

Inflation risks and retirement income innovations

October 2022

Inflation in Australia and around the world is hitting new generational highs. While the political debate is whether wages can increase to offset inflation without creating a 1970s-like wage-price spiral, retirees don't have that luxury. Retirees are no longer earning a wage that can increase with inflation. So they need a different approach to manage it.

A growing number of retirees are looking to generate retirement income over longer periods than prior generations ever needed to. This has prompted financial product innovations to help retirees achieve this. But how well do some of these innovations manage the inflation risks retirees currently face?

What is inflation?

Inflation refers to the rising costs of goods and services over time. It reduces the purchasing power of a retiree's income if not managed. Retirees need income that compensates for inflation to sustain a stable lifestyle throughout retirement. If the current high levels of inflation were sustained for several years the lifestyle of many retirees could be severely impacted.

Some level of inflation occurs in an economy as prices of goods and labour (wages) are not easily reduced. Flexibility in a market economy requires adjustments in relative prices, so some prices will rise while other prices do not (or rise less). This enables goods and capital to be allocated efficiently. High levels of inflation are generally undesirable. Adjustments to changing prices create frictional costs to the economy which grow rapidly in high inflation periods. Hyper-inflation has been responsible for the collapse in the economy of several countries historically including 1920's Germany, Argentina in the 1970s and 21st century Zimbabwe. A stable inflation rate is recognised as desirable in the Reserve Bank of Australia's inflation policy target of 2-3%p.a., on average, over time.¹

Inflation risk for investors arises because the level and impact of future inflation is unknown. Inflation expectations can be factored into an investment strategy, but there needs to be a plan for what happens if inflation does not match the built-in expectations.

Historical inflation costs- 1970s wage-price spiral

One of the current economic concerns is a wage-price spiral that could echo the inflation explosion of the 1970s. In the 1970s, inflexible labour markets drove inflation higher, oil supply shocks pushed the cost of oil up, then additional higher wage demands resulted in rising costs and more inflation leading to higher wage demands continuing the cycle. It was only broken in the 1980s by the 'Volcker' recession² in the US, and in Australia the series of Prices and Incomes Accord agreements that reduced real wages, and ultimately the 'recession we had to have'³ in 1990.

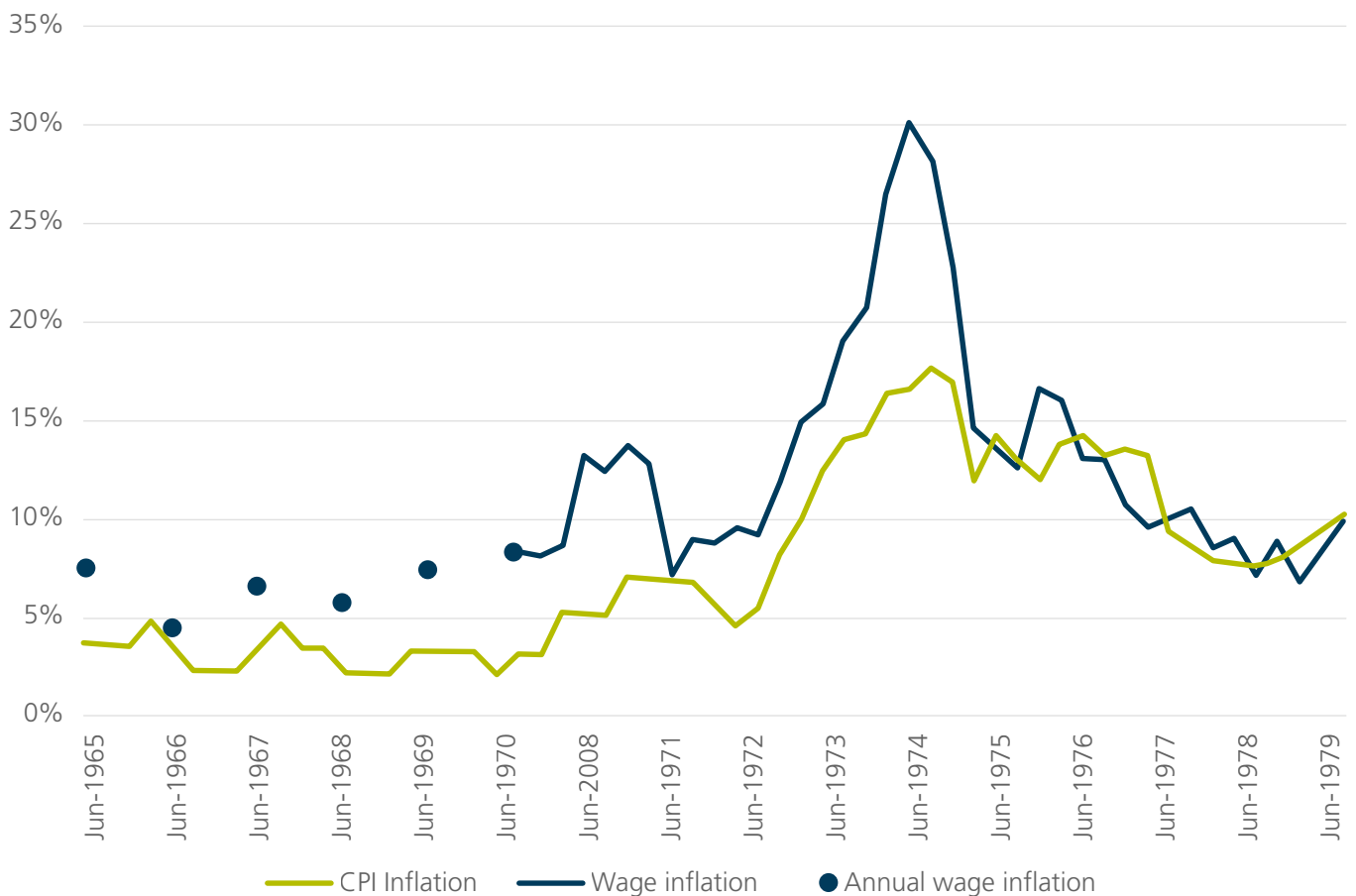
The 1970s inflation spiral was sustained through the decade. The data in Figure 1 highlights how wages were rising ahead of prices, compounding the supply-side shock to oil prices. Double-digit inflation extended well into the 1980s in Australia.

1 <https://www.rba.gov.au/monetary-policy/inflation-target.html>

2 <https://www.federalreservehistory.org/essays/recession-of-1981-82>

3 <https://www.smh.com.au/opinion/twentyfive-years-on-from-the-recession-we-had-to-have-20151201-glc9kn.html>

Figure 1: 1970s inflation blow out



Sources: ABS, RBA occasional paper #8 and Table G6 labour costs (as released in 2012). Underlying wage data is from the ABS and is based on average male earnings.

One of the biggest impacts of inflation is the lost purchasing power of investments. The 1970s in Australia provides a grim lesson for real returns. Over the 10 years to Dec 1979, returns lagged inflation for most Australian

investments. Using data from the Dimson, Marsh & Staunton database⁴ the returns for the 10 years to the end of 1979 are provided in Table 1:

Table 1: Returns on Australian investments 10 years to 1979

	Nominal return	Real return
Australian equities	+5.1% p.a.	-4.2% p.a.
Australian fixed income	+4.1% p.a.	-5.1% p.a.
Cash	+7.3% p.a.	-2.2% p.a.
CPI	+9.8% p.a.	n/a

This was a sustained period of wealth destruction in Australia. It highlights how devastating high inflation can be to an investor trying to accumulate savings for

retirement. At least the accumulator can still benefit from wages or salary that are increasing at the same time. A retiree does not usually have that protection.

