Retirement explainer series

Drawdown strategies

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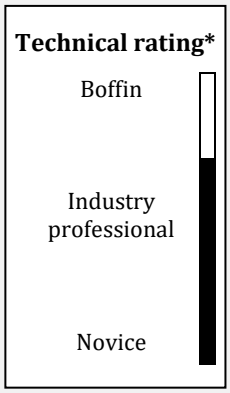
David Bell & Geoff Warren



** Refers to main body. Appendix is higher on the technical scale.*

Brief synopsis: This explainer discusses drawdown strategies and their implementation. Six categories of drawdown strategy are initially outlined before delving into selected strategies that are aligned with the three income objectives discussed in Explainer #2 – a 'draw-to-target' strategy for the income target objective; an 'affordable' drawdown strategy for the income optimisation objective; and their application under a hybrid 'baseline plus aspirational' income objective. The value of having flexibility over the income drawn is highlighted, the relation between drawdowns and flexible access to funds discussed, and selected implementation challenges noted.

Questions addressed:

1. What are the various types of drawdown strategy?
2. Which drawdown strategy is appropriate for particular income objectives?
3. How might drawdown strategies be implemented?
4. What type of income streams are delivered by various drawdown strategies?
5. How do drawdowns interact with the 'flexible access to funds' objective?

Key terms: Retirement income, drawdown (or withdrawal) strategies and rules, income objectives, income flexibility, flexible access to funds

Who should be interested? Retirement specialists, retirement leads, member experience personnel, financial advisers, policy makers, regulators, people wanting a career in the retirement income space

Introduction

A drawdown strategy is the set of procedures or rules governing how income is drawn from the flexibly accessible component of a retirement solution. This explainer identifies six categories of drawdown strategy, and links them to the income objectives discussed in Explainer #2. Selected drawdown strategies are examined in some detail, and implementation issues discussed. This explainer adopts more of a '*how it is done*' focus than the preceding explainers. A selection of references is cited for those interested in some further reading.

Drawdown strategies have no life on their own

A drawdown strategy determines the amount of income that is to be drawn from accessible funds, most likely an account-based pension (ABP) in an Australian context. Drawdowns 'shape up' the total income delivered by a retirement solution in conjunction with other income sources including potentially the Age Pension and related supplements and any income generated by lifetime income streams (i.e. annuities). The drawdown strategy regulates both the *magnitude and timing* of total income, i.e. how much income is delivered, and when.

A drawdown strategy does not (and should not) have a life of its own. It needs to be designed within the context of a broader retirement solution rather than imposed in isolation. There are two reasons:

1. **Drawdowns should link to objectives** – The three objectives under the retirement income covenant (RIC) of (i) maximising expected income, (ii) managing the risks to income and (iii) providing flexible access to funds were discussed in Explainers #1, #2 and #3. The drawdown strategy is integral to managing the trade-off between the three RIC objectives via determining the level and shape of total income, and influencing the amount retained as accessible funds. For example, an *income target objective* implies aiming to draw enough income to attain the target; while an income *optimisation objective* might imply drawing an amount that is deemed sustainable or affordable at a given point in time. Drawdowns might be restricted for members with a strong desire to retain significant accessible funds throughout retirement or are highly concerned with the risk of 'running out' (i.e. exhaustion of assets and hence income). Such preferences imply not setting out to convert all assets into income and thus intentionally restricting drawdowns.

2. **Drawdowns need to account for other income sources and the investments** – We have already mentioned the need to take other income streams into account in determining a drawdown strategy. The Age Pension is particularly notable. It can support higher drawdowns by acting as a significant hedge against poor investment returns, thus diluting the risk associated with running out. It may encourage drawing down at a faster rate once a retiree enters the 'taper zone' in order to maximise total income through capturing more Age Pension[1]. How the assets are invested should also impact on the drawdown strategy. Investing in riskier assets with higher expected returns supports higher drawdown rates in anticipation of future wealth generation, albeit at the risk of lower income if investment returns turn out to be poor.

More strategies than you can shake a stick at

A plethora of drawdown strategies have been proposed[2] – too many to list them all. We adopt the approach of identifying six broad categories of drawdown strategy and linking them to the income objectives discussed in Explainer #2.

The table over lists and provides a high-level overview of the six categories of drawdown strategy, along with selected references for readers who want to delve further. The six categories are:

1. **Dynamic optimisation** – The drawdown strategy is 'optimised'[3] over time by maximising an 'objective function' e.g. expected utility. This approach largely exists within the realms of academic literature. We mention this approach for completeness, choosing to focus on drawdown strategies that can be expressed as straightforward procedures or rules and hence are readily implementable in practice.

2. **Mandated by policy** – This is basically the minimum drawdown rules (MDRs) in an Australian context[4]. These rules act to constrain drawdowns from ABPs to a minimum level.

3. **Constant real amount** – An amount is established at retirement for the real income to be drawn until the savings account is exhausted[5]. This is known as the 'safe withdrawal rate' in the literature, but might be referred to as the 'x% rule'. The best-known version is the '4% rule', which is widely used in the US and entails drawing an amount equal to 4% of balance at retirement every year adjusted for inflation. A distinguishing feature of the x% rule is that the drawdown amount is determined without any consideration for other income streams. The percentage drawn may be calibrated based on the expected return on the investments, planning horizon and tolerance for running out of funds. A wide range of variations on the x% rule have been explored in the (mainly US-based) literature.

[1] This is somewhat complex, as it will not suit all retirees to run down their assets to capture more Age Pension. Nevertheless, this result often emerges from modelling of 'optimal' income strategies for Australian retirees.

[2] A sense for the wide variety of potential drawdown strategies can be found in papers by Blanchett, Chen and Kowara (2012) and Macdonald et al. (2013) and Pfau (2015), noting that more drawdown strategies have been proposed since these overview articles were written.

