spock in the old Star Trek series. He's an econ.

Ritholtz: Or at least tries to be.

Thaler: Pretty much succeeds.

Ritholtz: Pon farr? If you really want to get wonky ...

Thaler: No, no, no, I don't want to go there. But he's close – closer than you or me – versus, say, Homer Simpson. If you were building a model of economic agents, what would be better – a model of Spock or a model of Homer Simpson?

Ritholtz: Spock would be desirable, but Homer Simpson is the reality.

Thaler: Yes. So, economics is supposed to be about reality. Economics is not a theory of experts. That's a mistake that lots of people make – that it's built as if everyone knew as much about a subject as the economists studying it.

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1.2 Information processing

This contrast between logic and emotion is rooted in the way human beings perceive and process information. The human brain is exposed to around 18 million bits of information every second. Our processing power is limited to around 120 bits of information per second. To put that in perspective, the high-speed modems from the 1980s processed 1 200 bits per second and conversation processes around 60 bits per second: When two people are talking simultaneously most of us need to ask one to stop so that we can understand what is being said. This does not mean that the human brain is suboptimal – the fact that we can read this paper after hundreds of thousands of years of evolution is proof that our processing capability has been phenomenal. While the amount of stimuli we are exposed to has undoubtedly increased, we have been extremely efficient in filtering out unnecessary information and stimuli so that we can focus on what is important. In fact a feature of our daily information processing activity is processing information that is not even there. "We infer that the instances so categorised or identified have the other properties characteristic of membership in a category" (Bruner, 1973). Recognising cues and features of an object and assigning it to a category class is one form of going beyond the information given (Wright et al., 2011). When reading a financial publication and presented with the following word with a letter missing, "ST_CKS", the reader would read the missing letter as an "O" because of the context, even though the word could be "STICKS". The reason for this is simple, the shortcut saves time.

Ritholtz: So, the second question: How is a social science, such as economics, built on such a fundamentally flawed assumption?

Thaler: It didn't used to be. I would say economics through World War II was behavioural economics. Starting with Adam Smith – especially The Theory of Moral Sentiments, the book before The Wealth of Nations – through Keynes, economics was behavioural.

Then, there was a period of the great mathematisation of economics that started with people like Paul Samuelson. If you're going to write down mathematical models, the easiest models to write are the ones where people are rational, because you just write "max" and solve, and if you can take a derivative and set it equal to zero, then you're an economic theorist. If people are doing something more complicated than that, like buying a stock or a fund because of its ticker symbol, good luck writing that down in a mathematical model.

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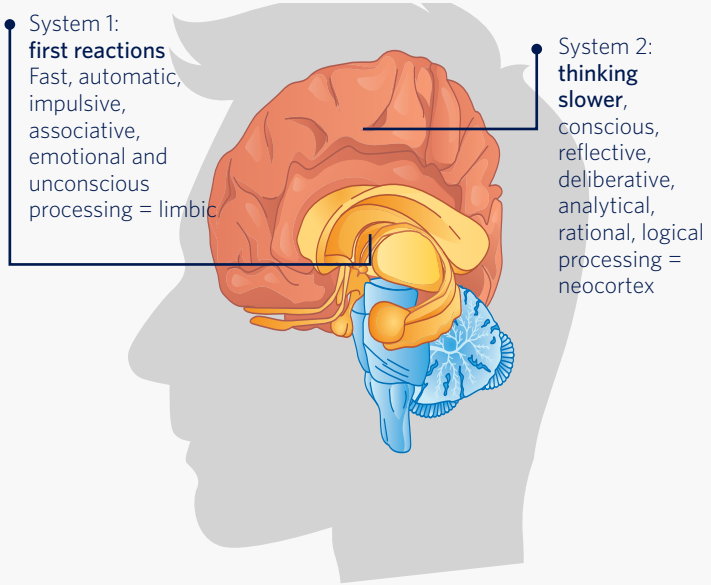
The effects of priming also show how providing information in certain contexts can influence the way we process this information that transcends to our actual behaviour. One definition of priming is that exposure to a stimulus influences the response. After being exposed to a scrambled sentence test where students were asked to place words like "old" "grey" "Florida" and "retired" in the correct sequence in various sentences (Bargh, Chen, and Burrows, 1996), participants were evaluated on how they behaved when they left the test. Surprisingly they walked slower when leaving the location in comparison to the group that were presented with the neutral scrambled sentence test that did not refer to old age. These tests show how we rely on both situational information as well as that stored in our memory from past experience to make sense of our surroundings when interpreting the stimuli around us.

1.3 Dual-process theory of thought

We probably believe that we are being rational most of the time but the majority of our thinking happens automatically without our being aware of it, or by instinct. A quick glance at figure 3 will also reveal that our centre for instinct (the limbic system in the orange section) in the brain developed as part human evolution, after the more primitive reptilian brain (blue section). Our default setting using instinct has assisted us greatly in survival. The brain is able to save valuable time and resources when making decisions by substituting difficult questions with easier ones without us being aware of it. In fact it has been shown that the outcome of a decision can be encoded in brain activity of the prefrontal and parietal cortex as much as 10 seconds before it enters awareness (Haynes, 2008). So, by the time we think we are making a decision, much of the time it has actually already been made. Over roughly the last two decades, psychologists have distinguished between two systems of thought with different capacities and processes (Evans 2003, 2008; Kahneman 2011; Kahneman and Frederick 2002; Metcalfe and Mischel 1999; Sloman 1996; Smith and DeCoster 2000; Strack and Deutsch 2004). They are referred to as System 1 and System 2 (Stanovich and West 2000).

Figure 3: System 1 and 2



Source: Adapted from Sentient Decision Science, October 2014

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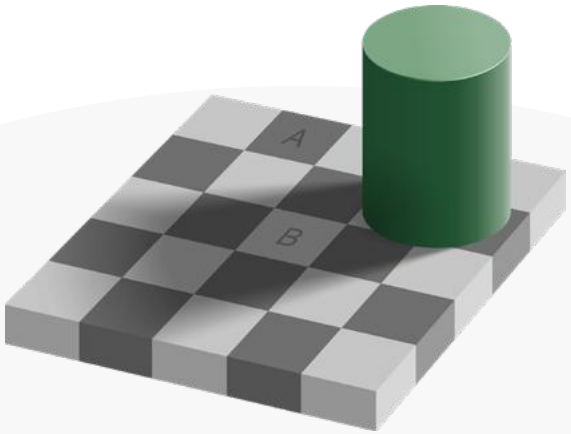
While the exact proportion of how much each system is used daily is virtually impossible to determine, there are many factoids online claiming that system 1 accounts for as much as 95% of our daily processing activity. The closest academic literature to support any precise proportion would be that 47% of daily activities were found to be habitual (Neal et al., 2006).

Kahneman (2011) defined these two systems as follows:

- System 1 operates automatically and very quickly, with little or no effort, and no sense of voluntary control. This is the quick and dirty system (Montier, 2010). This operates to the extent that the brain cannot even "unsee" an optical illusion even if we know we are being tricked because the processing is instantaneous. For example, the two squares "A" and "B" adjacent are exactly the same colour. This particular illusion is created because of the way the brain understands contrasts and shadows (Adelson, 1993), but also because we have seen a chessboard before and it fits inside this mental template. The shadow cast on the board tells our brain that the squares next to the dark grey squares should be lighter but darker than the other light grey squares because of the shadow. The image is quickly constructed, but incorrectly.
- System 2 allocates attention to the effortful mental activities that demand it, including complex computations. This also reinforces the physical strain of maintaining willpower. Staying on a diet is a system 2 function and drains the cognitive battery when called upon. System 1 can arise from expert intuition,

Figure 4: Adelson's checker shadow illusion (click for a video)



Source: https://www.illusionsindex.org/ir/checkershadow

trained over many hours of learning. A chess master can recognise a strong move within a second, where it takes a novice a few minutes of system 2 thinking. System 1 is the architect of our ability to judge people or situations on the basis of first impressions, our gut instinct or that little voice that tells us someone is just up to no good (Gladwell, 2006). System 2 requires attention and is disrupted when attention is drawn away. In fact when performing system 2 tasks and suffering an interruption it takes on average nearly 25 minutes to return to the level of concentration needed to proceed with the task (Mark et al., 2008). Interestingly this study was used to show conclusively that multitasking is in fact a myth.

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A great example of what can be a visibly tenuous conflict between these two systems was shown by Walter Mischel of Stanford University who conducted the famous marshmallow experiments in the 1960s and 1970s. The experiment offered children the option to consume a treat immediately, or wait a few minutes for double the number of treats. Some made no attempt at self-control (ringing the bell quickly and eating the reward), others stared at the object of desire until they gave in a minute or so later, and a few writhed in growing discomfort until they succeeded in waiting for the bigger reward.

1.4 The mental template

System 1 is able to make such rapid decisions because it is very efficient at creating structures to store and retrieve information, a cognitive structure that represents knowledge about a concept or type of stimulus and the relations among those attributes (Fiske and Taylor, 1991). These mental templates or schemas (Piaget and Cook, 1952) are an important part of cognitive development and formulate our understanding of the world over time (the variables change as our understanding changes). Like any template the basic variables and parameters are prepopulated to speed up the process. Furthermore, we store a multitude of these templates for easy retrieval and application to any given situation. For example, our "person schemas" are an archive of preconceptions about people that we have built up over time. In essence these are stereotypes (Hamilton, 1979). When introduced to an accountant, your person schema will prepopulate the characteristics of this person based on your experience. Thaler and Sunstein (2008) remind us in their acclaimed book, Nudge, that we would assume a 6-foot-8-inch African-American man is more likely to be a professional basketball player than a 5-foot-6-inch Jewish guy because there are lots of tall black basketball players and not many short Jewish ones. When faced with a given event, the stimuli of the situation are compared with a schema (Wright et al., 2011). If the schema fits, it will be used in further processing. These are mental shortcuts (heuristics) to save us time and help us deal with the all the stimuli we are faced with constantly, a cognitive screen saver of sorts. While these heuristics have served us extremely well over the course of our evolution, they are not particularly effective in our investment decision-making.

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1.5 Heuristics and biases

These shortcuts can be thought of as rules of thumb that inform us immediately whether a given cue is present, and this allows us to jump straight to an inference (Wright et al., 2011). They are snap judgements. Kahneman and Tversky (1973) originally identified and investigated three primary mental shortcuts that we will place in the context of investment decisions:

1. **The availability heuristic**: People tend to estimate the frequency of an event or the likelihood of its occurrence by the ease with which it comes to mind (Kahneman and Tversky, 1973). Investors will become more risk averse after a market crash because there are plenty of recent examples available that will establish and reinforce the belief that markets crash. The same goes for top performing shares or unit trusts; investors are more comfortable investing in things that provide recent examples of success because they mistakenly assume it is more likely than other investments to repeat this success. In a fairly recent study subjects were given a list of 51 quoted companies, 25 of which were well known and 26 were relatively unknown (Stephan, 1999). Adjacent to the company name the share price movement (% gain or loss) for the day was reported. When the well-known companies were composed mainly of "losers" for the day, participants reported that there were more losers overall, even though the opposite was the case.