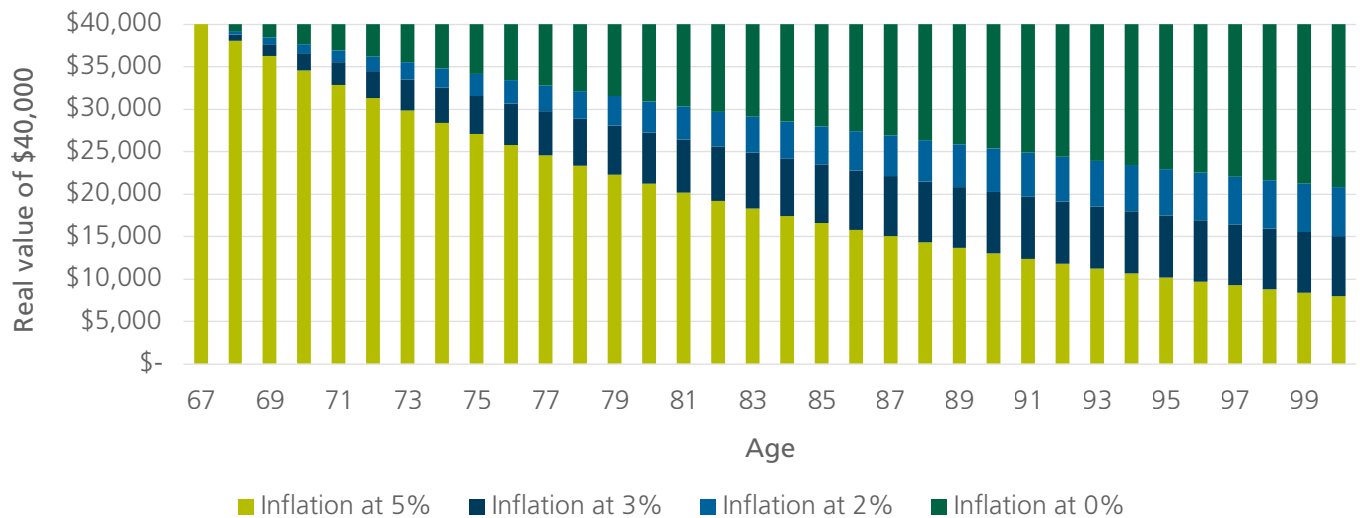
4 See the [Triumph of the Optimists \(degruyter.com\)](http://degruyter.com) for details on the dataset. It is available from Morningstar.

The impact of inflation on a retiree's lifestyle

The impact of inflation on a retiree's lifestyle can be dramatic even with modest inflation. Without a wage or salary also increasing with inflation, the retiree faces additional risks to maintaining their lifestyle. Figure 2 illustrates how inflation erodes the real value of income

for a retiree even with moderate levels of inflation. There isn't much difference in the early years, but the impact compounds over time. Even modest rates of inflation can hamper a retiree's lifestyle. With inflation of only 2% a year, one-quarter of the real value of the nominal income is lost after only 14 years. The risk from moderate inflation is stark, 5% a year would halve their purchasing power over the same period.

Figure 2: The impact of different inflation rates on retirement income



Sources: ABS, RBA occasional paper #8 and Table G6 labour costs (as released in 2012). Underlying wage data is from the ABS and is based on average male earnings.

The erosion of value can have a severe impact on a retiree's lifestyle. A modest reduction in lifestyle might be acceptable. Research by David Blanchett in the US⁵ and the Grattan Institute⁶ have shown that retirees tend to spend less (in real terms) over time. However, the fall in spending is typically less than inflation, which means that nominal spending increases. Even if a decline in living standards is intentional (i.e. less spending on discretionary items), retirees still need to manage inflation to afford the lifestyle they desire. If the cost of energy and groceries both increase, older retirees will not want a situation where they have to choose between cutting back on essential heating or trimming their grocery bills.

Investments to beat inflation expectations

The goal of investing for retirement is to put aside savings today to fund spending in the future. Inflation should be a key consideration in this saving and investment decision. The cost of future consumption increases with inflation, so it is reasonable to want an expected return from investing to be higher than

inflation. If inflation is expected to be high, asset prices today will adjust (downwards) so the expected return exceeds inflation.

Protecting against expected inflation in accumulating savings requires a high enough return to offset the inflation. While past performance is not always an indicator of future performance, some investments, like equities, tend to provide high returns that have compensated for rising prices over the long term. Others, such as unlisted property, can benefit as property prices often increase in inflationary periods, therefore increasing total returns.

Bond investments are more exposed to inflation because the yield to maturity doesn't change after purchase unless they are specific CPI-linked bonds. This doesn't mean that bonds can't help with managing inflation. Typically, buyers of bonds know about the potential impact of inflation. So, the price they pay, and the yield they demand, will depend on their expected inflation rate. This is central to bond markets and is measured by the Reserve Bank of Australia (RBA) in monitoring inflation expectations. Figure 3 shows the bond market's inflation expectations from the RBA back to 1985.

5 Blanchett (2013). Estimating the true cost of retirement. Morningstar.

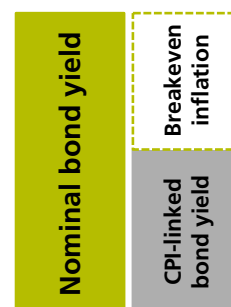
6 Daley, J., Coates, B., Wiltshire, T., Emslie, O., Nolan, J. and Chen, T. (2018). Money in retirement: More than enough. Grattan Institute.

Figure 3: RBA measure of inflation expectations from the bond market



Source: RBA

Breakeven inflation, as it is known, is simply the yield on a nominal bond, less the associated yield on a matching CPI-linked bond. If inflation were to match breakeven inflation until the maturity of both bonds, then the return on each bond would be the same. Investors can lock the breakeven inflation rate into expected returns. If the market expects that inflation will be higher, there will be more demand for CPI-linked bonds as they would provide higher returns. The market clears by increasing the spread between CPI-linked and nominal bonds. This increases the implied breakeven inflation rate. Similarly, if expected inflation is lower, the market will adjust to reduce the breakeven inflation rate.



As Figure 3 shows, expected inflation has generally been in the 2-3% band since the mid-1990s, reflecting the RBA policy target that was set at that time. It fell below that band in recent years as inflation surprised on the downside.

Targeting a higher expected return, or initial yield, can help manage expected inflation, but there is an additional challenge to manage inflation risk. What if the inflation outcome is not what was expected?

Lower than expected inflation will mean a better living standard so that isn't much of an issue for investors. The reverse situation, higher than expected inflation, is a bigger problem because it will reduce the retiree's lifestyle. This risk is one of the 'known unknowns' in the language of Donald Rumsfeld. Everyone knows that there will be inflation, and while we might have an expectation of what it will be, no-one knows what it will be until it has occurred. Managing this takes more than just high expected returns. They might not be high enough.

Managing inflation risks to investments

Managing inflation risk in an investment can produce an increase in the capital value if the return (at least) matches the inflation rate. From the investment point of view, it is only the final capital, or equivalently the average investment returns that need to offset any inflation shock. An asset with a high expected return could cover expected inflation, but it won't necessarily adjust to unexpected inflation.

What is needed is an investment that benefits from higher inflation, or even better, automatically adjusts through a linkage to the CPI. Academic researchers such as Zvi Bodie during the 1970s demonstrated that equities did not hedge inflation effectively.⁷ While equities provide high long-term real returns, the negative correlation to short term inflation can be attributed to the unexpected changes in inflation – like what we have seen in 2022.