[3] Dynamic programming is often used.

[4] The US counterpart is called the "required minimum distributions" (MDRs), with tax penalties incurred for non-compliance.

[5] The strategy is implemented as a form of income target.

Selected types of drawdown strategy and examples

Category	Examples	Comments	Some suggested references
Dynamic optimisation	Dynamic programming	Used in academic research, typically through maximising expected utility using dynamic programming. May be set up to address various income objectives and hence drawdown categories by applying different utility functions. Difficult to implement in practice.	Butt and Khemka (2015) provide brief overview of dynamic optimisation. Employed by Butt, Khemka and (2022) for Australian retirees under two utility functions.
Mandated by policy	Minimum drawdown rules	Australian MDRs are designed to ensure some income is taken but may be sub-optimal.	Retirement Income Review (2020) contained considerable discussion on the MDRs.
Constant real amount	x% rule	Draw x% of balance at retirement, adjusting for inflation to maintain real income. Common in the US, e.g. 4% rule. Often discussed under the heading of "safe withdrawal rate".	Bengen (1994) is the classic reference proposing 4% rule. Ample US literature exists on variations to the basic x% rule.
Draw-to-target (allowing for other income sources) *Relates to income target objective: see Explainer #2*	Replacement rates	Aims to maintain the standard of living enjoyed prior to retirement by drawing a percentage of real pre-retirement income. Replacement rates of 60%-80% are typical.	Retirement Income Review (2020) analysis was based on replacement rates. Chybalski and Marcinkiewicz (2016) for detailed discussion.
	Budget standards	Draw sufficient income to meet a spending budget. The ASFA retirement standards are a notable example, and are based around the cost of a basket of goods and services.	ASFA standards found at: https://www.superannuation.asn.au/resources/retirement-standard/
	Peer benchmarks	Spend in line with peers in a similar situation. The Super Consumer Australia (SCA) retirement targets provide low, medium and high income levels based on ABS data.	SCA targets found at: https://www.superconsumers.com.au/retirement-targets
Dynamic *Relates to income optimisation objective: see Explainer #2*	'Affordable' drawdown	Schedule for a percentage of balance to be drawn at each age is formed, often with reference to a planning horizon (e.g. life expectancy) and a hurdle rate of return (also often known as an assumed interest rate). Income adjusts with remaining balance and hence investment experience. The approach has been described as 'virtual annuitisation'.	Some examples include: MacDonald et al. (2013) Waring and Seigel (2015) de Ravin et al. (2019)
	Dynamic rules	Adjustments made to a baseline drawdown amount or drawdown rate with reference to investment experience and hence changes in probability of success or failure in meeting the planned drawdowns. A variety of rules exist.	For examples, see Guyton (2004); Guyton and Klinger (2006); Blanchett, Kowara and Chen (2012); Blanchett (2017)
Hybrid *Includes 'baseline plus aspirational' income objectives: see Explainer #2*	Baseline + aspirational	Baseline level of income is always taken, e.g. for subsistence or non-discretionary spending needs. Additional amounts taken as aspirational component, e.g. for discretionary spending. Aspirational component could be formulated as either an income target or dynamic drawdown strategy.	Blanchett (2023) is a good example. Some academic papers impose a consumption floor, e.g. Iskhakov, Thorp and Bateman (2015).
	Drawdown with deferred annuitisation	Drawdown from a retirement account is combined with a deferred annuity or delayed annuitisation, with drawdowns managed to generate income through to the age that annuity income commences.	Discussed by MacDonald et al. (2013). See appendix of Australian Treasury (2023) for a proposed application.

4. **Draw-to-target** – This drawdown strategy is based around drawing enough to attain a *total* income target after allowing for other sources of income. It thus is focused on the total member outcome, and accords with the income target objective discussed in Explainer #2. Specification of the income target itself is central to the strategy. The above table recounts the three approaches to specifying an income target that were raised and discussed in Explainer #2, including replacement rates, budget standards (e.g. ASFA comfortable) and peer benchmarks (e.g. the SCA retirement targets). Another issue is whether the income target should vary with age. For instance, the target might be reducing in line with the observed tendency of retirees to spend

less as they age, or on the basis that spending needs are lower at older ages. Another possibility is to increase the target so that retirees keep up with rising community livings standards. The next section contains further discussion on how a draw-to-target income strategy might be implemented.

5. **Dynamic** – Dynamic drawdown strategies entail rules for adjusting income over time in response to realised experience, in particular investment returns and their effect on the income that can be afforded. A variety of dynamic strategies exist. While these drawdown strategies generate variable income streams, some formulations may adopt rules that are directed towards delivering an element of income stability through deferring or smoothing adjustments to income. Dynamic drawdown strategies accord with the spirit of the income optimisation objective discussed in Explainer #2. They are discussed in more detail below and in the appendices.

6. **Hybrid** – A hybrid drawdown strategy combines features of other strategies. The 'baseline plus aspirational' income objective discussed in Explainer #2 aligns with a hybrid strategy. Here the baseline would be treated as an income target that is delivered if at all possible, and might align with subsistence income or non-discretionary income. The aspirational component might entail a dynamic drawdown strategy; although it could be an aspirational income target.

We now discuss how drawdown strategies might be framed under the three income objectives highlighted in Explainer #2 in more detail.

Drawdown under an income target

As a general rule, the draw-to-target drawdown strategy is implied by an income target objective. Intuitively, if the member has an income target, then enough income should be drawn to deliver the target if possible. The logic of doing so is reinforced if future expected income is treated as less valuable than current income due to either time discounting or accounting for the decreased likelihood of being alive to enjoy the income later in retirement[6]. Thus an element of 'bird in the hand' may be at play, i.e. hit the target now when you are able[7].