2. **The representativeness heuristic**: Investors judge whether an instance (such as investment outperformance) belongs to a category (such as superior fund management) based on the similarity of the instance to the category (Wright et al., 2011). We will shortly see how investors are lured by relative performance of balanced funds and are drawn like the proverbial moth to a flame by these instances. People have the tendency to overestimate the representativeness of a given sample on the basis of the similarity between the criterion and some information about the properties of the population (Tversky and Kahneman, 1974). Investors are often caught buying a stock not because it is a good investment but because it is a good company. This represents to them what a good share is when in fact paying too much for something is always a bad investment decision.

3. **Anchoring and adjustment**: When asked to make estimates, people will usually begin with an anchor value and make adjustments accordingly. This trapped a number of unsuspecting investors during the dot-com bubble when estimates of how far the Dow could go went well past ludicrous. Even though investors may have realised the unrealistic nature of the estimates, the fact is that we would likely anchor on that unrealistic estimate and adjust it downwards according to our own estimate, which in all likelihood would still result in an overly optimistic estimate in totality (Kahneman and Tversky, 1973).

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In respect of investor biases, some sources provide a list of more than 120 behavioural biases that we will not address. Three of the major identified biases relevant to the world of investing are the following:

1. **Loss aversion and the disposition effect**: The disposition effect refers to investors' reluctance to sell assets that have lost value, and a greater likelihood of selling assets that have made gains (Shefrin and Statman, 1985). These two effects are linked and will be highlighted in our prospect theory section of the research results. In effect, because losses hurt more than the equivalent gain, investors tend to avoid losses by hanging onto losers (hoping to recover the losses and ratify the original investment decision) and selling winners too early.

2. **Overconfidence**: This effect is observed when people's subjective confidence in their own ability is greater than their objective (actual) performance. From an investment perspective this overconfidence has been associated with higher risk-taking (Hirshleifer & Luo, 2001) and overtrading (Grinblatt & Keloharju, 2009).

3. **The endowment effect**: This bias is also quite closely linked with loss aversion simply because giving up ownership makes us feel like we are losing something (Wright et al., 2011). Kahneman, Knetsch and Thaler (1991) termed this the endowment effect that results in people demanding a sale price for something usually significantly higher than what it is worth. This effect could come into play when trying to value our investments.

1.6 Should we be channelling our inner Vulcan?

We will end this brief exploration into behavioural finance where we began, with the ever-logical protagonist, Mr. Spock. The popular culture exploration of reason over emotion is one with roots in Greek philosophy. Plato described emotion and reason as two horses pulling in opposite directions. This theme continued into modern day philosophy where in the 17th century René Descartes proposed a dualist or distinctly separate "thinking part" of our mind juxtaposed with the purely mechanical sources of drives and emotion. Immanuel Kant's world view followed in the 18th century, proposing that our decisions are informed, contextualised and therefore very much depend on this tension between emotion and reason. Fast forward to the early 1920s where Sigmund Freud contributed with his seminal work on personality theory where the instinctual "id" is suppressed by a higher cognitive function, the "superego".

We could therefore be forgiven for thinking that the aim of superior decision-making would be to lock away emotion and throw away the key. This could not be further from the truth. Enter neuroscientist Antonio Damasio who published "The Descartes Error" in 1994 and who developed deep insights through a long clinical

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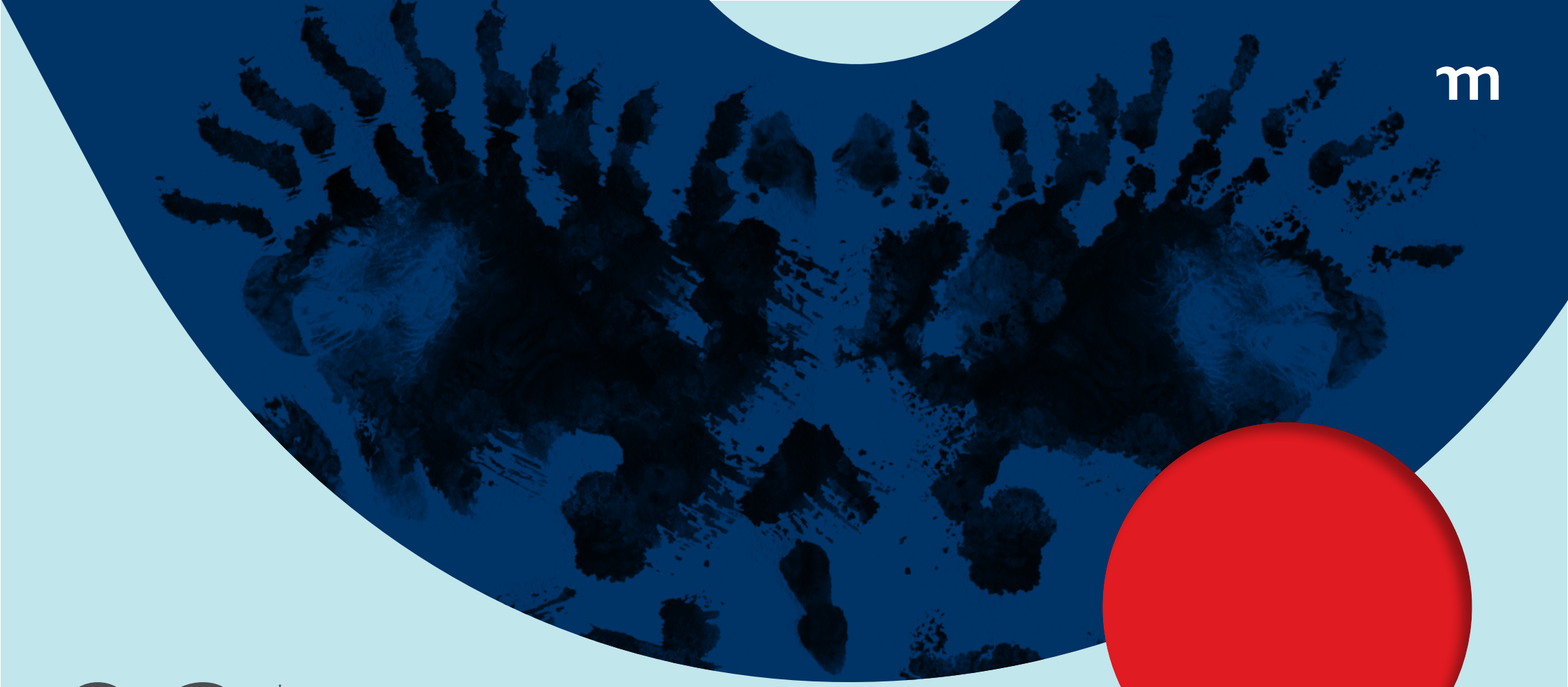
history of treating patients who sustained damage to their ventromedial prefrontal cortex (vmPFC). This region provides the connecting point to secondary emotions (those learned from experience) and when that connection is not functioning correctly, people struggle to function in society. Without delving into too much detail, Damasio's famous patient "Elliot," a real-life Mr. Spock, was left devoid of emotion when he lost part of his vmPFC while having surgery to remove a tumor. While his IQ remained intact, he was incapable of making decisions and was totally disconnected with the world. "I never saw a tinge of emotion in my many hours of conversation with him: no sadness, no impatience, no frustration," Damasio writes in Descartes' Error. Elliot's brain could no longer connect reason and emotion, something that left his marriage and professional life in ruins.

As much as emotion and reason appear to be on polar opposites of a spectrum, neuroscience and neurobiology do not corroborate this at all. In reality they are inseparably linked in a way that reflects our complexity as human beings. Emotion is in fact a key component of our decision-making ability, even though in the world of finance it can often lead us astray. What we need is some healthy middle ground, some guardrails in the bowling alley of investing.

As Greg Davies, who heads up behavioural finance for Oxford Risk, puts it, "It is about moving behavioural finance from the fringe to the core of decision-making systems. About blending the best of both worlds. It's about using 'decision prosthetics': tools that help guide humans towards a better, engaged, decision, not make it for them."



02 | The cause: Chasing the “hot dot”

“The design of this experiment reveals that institutional investors, just as individual investors, have their attention ultimately attracted by past price increases.”
Robert Shiller

02

Aggregate investor behaviour using discretionary balanced flows

2.1 Introduction

In 2019 Momentum Investments set out to establish how big an influence past performance was in the investor decision-making process and if this effect was evident based on industry investment flows. The study was conducted to understand the decision-making process and/or any relevant biases, but also to ascertain if decisions taken lead to the behaviour tax as we suspected, and if so, whether it could be quantified.

The study looked at all new business cases submitted between the start of 2010 and the end of 2018 – the value of these 200 000 investments added up to in excess of R100 billion. This is different from many other studies, as the norm is to investigate how investors behave subsequent to investing. Here the focus was on behaviour already present at the outset of the investment. Even though the study considered trends in new business flows that would be affected by macro-economic factors and investor sentiment (such as changes in trends across sectors and flows into offshore funds), this was not the main focus. The focus was on the subtle choices made in terms of choosing one fund above another when they appear to be similar. Emphasis was placed on the changing behaviour as reflected by the new business allocation to four well-known single manager balanced funds in the ASISA Multi-asset High Equity sector. While these funds may have underlying differences, many clients and financial advisers see them as substitutes for each other.

2.2 Initial findings: Cross sector allocation/offshore flows

In the aftermath of the financial crisis in 2008, a large portion of new business flows was invested into conservative funds. Compared to a proxy of popular conservative balanced and equity funds, more than 60% of the flows to these sectors went into conservative funds in 2009. This trend played out again as balanced funds received more than 70% of the inflows in the latter years. Our results showed that being overly conservative after the financial crisis did not lead to optimal results for investors. Clients should have invested in line with what they really needed, instead of letting their fear of another financial crisis cloud their better judgement.

While most investors followed the trend to invest in conservative funds in 2009 to minimise their risk, some did invest against this trend. Their choice for more risk is reflected by the 10% allocation to an equity fund (compared to the long-term trend of investing 5% or 6% in equities). In retrospect, this was an appropriate decision, not just based on the result, but also because asset values where severely depressed at the time.

> The initial over-allocation to conservative funds led to a significant behaviour gap. Over the course of 2010, 2011 and 2012, there was a difference of more than 4,5% in yearly returns between the conservative fund and balanced fund in question (and many investors should have been invested in the balanced fund, had they been investing according to their needs).

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Aggregate investor behaviour using discretionary balanced flows

Flows into the most used offshore funds on the Momentum Wealth platform also displayed significant changes with yearly flows increasing by more than 400% in less than two years. This increase followed a sustained period of rand depreciation.

2.3 Overall results

The main analysis, of the allocation of new business into four balanced funds, showed that the proportionate allocation to these funds varied significantly over time. It showed that the allocation to even the most popular fund halved at times. The fund that received the lowest inflows initially paints the opposite picture. Its initial allocations of 5% to 6% of all allocations improved to more than 25% of the total allocation in later years, just to reduce to levels close to its initial allocation again. The aim of the study was to understand what drove this change in allocations. The key findings were as follows:

1. New business allocation is driven by a combination of factors, which includes the current allocation; a function of relative past returns; and secondary factors. These include how long the outperformance persisted and if any outperformance was shared.
2. A behaviour tax was identified as investors generally missed the outperformance cycle when chasing past performance.

