

IN BUILDING OPTIMAL PORTFOLIOS, DO NOT IGNORE INVESTORS'
EMOTIONS

Prince Sarpong, PhD, CFP®
Centre for Financial Planning Studies
Cape Town
South Africa
pk.sarpong@cfps.co.za

17th February 2019

Abstract

Behavioural finance points out various investor biases and heuristics which inhibit optimal investment choices and are sometimes deemed irrational. Although emotions are often viewed as anathema to sound financial decisions, there is a big emotional component that has to be taken into consideration when holistically defining financial goals. Investors have differing goals for investing. Portfolio theory should therefore not overlook these goals and its horizon should be expanded to offer investors with the best possible achievable solutions by incorporating financially efficient anxiety reduction. A rational solution should therefore take investors' behavioural shortcoming into account because investors do not simply care about risk-adjusted returns but the best returns that can be achieved for the level of stress they are going to have to endure over the volatile investment journey.

Keywords: Anxiety-adjusted returns, Goals-based investing, Loss Aversion, Mental Accounting, Prospect Theory

JEL Codes: G40; G41

1. Introduction

The argument on the irrationality of investors has existed for a very long time and possibly, the most popular historical example of investors' irrationality can be traced to the sixteenth century when a man named Conrad Giestner introduced tulip bulbs to Holland. The tulips were beautiful, difficult to obtain and thrilled consumers and in the process, became a status symbol for the elite. In the early periods, most buyers bought the flowers simply because of its aesthetic value. Speculators eventually joining the trade to make profits. Trading activities in tulips skyrocketed, and tulip bulbs were eventually listed on the local market exchanges. As speculative trading increased, people sold everything they owned in order to acquire tulips, with the hope that the value would continue to soar. When speculators started liquidating their holdings, the prices of tulips declined and eventually plunged by 90% within a month with investors defaulting on their tulip contracts and incurring heavy losses (Pompian, 2006).

The study of the human aspect of economic decision making begun in the same period (mid eighteenth century) as classical economics and subsequently served as the foundations for behavioural finance. It was during this same time that the concept of utility emerged as a measure of the satisfaction associated with the consumption of a good or a service (Pompian, 2006).

Besides the well-known *Wealth of Nations* by Adam Smith (Smith, 1776), his book *The Theory of Moral Sentiments*, focused more on the psychology of the individual rather than on the creation of wealth in markets. Smith (1759) explained the emotional and mental foundations of human interaction, which included economic interactions. While classical economists believed that the behaviour of people could be modelled in mathematical terms and assumed to be completely rational, Adam Smith argued that each human was born with an innate moral compass, which influences externalities such as logic or law. Although Adam Smith posited that an 'invisible hand' guided both economic and social conduct, the viewpoint of economic decision making by individuals being 'perfectly rational' was never part of Smith's argument (Pompian, 2006). When dealing with financial issues, *The Theory of Moral Sentiments* focused on factors such as shame, pride, insecurity, and egotism:

"It is the vanity, not the ease, or the pleasure, which interests us. But vanity is always founded upon the belief of our being the object of attention and approbation. The rich man glories in his riches, because he

feels that they naturally draw upon him the attention of the world, and that mankind are disposed to go along with him in all those agreeable emotions with which the advantages of his situation so readily inspire him... The poor man, on the contrary, is ashamed of his poverty. He feels that it either places him out of the sight of mankind, or, that if they take any notice of him, they have, however, scarce any fellow-feeling with the misery and distress which he suffers. He is mortified upon both accounts. For though to be overlooked, and to be disapproved of, are things entirely different, yet as obscurity covers us from the daylight of honour and approbation, to feel that we are taken no notice of, necessarily damps the most agreeable hope, and disappoints the most ardent desire, of human nature.” (Smith, 1759, p. 28).

The classical economic assumption of rationality however prevailed over the role of psychology in economic decision making and became the mainstream until the expanding field of experimental economics analysed theories of individual choices and begun questioning the theoretical foundations of perfect rationality.

2. Behavioural Finance

The field of behavioural finance begun to take shape when psychology professors Daniel Kahneman and Amos Tversky happened to compare their life experiences and notes. This subsequently led to collaborations that brought about a competing version to the rational model of classical finance on how individuals make decisions under conditions of uncertainty (Bernstein, 2007). 2013 Nobel laureate in economics Eugene Fama (also deemed the father of modern finance (Chicago Booth, 2018)) however contends that behavioural finance is simply a branch of traditional finance, because all it does is criticize the efficient markets model (Fama & Thaler, 2016).

