

Changing the shape of retirement

Using prospect theory to align retirement design with real world outcomes

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Introduction

Most people are aware that buying lottery tickets makes no sense. From a rational assessment of risk and return, the value of the ticket is probably less than the paper it's printed on. And yet despite this, the lottery ticket industry continues to harvest its outsized return – in part because of our humanistic tendency to overweight low probability events and make decisions on this basis.

The same behavioural forces are at work during times of market volatility or crisis. Retirees in particular are evidenced to be *most* vulnerable to making decisions against their best financial interests, at the worst possible times. Despite many retirees having long-term, well-crafted investment plans in place, market volatility can turn these plans into 'impatient capital' overnight, with extremely damaging consequences. Unfortunately it's common to hear the story of a friend or relative who, driven by fear, moved to cash at the bottom of a market cycle.

The primary reason for this seemingly irrational behaviour is our cognitive bias – instinctive decision-making that is hard-wired into us at birth. This was the focus of Daniel Kahneman and Amos Tversky's pioneering work on prospect theory, which has formed the bedrock of modern behavioural finance theory. Prospect theory holds many of the answers as to why humans tend to lack reason when it comes to financial decision-making.

We believe a thorough understanding of the 'emotional magnets' that pull us away from rational decision-making can assist in retirement strategy design. By recognising these cognitive biases – and importantly, by building retirement portfolios that take these biases into account – we believe retirees are better placed to adhere to their long-term plans and thus realise their targeted outcomes. Advisers, too, know that a less stressful financial journey makes for a happier client/adviser relationship, where both parties benefit.

At Wheelhouse, our mission is to improve investment outcomes for retirees. Delivering equity growth in an income-driven and retiree-friendly shape is integral to our philosophy.

What is prospect theory?

The term 'prospect theory' describes how people choose between different options (or prospects) and how they estimate (many times in a biased or incorrect way) the perceived likelihood of each of these options. It was pioneered by Daniel Kahneman and Amos Tversky in 1979 as a pragmatic model for explaining real-world choices and how these can systematically override optimal decision-making in many situations, especially financial. The theory has been lauded as a milestone in economics, and based on citations is regarded as one of the most influential studies in explaining how human cognitive biases can often impair rational decision-making processes.

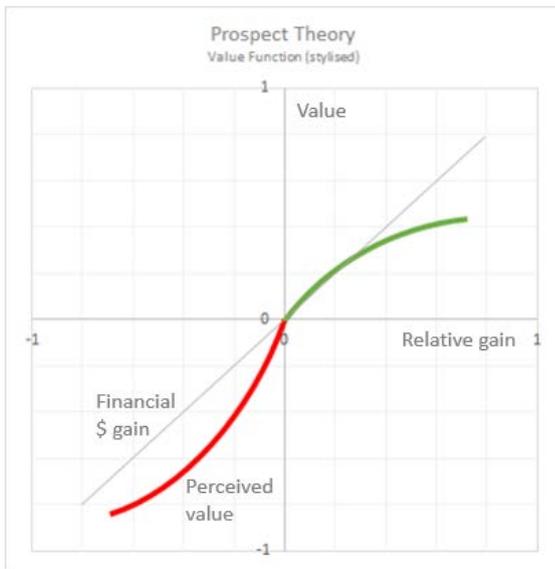
The theory was a dramatic departure from previous utility-based models, whereby academics portrayed human decision-making as perfectly rational and argued that probability-weighted outcomes would serve as the basis for determining risk and return. Utility theory was based in part on the view that investors would focus on the *final* wealth outcome, or the probability-weighted return, and rely on this as a key consideration in decision-making.

Kahneman's key departure from this view was that in the real world, investors are more likely to prioritise gains or losses from a *current* reference point and treat these gains or losses differently from a value perspective. **In other words, the path of investment returns is more important than the final wealth destination.**

A critical consideration in assessing this path is the concept of loss aversion. This is illustrated in the following chart, where for a given gain or loss, the perceived value is treated very differently. At the

breakeven reference point (0), the value function is kinked and losses deliver significantly greater negative utility than equivalent gains.

Put simply, the pain felt from losing \$100 is sharper than the joy of making \$100.



- Gains/ losses relative to a reference point are more important than overall wealth at the destination (the *path* of returns matters).
- Value function is kinked at the reference point (0). The fear of losses loom larger than the prospect of equivalent gains (Kahneman estimates 2:1 for losses and 1:1 for gains close to the reference point).
- The function is concave for gains and convex for losses.