On closer examination, implementing an income target objective that maximises member welfare is not as straightforward as just setting an income target and drawing to that amount regardless. Issues arise where the income target is misaligned with available assets. If assets are insufficient to sustain the target over a reasonable period, should the target or drawdowns be reduced? Conversely, if assets comfortably exceed that required to sustain the target with high confidence, should the target or drawdowns be increased? Misalignment between the target and assets can arise either due to how the target itself is initially set, or due to unexpectedly good or bad investment returns along the path.

The two charts over motivate the discussion. The chart on the left plots the distribution of income under a draw-to-target strategy for a member who commences retirement with a balance of $400,000, is a homeowner with full access to the Age Pension and supplements, and is targeting ASFA comfortable of $50,891 (at September 2023). With reference to the median income, the draw-to-target strategy is expected to deliver ASFA comfortable until about age 93, after which income would fall to the Age Pension. There is about a 5% chance that ASFA comfortable could be sustained if the member lives to 109, and a 5% chance that it might only be sustainable until about age 82. On balance, the target seems well-calibrated as there is a good chance of the target being delivered over a reasonable period.

The chart on the right assumes that the member starts retirement with only $200,000. The analysis now indicates a high likelihood of the balance being exhausted between about age 73 and age 82 – well less than life expectancy of closer to age 90[8]. Thus ASFA comfortable seems an unsustainable target from the get-go for a member with $200,000.

This is a good example of how it is dangerous to set income targets and implement a draw-to-target strategy without also giving due consideration to the available means to sustain the desired income. Thus the first issue is whether the target itself needs to be calibrated to available means in the initial instance.

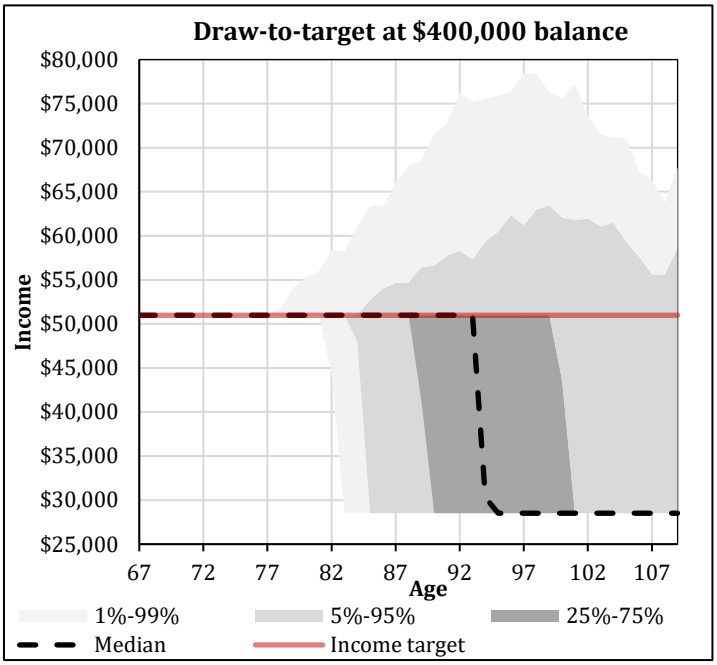
[6] Any undershooting of the target now is certain, while continuing to draw the target defers the risk of undershooting to after the assets are totally exhausted, which is likely to occur much later in retirement.

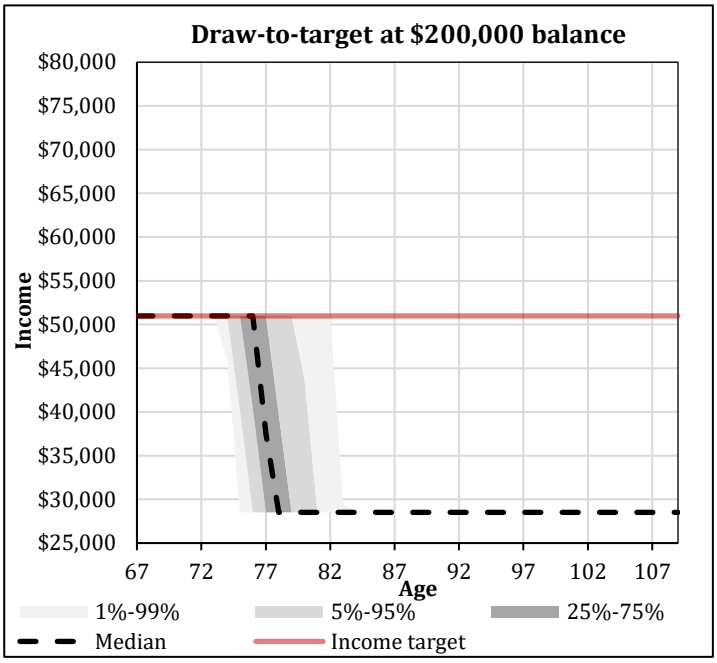
[7] Such behaviour is also predicted by prospect theory, which suggests taking risks to reach the reference value in the realms of loss. In a retirement context, this translates into securing the target now at the peril of missing it later.

[8] A 2019 note for the Actuaries Institute by Jim Hennington estimates that life expectancy is 87 years for a single male and 89 years for a single female after allowing for mortality improvements, see https://actuaries.asn.au/Library/Miscellaneous/2020/RNLifeExpectancy.pdf.

Income delivered under draw-to-target drawdown target at differing balances

ASFA comfortable target ($50,981), assuming access to full Age Pension and supplements; 60/40 portfolio





A further issue is whether the target should be treated as sacrosanct once set, or whether the drawdown strategy might be dynamically adjusted over time if circumstances change. Consider again the left chart above. If the member encounters a poor run of investment returns they could find themselves on a path where the target may look unlikely to be sustained beyond age 80-85. They face two choices: stick with the drawdown strategy and accept that their balance might soon be exhausted; or cut back on the income drawn. The latter could be implemented through either adjusting the target downwards or deciding to draw less than the target, at least until the balance (hopefully) rebuilds.