2.4 The effect of past performance on fund selection

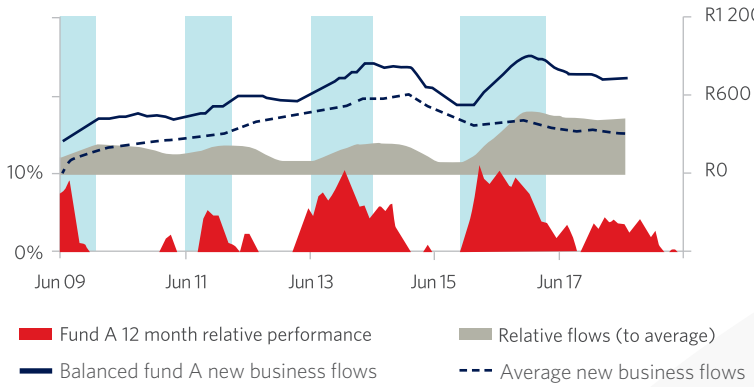
To understand the changing allocation between the funds better, one first needs to understand what happened to the overall flows in the sector. In the analysis period, there was a general upward trend up to about the end of 2014. Thereafter, the allocation to balanced funds reduced significantly for about a year, after which it slowly lost traction for the remainder of the study. Had the funds each just followed the overall trend, the new business flows into each fund would have maintained the same pattern. This was not the case.

The assumption:

> Recent relative past performance between these four funds led to the change in allocation

Aggregate investor behaviour using discretionary balanced flows

Figure 5: The analysis of Fund A



Source: Momentum Investments, Morningstar

To understand if the assumption was accurate, we compared each fund's inflow to the average inflows seen on these funds. (This is illustrated by the grey area on figure 5.) This area was added to see if the relative flows to the average was increasing or decreasing. We then highlighted periods of increased support for each fund (in blue). We then checked if relative outperformance coincided with these periods. To do this, we added the relative 12-month performance (the performance was offset to align to the yearly flows, which occurred six months later). The relative fund performance shows how much the respective fund outperformed the worst performing of the four funds over a 12-month period. Thus, a 10% relative outperformance (displayed on the left-hand axis), implies that the fund did 10% better than the worst of the four funds over the preceding 12-month period.

From figure 5, the high correlation between the relative performance of a fund's return (red area) and increased new business flow (blue overlays) can clearly be seen. When looking at Fund A, one can clearly see two periods in the first half of the analysis in which it lost support. (These changes coincided with the gaps between the blue areas.) Over the period when balanced funds lost overall support, Fund A lost a larger share of its support (which again coincides with a period of relative underperformance).

The most interesting insight is the fourth blue area, which overlapped with the longest relative outperformance and the highest positive change in inflows – the grey area. The same pattern followed when analysing the other three funds, but it was clear that outperformance, when shared, did not have the same impact as individual relative outperformance.

In a nutshell: Recent past performance bias has a significant impact on fund selection behaviour.

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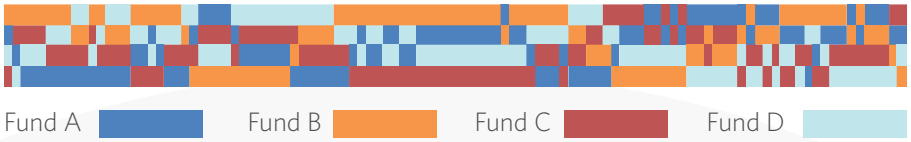
Aggregate investor behaviour using discretionary balanced flows

2.5 How the behaviour tax is created when past performance informs fund selection

By chasing past performance to try and outperform, investors achieved the opposite. Table A adjacent shows the historic order of the relative 12-month performance of the four well-known balanced funds. The top row shows the best-performing funds during the time period of the analysis, and the fourth row the worst performing funds over the period.

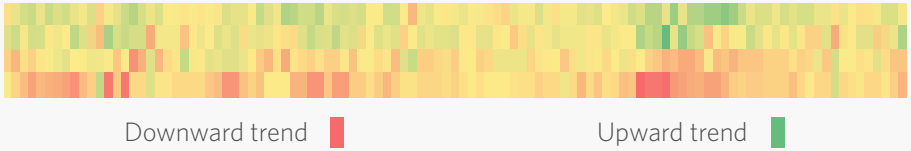
Based on the colouring, it's easy to see that the position of their performance changes frequently (even though there are stints of consistent outperformance or underperformance by some of the funds). For instance, Fund B was the best performer for long stretches of time, but was also the worst performer of the four at times. How did flows into these funds react to this performance? We calculated the change in yearly inflows over time, and ordered it according to the performance a few months earlier. We then coloured each block in the table according to its flow trend, where green indicates a positive trend and red a negative trend. It is clear to see that the top rows in table B (the better performers a few months ago) are more green and the bottom performers (the bottom rows) are more red. This is a clear indicator that past performance plays a significant role in future new business inflows.

Table A: Ordered performance of four well-known balanced funds



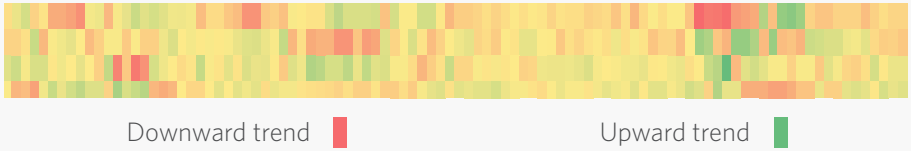
Source: Momentum Investments

Table B: Investment flows follow performance



Source: Momentum Investments

Table C: Performance does not follow flows



Source: Momentum Investments

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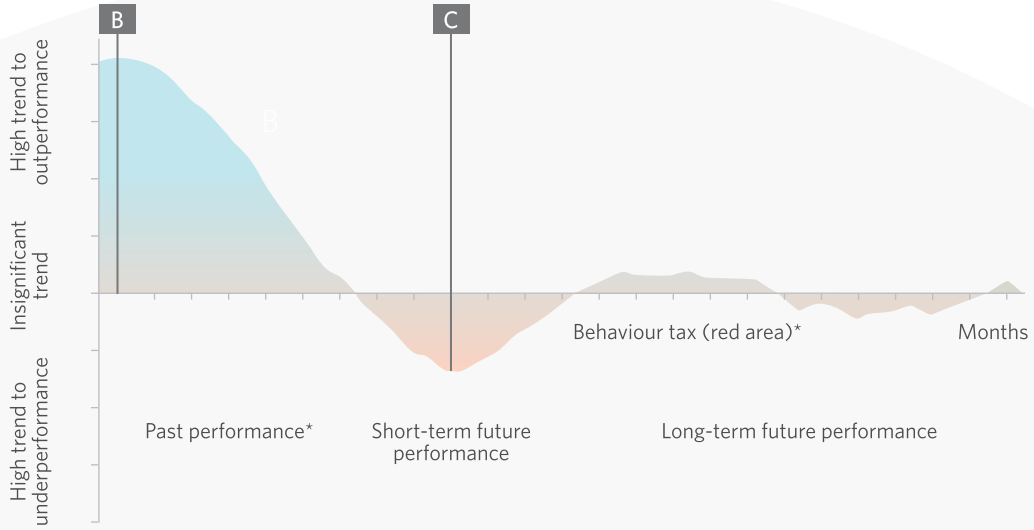
We then examined what the effect of this selection methodology was on the relative performance of these new investments to see if chasing past performance increased the future performance of these investments. Using the same colouring scheme as before we put the current trends in new business flows in order and in terms of future performance (table C). Thus, if the funds that are experiencing significant inflows perform better in the future, it would pull more green to the top of the table and push more red lower down on the table. But we saw the opposite. The fund selection methodology turns the top half of the table more red (which means the better future performers got less inflows) and the bottom half more green, even though it is not with the same magnitude as the results in table B. Thus – positive trends in fund flows (which are driven by superior past performance) do not correlate to the future performance and actually shows a negative correlation. When combining these findings from all three tables, the following results were evident. Balanced funds go through performance cycles and superior long-term outperformance is difficult to achieve. Yet, as a fund shows superior 12-month relative performance, it has a significant impact on the new business flows that the fund receives. New investors, who make their fund selection decisions based on past performance, do not experience a repetition of this past performance; they only experience the future performance that must still transpire. Unfortunately, the average experience shows that the selection methodology used to place their money into these funds misses the outperformance cycle, leading to them experiencing relative underperformance. This cycle of how these four funds performed according to flows and returns are demonstrated in figure 6.

Figure 6: The trend of inflows to outperformance turning to underperformance



Source: Momentum Investments

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*The past performance is based on 12-month performance and even though it was never experienced by the investor, it takes a few months to phase out of the analysis. As such, the graph takes much longer to turn red than the time it takes for the investor to experience relative underperformance.

More information about the graph

Point B (corresponds to the timing of Table B)

Balanced funds that had higher relative past performance, received higher relative inflows.

Point C (corresponds to the timing of Table C)

Balanced funds that had higher relative inflows on average achieved a lower relative future performance.

At points further into the future, the past inflows do not display a significant correlation to performance.

(For the more technically inclined readers: The height at each point on the graph was created by converting each time period (and therefore each potential table similar to Table B and C) into a single index value that is higher when trending funds correspond to better performance and vice versa.)

In essence, past performance affects future flows, which on average detracts from a client's future performance. This trend of chasing past performance when allocating new investments to outperforming balanced funds is a form of behaviour tax. Even though it was quantified in the study, the remainder of the paper will focus on and quantify a similar behaviour tax, but one created by a different event. The remainder of the paper looks at the South African behaviour tax created by switching between funds.

03 | The symptom: A behaviour tax

"The investor's chief problem – and even his worst enemy – is likely to be himself."
- Benjamin Graham

03
The South African investor behaviour tax

3.1 Introduction

The journey to uncover the behaviour tax at a client level began in 2018 as Momentum Investments initiated a project as part of the North West University's Business Mathematics and Informatics (BMI) initiative. The project was part of a Masters dissertation and demonstrated traction in respect of the Department of Science and Technology's industry-university engagement. To reiterate, we define a "behaviour tax" for the purposes of this study as a cost to the investor that is calculated as the difference between what an investor should have earned if he or she kept to his or her investment strategy (the theoretical buy-and-hold strategy) and what he or she actually earned (measured by calculating the internal rate of return or IRR) on the investment.

3.2 Study parameters

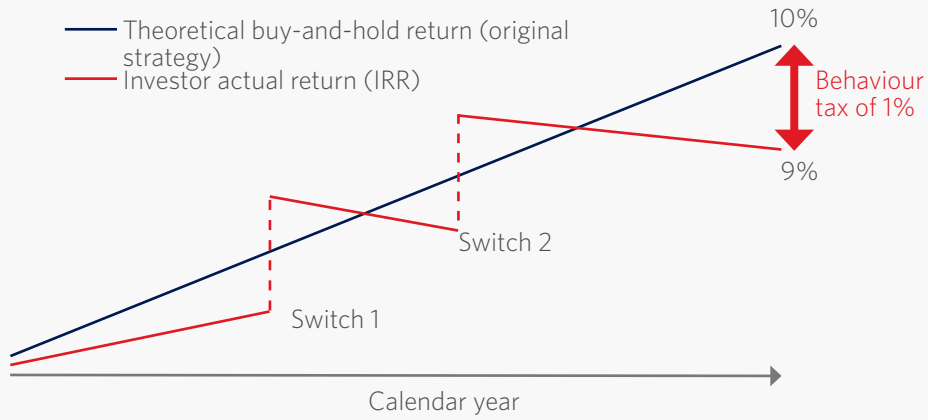
The approach to the study was to gather transactional data from the Momentum Wealth platform from January 2008 to December 2017 (10 years). The dataset provided detailed information about the timing, amount and any switching transactions (ie switching money from one or more funds to another fund or combination of funds) made over the course of the investment.