Behavioural biases can be described abstractly as systematic errors in judgement (Pompian, 2006), whereas a heuristic is any kind of ‘rule of thumb’ or a simple rule of behaviour through which a problem is solved (Cartwright, 2014). In their book *Judgment Under Uncertainty: Heuristics and Biases*, Daniel Kahneman, Paul Slovic and Amos Tversky presented ground-breaking studies in behavioural finance, claiming that when evaluating probabilities, people depend on limited number of heuristics which lessen the complex tasks of calculating

probabilities and forecasting values to facilitate easier judgmental operations (D. Kahneman, Slovic, Slovic, & Tversky, 1982). Gilovich, Griffin, and Kahneman (2002) in their book *Heuristics and Biases: The Psychology of Intuitive Judgment*, offered some of the most prominent study on biases and heuristics after *Judgment Under Uncertainty*.

Behavioural finance highlights the behavior gap (Richards, 2012), which is the difference between the actual investment returns that investors achieve and the returns investors could have achieved had they doggedly adhered to classical finance principles (G. Davies, 2014). Figure 1 depicts the behaviour gap. Kahneman and Tversky did not claim it is irrational for people to apply heuristics. They argued on the contrary that the heuristics are quite valuable as a general rule. The drawback is that in certain cases, the use of heuristics lead to systematic and severe errors which were not random and could be described and even predicted.

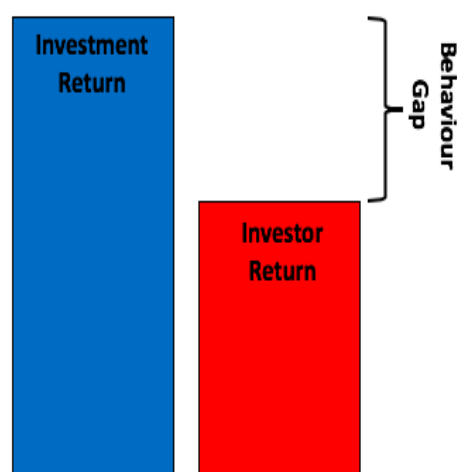
According to D. Kahneman (2011), our thinking can be described by two systems, explained by a catalogue of opposing characteristics. System 1 is described as the unconscious, works by heuristics, and prone to errors. System 2 on the other hand, is the conscious, works by rule of logic and statistics, and not prone to errors.

Biases may be categorised as cognitive biases or emotional biases. Cognitive biases refer to predispositions to thinking and acting in certain ways and can also be regarded as a heuristic or rule of thumb, which may lead to systematic divergence from a standard of good judgement or rationality although controversies still prevail on whether some of these heuristics are in fact irrational (Baker & Ricciardi, 2014). An emotional bias on the other hand results in making decisions based on one's feelings instead of facts.

In reality, every heuristic studied can be applied both consciously and unconsciously, therefore, heuristics cannot be construed to stand in opposition to consciousness. Furthermore, heuristics cannot be pointed out as the general cause of errors since heuristics can lead to more precise inferences when compared to logical or statistical rules (Kruglanski & Gigerenzer, 2011). Moreover, practitioners sometimes find themselves in a dilemma with behavioural theories due to the lack of clarity on how information on the nature of biases and their consequences for portfolio management could be collected and used in practice (Pompian & Longo, 2005).

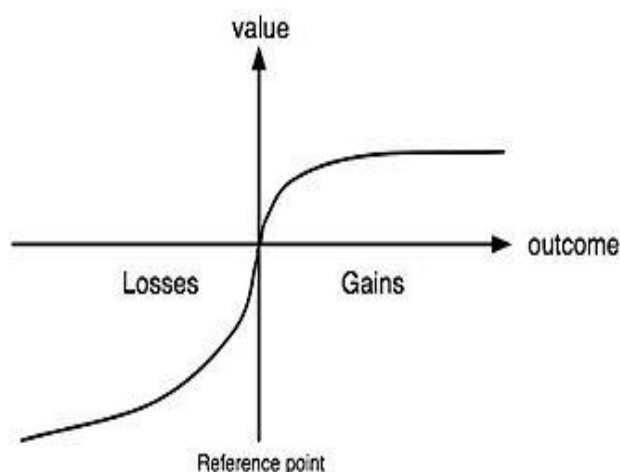
There can be circumstances where behavioural biases/heuristics could be helpful. As humans we need them to function, we need them to survive, and so in some cases, it may be irrational to act ‘rationally’ (if we take the classical/modern finance definition of rationality). Sections 3 and 4 present classical behavioural biases and contrast them with alternative arguments on why such biases/heuristics are necessary for the investor and should not be misconstrued as irrational behaviour.