⁷ Bodie, Z., 1976, "Common Stocks as a Hedge Against Inflation," Journal of Finance Vol. 31, No. 2, pp. 459–470.

Other investments manage inflation risks in different ways. Commodities such as gold have a high correlation to inflation changes but tend to have low long-term returns. Attie and Roache's research highlights the

effectiveness of different asset classes for inflation hedges over different timeframes.⁸ A summary of their results is provided in Table 2.

Table 2: Effectiveness of inflation hedges over different timeframes

Asset class	Short term (<1.5 years)	Intermediate (up to 5 years)	Long-term (5years+)	Long-run real returns
Cash	Not effective	Improving benefit	Largely effective	Modest
Nominal Bonds	Not effective	Losses decline	Not effective	Higher than cash
Equities	Not effective	Losses stabilise	Not effective	Highest
Commodities	Effective	Effect wanes	Not effective	Low

Source: Based on Attie & Roache(2010) Table 4, page 27.

The change over time highlights how the effectiveness of inflation hedging is impacted over time. The main asset classes have a different reaction over time.

- Cash. Suffers an initial loss in real terms from unexpected inflation. The inflation surprise leads to an increase in expected inflation and higher real cash rates, so after the initial shock, higher cash rates provide an improving benefit. Over the long run, Attie & Roache estimate that a cash investment will recover 80% of an inflation shock.
- Bonds. Suffer a larger loss from unexpected inflation. The reaction of higher yields also has a duration impact on the value of the bond investment. This causes a large initial loss. The increase in yields reduces some of that loss, but over the longer-term nominal bonds are ineffective hedges for inflation.
- Equities. Suffer a real loss, but not as much as nominal bonds. The losses stabilise after the initial loss, but unlike bonds, there is no recovery. Over the longer run, equities remain ineffective at hedging the inflation shock. The high long-term returns persist which protects against expected inflation, but there is no recovery for an inflation shock
- Commodities. Provide an effective short-term hedge to inflation shocks. The price of commodities tends to increase with inflation shocks. Sometimes the increase exceeds the inflation shock in the short run. Over time, the price gains tend to unwind and they find the longer-run hedge to inflation shocks to be ineffective. Commodity prices are volatile and react to many variables other than inflation. Over time, this reduces the effectiveness of the hedge.

There are other asset classes that could be effective hedges:

- CPI-linked bonds. Fixed income investments specifically linked to inflation are generally considered to be the best inflation hedge. Barnes et. al. (2010) notes the effectiveness of CPI-linked bonds (known as TIPS in the US) in hedging inflation.⁹ They also address some concerns that the investment performance does not exactly match inflation surprises. The difficulty is that CPI-linked bonds have a long maturity and the duration impact from a changing level of market yield can move the price more than the inflation shock. If you use only a short-term inflation-linked bond, the hedging can be very efficient. CPI-linked bonds hedge the string of payments through to the maturity of the bond.
- Real assets. Infrastructure and real estate can provide inflation hedges because the underlying cash flows, such as rent, adjust with inflation. As the income stream is capitalised in the value of the asset there is a potential inflation hedge. Studies find mixed results on the effectiveness of the inflation hedge.¹⁰ Listed investments, such as REITs and listed infrastructure, like their listed equity counterparts provide a limited hedge to unexpected inflation. For unlisted investments, the adjustment to inflation is not always captured immediately, depending on the timing of asset revaluations.

A portfolio manager can use a range of assets to manage the risk of unexpected inflation to the capital value of their investment portfolio. In retirement, it is the impact of inflation on an income stream that needs to be managed. The differences provide scope for an investment manager to consider alternative approaches to managing inflation risks for retirees.

8 Attie, A.P. and S.K. Roache, Inflation Hedging for Long-Term Investors; IMF Working Paper; Available online: <https://www.imf.org/external/pubs/ft/wp/2009/wp0990.pdf> (accessed on 30 June 2022).

9 Barnes, M. Z. Bodie, R. K. Triest & J. C. Wang (2010) "A TIPS Scorecard: Are They Accomplishing Their Objectives?", Financial Analysts Journal, Vol 66 no5, pp68-84

10 See for example Bird, R., H. Liem, & S. Thorp, (2014). "Infrastructure: Real assets and real returns." European Financial Management, Vol 20(4), pp802-824.

Managing inflation risks for retirees

If a retiree is maximising their retirement income for their level of savings capital (including assets outside super), then generally protecting the capital against inflation will protect the income against inflation. A given level of savings would support a future income stream over a specific period. A retiree also wants their inflation-protected income to last for their lifetime. This was the basis for 4% rule developed by Bengen in the 1990s and is still commonly used in retirement models. The additional challenge is to solve for both risks (inflation and longevity) at the same time.

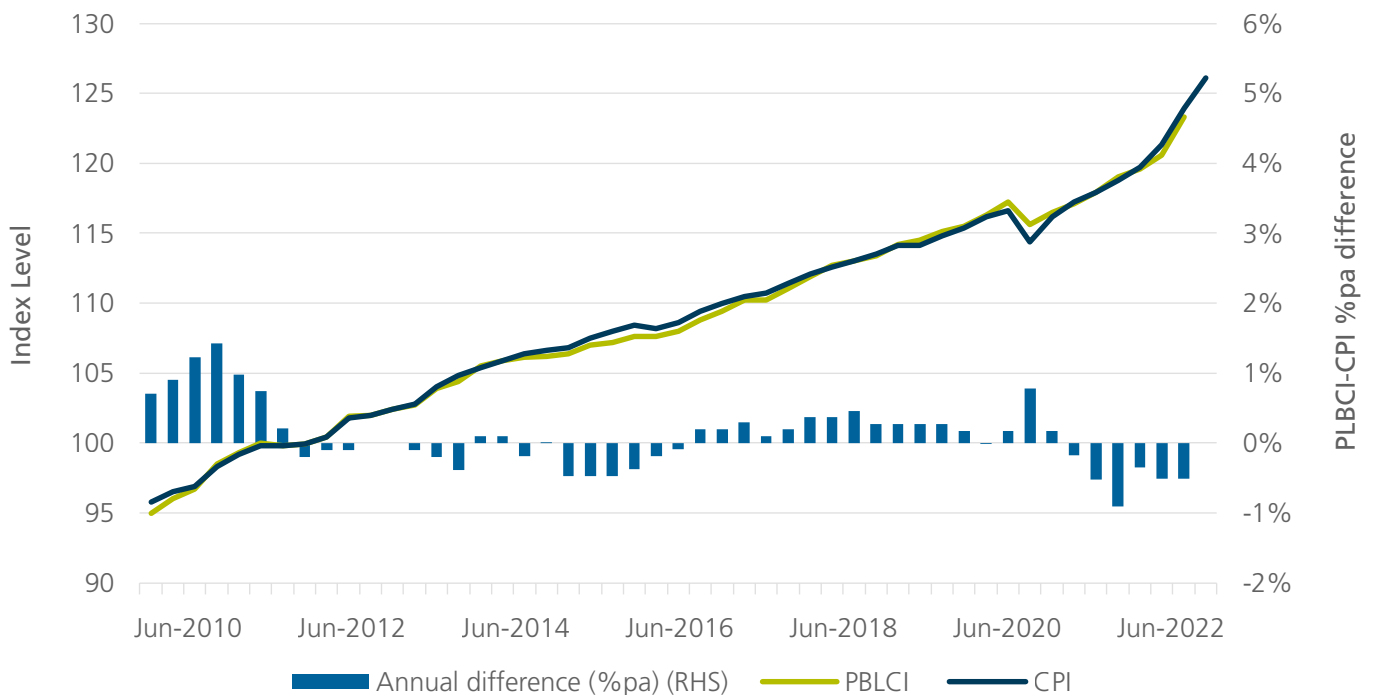
The retirement income covenant requires super funds to have a retirement income strategy that does both. Part of a retirement income strategy should consider the Age Pension as many retired fund members will receive at least a partial Age Pension in retirement. This will help with inflation management because the Age Pension is automatically adjusted for inflation. The full

Age Pension tracks average wages over time, which typically grow more than inflation (although not in recent years in Australia).