In summary, an initial group of 79 322 investors was identified and classified as:

- natural persons (excluding companies and trusts);
- those who started investing between 2008 and 2015 (minimum two-year investment period); and
- those using the flexible investment option (FIO) product on the Momentum Wealth platform (typically used for discretionary investing).

Subject to further data refinement, this narrowed the investors examined to 17 994 individuals who may be classified as "switchers" for the purposes of this white paper.

Figure 7: Hypothetical switch behaviuour to illustrate the behaviour tax



Source: Momentum Investments

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3.3 Calculation methodology

To quantify the behaviour tax various measures of return have to be calculated. In the studies provided by Clare and Motson (2010) and Dalbar (2016) the investor behaviour gap was calculated as the difference between investors' money-weighted rate of return (MWRR) and their time-weighted rate of return (TWRR), with the difference being attributed to poor market timing by investors. The MWRR reflects the timing and amount of money inflows and outflows and is consistent with the observed profit or loss realised on a fund (Illmer and Wolfgang, 2003). According to Illmer and Wolfgang (2003), the MWRR is affected by three main factors, namely the benchmark effect, the management effect, and the timing effect. The benchmark effect is the return contribution made by the benchmark return of the initial investment while the management effect is the return contribution made by the decision to change the asset allocation relative to the benchmark over the investment period. The timing effect is the return contribution made by the decision to change the amount of money invested in the benchmark and/or asset allocation strategies. The MWRR is therefore a measure of the internal rate of return (IRR), which is a true representation of an investor's return while the TWRR by contrast is not affected by changes in the amount of and timing of money invested. It does allow for fund comparisons across peer groups and against a benchmark or an index (Illmer and Wolfgang, 2003), but is not really suitable for an investor behaviour tax study as the MWRR is the only relevant indicator of the investor experience. This criticism is supported by Edesess et al. (2014) who conclude that calculating a gap using these two different measures would not produce very accurate results. Only MWRR comparisons were therefore conducted.

3.4 Overall results

Of the 17 994 investors analysed between 2008 and 2018, the results can be separated into the two distinct gaps studied.

The first gap relates to the behaviour tax, the extent thereof and its origins:

- Approximately one-third of the 79 322 investors analysed switched at least once from 2008 to 2018.
- Over 60% of investors were chasing past performance when they switched funds.
- A return of 3% lower on the investor's current fund was enough to trigger a switch.
- 22,7% of investors imposed a behaviour tax in excess of 1% per year on their investment returns when compared to the equivalent buy-and-hold strategy.
- During a market crisis the number of investors affected doubles and the behaviour tax escalates to 1,1% per year.
- 10% of investors imposed a behaviour tax in excess of 2,6% per year on their investment returns when compared to the equivalent buy-and-hold strategy.

Behaviour tax and helping investors count what counts

Of the 17 994 investors analysed between 2008 and 2018, the results can be separated into the two distinct gaps

GAP 1 = BEHAVIOUR TAX
A lower return investor's realise from changing the plan or switching

GAP 2 = OBI GAP
The potential gap between the investor's initial choice & an outcome-based solution (OBI solution)

33%
of the 79 322 investors analysed switched at least once

60%
of investors were chasing past performance when they switched funds

10%
of investors imposed a behaviour tax in excess of 2,6% per year on their investment returns*

3%
A return of 3% lower on the investor's current fund was enough to trigger a switch

22,7%
of investors imposed a behaviour tax in excess of 1% per year on their investment returns*

2x
During a market crisis the number of investors affected doubles and the behaviour tax escalates to 1,1% per year

10%
of investors had an OBI gap larger than 3% per year

60%
of the time, the equivalent OBI fund would have outperformed the investors' initial choice

33%
of investors had an OBI gap larger than 1% per year

*when compared to the equivalent buy-and-hold strategy

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3.4 Overall results (continued)

The second gap relates to the potential gap between the investors' initial choice and the equivalent diversified fund (an outcome-based solution or OBI fund). Once again a gap was clear to the following extent:

- More than 60% of the time, the equivalent OBI fund would have outperformed the investors' initial choice.
- OBI funds outperformed the investors' initial selection by 0,70% per year on average.
- 33% of investors had an OBI gap larger than 1% per year.
- 10% of investors had an OBI gap larger than 3% per year.

The message here is clear. Investors chase past performance when they decide to change the plan or switch funds. We will see shortly that this is more related to loss aversion and fear than greed, while both remain strong motivators of investor decisions. When switching, investors may impose a behaviour tax on their investments. A 1% per year behaviour tax would cost investors 22% in investment value over 10 years, assuming a growth rate of 10% per year, so this could be a substantial cost. If investors had chosen a diversified fund at the outset, they would have outperformed their own choice on 60% of occasions and by 0,70% on average per year. There is little more to be said about the benefits of focusing on an investment goal, linking this to a well-diversified investment strategy, and sticking to the plan over time.

3.5 The behaviour tax under varying market conditions

As it turns out, the behaviour tax is not constant. To examine its extent a return erosion index was constructed to indicate the severity of the behaviour tax generated between the investors' actual return and the buy-and-hold strategy over time as market conditions vary. The red zones indicate the two severe market cycles, the gradient showing how the behaviour tax is increasing to its maximum point. In both cases it is clear that volatile markets cause panic switching and investors are simply in the wrong place at the right time.

The research timeline was matched to three distinct market periods as follows:

1. The crisis and post-crisis period from the start of 2008 until the start of 2010.
2. A bull trend from the start of 2010 until midway through 2014.
3. A flat and fluctuating market from midway through 2014 until the end of 2017.

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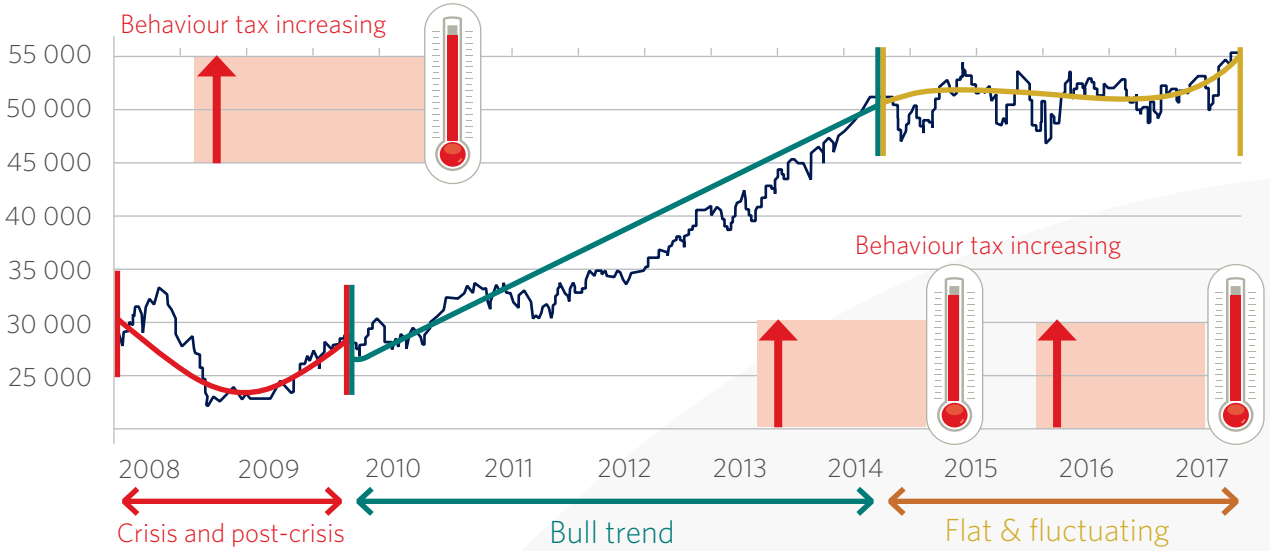
Figure 8: Value erosion hotspots 2008 - 2018



	Crisis period	Bull trend	Flat/fluctuating market
Number of investors	729	8 587	8 676
Average behaviour tax	1,11% p/y	-0,07% p/y	0,42% p/y
% population with behaviour tax > 1%	45%	20%	24%
% population with behaviour tax	62%	42%	53%

Source: Momentum Investments

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3.5.1 The crisis and post crisis period (2008 - 2010)

During and shortly after the financial crisis of 2008, the economy was shocked by asset class correlations approaching one, and therefore dramatic price declines (Barberis, 2013). The result of this decline was arguably that many investors became anxious and loss-averse. The effect of such emotions can be confirmed by the flow of assets from balanced asset allocation funds into lower-risk bond and money market funds (Louw, 2018) over this period. Interestingly, the results for this period gave no clear indication that investors were actively switching to funds with better past performance. The average investor behaviour gap was large regardless of whether investors chased past performance or not. The conclusion may be drawn that the behaviour was more based on fear (loss aversion) than greed.

3.5.2 The bull trend (2010 - midway 2014)

The first clear observation is that during the bull market, on average the behaviour tax was very slightly negative (near zero at 7bps). Effectively investor switching behaviour added no value on average even though markets were rising. Furthermore, multiple studies have shown that accurate market timing cannot be done consistently (Clare and Motson, 2010) (Clare et al., 2009) (Friesen and Sapp, 2007). Unsurprisingly our results confirmed this. A greater proportion of investors (63%) were switching to funds with better past performance during this period and this group of investors (subset of the population) were able to generate a negative behaviour tax of 0,07% per year. In essence they were able to generate some value from the activity, initially at least. Such gains are likely to induce overconfidence, optimism and greed (Goldberg et al., 2004). This might have led these investors into believing in their ability to time the market instead of simply being lucky. At some point overconfident investors are bound to run out of luck and this is exactly what happened when the bull trend came to an end while switching behaviour was still increasing significantly. During the first half of 2014 the proportion of switchers that were chasing past performance had increased from 63% to 79% and all investors that switched during the first half of 2014 imposed a subsequent behaviour tax of 0,81% per year, effectively eliminating previous gains and placing these investors in the red overall once more.

3.5.3 Flat/fluctuating markets (midway 2014 - 2018)

After July 2014, the momentum from the bull period began to subside with more fluctuation in equity markets. The number of investors imposing a 1% behaviour tax or more on their investments is evident with an increase from 20% to 24%. Once again the emotional discomfort resulting from such volatility in returns is evident and leads to an increase in the proportion of investors chasing past performance (66%) with a larger behaviour gap for this subset of the population at 0,60% per year. Of those investors who lost more than 1% per year from the behaviour tax, 75% were chasing past performance, proving that this behaviour

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might be one of the most significant value-eroding behaviours exhibited by investors. Davies (2013) divides investors by defining a difference between low- and high-composure individuals. High-composure investors do not have significant emotional reactions to market movements, whereas low-composure investors pay much more attention to short-term market movements. Low-composure investors are therefore more likely to react to short-term volatility in fund returns to reduce the emotional discomfort experienced. They are likely to be tempted to chase past performance and as a result they might end up buying high and selling low.