Conversely, might more income be drawn after a good run of returns? Apart from the possibility that the MDRs might require higher drawdowns, the question arises over whether either an adjustment to the target may also be in order, or a rule formulated for drawing above the target. The latter is happening in the left chart, where a rule was devised for drawing more tha the target where it is safe to do so[9].

In summary, a 'draw-to-target' drawdown strategy is most appropriate under an income target objective. The issue is whether an element of flexibility should be introduced into the implementation, either by recalibrating the income target where clearly misaligned with available assets, or establishing rules where income either above or below the target may be drawn.

Drawdown under income optimisation

An income optimisation objective implies maximising the expected income extracted from available assets while managing income risk, as discussed in Explainer #2. Dynamic drawdown strategies best accord with this objective. Strategies in this category set out to make best use of available assets by initially taking as much income as is prudent, and then adjusting income upwards or downwards in response to investment returns. This allows as much income as possible to be extracted given the realised path of returns, while managing income risk by always retaining some assets to support future income if the member survives. Dynamic drawdown strategies might be likened to trying to land an aeroplane when the runway length is unknown!

While many dynamic rules exist, we will focus on what we shall call the 'affordable drawdown strategy'. This strategy is readily implementable by

[9] The rule applied for drawing above target (and the excel models used in the examples) were formulated for the *Primer on Retirement Income Strategy Design and Evaluation* released by US Society of Actuaries, which may be found at: https://www.soa.org/resources/research-reports/2023/ret-income-strat-de/.

superannuation (super) funds, and the underlying principles are already being applied in practice through lifetime income streams[10]. We describe its operation below and provide further detail in Appendix 1. Examples of two other dynamic rules are provided in Appendix 2.

Under the affordable drawdown strategy, income is determined as a function of a planning horizon and what we will call a 'hurdle rate' of return[11]. The planning horizon determines the period over which income needs to last and is often set with reference to remaining life expectancy. The hurdle rate anticipates that the assets are expected to generate returns that add to the balance and hence support additional income into the future. A higher hurdle rate signals that higher income is 'affordable' and thus increases the drawdown rate.

(*Technical note* – The hurdle rate operates as a reference point, with the trajectory of income being impacted by differences between realised returns and the hurdle rate. One implication is that the relation between the hurdle rate and expected returns can be used to moderate the overall shape of expected income and the remaining balance over time. Appendix 1 discusses how this works.)

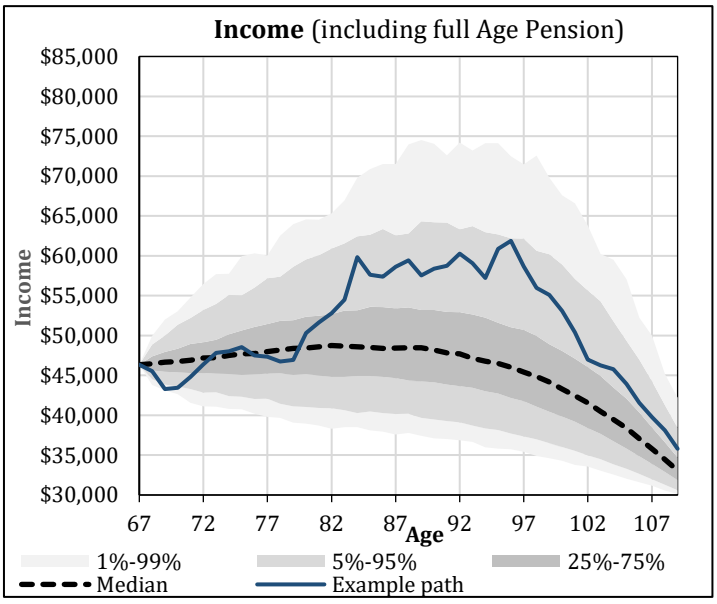
The affordable drawdown strategy is expressed as a schedule of drawdown rates, i.e. what percentage of the balance is to be drawn at each age. The result is that, while the percentage amount to be drawn at each age is predetermined, the *actual income drawn will fluctuate with balance and hence realised investment returns*. An affordable drawdown strategy thus looks similar in form to the MDRs, although the percentage drawdown rates will differ. (Appendix 1 compares the affordable drawdown strategy with the MDRs.)

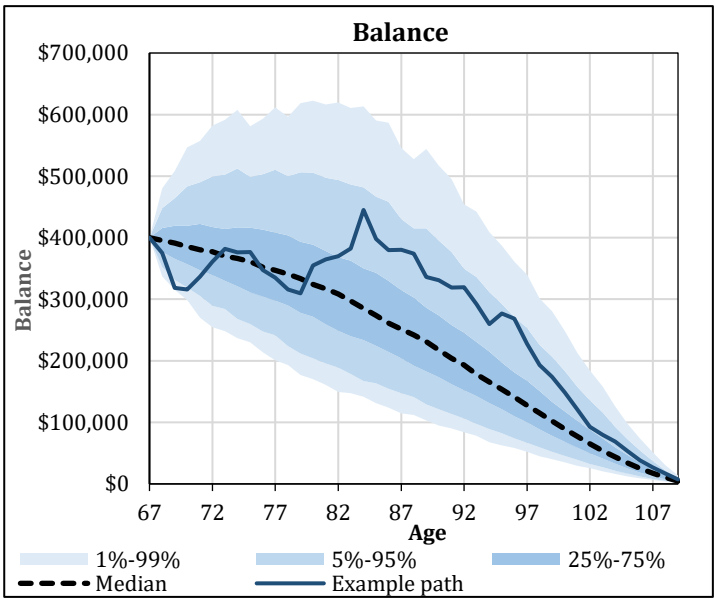
The chart below presents an application of the affordable drawdown strategy: see Appendix 1 for details of the analysis. The plots show the percentile distributions for income on the left and remaining balance on the right. One example path is also plotted to illustrate how individual paths may be volatile over time, noting that percentiles across a range of paths can give an illusion of stability.