Figure 1: The Behaviour Gap



Source: Richards (2012: 13)

Figure 2: A Hypothetical Value Function



Source: Kahneman and Tversky (1979: 279)

3. Prospect Theory/Loss Aversion Vs Anxiety-adjusted Returns

Prospect theory is to behavioural finance what the expected utility theory is to classical finance. Prospect theory argues that people base their decision making on the consequences of the outcome on their current wealth. The pain one experiences as a result of a loss exceeds a gain of similar magnitude. Figure 2 represents a hypothetical value function which was used by Daniel Kahneman and Tversky (1979) to show how the value assigned to a gain is far below the value assigned to a loss.

A research on the rationality of consumer valuations of health risks (Viscusi, Magat, & Huber, 1987) showed that a parent will pay a certain amount of money to minimize the risk of her child contracting a debilitating disease from 10% to 5% and even be willing to pay an additional twice or thrice as much to push that risk from 5% to 0%. This decline from 5% to 0% is so much more valuable to the parent than the decline from 10% to 5%, this is because it offers more than just a 5% reduction in risk. It brings certainty. To the parent therefore, 0% and 100% weigh far more heavily in the mind than what mathematical models argue they should.

Although this premium paid is considered irrational under the rational model of classical finance, it is consistent with the psychology of worry where parents are willing to pay a premium for certainty (D. Kahneman, 2011).

Harry Markowitz won the Nobel Prize in economics in 1990, being honoured *inter alia*, for developing a mathematical formula that helps investors maximize profit and minimize loss in their portfolios. Interestingly, he ditched his award-winning strategy when he had to make an investment decision on his retirement. Instead, he applied a simple rule of thumb known as $1/N$ where the investor allocates her capital equally among N number of asset classes. In an interview, Markowitz admitted that he wanted to steer clear of regrets: “I thought, ‘You know, if the stock market goes way up and I’m not in, I’ll feel stupid. And if it goes way down and I’m in it, I’ll feel stupid.’ He recalled, “So I went 50-50.” (Bower, 2011, p. 26).

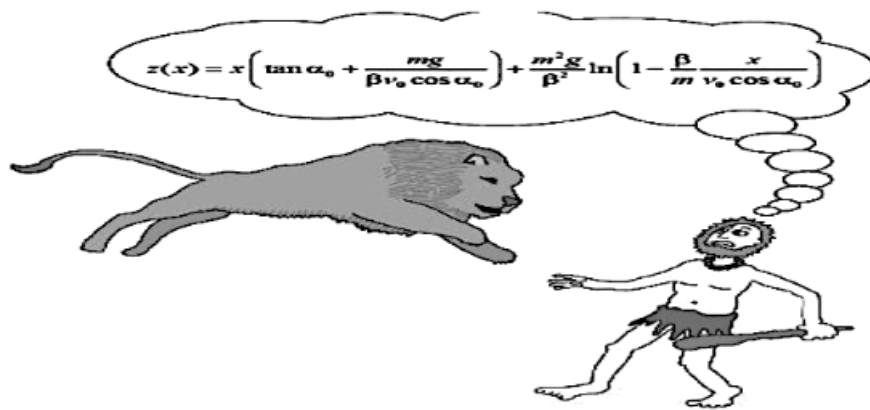
According to Skinner (1953), it is difficult to analyse human behaviour as a result of its tremendously complex nature and based mainly on cause-result relation. People take actions due to the multifarious effects of both external and internal stimulants and demonstrate certain actions/reactions. Over time, the tension between the ideal concept of human rationality and the reality of our daily lives has become a progressively critical issue. To what extent do we know about how in the real world, people make decisions and choices and how divergent are the disparities between the real world and the theoretical assumptions? Do those differences even matter?

Gigerenzer (2015) argues that heuristics and errors are not associated. The two-system view suggested by D. Kahneman (2011) overlooks the difference between uncertainty and risk, suggesting that whereas statistical methods are vital when faced with known risks, heuristics on the other hand come in handy when faced with uncertainty. Todd, Gigerenzer, and ABC Research Group (2012) propose that instead of spending time knocking down heuristics, it is imperative to research their ecological rationality; i.e., investigate in which circumstances heuristics work and in which circumstances they don’t.