3.6 The behaviour tax explained by prospect theory

Traditional economic and finance theory assumes that we are so-called rational agents and will therefore make decisions to maximise the benefit or expected utility from making that decision. However, there are two problems here. Firstly, human rationality is restricted because there are limits to our thinking capacity, available information and time (Simon, 1982). The second problem concerns utility, a concept introduced by Swiss mathematician Daniel Bernoulli in the 18th century. Utility theory was applied to economics as the satisfaction or happiness derived from consuming a good or service (Stigler, 1950) and expressed as the willingness to pay for this consumption. In the field of finance, modern portfolio theory (Markowitz, 1952) proposed the maximum utility for investors as the option that provided the maximum return for a given level of risk aligned with the investor's risk aversion or preference. As a normative model that explains what the answer should be, utility theory is sound. As it turns out, however, it does not really assist much in explaining investor behaviour in the real world. It fails as a descriptive model. It was not until the late 1970s when a new branch of utility theory was proposed to explain decision-making under risky conditions where we know the probabilities of all associated outcomes (Kahneman, 1979). This was termed "prospect theory" and later expanded upon to include conditions of uncertainty where the probabilities of outcomes are unknown (Tversky and Kahneman, 1992).

The real world is a place where people's preferences violate standard utility theory:

1. Our preferences can be swayed by the way a choice is worded or framed (Tversky and Kahneman, 1989).

2. We are not great at evaluating probabilities correctly (Allais, 1953) and would pay more to shift the probability of an event from 99% to 100% than from 10% to 11%.

3. People would prefer to bet on events related to their field of expertise even if the odds of success are far worse (Heath and Tversky, 1991).

4. When exposed to uncertainty, we would expect people to try and lower that uncertainty (risk aversion) but observation shows that we actually look for risk if it means we can avoid a loss.

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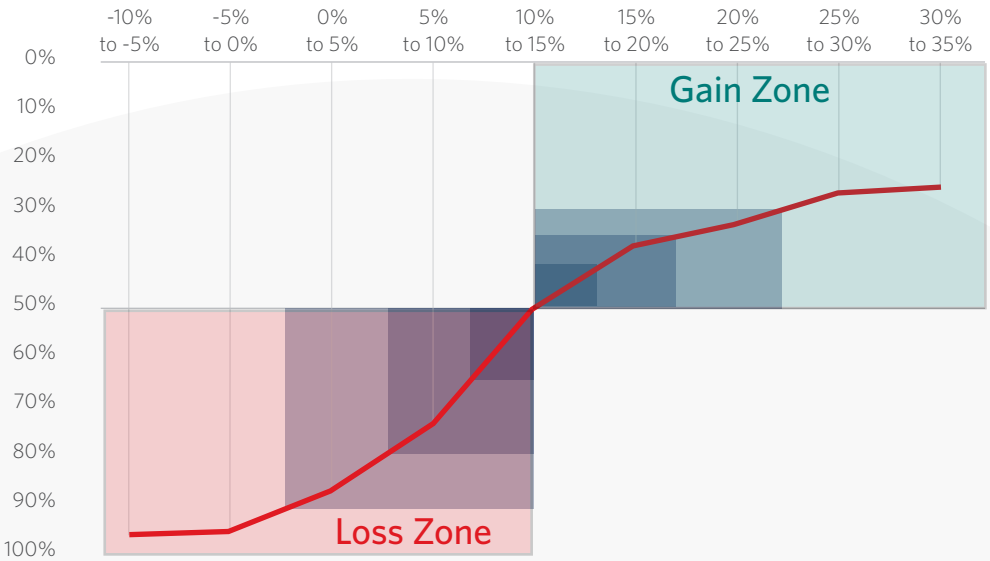
5. Related to the previous point, we look at gains and losses completely differently (Tversky and Kahneman, 1992). Finding R100 in the street is not the same as finding R200 and losing R100 on the way home, although the economic reality is precisely the same.

The last two items on the list above are of particular importance and bring us to our research findings. Figure 9 shows some particularly fascinating results when looking at investor utility through the lens of fund or portfolio performance and gives valuable insight into exactly when investors are likely to change the plan by switching from their current fund and therefore risking the behaviour tax. Of the 17 994 investors analysed, the vertical axis represents the proportion of that population that would initiate a switch when their fund performs at the corresponding horizontal axis level. So everyone who experienced negative 5% to negative 10% switched and nobody who experienced positive performance of 35% or more switched. The line itself therefore represents the propensity to switch or change funds at corresponding levels of fund performance. Kahneman and Tversky presented the way we evaluate outcomes as a value function that clearly shows the subjectivity of the decision maker in discerning between gains and losses. This becomes clear when we examine the reference point (centerpoint) of this graph. We may expect investors to differentiate between gains and losses in absolute terms or using a 0% return as the reference point. In contrast to homo economicus, who uses total wealth to evaluate choices (an assumption of traditional utility theory), human beings behave differently in reality. People

Figure 9: Prospect theory and the investor "switch itch"



Source: Adapted from Louw, Dirk JD, 2018: Investigating and quantifying the retail investor behaviour gap

evaluate their decisions in relation to a reference point (Wright et al., 2011). Psycho-physiology explains this relative perception by what are termed levels of adaptation, first investigated by Harry Helson (1964). The notion is that the subjective experience of current stimuli is influenced by the stimuli that an organism has registered before (Wright et al., 2011). Basically, if you put your hand in lukewarm water after icy cold water, it feels hot because of what you have

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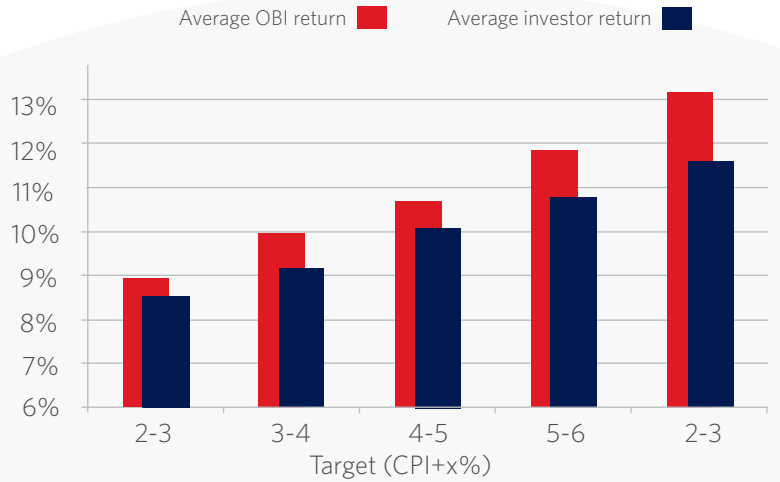
experienced before. Figure 9 shows that to the right of the reference point investors are in the gain zone. We know this because the utility function to the right of the reference point resembles the traditional diminishing marginal utility curve. Investors become less sensitive to changes in fund performance as this performance increases. They are more likely to switch when their funds are performing at between 10% and 20%, for example, than when they are returning more than 35%. To the left of the reference point investors are in the loss zone. We can now clearly see a different relationship as the curve becomes much steeper, indicating sensitivity is increasing at an increasing rate. The reference point in itself is interesting in that the average investor clearly views fund performance of less than 10% as a loss, or rather this is the inflection point at which sensitivity increases at an increasing rate. This may provide an interesting window into what investors deem fair compensation for taking risk as deposit rates in South Africa on average approached 6,5% over this period. Our insights here in summary are:

1. The behaviour tax is rooted in fear and loss aversion.
2. Investors are on average 1,7 times as likely to switch when their funds perform at between 7% and 10% than when they perform at between 10% and 13%.
3. Investors are more than twice as likely to switch when their funds are yielding from 2,5% to 7,5% than when they return 22% or more.
4. Client engagement strategies need to cater for times when the investor "switch itch" is heightened to keep clients invested and on track to achieve their goals.

3.7 Diversification to minimise the behaviour tax

Figure 10: Investor selection versus equivalent OBI fund (CPI target %)



Source: Adapted from Louw, Dirk JD, 2018: Investigating and quantifying the retail investor behaviour gap

Figure 10 shows the difference in the equivalent OBI fund and an investor's initial choice over time, on average. These were matched by using the closest equivalent OBI fund based on asset allocation. The results vary from approximately 40bps on the CPI + 2% to 3% target to 160bps on the CPI + 6% to 7% target respectively. The investor's initial choice was also compared to an outcome-based investing (OBI) approach to ascertain if a more diversified investment strategy on average would have made a difference to the eventual result for investors.

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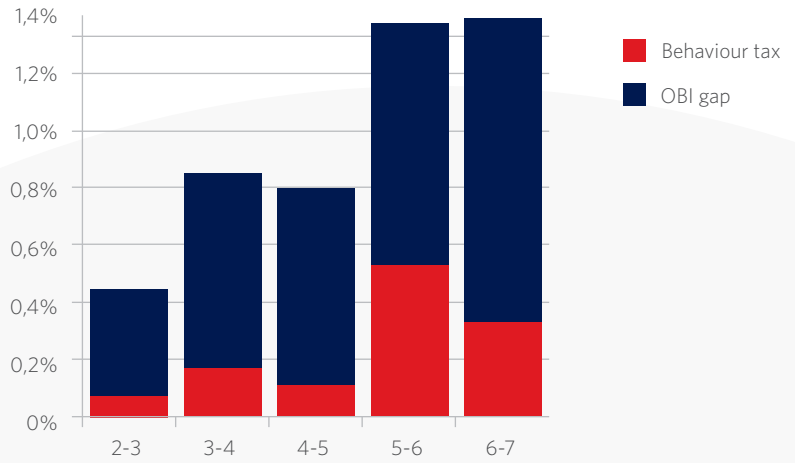
The South African investor behaviour tax

It should also be noted that the results were delivered at the same or (in most cases) lower levels of investment volatility measured by standard deviation. Lower volatility is however not an explicit aim for an outcome-based investing philosophy.

Figure 11 shows the cumulative effect of an investor who chooses a well-diversified investment fund and sticks with the plan over his or her investment horizon. The stack chart shows that investors could add from just over 40bps in the CPI + 2% to 3% target range to a substantial 140bps or 1,40% on average to their investment returns by following this approach.

In conclusion, sticking to an outcome-based solution or fund where asset allocation is tied to an investment outcome for investors appears to yield a better result over time. This is particularly revealing and is also indicative of the "shock absorber" effect that good asset allocation provides investors, who in turn are more comfortable to stay the course of the journey and in doing so minimise the cost of the behaviour tax.

Figure 11: The cumulative effect of both gaps per CPI mandate



Source: Adapted from Louw, Dirk JD, 2018: Investigating and quantifying the retail investor behaviour gap

04 | **The prescription:** An alternative anchor

"Many people have made money selling magic potions and Ponzi schemes, but few have gotten rich selling the advice, Don't buy that stuff."
- Richard Thaler

04
Helping investors count what counts

It is clear from the preceding sections demonstrating the existence and effect of the behaviour tax that the cost of being human is still very much a phenomenon that investors, their financial advisers and seasoned professionals suffer from. This is despite the innumerous literature on behavioural finance. To expect all investors to behave without any bias would be akin to expecting markets to behave perfectly efficiently, something the past 50-60 years or so have shown to be an unreasonable expectation. Therefore, what we propose here is not a cure, but rather a behavioural prosthetic, as Davies refers to it, that will help investors in making decisions that will not only help alleviate their behaviour tax, but also reduce their anxiety along the way.