Inflation protection from the Age Pension

The Age Pension provides protection from inflation in several ways. The first level of protection comes from the twice-yearly indexation of Age Pension payments.¹² Age pension payments are increased by the higher percentage increase in the Consumer Price Index (CPI) and the Pensioner and Beneficiary Living cost index (PBLCI). The PBLCI is similar to the more familiar CPI measure, but it is weighted to reflect the spending by households in receipt of the Age Pension or other Government benefits. Over time, the aggregate levels are similar but there are short-term differences that are captured through this mechanism as can be seen in Figure 4. These are generally small (<1%) and offset each other over time.

Figure 4: Differences between PBLCI and CPI over time



Source: ABS

The additional indexation component is the requirement for the combined base payment for a couple on the full age pension to be at least 41.76% of Male Total Average Weekly earnings (MTAWE).¹³ This requirement would normally result in the Age Pension payment increasing in line with increases in wages. Since March 2014 the

Age Pension has been above this MTAWE minimum so the indexation has only been due to the higher of CPI and PBLCI increases. The current combined base rate for a couple is about 43% of MTAWE and with real wages falling, it might be several years before the MTAWE minimum is applied again.

11 Bengen, W. (1994) 'Determining Withdrawal Rates Using Historical Data'. Journal of Financial Planning Vol7, (4) pp171-180.

12 See <https://guides.dss.gov.au/social-security-guide/5/1/8/50> for further details.

13 MTAWE is affected by compositional effects such as part-time employment. The trend to greater part-time employment has kept MTAWE lower than other indicators of wages growth.

In addition to the base rate there are also two supplements with different indexation treatment. The pension supplement is paid to everyone eligible for a full or part Age Pension. This is indexed over time in line with movements in the CPI. The energy supplement was introduced to offset the impact of the carbon tax in 2014 but was maintained even after the carbon tax was repealed. There is no indexation to this payment. It remains at \$14.10 per fortnight for a single Pensioner. Overall Age Pension payments should increase by more than the CPI. The flat energy supplement is small relative to the base rate with its higher indexation.

There is additional inflation protection provided for people receiving a part Age Pension. Additional inflation indexation arises because the means test operates to reduce payments from the maximum age pension. When there is inflation, the maximum payment is indexed, but the reduction is not changed. This provides the dollar increase of the full Age Pension indexation to all part Age Pension recipients also. In addition, the means test thresholds are indexed to either CPI or wages so it is possible that a Part Pension could have their means testing reduced on top of any indexation changes. The best way to demonstrate this is the illustrative example in the box.

Inflation indexation for different Age Pension payment rates

Consider:

- Anne current receives the maximum Age Pension of \$26,689 a year consisting of \$24,357 base payment, \$1,966 pensioner supplement and \$367 from the energy supplement
- Barry has assets which reduces his pension by \$12,000 a year. His \$14,689 comes from \$12,357 base payment, and the same \$1,966 and \$367 supplements.
- Christine is also a part pension, but she only receives \$2,357 base payment. She also gets the full \$1,966 and \$367 supplement payments for a total of \$4,689.

Assume that the CPI increases by 4% (as does PBLCI and MTAW). For clarity, also assume that the threshold changes match any increase in assets for Barry and Christine. The maximum age pension will now be \$27,742 consisting of:

- \$25,331 base payment ($\$24,357 \times 1.04$)
- \$2,044 pension supplement ($\$1,966 \times 1.04$ with the rounding adjustment)
- \$367 energy supplement
- However, as the means tested amounts are unchanged all three will get the same increase:
- Anne's payments increase \$1,053 to \$27,742 (+3.9%)
- Barry's payments increase \$1,053 to \$15,742 (+7.2%)
- Christine's payments increase \$1,053 to \$5,742 (+22.5%)

The inflation indexation for Barry and Christine is well in excess of what is required for their part Age Pension payments. This reduces the need to hedge inflation impacts across their investment portfolio.

As the safety-net for retirees, it is important that the Age Pension has strong protection against inflation. Many retirees can enjoy a lifestyle better than the safety-net which enables some different approaches to inflation protection for retirees.

Spending patterns and inflation protection

Typically, people's spending pattern changes over their lifetime. This is also true in retirement. Assuming a fixed level of spending (in real terms) is convenient in a model or retirement calculator, but it doesn't reflect how

retirees spend their money. The changes impact how the inflation risks to retirement income need to be managed.

The Retirement Income Review considered the pattern of spending in retirement.¹⁴ While there are different thoughts on the pattern throughout retirement, the review concluded "retirees have flat or falling spending relative to prices as they age."¹⁵ This was why they discounted spending in retirement in line with CPI but used wage inflation as the discount factor for years of employment. Further the report notes that the decline in expenditure is because retirees spend less on discretionary items, and broadly maintain their inflation-adjusted spending on essentials.¹⁶ The pattern was

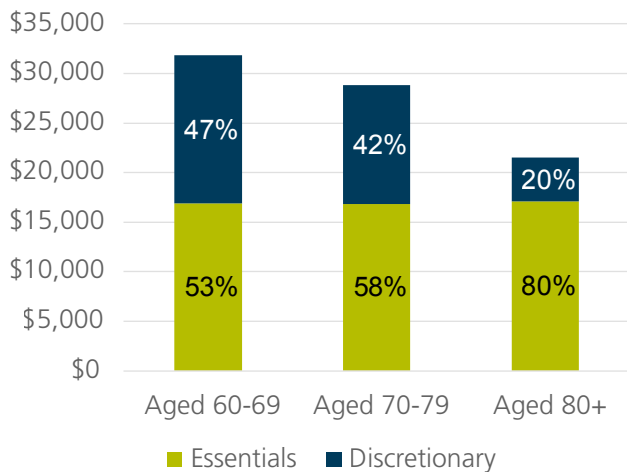
14 Callaghan, M., D. Ralston, C. Kay, Retirement Income Review Final Report The Australian Government the Treasury July 2020. [Retirement Income Review - Final Report | Treasury.gov.au](#)

15 Ibid page 487

16 Minney, A. (2018) "Household spending patterns in retirement" The Australasian Journal of Applied Finance 2018 (1) pp 18-26 reported a similar pattern in spending.

found to be consistent across households of different wealth and income levels. While the level of discretionary spending is relatively constant in real terms, the proportion of spending on essential items increases with age, from around 50% up to 80% for those aged over 80. Figure 5 presents the data from Minney (2018) for single households of different ages in 2015-16.