Source: Wheelhouse

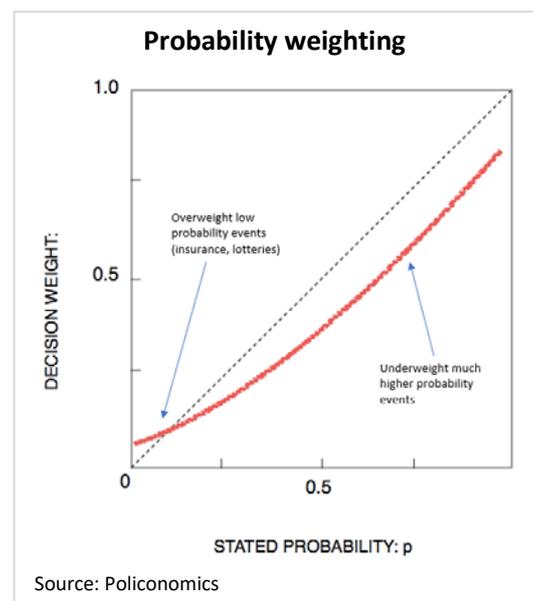
There are a number of other ground-breaking conclusions to come out of prospect theory (explaining why Kahneman was awarded a Nobel Prize in 2012), some of which are outlined below.

Overweighting small probabilities

This is the main feature of the probability weighting function (refer to the following chart), and explains the simultaneous demand for both lotteries and insurance.

Insurance is the mirror image of the aforementioned lottery tickets – whereby even though the likelihood of a costly event may be miniscule, most of us would rather agree to a smaller, certain loss (the premium paid) than risking a large expense. The perceived likelihood of a major health problem is greater than the actual probability of that event occurring. There’s a reason insurance companies are some of the oldest on the planet.

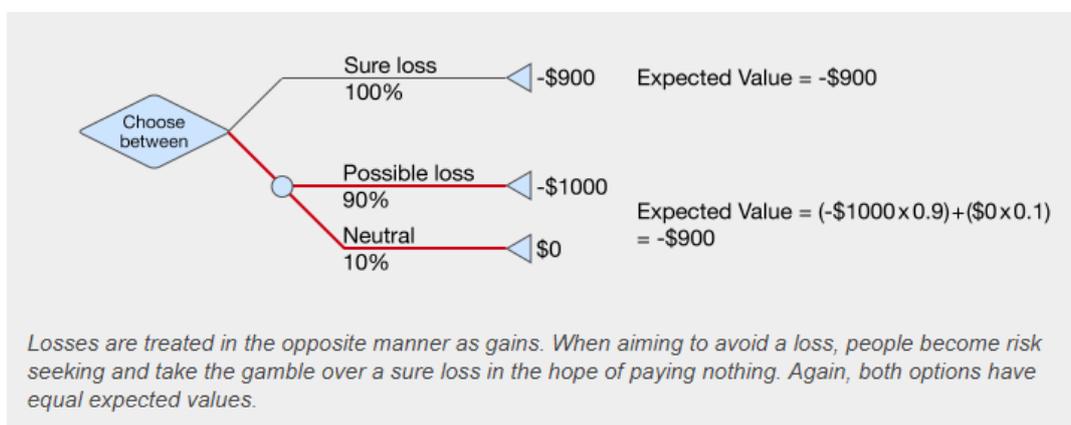
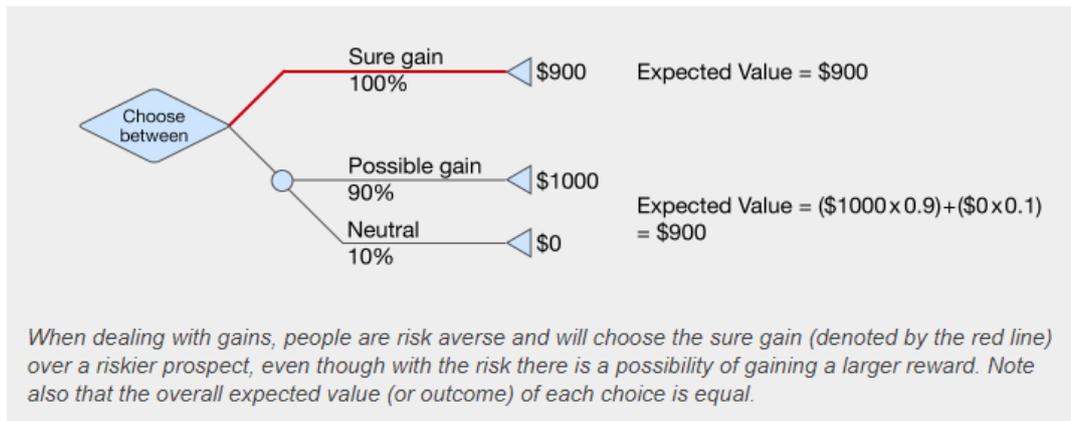
There are numerous examples of people under-estimating more frequently occurring or common risks. For example, a recent study of Australian hospital data¹ reports that that nearly 40% of all injury-related hospital admissions in Australia were due to falls, versus 13% for transport accidents. For Australians aged over 65, the rate for falls increases to more than three quarters of all hospital admissions. And yet most of us perceive driving to be a riskier activity than the daily event of taking a shower.