4.1 Outcome-based investing perspective

As the name eludes, outcome-based investing (also referred to as goal-based investing) is primarily concerned with achieving a predefined outcome. Our research has shown that the majority of client investments are made with a particular goal or desired outcome in mind, eg save for a comfortable retirement or invest for a child's education. Very simplistically, from the perspective of an investor, such an outcome simply boils down to two things; "how much" and "by when". Add to this the amount(s) available to invest towards this goal and it becomes a simple time-value-of-money calculation to determine the required investment return needed to turn the desired outcome into a reality. A successful investment from the perspective of a client must therefore be measured by whether or not the outcome (retiring comfortably, saving for education) was met, which can be directly attributed to whether or not the required investment return was realised over the full investment term. Acknowledging this perspective as the applicable measure of a successful investment, is a reasonable precursor towards avoiding many of the behavioural pitfalls that have been shown to lead to the "behaviour tax". It focusses the investor on what really matters. This is a departure from measures of success based on intra-asset manager rankings, performance measurement against somewhat arbitrary benchmarks and in particular the focus on short-term (3-month to 12-month) past performance, which has been shown in section 2 often to be a reasonable predictor of investor fund selection behaviour.

With a successful investment outcome in mind, the next logical requirement would be to construct an investment portfolio that satisfies the determined required rate of return over the desired investment horizon. This can be an onerous endeavour given the varying levels of risk and the regulatory constraints and complexity encountered in executing and managing such an investment portfolio on an ongoing basis. Luckily this part of the investment process can be easily outsourced. Many funds exist that have such predefined return (and risk) objectives as stated benchmarks. The Momentum Focus Fund of Fund and Momentum Target Fund of Fund ranges are examples of funds that are aligned to this outcome-based investing perspective. These funds are specifically managed to Momentum's explicit outcome-based investing philosophy, which minimises the risk of misalignment between the investment manager and the investor's measures of success, a key but often overlooked point. The Momentum outcome-based funds cover the entire spectrum of return and risk objectives, which imply

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Helping investors count what counts

that matching an investor's desired outcome with an outcome-based fund most suitable to achieve the investor's desired outcome becomes a very simple risk appetite and risk capacity discussion. Some investors elect to delegate the responsibility of constructing suitable investment portfolios to their financial advisers, who blend multiple funds together in an attempt to diversify risk and/or the sources of return. While this may mitigate some of the risk of a mismatch between investor objectives and the investment portfolio, it does not eliminate it. Even skilful financial advisers suffer from behavioural biases such as herding, recency, familiarity, home bias, coupled with the added pressure of demonstrating superior fund manager selection skills to clients through all the cycles of the markets.

4.2 Measuring the suitability of a succesful investment strategy

One popular way of assessing the success of an investment fund is to consider the past performance as shown in the minimum disclosure documents (MDDs). These documents are aimed at standardising critical information about Collective Investment Schemes Control Act-approved funds in such a way that it facilitates fair comparison between funds and informed decision-making by investors. The information in MDDs is regulated by board notice 92 of 2014. While beneficial and well-intended, this information is not necessarily dynamic in its applicability to the individual circumstances and to which extent the particular fund can solve for individual investor objectives. Many of the measurements and statistics shown in these documents are less goal-relative (investor-centric) and rather relative to metrics such as the asset manager's chosen benchmark, the period since inception of the fund, the regulated reporting periods and past or prevailing market cycles during which such past performance occurred. For example, the fund's most recent five-year investment return reported at a point in time may not be the best indicator of the return that the investor can expect over his or her five-year investment horizon. Well-founded risk metrics such as (i) volatility, (ii) Sharpe ratios, (iii) information ratios and (iv) Sortino ratios, to name a few, are useful metrics to asset managers but can quickly become sources of confusion and complexity that detract from optimal fund selection when investors aim to compare or make sense of these. It is not uncommon to compare funds where Fund A appears superior when measured using metrics (i), (iii) and (v) while Fund B simultaneously measures superior on metrics (ii), (iv) and (vi). Which is better suited to the investor's needs? How much influence does each metric have on whether the investor's desired objective will be met? The next section gives a perspective on these questions.

4.3 The OBI Score™

In an effort to demystify the complexity of attempting to measure the suitability of an investment portfolio, relative to an investor's goal or objective, Momentum has developed the OBI Score™. It is a simple metric that dynamically summarises the most relevant risk and return characteristics of a fund or a portfolio (multiple funds blended together) relative to the investor's specific objective. The OBI Score™ is therefore a single number that is easily understood, interpreted and compared.

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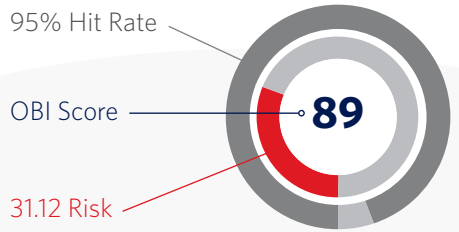
The score is determined by considering the hit rate of the fund relative to the investor objective. For example, if the investor requires a CPI + 5% return over a six-year investment horizon, the score will consider how often the fund has been able to achieve this level of return in every past rolling six-year period since the inception of the fund. This inherently considers the ability of the fund to match the investor's expectations through all market cycles as opposed to snapshots in time. In addition, the score considers the risk with which this return was delivered. We consider the risk from the perspective of the investor as opposed to risk as defined by investment managers. To this extent we believe that the appropriate measures of risk are not volatility-related, but rather measured by the following indicators:

1. **Shortfall risk**: When the explicit return objective was not achieved (CPI + 5% in the example above), by how much did it under-perform? This is relevant because it relates directly to how close the investor came to the outright achievement of his or her objective (eg provision for 100% or 95% or only 50% of a child's tertiary education costs).

2. **Drawdowns**: How often and how severe were portfolio drawdowns over any rolling 12-month period along the way? This is relevant as the frequency and severity of drawdowns relate directly to investor discomfort, which may initiate switch behaviour along the way.

The outer dial refers to the investment's success (hit) rate. For example, how often the portfolio achieves the desired return over the requisite number of rolling-return periods. The inner dial relates to the risk number calculated in line with the objective we are solving for. In this context we examine if the investment has yielded capital losses historically, as well as the magnitude of these drawdowns.



The OBI Score™ therefore provides our relative assessment of the fund's track record in delivering a palatable investment journey that is geared to deliver a particular investment outcome. How much focus should be placed on each of the risk and return metrics as a function of the investment's return objective and investment horizon? The answer to this is that it is dynamic. In general, for shorter-termed investments the focus shifts more towards drawdown protection, while for longer-duration investments, the emphasis is tilted to outright achievement of the return objective. The OBI Score™ is a standardised score by means of generating a statistical normalised rating of each of the four metrics used in its calculation, when measured over all funds available on the Momentum Wealth platform. The final score, once weighted and and totalled, is out of 100. A fund's OBI score is a living score as every new data point (additional monthly return) is taken into account as it occurs. It is expected that funds that are more aligned to an investor's objective will have consistently higher OBI scores than funds that score high on the individual metrics at a certain point in time only.

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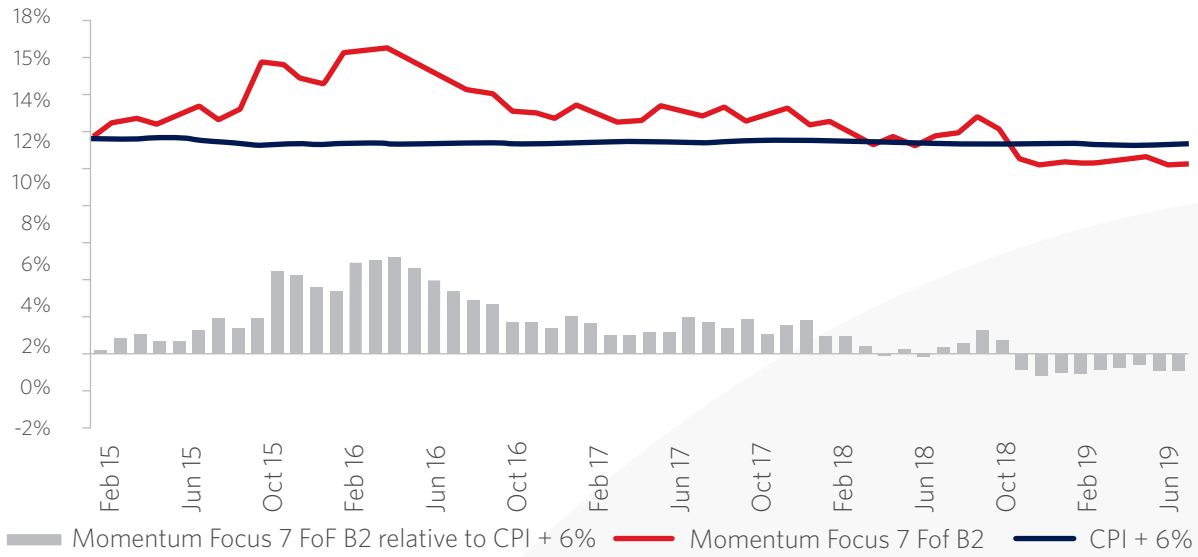
Helping investors count what counts

Figure 12: Rolling returns of the Momentum Focus 7 Fund of Funds



Source: Momentum Investments, Morningstar

Table D: Focus on factors across CPI mandates

Objective	CPI + 2%	CPI + 3%	CPI + 4%	CPI + 5%	CPI + 6%
Term:	3 years	4 years	5 years	6 years	7 years
Hit rate	Low		Medium		High
Severity of miss	Low		Medium		High
Probability of drawdown	High		Medium		Low
Max 12-month drawdown	High		Medium		Low

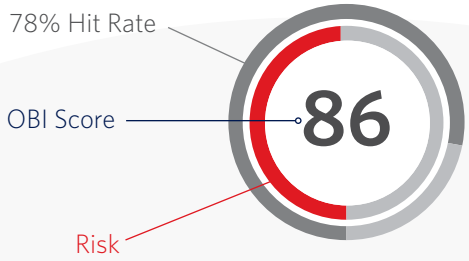
Source: Momentum Investments

4.4 Does an outcome-based fund achieve better investment outcomes more often?

Figure 12 indicates the actual investment delivery of the Momentum Focus 7 Fund of Funds, which is managed specifically in line with achieving CPI + 6% (net of fees) for investors over any rolling seven-year investment horizon. Each month on the chart is representative of the prior seven-year investment period. Being a market-linked multi-asset fund functioning within the Regulation 28 limits, these returns are not guaranteed, but the graph indicates how deliberately managing the fund with this investor-centric objective does more often than not mean that it will deliver on the investor objectives with a higher probability of success.

Figure 13 on the following page shows the frequency and severity of underperforming the CPI + 6% (net of fees) experience of the Momentum Focus 7 Fund of Funds relative to the Asisa MA High Equity peer group. Deliberately managing the fund to the investor outcome also means deliberately trying to minimise any extent of underperformance in times when markets in general are underperforming. Again, measured over a rolling seven-year period, the graph indicates the success with which this was achieved.