Figure 5: Spending patterns for single households by age, 2015-16



Source: Minney (2018)

This pattern suggests that it is important to maintain inflation protection for essential spending. Protection for discretionary spending is less useful. But, by its discretionary nature, if prices rise, the amount of

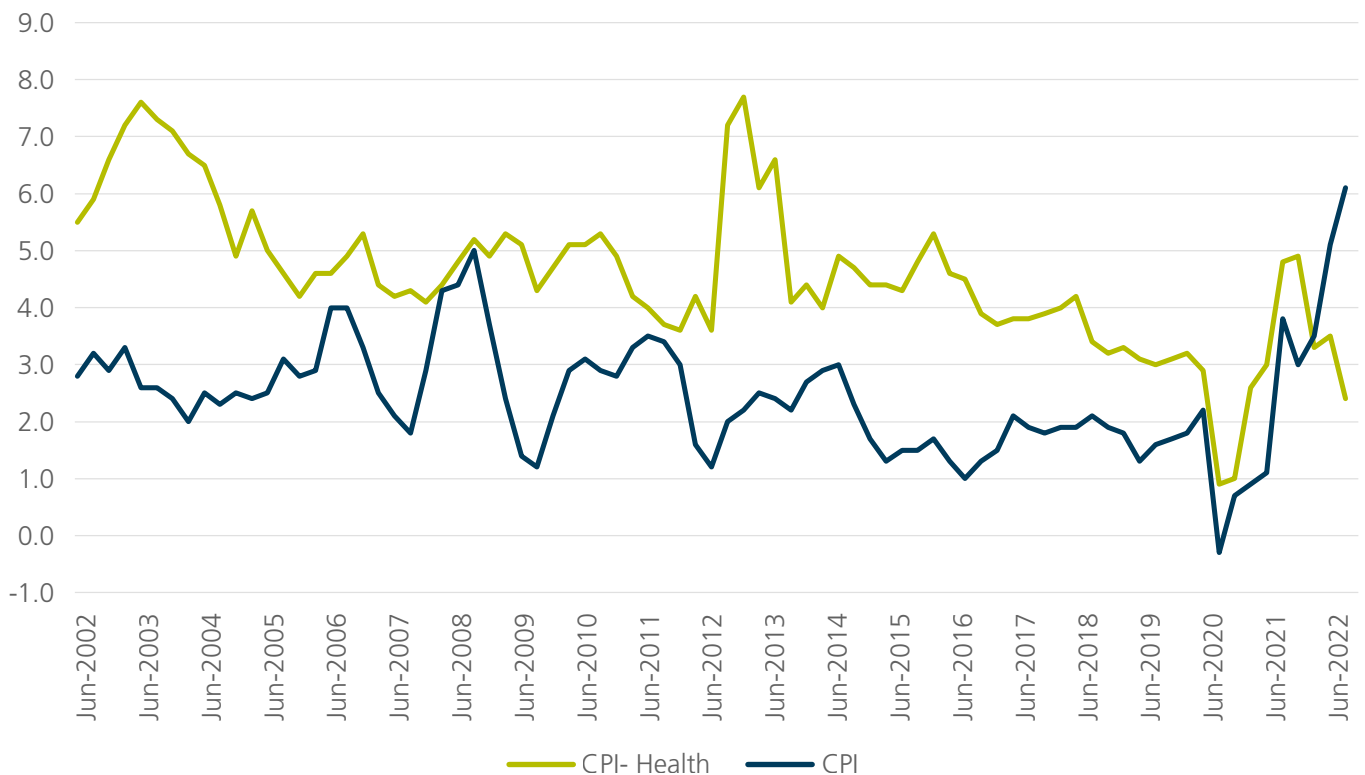
discretionary spending can be reduced within an overall budget. It would also be reasonable to consider inflation protection for discretionary spending that is not as strong as the protection for a retiree's essential spending needs. A return-based solution might be more appropriate than a direct CPI-linked exposure.

Health Costs

There is an additional concern over increase medical expenses in later life. A recent survey of National Seniors members highlighted the extent of this concern for retirees.¹⁷ The cost of health services has experienced higher inflation in recent years. This inflation difference can be seen clearly in Figure 6 where inflation for the health component of the CPI has been consistently higher than the overall CPI measure for the past 20 years. The only exception is the spike in inflation in recent months. While the total CPI increase has averaged 1.9% p.a., health costs have increased by an average of 3.7% p.a. over the 20 years to June 2022.

Higher health cost inflation adds to retiree fears about health costs, but on average the increase in total spending on health is less than the reduction in other spending.¹⁸ With a large proportion of the costs covered by public spending the inflation impacts of health costs on average are not as large as many people fear. What is needed is cover for the minority who do have large out-of-pocket expenses, which is why health insurance, in addition to Medicare, is considered essential by many retirees.

Figure 6: Annual Inflation: CPI and CPI-Health June 2002-2022



Source: Minney (2018)

17 See [The evolution of retirement income: A 2022 snapshot - National Seniors Australia](#) August 2022.

18 This is detailed in the Daley et.al. (2018) report.

Inflation protection from lifetime income streams

Most retirees will have some form of income stream product from their super as a regular stream of cash flows. These options vary from a traditional defined benefit pension to a lifetime annuity to an account-based pension with differing drawdown strategies. These varying options protect a retiree from inflation in different ways, and with varying effectiveness. A traditional defined benefit pension has a very effective direct measure to assist with inflation. Generally, payments to the retired pensioner are increased in line with inflation. With a starting payment that was linked to salary (and years of service) this provides each retiree with an income stream that is consistent with their lifetime earnings and can add some protection from inflation.

Inflation protection in drawdown strategies

The most flexible approach to retirement income from super is an account-based pension where the retiree draws a sum from their pension account each year. This is subject to regulatory minimums, but once the regulations are satisfied, the retiree can draw as they want. A retiree can simply draw more money in the following year to offset the impact of inflation. For example, if someone drew \$20,000 from their account-based pension in a year and inflation was 3%, they could draw \$20,600 the next year to maintain the same living standard. This is possible as long as their savings capital is not exhausted.

This direct approach to inflation adjustment was the basis for the 4% rule developed by Bengen. His calculation was to estimate the amount of money that could be spent in the first year, so that it could be increased with inflation and not run out after 30 years. His analysis suggested that with a diversified portfolio spending 4% of the initial capital was the appropriate starting point.