The affordable drawdown strategy has the following features, which are illustrated by the chart:

- Tendency to deliver a volatile income stream, as reflected in the 'example path';
- The balance is never totally exhausted (at least until the end of the horizon, set here at age 110);
- Some amount of income is thus always generated;
- Dynamically adjusting the income drawn in line with movement in the remaining balance tends to limit the extremes of the income distribution by cutting back income when returns are lower and increasing income when returns are high.

Income and remaining balance under an example affordable drawdown rule





[10] The principles underpin the design of investment-linked annuities being offered by providers such as AMP North, Australian Retirement Trust, Challenger and Generation Life. A key difference is that these products also provide longevity protection through access to 'mortality credits'.

[11] The hurdle rate is also called an "assumed interest rate" or "assumed investment return" (AIR).

Notable points of difference arise versus the draw-to-target strategy as plotted earlier. The latter has the potential to deliver both higher and lower income than the affordable drawdown strategy. It may also result in total exhaustion of the balance and hence income drawn at some point in time. In part, this is because the draw-to-target strategy is more exposed to sequencing risk[12]. The draw-to-target strategy may deliver stable income, but it only does so up to the point that the balance is exhausted and income dislocates downwards.

In summary, the affordable drawdown strategy adjusts income in line with available assets over time but delivers a variable income stream as a consequence. It hence might only be suitable for members who can cope with income variability as they are able to exercise some flexibility.

Drawdowns under hybrid objectives

The hybrid income objective we discuss assumes there exists a base level of income that acts as a type of hard target to be met if at all possible, with income above the base level treated as aspirational. When implementing a drawdown strategy under a hybrid objective, enough should always be drawn to deliver the base income where feasible. A question that arises is whether the base might be covered by other income sources, thus rendering redundant the need to draw the base income from accessible assets. For instance, an acceptable base level of income could be delivered by the Age Pension and other social security benefits (at least for many homeowners). Another question is whether a lifetime income stream might be taken to cover the base, rather than rely on drawdowns from accessible funds. In this case, the drawdown strategy reverts to addressing the aspirational income component only.

The aspirational component could be formulated as either an income target or income optimisation objective. Either way, the drawdown strategies discussed above may be applied to the aspirational component under a hybrid income objective.

Value of flexibility

Flexibility to vary income is valuable. A member with such flexibility can take higher drawdowns initially and expect higher income over the course of retirement. A preparedness to cut back on income if required brings benefits through two channels:

1. It can support taking more investment risk on the understanding that income can be lowered if poor returns are experienced. Taking more investment risk in turn supports taking more (initial) income through an expectation of higher future returns.

2. Drawing more income in the initial instance increases the chances of experiencing higher income over the full course of retirement once survival probabilities are taken into account. Consider two members. Member A adopts a low drawdown rate in order to be more confident they will not run out. This member would greatly undershoot on the income they could afford if investment returns are good, or if they happen to die early – even though they should be able to sustain the lower income if they survive. Member B adopts a higher initial drawdown rate. They start off enjoying higher income and can continue to do so if investment returns are good. If investment returns are poor, or they survive to an old age, they may need to cut back. Member B is more likely to enjoy the higher income of the two on a probability-weighted basis once likelihood of survival is considered.

Thus an important consideration in forming drawdown strategies is capacity of the member to be flexible over the income they draw, i.e. their ability to adjust spending downwards if returns are poor or they live a longer life. While not all members will be comfortable exercising this flexibility, those who are able and willing to do so can use it to their benefit.

Providing flexible access to funds

We discuss the flexible access to funds objective in Explainer #3. A key point is that flexible access to funds might be required throughout retirement and not just at retirement. Doing so inevitably entails reducing drawdowns and hence income to ensure that some assets remain available, rather than setting out to convert all assets into income.

Below are four ways that income may be reduced to provide flexibly accessible funds. The first two impact directly on the drawdown strategy; while the third and fourth deploy other mechanisms.

1. Under an income target objective, the target might be reduced (or less than the target drawn) to ensure more assets are retained.

2. Under the income optimisation objective, drawdown rates might be reduced. This might be

[12] Drawing a specified dollar amount of income means that a higher proportion of the balance is drawn after poor investment returns, which can quickly run down the balance if poor returns are incurred earlier in retirement.

implemented by shaving the drawdown rates across the board or setting a lower hurdle rate under an affordable drawdown strategy.

3. A contingency fund could be 'carved out' from the assets and invested separately as a source of flexibly accessible funds (see discussion in Explainer #3). This reduces income and hence drawdowns through lowering the assets on which drawdowns are based.

4. Some access to funds may be provided through a lifetime income stream, e.g. death benefits, ability to redeem capital not paid out as income. Such arrangements result in the lifetime income stream delivering lower income than otherwise.

Some implementation issues

Strategies designed around income optimisation are relatively straightforward to implement as they can be formed with respect to retirement savings (i.e. an ABP) in isolation. Further, a schedule of drawdown rates under an affordable drawdown strategy should be easy for super funds to implement as a variation on the MDRs with differing percentages. An element of complication may arise if drawdowns are taken under dynamic drawdown rules that account for the path of returns, although this hurdle should be addressable through system design.

A draw-to-target strategy is more problematic. The drawdown strategy gives rise to various issues related to the need to access information other than the account balance for effective implementation. First, allowance should ideally be made for other income streams in determining how much income is drawn. Here accounting for Age Pension requires knowledge of any personal attribute that influences Age Pension eligibility, including assets outside of super, homeownership and partnered status. Second, such attributes can also matter in setting the income target. In short, it is difficult to properly calibrate both the drawdown and the income target without access to certain personal information on the member. Another hurdle is that the strategy implies drawing a *dollar amount* from an ABP that needs to be personalised and probably time-vary (at least in nominal terms). This may create challenges from system and governance perspectives[13].