Taking the investment delivery shown above into account, the OBI Score™ for this fund will be as follows as at end of June 2019:



The Momentum Focus 7 Fund of Funds hit its mark on 78% of occasions (outer dial) over the past 55 rolling seven-year return periods (available from January 2008 to June 2019) and only provided a negative return over a 12-month period on 8,66% of occasions (the inner dial also considers the extent of this negative return). One of the most useful features of the OBI Score™ is that it facilitates (through the Momentum OBI Score™ toolsets) like-for-like comparisons between funds or portfolios. This allows financial advisers and investors to perform OBI Score™ comparisons, calculated over the exact same time periods, normalised against the identical universe of other funds available and for the exact same investor objective. Figure 14 shows a peer comparison for five of the ten largest balanced funds in the Asisa high equity sector comprising 11,49% of industry assets (R260 billion) over the same 55 rolling return periods. The Momentum Focus 7 Fund of

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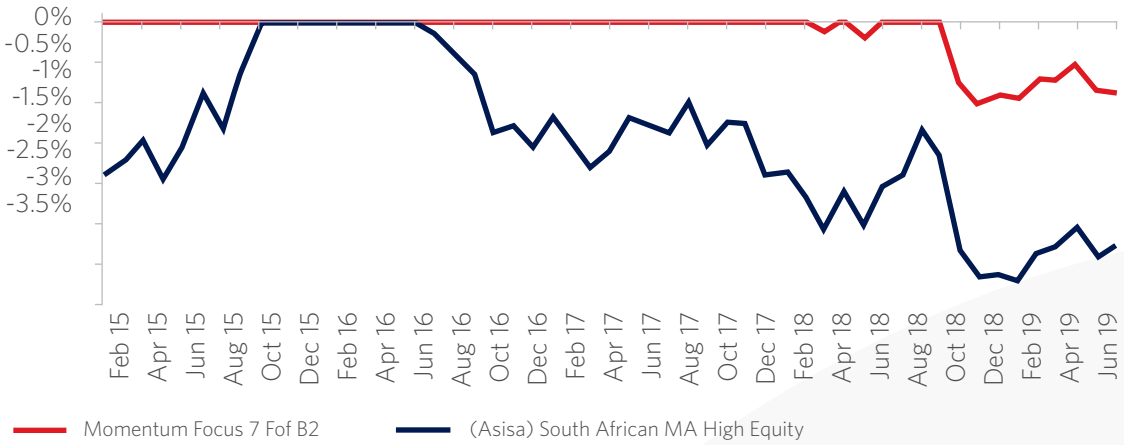
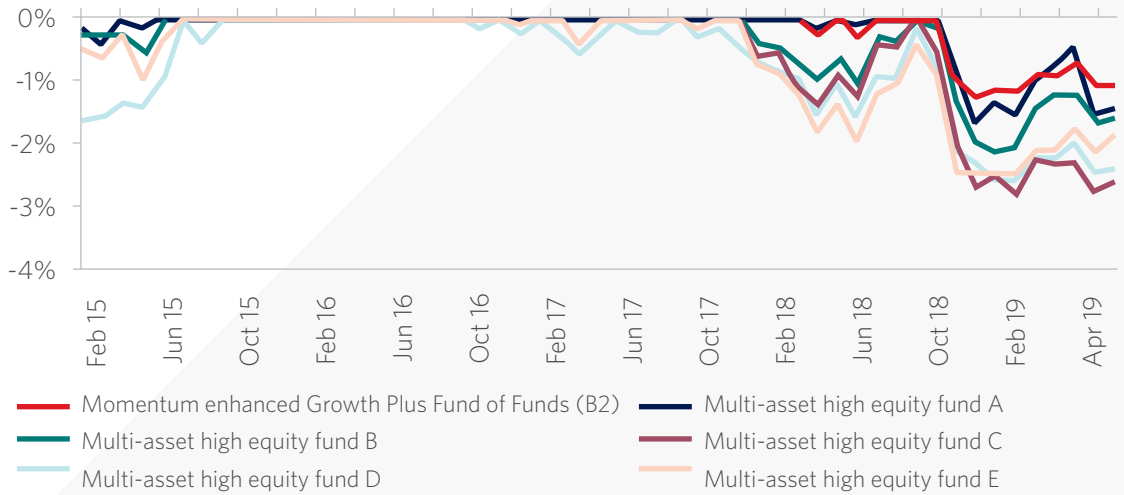
Helping investors count what counts

Figure 13: Momentum Focus 7 Fund of Funds CPI + 6% Asisa peer comparison



Source: Momentum Investments, Morningstar

Figure 14: Investment experience against five popular balanced funds



Source: Momentum Investments, Morningstar

Funds has an OBI Score™ of 86 while the balanced funds in question have scores between 68 (fund E) and 84 (fund A). It is clear from the journey in figure 14 that investments with higher scores are going to provide a more palatable investment experience for clients as outcomes will be more predictable.

In conclusion, there are many metrics to evaluate an investment's performance. Yet as an industry we have tended to focus on only investment performance. But when an investment manager's interests are not aligned with that of the investor, it may not benefit the investor. Simply put, if someone has to drive 100km and speed is the only measure of success, a bumpy journey and a crash are not impossible. The industry needs a new way to measure the likelihood of an investor achieving a goal, while not neglecting the investment experience.

Conclusion

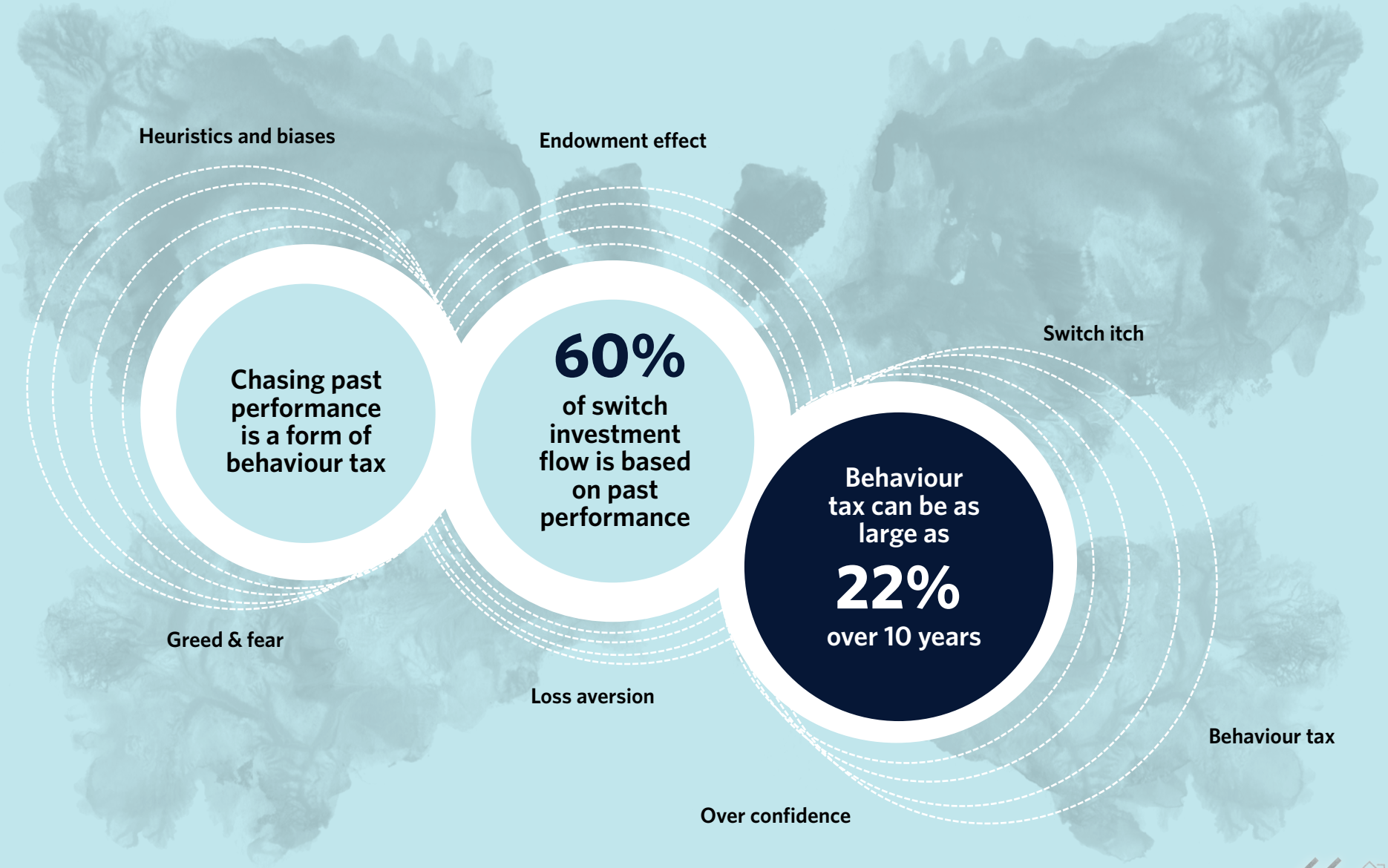
"Humans are great. But they make systematic mistakes. Financial advisers are skilled technicians, but they are also human. And in every field, from chefs following recipes and using scales, to writers using editors, to sportspeople using coaches, to doctors following checklists, even the most skilled technicians use tools to ensure consistency." Greg B. Davies

This paper has presented ample evidence that the past performance of funds still plays far too large a role in our ultimate investment decisions. This is hardly surprising. Investment decisions are complex and using mental shortcuts for these decisions does not lead us anywhere worth going. Our problems started some time ago with the advent of fiat currency or money. Why? Money is fungible. If our ancestors farmed apples and wanted something different (like oranges) they just needed to agree on exchange quantities and completed the transaction. It was very easy to assess the opportunity cost of apples. Money introduced the complexity of when to consume something and the levels of financial complexity have increased exponentially since. Our instinct in these situations is likely to try and remove complexity by searching for relative cues of value. Ask Ron Johnson (former JC Penny CEO) who decided to stop sale items and give customers an everyday low price. Sounds rational, but it turns out when we do not have a marked up "normal" price to compare a sale price to, we stop buying the goods altogether. It also takes away the transaction utility that makes us feel smart for spotting and taking advantage of the sale. It also cost Penny his job. The amount of information at our disposal and our uncanny knack to put up filters that conveniently let slip though information that supports our cognition and filter out that which does not, can end up costing us a significant amount of money over time. The results of this paper for financial practitioners pose three key questions:

1. Are your clients paying you to "beat the market" or are they paying you to be their guide or mentor on the path to achieving financial goals?
2. Are you able to articulate the likely investment journey for your clients en route to the ultimate destination and are you managing their expectations along the way?
3. Are you able to show your client how they are progressing towards these investment goals and are you reporting in a manner that shows levels of volatility matched to the investment goal as opposed to arbitrary short-term and market volatility?