Inflation protection in lifetime annuities

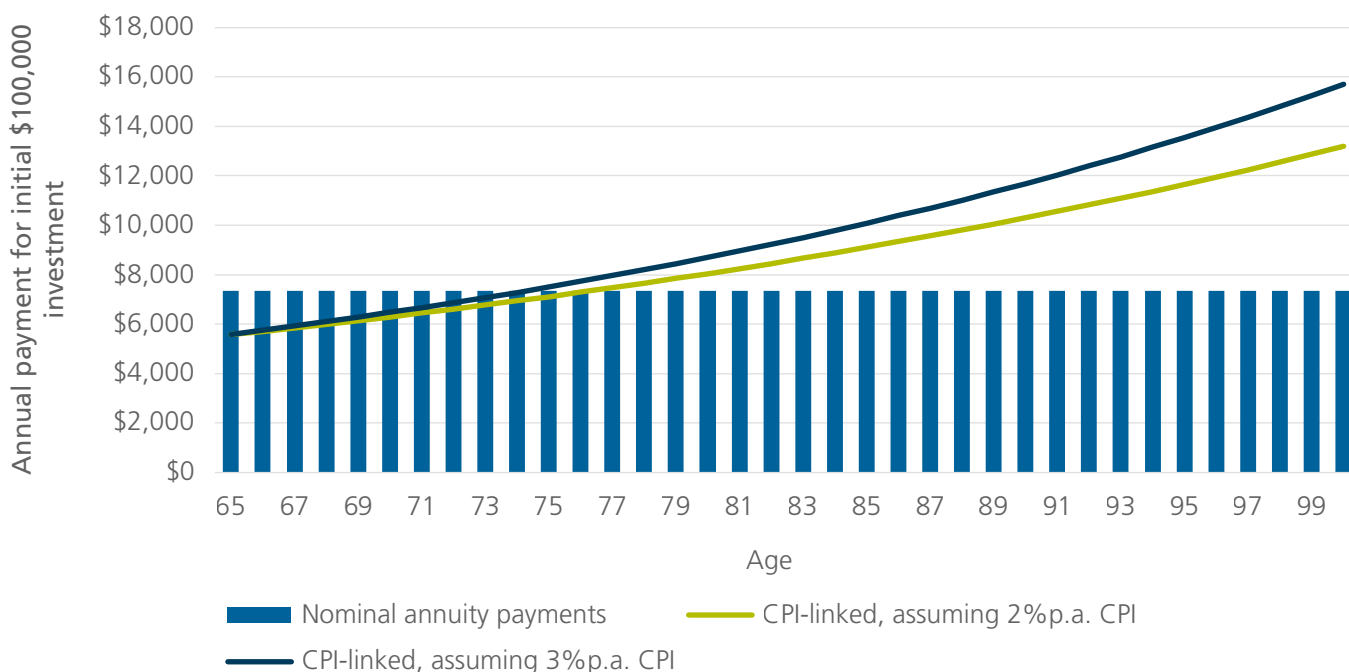
Bengen's approach of the 4% rule is based on a high probability of success, but it is not guaranteed. The money can always run out if market returns are not sufficient or spending is higher than planned. An alternative option for a retiree is a guaranteed CPI-linked lifetime annuity. The annuity pays the retiree an income stream for the rest of their life that adjusts in line with CPI changes. In Australia, the guaranteed annuity is provided by a life insurance company that is supervised by the Australian Prudential Regulation Authority (APRA). APRA ensures that the life insurer maintains enough capital to pay the guaranteed amounts to the annuity holder, no matter what happens in markets or how long people live.

Payments for the lifetime annuity are set by market conditions as well as expectations on longevity, rather than an arbitrary rate and time horizon like Bengen's proposal. Given that there is (generally) no residual capital from the annuity, the payments are usually higher than Bengen's 4%. For example, as at 10 October 2022 an annuity that was fully protected from CPI inflation for a 65-year-old male would pay \$5,678 in the first year for a \$100,000 investment.¹⁹ Subsequent year's payments would adjust in line with inflation. The rate for a 65-year-old female was \$5,283, still well above the 4% rule payment even with a longer life expectancy of a 65-year-old Australian woman.

The guaranteed CPI-linked annuity can help provide peace of mind to a retiree that they will be protected from inflation. This is not the only guaranteed option for retirees. Retirees who were not concerned about inflation could purchase a fixed (or nominal) lifetime annuity where the payments would remain the same and still be guaranteed for life. This would provide a much higher starting payment (\$7,420 for a 65-year-old male or \$7,025 for a 65-year-old female as at October 10). The difference is that it does not increase over time.

¹⁹ The rates in this paper are based on rates published by Challenger. The rates refer to a traditional annuity where there is no payment on death at any stage. Many annuities sold today include limited access to capital and a payment of death, equal to the total initial premium for deaths within only a few years of purchase. The payments with the death benefit are lower. For example, the equivalent CPI-linked payment for a 65-year-old male was \$5,319 as at October 10 2022 and \$5,012 for a female.

Figure 7: Comparison of nominal and CPI-linked annuity payments over time



Source: Calculations based on payment rates as at October 10 2022.

The CPI-linked payments would be expected to increase above the higher initial payment for a nominal annuity. If inflation was lower than expected, or negative, the payments might not rise high enough and could even be lower than the starting payment. Figure 7 shows how an increase occurs for modest CPI values, either side of the Reserve Banks 2.5% p.a. target. For higher CPI outcomes, the payment will increase faster. This shows how the CPI-linked annuity income could provide an inflation hedge in contrast to a nominal investment. The payments will also increase with any large CPI increases, providing some protection from extreme events.

The payments in Figure 7 look skewed in that more CPI-linked payments are higher than the nominal payment. This is the result of the pooling in the lifetime annuity and that the life insurer only pays the survivors. At older ages, there are fewer survivors so generally the life insurer can afford to make the higher payments.

There is another option for CPI protection that might be suitable for retirees on a part Age Pension. This provides partial CPI-indexation by increasing payments by (CPI-2%) when the CPI increase is greater than 2%. When held with a part Age Pension, this partial hedge will combine with the indexation of the part Age Pension to provide inflation protection to retiree’s income. The starting payment would be higher than the full CPI-indexed option.²⁰

Inflation protection in market-linked lifetime annuities

Another innovation in lifetime annuities has been to provide payments that increase in line with either an underlying diversified portfolio or a nominated basket of market indices. There are some differences among these options, but their effectiveness as an inflation hedge is similar. These innovations have been made possible by legislative changes to promote innovative superannuation income streams.²¹ When the income stream is payable for the lifetime of the retiree and their access to capital is constrained appropriately then there can be a beneficial application of the means test rules for users of the innovative income streams. This provides the same treatment as guaranteed lifetime annuities and can increase the entitlement to the Age Pension, particularly early in retirement.

The common theme in these market-linked annuities is that changes in income payments are linked to investment market returns. The income payments will go up and down with markets. Some options are impacted by the number of survivors among the other investors in the product, while other products protect the retiree from other non-market risks. Management of inflation risks are dependent on the performance of the underlying markets. As discussed above, different investments can protect against inflation in different ways. While past performance

20 As at October 10 2022 the initial payment would be \$6,696 for a \$100,000 investment based on Challenger Lifetime Annuity (Liquid Lifetime) 2% CPI part indexation option for males and \$6,295 for females.

21 http://classic.austlii.edu.au/au/legis/cth/num_reg/tla2017mn1r2017201700704516/

is not necessarily an indicator of future performance, over the long run a diversified portfolio can generally be expected to provide a positive real return. This means that income should ultimately increase more than inflation, but there might be negative swings over shorter time periods.

Consider the following example for an Australian investor. A diversified fund could be represented by the following market allocations:

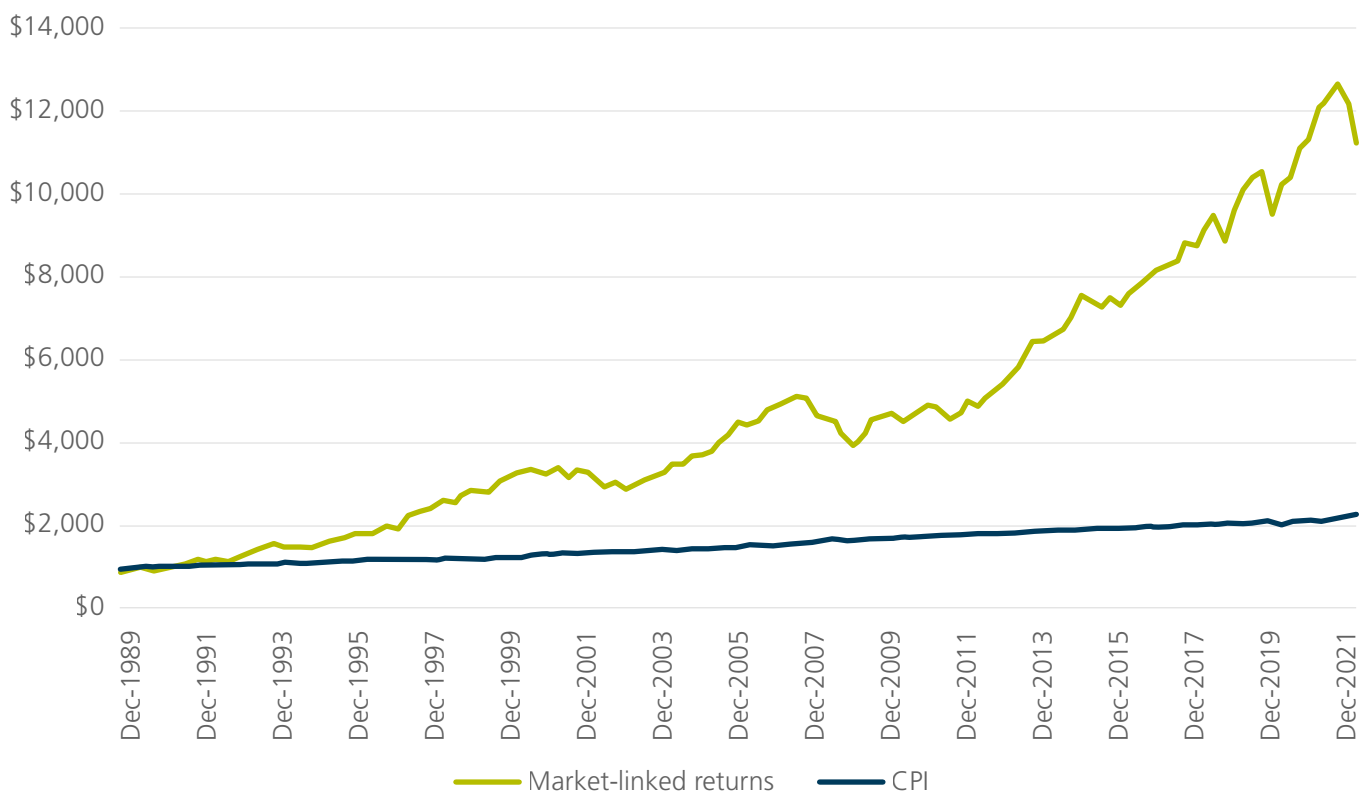
- 32.5% in Australian equities
 - Measured by S&P/ASX 200 total returns
- 32.5% in Global equities
 - Measured by MSCI World ex Australia in AUD (unhedged)
- 25% in Australian Bonds
 - Measured by Bloomberg AusBond Composite 0+Yr Index
- 10% in Cash
 - Measured by Bloomberg AusBond Bank Bill Index

The data for these indices is available from Bloomberg

back to at least December 1989. A market composite can be obtained by weighting the return for each market index by the appropriate percentage.²²

The long-term benefit of market exposure, using the weights above, in managing inflation can be seen in Figure 8. This shows the growth of a \$1,000 initial cash flow from December 1989 in the above market-linked income stream and what was needed to match CPI growth from December 1989. Returns from a market-linked investment are well ahead of CPI increases over the long run.

Figure 8: Market-linked returns and CPI inflation Dec 1989-June 2022



Source: Author calculations using ABS, MSCI, S&P and Bloomberg data

This does not mean that the market-linked payments would always grow faster than the CPI. If we break the returns down over different time periods, we can see how the trends differ over different periods. Figure 9 shows how market-linked income payments

would increase or decrease relative to inflation. Instead of the two separate lines in Figure 8, the lines in Figure 9 represent the growth of \$1,000 income payments using market-linked returns less inflation. This represents the real income growth over time. Each

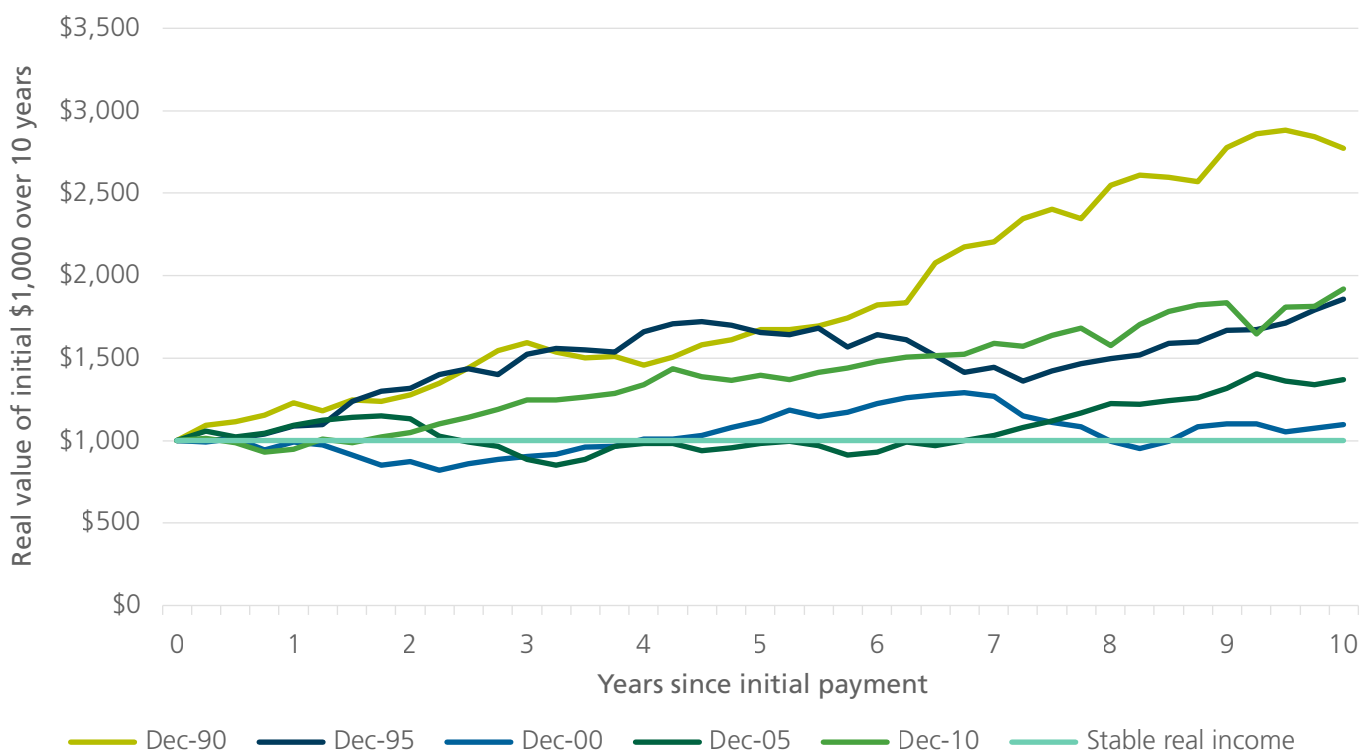
²² For comparative purposes the paper uses a quarterly weighting scheme to align with the availability of CPI measures. In practice, the market indices are usually calculated on a monthly or daily basis.

line represents a 10-year period for someone starting at the end of 1990, 1995, etc.

For each of the starting points since 1990, the market-linked returns have been higher than inflation over 10 years. The real income payments in year 10 are higher than the initial payment. The different start dates produce a range of paths for returns, which

would impact the income paid to a retiree with a market-linked income stream. For the periods starting December 2000 and December 2005, the income payments in the first five years would average less than the original \$1,000 in real terms. Conversely, the 1990 and 2010 starting points provided stronger growth from consistent market-linked returns.

Figure 9: Real market-linked income from different start dates



Source: Author calculations using ABS, MSCI, S&P and Bloomberg data

The examples here also highlight the benefit of diversification in a balanced (or growth or other diversified) fund. When equity markets declined, the return from bond investments provided a buffer than helped to maintain real returns. This was not always the case. That's why it's important to note that past performance is not an indicator of future performance and market conditions can change. The 1970s was a period when market-linked returns failed to match inflation. While data on bond market returns is less readily available for the period the rise in bond yields caused large losses, particularly after inflation adjustment. Long run data from Morningstar²³ indicates that the real return on Australian equities was negative throughout the 1970s. The market did not regain the end of 1969 peak, adjusted for inflation, until 1985.