Another issue is the MDRs. While easy to apply as a constraint, they can also disrupt the implementation of a drawdown strategy by requiring higher drawdowns than desired. For example, members that have adequate income available from a lifetime income stream or a strong preference to retain flexible access to funds may have genuine reasons for drawing less than indicated by the MDRs.

Finally, research[14] suggests that it can be optimal to increase drawdowns within the 'taper zone' under the Australian means testing rules to capture more Age Pension and hence boost expected income. Allowing for this will add complication in applying strategies designed around income optimisation.

Our take: Multiple drawdown strategies needed

We have discussed a variety of drawdown strategies. A key takeaway is that there is no one-size-fits-all strategy as members can have differing objectives and preferences, including varying willingness and capacity to exercise flexibility over income. Super funds and other providers should set out to offer a suite of drawdown strategies to meet these differing needs and wants, rather than commit to one type.

APPENDIX 1

Closer look at the affordable drawdown strategy

This appendix provides further details on the affordable drawdown strategy. The illustrative analysis underpinning the chart on page 6 and presented below is based on life expectancy for an Australian female that invests in a 60/40 portfolio with an expected real return of 2.5%. We have allowed for a full Age Pension at September 2023 of $28,514 to maintain consistency with the income target analysis, noting that the existence of other income streams make no impact on the drawdown rates under this strategy.

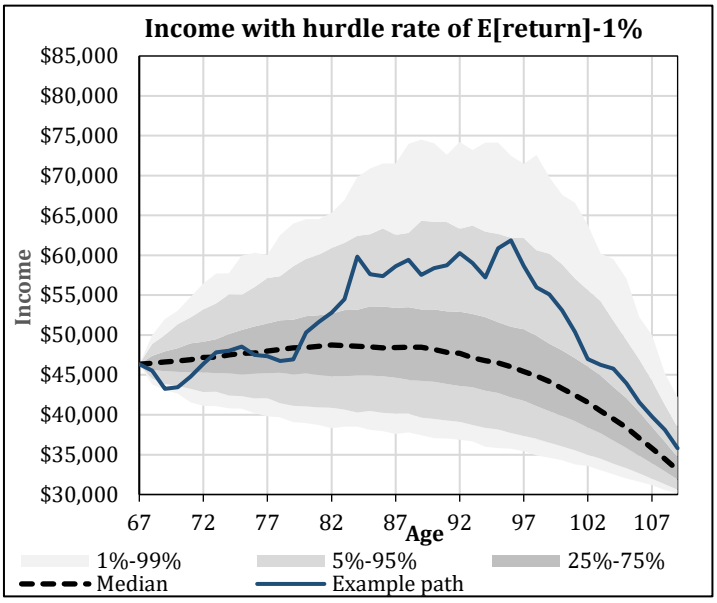
The chart set over illustrates how different hurdle rates impact on the shape of the expected income stream. Percentile distributions are plotted for income on the left and remaining balance on the right for three hurdle rates. We also plot one path (based on the same realised returns) that is extracted from the simulations to show how income and balance fluctuates over time. This illustrates the point that, while percentile distributions across a range of simulations can give an impression of smoothness, a member will ultimately experience a single income path that may be volatile.

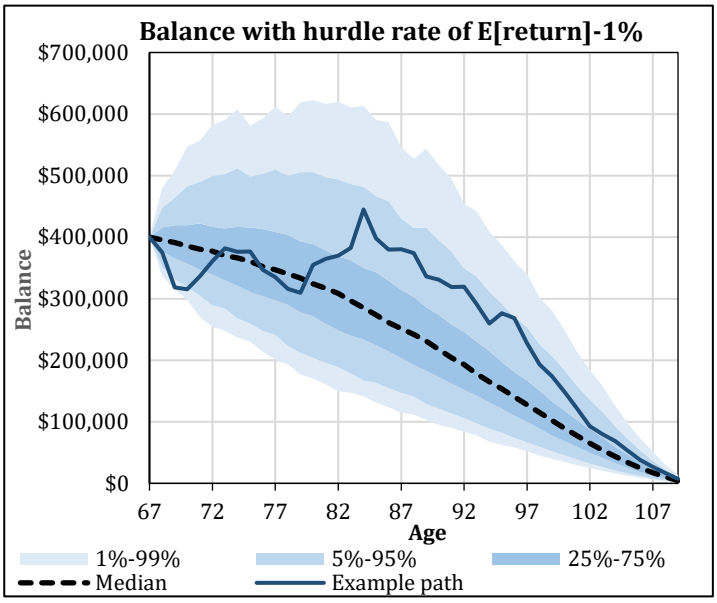
[13] For example, the super fund will need to keep tabs on Age Pension eligibility over time, and the member may need to delegate the authority to the trustee to determine and draw a time-varying dollar amount.

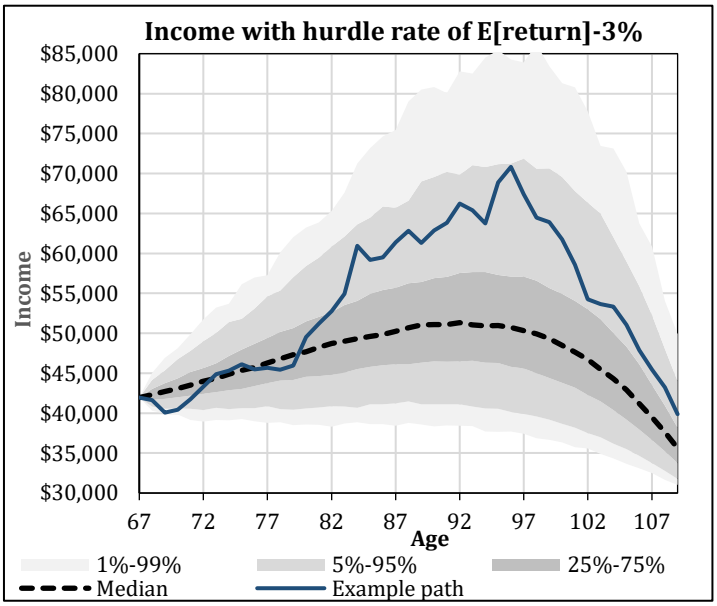
[14] For example, the Actuaries Institute has proposed drawdown rules incorporating increased drawdown rates in a certain balance range to capture more Age Pension.