The Greek term ‘heuristic’ originally meant ‘serving to find out or discover’ and in fields that deal with uncertainty such as artificial intelligence and animal behaviour, heuristics have continuously had a positive connotation (Gigerenzer, 2015). Stanford mathematician Pólya (1954) makes a distinction between analytical thinking and heuristic, stating that heuristic thinking is essential in finding a mathematical proof, while analytic thinking is required for

checking the processes of a proof. Emotions are complements to reason more often than they impede it. Thus, the interactions between reason and emotions are mostly beneficial. Emotions ward us away from being lost in thought when instant action is crucial, and emotions also reinforce lessons we must learn (Statman, 2014).

Figure 3: Fear Prevents Us from Thinking too Long Before Acting in Dangerous Situations



Source: Gigerenzer (2015)

Stetson, Fiesta, and Eagleman (2007) in a study titled *Does Time Really Slow Down During a Frightening Event?* designed a test of present orientation (the tendency to overly concentrate on the present without taking the future into consideration) by asking participants to read some digital numbers that flashed quickly on a small display. They found that when the participants were relaxed, they could not read the numbers, since they flashed too quickly. However, in a freefall during bungee jump, they could read the numbers. The freefall elicits strong emotion and concentrates all mental resources solely on the present therefore providing an extra mental power that allows people the ability to read numbers that previously were undecipherable. Fear and excitement therefore heighten present awareness, while sharpening instincts and help us survive.

Given our behavioural responses, reaching the best achievable returns over the investment journey may involve intentionally shifting away from the optimal normative portfolio to achieve sufficient comfort in order to stick to the journey. Rationality entails more than a normative solution. It also necessitates the ability of the investor to carry on with a strategy from the start and stick to it through to the end. The path an investor takes during the investment

journey plays a significant part in the ability of the investor to control emotional responses. A rational solution should therefore take the investor's behavioural shortcoming into account (G. B. Davies & Lim, 2014). Although this may sound counterintuitive, investors are able to get closer to achieving financial efficiency in the long run by focusing on something other than the long-run financial efficiency. This paradox is due to the fact that an investor may find it very difficult to establish and stick with the optimal solution if the short-term desire for emotional comfort is not taken into consideration. Consequently, investors who endeavour to ignore emotional responses will strive for perfection but fail, and fail expensively (G. B. Davies & Lim, 2014).

Traditional finance models assume that investors only care about risk-adjusted returns but that is not entirely the case. Investors want the best returns that can be achieved for the level of stress they are going to have to endure. Although part of the stress comes from risk taking, the greater part of this stress comes from the emotional responses to volatility along the investment journey and this can be independent of risk. Investors therefore aim at maximizing 'anxiety-adjusted returns' which is the best possible returns relative to the stress, discomfort, and anxiety they will have to go through over the investment journey. Deviating from classical investment techniques therefore is justified if it enables investors avoid bigger costs elsewhere, by minimising anxiety and avoiding costly knee-jerk reactions to short-term fluctuations in the market. These deviations are intended to increase anxiety-adjusted returns (G. Davies, 2014).

“We want more from our investments than a reasonable balance between risk and return. We want to nurture hope for riches and banish fear of poverty. We want to win, be number one, and beat the market. We want to feel pride when our investments bring gains and avoid regret when they inflict losses. We want the status..., the virtue conveyed by socially responsible funds, the patriotism conveyed by investing in our own country, and the loyalty conveyed by investing in the companies that employ us. We want financial markets to be fair, but we search for an edge that would let us win. We want to leave a legacy for our children when we are gone. And we want to leave nothing for the tax man.” (Statman, 2010, p. 8).

4. Mental accounting vs Goal-Based investing

Mental accounting refers to the tendency of separating money/investments into different accounts/portfolios based on miscellaneous subjective criteria, including the source of the money and the intended use for each account (Thaler, 2008). The theory of mental accounting argues that people are likely to allocate different functions to each asset group. Thaler (1999, p. 183) defines mental accounting as “the set of cognitive operations used by individuals to organize, evaluate, and keep track of financial activities,” Mental accounting entails grouping expenses into categories, assigning funds to each category, determining budgets, and performing elements of cost–benefit analyses. Although categorizing funds can help reduce the burdens that accompany financial decision-making, there are implications on how people decide to spend and save their money which can lead to systematic errors. In line with traditional economic theory, grouping funds into various mental accounts should have no consequence on subsequent behaviour because the boundaries of mental accounts are only set notionally. On the contrary, a large amount of evidence shows that the classification and labelling of funds can influence individual preferences for spending. Mental accounting therefore violates the economic principle of fungibility, the notion that money is interchangeable (Abeler & Marklein, 2017; Shefrin & Thaler, 1988). Mental accounting can lead to holding investment ‘buckets’ that are highly correlated, or worse, lead to the *house money effect* (Thaler & Johnson, 1990)- the tendency of investors taking on higher risk when reinvesting profit earned from an initial investment, than they would when investing their savings or a portion of their wages¹.