¹ Australian Institute of Health and Welfare, 'Unintentional falls remain the top cause of injury hospitalization in Australia', Canberra, 2012

There is an extension to this bias, where it is observed that people will ascribe more weight or value to the complete elimination of a given risk, as opposed to an equivalent reduction in risk. This principle is often evident in the pricing of insurance, where risk removal is priced differently to risk reduction (witness a high excess versus no excess and the subsequent effect on an annual premium). It is also often reflected in the pricing of many capital protected type instruments.

The following diagrams highlight the concepts of loss aversion, overweighting small probabilities, and an investor's focus on relative gains or losses (the path of returns) as opposed to the final wealth outcome.



Source: Nielsen Norman Group

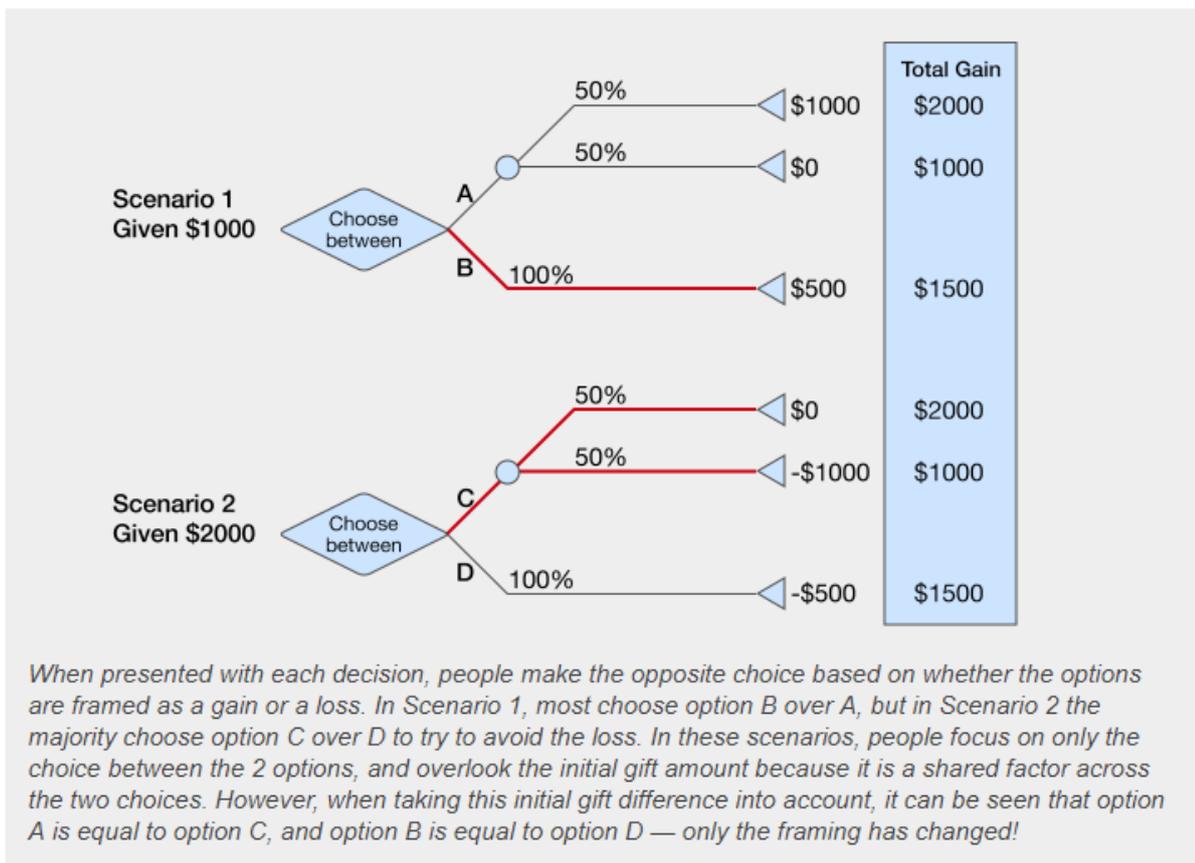
The first example shows that investors are far more likely to accept potential underperformance in exchange for increased certainty of a gain. When gains are being considered, ambiguity is penalised and investors opt for the certainty of \$900.