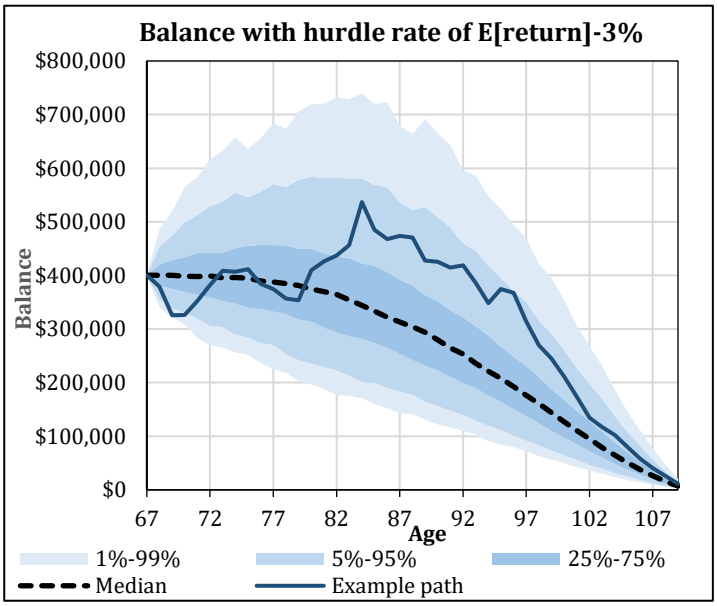
Income and remaining balance under affordable drawdown target with differing hurdle rates

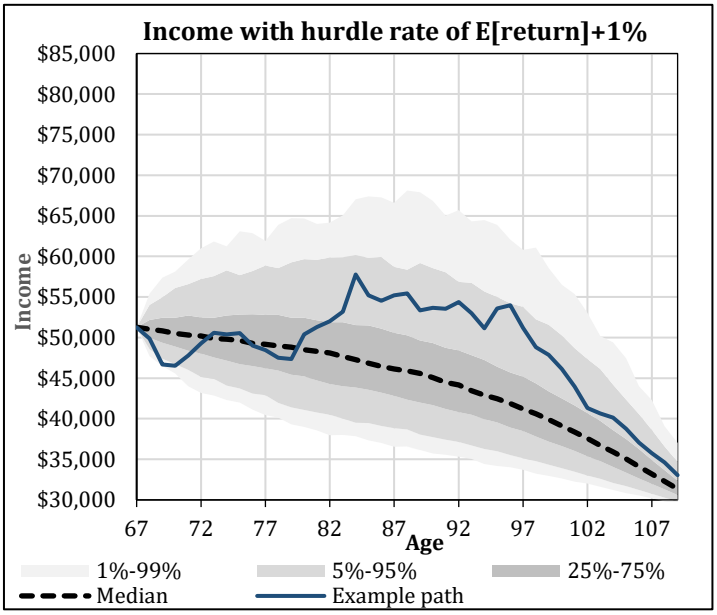
Life expectancy based on Australian female, with access to full Age Pension and supplements; 60/40 portfolio