Linking a lifetime income stream to market returns can provide some protection from the impact of inflation over time. A retiree could expect that, on average over

the long term, their income will increase by more than inflation. However, this is not without risk. The payments will be variable, falling at times as well as increasing as markets move. The key risk is that the market-linked payments could take a long time to recover from a decline early in retirement. This could be a longer horizon than a retiree would prefer to bear.

Accelerating payments to smooth the income profile

Aligning income payments to market-linked returns can be expected to provide higher income (in real terms) over the long term. However, this is not the typical pattern of retiree spending. As shown in Figure 5 total spending tends to decline in real terms over retirement, in contrast to the rising profile in Figure 8. The income profile can be flattened by providing higher payments at the start of retirement, but subsequently increase less than the market returns. The increase in the initial

23 Known as the Dimson Marsh Staunton database after the original compilers of the data.

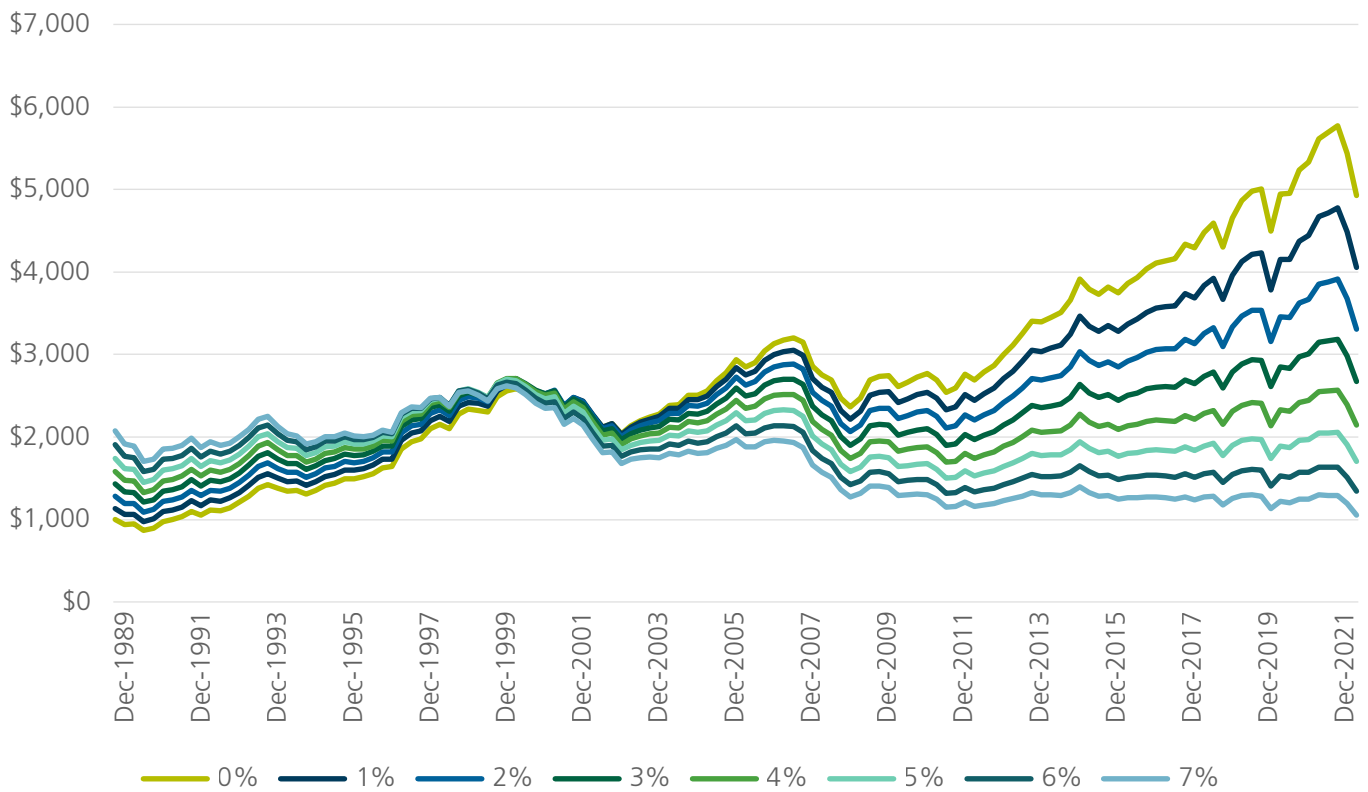
payment will depend on the performance adjustment and the age that the income stream starts. As a lifetime income stream, there will be some pooling like a traditional annuity. The performance adjustment can be managed as a reduction from the market-linked performance. For example a 3% adjustment would mean that if the market-linked return was 7%, then the income payments would only increase 4% (7%-3%). For comparison, the following table estimates a realistic increase in starting payments relative to an initial \$1,000 for a market-linked increase with no adjustment.²⁴

Performance adjustment	Equivalent Initial Payment
0%	\$1,000
1%	\$1,140
2%	\$1,280
3%	\$1,420
4%	\$1,580
5%	\$1,750
6%	\$2,910

7%	\$2,080
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The higher the performance adjustment, the larger the initial payment increase. Over time the payments will converge as the adjustment unwinds the starting advantage. Taking the previous example from balanced market-linked return index from 1989, the different income paths can be seen in Figure 10. These paths are inflation-adjusted so a fall in the chart simply means returns have not exceeded inflation.

Figure 10: Alternative inflation-adjusted market-linked income profiles



24 These are not actual quotes. They are hypothetical payments based on 65-year-old females with 25-year mortality improvement factors.

Source: Hypothetical outcomes based on market returns since 1989

The impact of different performance adjustments has some interesting outcomes. For example, all the payments tend to converge after 11 years, (June 2000 in this chart). This reflects the population survival assumptions and is a weighted average and will occur well before life expectancy. The payments in this chart noted for 2021 would be for someone who survives 32 years. This would only be around one in six females currently aged 65, which was the basis of the example.

In terms of inflation protection, Figure 10 highlights a limit of maintaining protection while smoothing the payment profiles. At some point, creating a larger adjustment to increase initial payments will undermine the long-term inflation protection provided by a market-linked payment. In this example it was a hurdle of around 5%, close to the compounded real return of the period, but the limit will vary for different investments and over different time periods.

Retiree choice for CPI protection for income streams

The growing range of income stream options is providing retirees with alternative ways of managing the impact of inflation on their retirement income. Retirees can choose the type of inflation protection that they prefer, from none to a guaranteed CPI-linked option to approaches that should work but retain some market risks. This is in addition to the option to draw down capital, adjusting for inflation as desired. It is also possible to use different approaches to inflation management across different components of the retirement income portfolio.

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Conclusion

Rising inflation is once again a concern in Australia and around the world. Retirees are susceptible to inflation as their income is drawn from their savings and investments and not coming from wages that adjust to inflation. In retirement, there are different options to manage inflation. The strategies that help accumulate inflation-adjusted wealth can also help retirees manage inflation risks, but there are other strategies available. It is important to generate an income stream that compensates for inflation and this is more important than managing the real capital value when income is needed in retirement. Innovation in recent years provide more products for retirees to generate income and has expanded the ways that retirees can manage inflation. This gives them a better change to manage one of the three key risks in retirement: inflation, as well as longevity and investment risks.