Conversely, when losses are under consideration, the sting of loss looms large and investors take more risks to avoid it. By overweighting the low probability of a \$0 loss, investors gravitate to the riskier option even though they should be completely indifferent as to the probability weighted final wealth outcome.

Framing and mental accounting

Framing describes the tendency for people to use a reference point as the benchmark for comparisons. As mentioned, this is a key difference to utility-based models which focused on final wealth outcomes.

In the example below, investors are given an initial sum of money and asked to choose between alternate scenarios. In either case the *final* wealth positions (total gains) are exactly the same across both scenarios. Under utility theory, an investor should choose the same option in either scenario – but in reality this rarely happens. The starting point matters, as it determines the path to the final wealth destination.



Source: Nielsen Norman Group

In Scenario 1, investors are overwhelmingly more likely to accept a certain gain of \$500 (risk-averse behaviour). However, when faced with relative losses, investors focus on minimising the sting of loss – even if this means the possibility of losing \$1000 in order to deliver zero loss (risk-seeking behaviour).

When gains are being evaluated, ambiguity is penalised – but the preference for avoiding ambiguity is less established when facing the prospect of losses. In other words, investors are assessing their path and altering the perceived risks according to their biases, as opposed to focusing on the final wealth attained (which is equivalent).

Mental accounting is a similar concept to framing and, while part of prospect theory, was identified and named by another Nobel Laureate, Richard Thaler, in 1988. It describes the process whereby people have different ‘mental bank accounts’ for different expenditures. For example, people tend to have a greater willingness to pay for goods using a credit card than cash, even though they draw upon the same resource. Similar to prospect theory, people are unable to focus on the final wealth outcome, instead considering the individual transactions separately and once again focusing on the path of returns.

Diminishing marginal returns

Utility theory and prospect theory appear similar in that as wealth or gains increase (utility theory is focused on total wealth and prospect theory on relative gains versus a starting point), the marginal value or utility progressively declines. In other words, the joy felt from a \$1000 investment moving up to \$1010 is less than the joy felt from a \$100 investment moving up to \$110. The absolute gain is the same, but clearly we value relative gains differently to absolute gains.

What does this mean for retirement planning?

We believe a sound understanding of prospect theory can assist advisers and investors design better real-world portfolios that more closely align our humanistic behavioural biases with the path of asset class returns – and ultimately, investment outcomes.

It seems like common sense when markets are calm, but integral to a financial strategy delivering the benefits and outcomes it was designed for is the investor ‘staying the course’ and remaining invested with a consistent long-term strategy. By recognising the pull of our emotional magnets and incorporating these into a comprehensive investment plan, advisers can add value by increasing the likelihood that their clients stick to their long-term plans.

Based on this, it makes sense for investor portfolios to address the following three key criteria.

1. Loss aversion (via capital protection)

Losses are felt more acutely than gains, and – as the GFC proved – retirees are more likely to disinvest during market stresses (i.e. precisely the wrong time) than other age groups. This behavioural bias during drawdowns is compounded by the separate concept of sequencing risk, which can also serve to materially impair outcomes for retirees.

As such, capital protection is integral during periods of market weakness. Note that this usually only comes at some cost of foregone investment returns (i.e. without risk there can be no return), and hence some approaches to capital protection can perversely *increase* risk as they simply increase the certainty of investment returns not delivering a portfolio’s objective. The key is to improve the *shape* of returns to minimise drawdowns – delivering a growth profile with capital protection.

2. Certainty effect (via higher income)

Investors value more certain returns above more ambiguous returns. In an equity landscape, we believe this helps explain the typical Australian retail investor’s focus on distributions, where regular bank account deposits can unfortunately be prized more highly than the accompanying capital fluctuations in the unit price. While there may be some comfort provided to retirees from regular payments, the more important metric is ‘total return’, which includes movements in the unit or share price alongside distributions.

Within this total return focus, income can play a critical role by providing:

- greater certainty, especially in low growth environments when real returns are difficult to generate, and
- increased predictability, as the range of possible investment outcomes can be narrowed.

3. Diminishing marginal returns (via a smoother return profile)

As above, an investor’s sense of value diminishes as gains increase, so a gain from \$100 to \$110 is less meaningful than a gain from \$50 to \$60. In this way, underperformance in a strong positive market is less important to an investor’s sense of value, especially in relation to stronger performance in a lower growth or negative market.