Rohner and Uhl (2018) however argue that one fundamental principle behind goal-based investing is mental accounting, as described in Thaler (2008). Goal-based investing is an investment strategy where performance is measured by the success of investments in achieving the personal and lifestyle goals of an individual. This is different from conventional investment strategies, where performance is defined as a return against an investment benchmark. With this strategy, the investment approach shifts from achieving higher returns or outperforming the market, and moves towards funding personal financial goals. Generally, financial industry, academics in finance and financial advisors associate the notion of ‘risk’ with the standard deviation of an investor’s portfolio. Investors, however, typically associate ‘risk’ with the

¹ Richard H. Thaler and Eric J. Johnson of the Cornell University Johnson Graduate School of Management first defined the ‘house money effect’, a term borrowed from casinos and similar to a gambler who continues to allow the chips ride after a significant gain. The gambler is said to be playing with house money.

possibility of not attaining their goals. Distinguishing between these two perspectives on risk is crucial because, reducing standard deviation risk in an underfunded investor's portfolio, for example, increases, as opposed to reducing the risk of not attaining their goals. An appropriate portfolio strategy should therefore incorporate viewing risk from the goals-based perspective of investors, as well as the perspective of traditional standard deviation (Das, Ostrov, Radhakrishnan, & Srivastav, 2018).

The profession of financial planning is a goals-based one since financial planners help clients accomplish their goals through guidance and advice on several issues like saving, investing, and risk management. Although investing well is generally an important part of the process of achieving a goal, achieving such goal often involve advice that goes beyond putting together efficient/optimal portfolios and choosing investments that are expected to outperform a given benchmark or group of peers on a risk-adjusted basis.

Adopting a goals-based investment approach to making a decision on which goals to fund and how to fund them can increase utility-adjusted wealth by 15.09% for a hypothetical household which is equivalent to achieving an annual alpha of 1.65% over the lifetime of the base scenario household in contrast to a naïve strategy focused only on funding retirement. These potential gains point to a substantial amount of value by adopting a goals-based financial planning approach which extends beyond traditional asset management techniques (Blanchett, 2015).

Furthermore, investing based on concrete goals enables clients attach unambiguous and explicit purposes and a time horizon to their personal life goals. There are emotions tied to goals investors set for themselves, such as the education of their children or retirement. Secondly, investors have different levels of priorities for these goals and different time horizons. By considering life goals, it is not only possible for investors to attach particular emotions to their investments, but it is also possible to increase their satisfaction and happiness (Rohner & Uhl, 2018). While emotions are often seen as anathema to sound financial decisions (Ariely, 2009), results from a study by Sin, Murphy, and Lamas (2018) suggest that there is a big emotional element to holistically defining financial goals. Portfolio theory should therefore not overlook the principal reason why investors are unable to attain good returns. It is not due to a lack of knowledge of the normative solution, but the absence of the requisite emotional capacity to implement it. Portfolio theory should therefore expand its horizon to offer investors with the

best possible achievable solution by incorporating financially efficient anxiety reduction. The normative must not become the enemy of the achievable (G. B. Davies & Lim, 2014).

5. Conclusion

Behavioural finance has provided insights to why investors behave contrary to what is assumed under traditional finance models. These deviations from the assumed, usually referred to as biases and heuristics prevent investors from making optimal financial decisions. Biases and heuristics are part of the behavioural traits of human beings and are part of the numerous mechanisms required for humans to navigate their environment.

Although behavioural biases are discussed in the context of investors aiming to achieve optimal risk-adjusted returns or outperforming the market, investors are complex beings whose investment goals go beyond achieving optimal risk-adjusted returns. Investors' emotional ups and downs and the gut reactions to news are a key concern that are equally important that is why investors sometimes deviate from specific investment strategies regardless of their utilitarian characteristics such as risk and return. Encouraging investors to adhere strictly to optimal portfolios while ignoring their behavioural construct can lead to extreme anxiety making the investment journey an excruciating one. It is therefore important for portfolio theory to take cognisance of the behavioural make up of investors which may then imply deviating from the mathematically optimal choice but could be sufficient in enabling investors achieve their goals with less emotional distress.

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