The answer to the first question above, to articulate the value proposition, lies squarely within the control of the financial practitioner. But the industry has to do a considerable amount of work to help its financial adviser and planner partners to manage their clients' behaviour gaps or minimise their behaviour taxes, and to show clearly the extent to which they are successful. Momentum Investments has developed the first "decision prosthetic", as Greg Davies puts it, for South African financial advisers to help their clients anchor on one number that steers the conversation away from market benchmarks and towards a personal benchmark. The next step in our journey is to gain a deeper understanding of investor behaviour to the extent that we are able to put forward a predictive model that enriches the engagement of practitioners and their clients. This remains an area where machine learning has a major part to play in analysing a ton of data to dig out what could be meaningful relationships between endogenous client variables (such as personality traits, income levels, gender and even advice received) and exogenous variables related to markets and even geopolitics. Think of the value added if each client along with his or her financial adviser receives a tailored engagement strategy to enrich the advice process and review discussions where information is presented in a manner that encourages the right investing decisions. The good news is that willpower can be learned and become even stronger. We need to think of it as a psychic muscle that can be strengthened if we understand where our own biases affect investment behaviour. The financial adviser has a pivotal role to play in conveying this insight.

Behaviour tax
and helping investors count what counts



References

Adelson, E.H., 1993. Perceptual organization and the judgment of brightness. Science, 262(5142), pp.2042-2044.

Allais, M., 1953. The rational man's behavior in the face of risk: critical of postulates and axioms of the American school. Econometrica: Journal of the Econometric Society, pp.503-546.

Barberis, N., 2013. Psychology and the Financial Crisis of 2007-2008. Financial innovation: too much or too little, pp.15-28.

Bargh, J.A., Chen, M. and Burrows, L., 1996. Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. Journal of personality and social psychology, 71(2), p.230.

Bruner, J.S., 1973. Beyond the information given: Studies in the psychology of knowing. WW Norton.

Clare, A. and Motson, N., 2010. Do UK retail investors buy at the top and sell at the bottom? Available at SSRN 2728214.

Clare, A., Nitzsche, D. and Cuthbertson, K., 2010. An empirical investigation into the performance of UK pension fund managers. Journal of Pension Economics & Finance, 9(4), pp.533-547.

Dalbar. 2016. Dalbar's 22nd Annual Quantitative Analysis of Investor Behavior 2015 For period ended: 12/31/2015. [online]. Available from World wide web: https://www.qidllc.com/wp-content/uploads/2016/02/2016-Dalbar-QAIB-Report.pdf

Damasio, A.R., 1994. Descartes' error: Emotion, rationality and the human brain.

Davies, G.B. 2013. Barclays White Paper: Overcoming the cost of being human (or, The pursuit of anxiety-adjusted returns). Barclays.

Davies, G.B. 2014. Overcoming the cost of being human. [online]. Available from World wide web: https://www.genesiswealthmanagement.com/sites/marioyngerto.us1.advisor.ws/files/documents/overcoming-the-cost-of-being-human.pdf

Evans, J.S.B., 2003. In two minds: dual-process accounts of reasoning. Trends in cognitive sciences, 7(10), pp.454-459.

Fisher, G.S. 2014. Advising the Behavioral Investor: Lessons from the Real World. In: Investor Behaviour, Hoboken, NJ: Wiley, pp.265-283.

Friesen, G.C. and Sapp, T.R., 2007. Mutual fund flows and investor returns: An empirical examination of fund investor timing ability. Journal of Banking & Finance, 31(9), pp.2796-2816.

Fiske, S.T. and Taylor, S.E., 1991. McGraw-Hill series in social psychology. Social cognition (2nd ed.). New York, NY, England: Mcgraw-Hill Book Company.

Gladwell, M., 2006. Blink: The power of thinking without thinking.

Grinblatt, M. and Keloharju, M., 2009. Sensation seeking, overconfidence, and trading activity. The Journal of Finance, 64(2), pp.549-578.

Hamilton, D.L., 1979. A Cognitive-Attributional Analysis of Stereotyping. In Advances in experimental social psychology (Vol. 12, pp. 53-84). Academic Press.

Heath, C. and Tversky, A., 1991. Preference and belief: Ambiguity and competence in choice under uncertainty. Journal of risk and uncertainty, 4(1), pp.5-28.

Helson, H., 1964. Adaptation-level theory: an experimental and systematic approach to behavior.

Hirshleifer, D. and Luo, G.Y., 2001. On the survival of overconfident traders in a competitive securities market. Journal of Financial Markets, 4(1), pp.73-84.

References

Illmer, S. and Marty, W., 2003. Decomposing the money-weighted rate of return. Journal of Performance Measurement, 7(4), pp.42-50.

Jeffries, L. 2015. Fear Of Missing Out: An Investor's Worst Enemy. [online]. Available from World wide web: http://networthadvice.com/fear-of-missing-out-an-investors-worst-enemy

Kahneman, D., Knetsch, J.L. and Thaler, R.H., 1991. Anomalies: The endowment effect, loss aversion, and status quo bias. Journal of Economic perspectives, 5(1), pp.193-206.Kahneman, D., 2011. Thinking, fast and slow. Macmillan.

Kahneman, D. and Frederick, S., 2002. Representativeness revisited: Attribute substitution in intuitive judgment. Heuristics and biases: The psychology of intuitive judgment, 49, p.81.

Kahneman, D. and Tversky, A., 1973. On the psychology of prediction. Psychological review, 80(4), p.237.

Kennon, J. 2018. Past Performance Is No Guarantee of Future Results. [online]. Available from World wide web: https://www.thebalance.com/past-performance-is-no-guarantee-of-future-results-357862

Kinsley, J. 2000. Chasing good performance can destroy value. [online]. Available from World wide web: https://www.fin24.com/Finweek/Archive/Chasing-good-performance-can-destroy-value-20050920-7

Lamprecht, I. 2016. Chasing performance can destroy returns. [online]. Available from World wide web: https://www.moneyweb.co.za/investing/unit-trusts/how-chasing-performance-can-destroy-returns

Mark, G., Gudith, D. and Klocke, U., 2008, April. The cost of interrupted work: more speed and stress. In Proceedings of the SIGCHI conference on Human Factors in Computing Systems (pp. 107-110). ACM.

Markowitz, H., 1952. Portfolio selection. The journal of finance, 7(1), pp.77-91.

Maymin, P.Z. and Fisher, G.S., 2011. Past performance is indicative of future beliefs. Risk and Decision Analysis, 2(3), pp.145-150.

Metcalfe, J. and Mischel, W., 1999. A hot/cool-system analysis of delay of gratification: dynamics of willpower. Psychological review, 106(1), p.3.

Montier, J., 2010. The little book of behavioral investing: how not to be your own worst enemy (Vol. 35). John Wiley & Sons.

Neal, D.T., Wood, W. and Quinn, J.M., 2006. Habits—A repeat performance. Current Directions in Psychological Science, 15(4), pp.198-202.

Piaget, J. and Cook, M., 1952. The origins of intelligence in children (Vol. 8, No. 5, p. 18). New York: International Universities Press.

Richards, C. 2012. The Behaviour Gap: Simple Ways to Stop Doing Dumb Things with Money. New York: Penguin.

Rizzi, J.V. 2014. Post-Crisis Investor Behavior: Experience Matters. In: Investor Behaviour, Hoboken, NJ: Wiley, pp.439-455.

References

Shefrin, H. and Statman, M., 1985. The disposition to sell winners too early and ride losers too long: Theory and evidence. The Journal of finance, 40(3), pp.777-790.

Simon, H.A., 1982. Models of bounded rationality. vol. 2, Behavioral economics and business organization. MIT Press.

Sloman, S.A., 1996. The empirical case for two systems of reasoning. Psychological bulletin, 119(1), p.3.

Smith, E.R. and DeCoster, J., 2000. Dual-process models in social and cognitive psychology: Conceptual integration and links to underlying memory systems. Personality and social psychology review, 4(2), pp.108-131.

Stanovich, K.E. and West, R.F., 2000. Individual differences in reasoning: Implications for the rationality debate? Behavioral and brain sciences, 23(5), pp.645-665.

Stephen, E. 1999. The Role of Judgmental Heuristics in Financial Decisions:

Anchoring and Availability Effects. In: Finanzpsychologie, 101–134.

Stigler, G.J., 1950. The development of utility theory. I. Journal of political economy, 58(4), pp.307-327.

Thaler, R.H. and Sunstein, C.R., 2009. Nudge: Improving decisions about health, wealth, and happiness. Penguin.

Tversky, A. and Kahneman, D., 1973. Availability: A heuristic for judging frequency and probability. Cognitive psychology, 5(2), pp.207-232.

Tversky, A. and Kahneman, D., 1974. Judgment under uncertainty: Heuristics and biases. science, 185(4157), pp.1124-1131.

Tversky, A. and Kahneman, D., 1989. Rational choice and the framing of decisions. In Multiple criteria decision-making and risk analysis using microcomputers (pp. 81-126). Springer, Berlin, Heidelberg.

Tversky, A. and Kahneman, D., 1992. Advances in prospect theory: Cumulative representation of uncertainty. Journal of Risk and uncertainty, 5(4), pp.297-323.

Wright, S., Smithers, A., Warburton, P., Pepper, G., Goldberg, J., Brodie, H., Riley, B. and Napier, R., 2011. Practical history of financial markets. Harlow: Pearson Education.

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Foreign securities within portfolios may have additional material risks, depending on the specific risks affecting that country, such as: potential constraints on liquidity and the repatriation of funds; macroeconomic risks; political risks; foreign exchange risks; tax risks; settlement risks; and potential limitations on the availability of market information. Fluctuations or movements in exchange rates may cause the value of underlying international investments to go up or down. Investors are reminded that an investment in a currency other than their own may expose them to a foreign exchange risk. The terms and conditions, a schedule of fees, charges and maximum commissions, performance fee frequently asked questions as well as the minimum disclosure document (MDD) and quarterly investor report (QIR) for each portfolio are available on Momentum Collective Investments' website at www.momentum.co.za/collectiveinvestments. Associates of the manager maybe invested within certain portfolios and the details thereof are available from the manager. Momentum Collective Investments (RF) (Pty) Ltd is an authorised manager of collective investment schemes in terms of the Collective Investment Schemes Control Act, No 45 of 2002. Momentum Metropolitan Life Limited is a full member of the Association for Savings and Investment South Africa. The Standard Bank of South Africa Limited (PO Box 54, Cape Town, 8000) is the Trustee of Momentum Collective Investments Scheme. The manager and trustee are registered and approved under the Collective Investment Schemes Control Act (No. 45 of 2002). Momentum Collective Investments (RF) (Pty) Ltd (Reg No.1987/004287/07) (PO Box 7400 Centurion 0046).

Some of the portfolios are managed by Momentum Asset Management (Pty) Ltd and some are managed by Momentum Outcome-based Solutions (Pty) Ltd.

Investment manager	Registration number	FSP number	Registered address
Momentum Asset Management (Pty) Ltd	1987/004655/07	623	268 West Avenue Centurion 0157
Momentum Outcome-based Solutions (Pty) Ltd	2004/023064/07	19840	268 West Avenue Centurion 0157

The above investment managers are authorised financial services provider under the Financial Advisory and Intermediary Services Act (No. 37 of 2002), to act in the capacity as investment manager. This information is not advice, as defined in the Financial Advisory and Intermediary Services Act (No. 37 of 2002).Please be advised that there may be representatives acting under supervision.