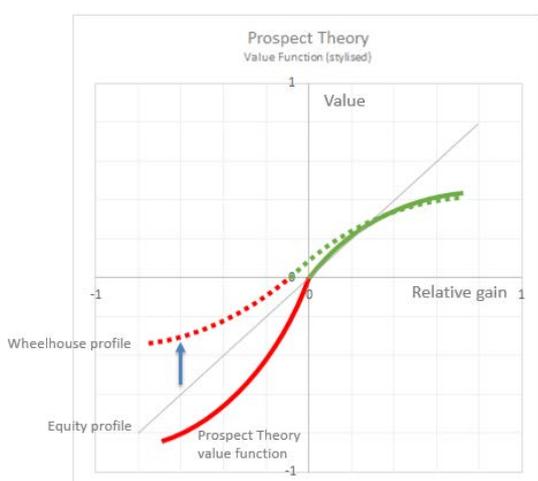
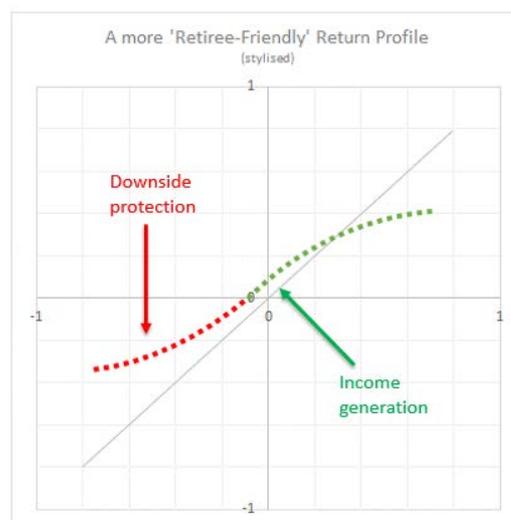
Prospect theory provides a framework for how investment decisions are actually made in the real world, as opposed to how they should be made in terms of maximising outcomes. Kahneman touches on the evolutionary origins of these behaviours, and that the instinctive, reactionary impulses that served us well for millennia need to be recognised as being less-suited for investment portfolios!

The Wheelhouse approach

We recognise the unique investment challenges faced by Australians in retirement.

Retirees require growth for their savings to fund ever-lengthening life expectancies, so equities are an important part of their asset allocation decision. However, retirees need those equity returns delivered in a more 'retiree-friendly' shape that incorporates **a higher component of income along with greater levels of capital preservation**. This retiree-friendly shape is illustrated in the chart on the right and underpins our investment philosophy.

It's no coincidence that our targeted return profile is very similar in shape to the value function observed in prospect theory. The below chart combines the two shapes.



- **Capital protection** – our strategy steadily reduces risk the more the market drops, preserving capital more aggressively the sharper the fall.
- **Income generation** – income accounts for approximately two thirds of our total equity return, increasing consistency and certainty – especially in low-return environments where it can be a source of real return (e.g. around 0).
- **Acceptance of drag in strong markets** – our return profile is consistent with behavioural tendencies being more accepting of underperformance in strong markets.

Proof of concept

The following chart illustrates the daily returns of the Wheelhouse Global Equity Income Fund versus the underlying equity portfolio, which is representative of typical equity market returns. Data points above the orange line represent outperformance and below the line represent underperformance, and the targeted 'retiree-friendly' return profile is self-evident.



Source: Wheelhouse daily returns are gross of all costs and fees. May 26 2017 – Apr 5 2018.
Data is presented in USD to be used for risk management of the strategy.

Net returns are available on our website, wheelhouse-partners.com

Conclusion

Prospect theory is the bedrock of modern behavioural finance, particularly as it applies to our investment decision-making.

Unfortunately, as humans our ‘emotional magnets’ can wreak havoc with rational decision-making, particularly in times of a crisis. Long-term, well-crafted investment plans can turn into ‘impatient capital’ overnight, with damaging consequences. John Maynard Keynes is famously quoted as saying, “When the facts change, I change my mind.” Evidence suggests that retirees are particularly at risk of acting against their best financial interests at the worst possible times.

We believe retirement portfolios that are constructed to deliver growth, but with a return profile that mirrors our humanistic biases and includes elements of loss aversion and income certainty, can result in an increased likelihood of adhering to long-term plans and thus achieving better outcomes.

From an adviser’s perspective, it should also be noted that this less stressful investment path may lead to a more rewarding and fulfilling client relationship – which is in everyone’s best interest.

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