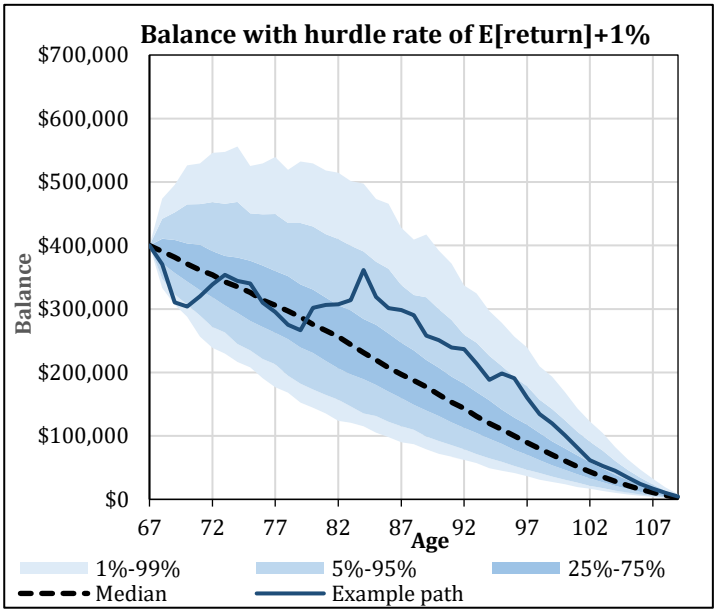












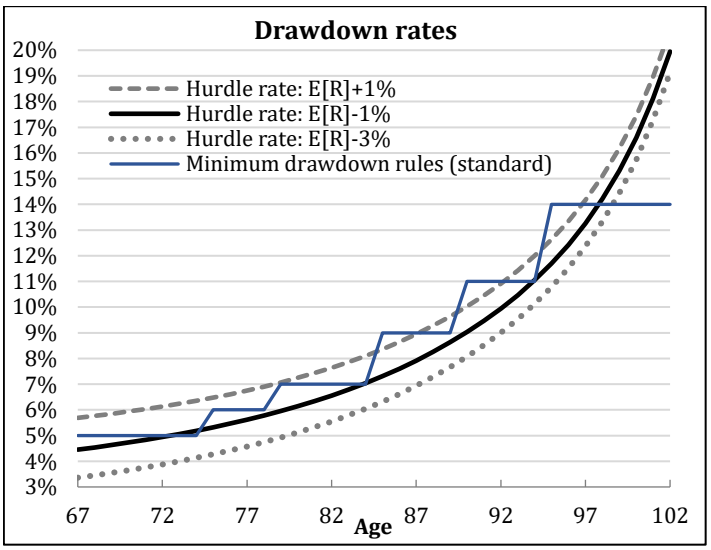
The top charts show results for a hurdle rate of expected return less 1%, and are the same series that were plotted on page 6. Here the hurdle rate is chosen to deliver a relatively flat stream of expected income until the mid-late 90s, with income then dropping off at very old ages.

The middle and bottom charts on page 9 reveal the impact of setting the hurdle rate 3% below and 1% above the expected return, respectively. The low hurdle rate (middle charts) results in income starting lower then rising over time before dropping off (albeit still delivering more income late in retirement than seen in the top chart). Thus income has been shuffled from earlier to later in retirement. The high hurdle rate (lower charts) results in income starting higher and then trending down over time. Thus income has been shuffled from later to earlier in retirement. This demonstrates how the relation of the hurdle rate to expected return governs the broad trajectory of income over time.

What is going on is that the hurdle rate operates as a reference point against which realised returns are implicitly compared. When realised returns exceed the hurdle rate, asset values would have risen further than built into the calculations, which results in an additional boost to income. Similarly, realised returns that are lower than the hurdle rate will dampen income. The implication is that setting the hurdle rate below the expected return will tend to tilt the income stream upwards as the member ages (as assets are more likely to turn out greater than built into the calculations). Conversely, setting the hurdle rate above the expected return will tend to generate a declining income profile with age. It is worth noting that income is initially higher with a higher hurdle rate, as it amounts to assuming that future returns will be higher and hence more income affordable (and vice versa for lower hurdle rates).

Examining the remaining balance charts on page 9 reveals that the hurdle rate also influences the availability of accessible funds. A lower hurdle rate (middle right) results in the balance being drawn down more slowly than under a higher hurdle rate (bottom right). Hence, the counterpart of shuffling income from earlier to later in retirement is that more accessible funds will tend to remain available for a longer period before the strategy exhausts them as the end of the planning horizon approaches.

The above chart plots drawdown rates under the three hurdle rates, along with the MDRs at the standard rate. This chart further reveals how higher hurdle rates dictate higher drawdown rates, due to the fact that higher returns are implicitly assumed and hence more income is deemed 'affordable'.



The above charts raises some interesting points about the MDRs. First, until about age 99 the drawdown rates sit in the ballpark of an affordable drawdown strategy with a hurdle rate of around the expected return that we have assumed (i.e. 2.5% real). This can be inferred based on the positioning of the MDRs being around the drawdown rates with the hurdle rate set at expected return ±1%. Further, the MDRs are not calibrated towards the expected return on the member's actual portfolio. The MDRs may be set too high for a member that invests defensively, and set too low for one that invests aggressively. One advantage of the affordable drawdown strategy is that it provides a mechanism for adjusting drawdown rates to take into account the expected return on the underlying portfolio.

APPENDIX 2

Two example dynamic rules

We describe two dynamic drawdown rules to illustrate another class of strategy that attempts to maximise income while managing risk. One rule is designed by Jonathon Guyton, and the other by Don Ezra. These are just two examples – plenty of drawdown rules of the dynamic type are available.

Guyton rule

The 'Guyton' rule[15] varies the constant real drawdown strategy (i.e. the x% rule) through

[15] Initially proposed in Guyton (2004), and further examined by Guyton and Klinger (2006).

additional procedures to adjust drawdowns in response to realised returns and inflation. Guyton proposes a group of rules with three main variations of increasing complexity. The most basic rule eschews the inflation adjustment applied to the drawdown amount when returns are negative on the overall portfolio. A further variation applies hierarchical rules that govern drawdowns from asset sub-portfolios with reference to whether particular portfolios have generated positive or negative returns. The third variation places a 6% cap on the inflation adjustment to address high inflation. Guyton concludes that his rules support a higher initial constant 'safe' drawdown rate of around 6%, i.e. better than the 4% rule. This is an example of the value of flexibility, as was discussed earlier.

Ezra's rule

The rule devised by Ezra[16] combines a bucketing strategy with a real constant drawdown strategy, i.e. a variation on the x% rule. The initial drawdown rate is set using similar principles to those underpinning the affordable drawdown strategy. This is combined with a procedure for staged adjustment of income upon persistently poor returns.

Ezra first estimates a 'sustainable' real drawdown rate based on a planning horizon with reference to life expectancy and expected returns for the chosen asset mix. He then determines an allocation to an 'insurance' (defensive) bucket, which is deployed to generate income. The amount allocated is based on a 75% probability that any losses will be recovered by the time the insurance bucket is exhausted, so that the strategy can then re-set and income is sustained. His estimates allocate enough into the defensive bucket to cover 5-years of income. The remainder goes into the growth bucket. If gains are made, the growth bucket is used to top up the insurance bucket. If losses are made, then income is drawn from the insurance bucket without top-up. If the growth bucket has not recovered by the end of 5-years, Ezra suggests reducing income over the planning horizon. This provides a mechanism to gradually adjust income in the event of sustained poor investment returns.

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[16] See Don Ezra's blog post number 31 and number 51, accessed via the index found here: donezra.com/wp-content/uploads/2023/12/ACTUAL-INDEX-OF-BLOG-POSTS-2023.html.