Manulife Investment Management

The impact of soaring inflation on defined benefit pension plans

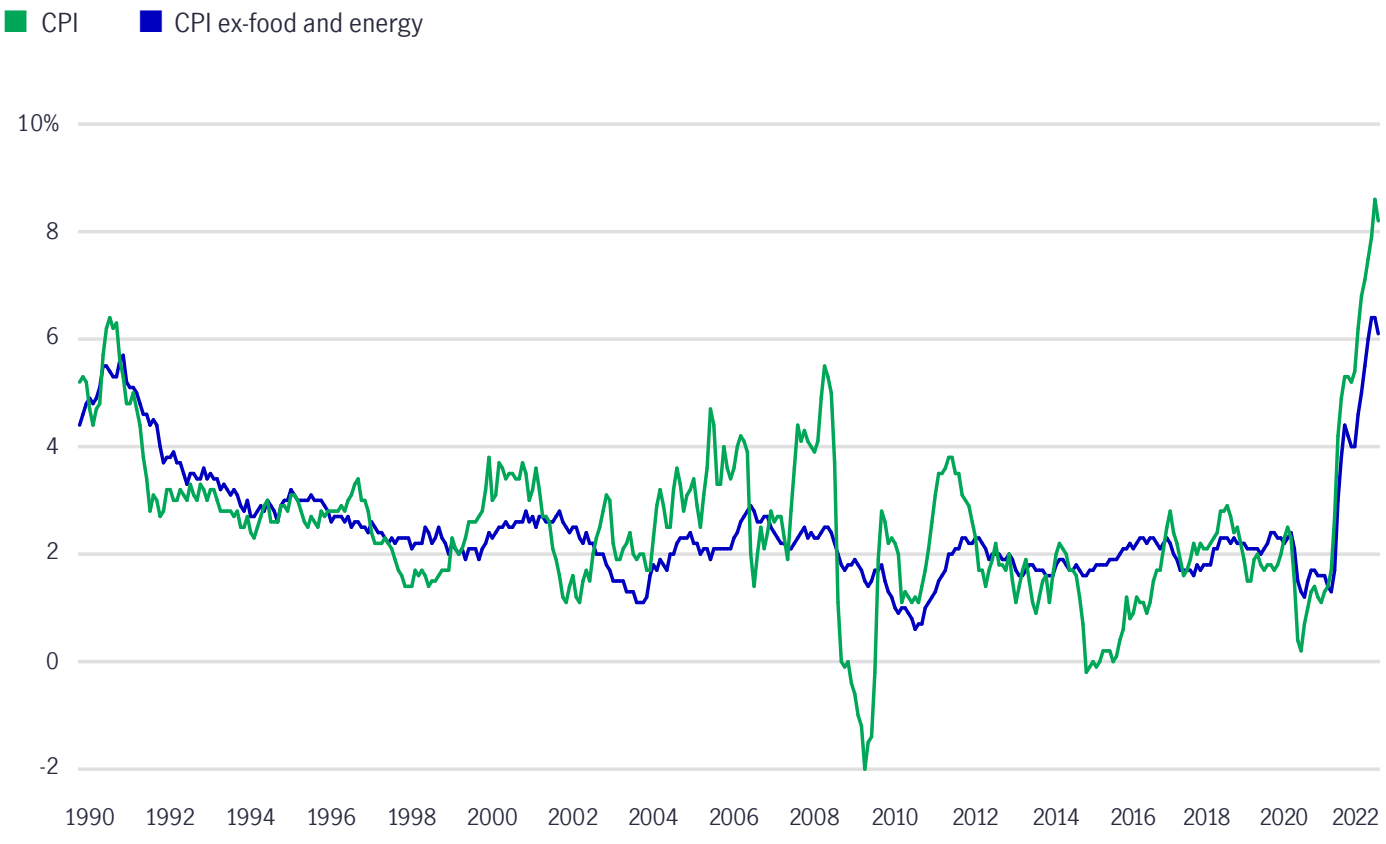
Inflation is bad news generally, but it can be particularly devastating for DB plans. How bad, exactly? We quantify just how much varying inflation outlooks can affect different types of pension plans and the solutions available to help mitigate the damage.

Key takeaways

- DB plans are particularly susceptible to inflation regardless of whether or not they offer benefits directly linked to the CPI.
- While the impact can vary depending on how long inflation lasts—expected inflation levels and plan structure—almost all plans are now facing growing liabilities as a result of inflation.
- There are a number of asset classes and investment strategies available to investors that can help mitigate the risk of longer-term inflation.

With inflation rates across the world hitting peaks not seen in decades, many investors are questioning where the economy goes from here. In the first two months of the year, U.S. consumer price increases accelerated to their highest level in 40 years, posting 7.5% and 7.9%, respectively, in year-over-year changes in the Consumer Price Index (CPI) for two consecutive months, before rising to 8.5% in March 2022. The current heated state of the economy has pushed the U.S. Federal Reserve to end the near-zero interest-rate environment by raising interest rates for the first time since 2018. Fueled by additional risk factors, such as regional geopolitical conflicts, many investors are increasingly anticipating higher inflation and more interest-rate hikes.

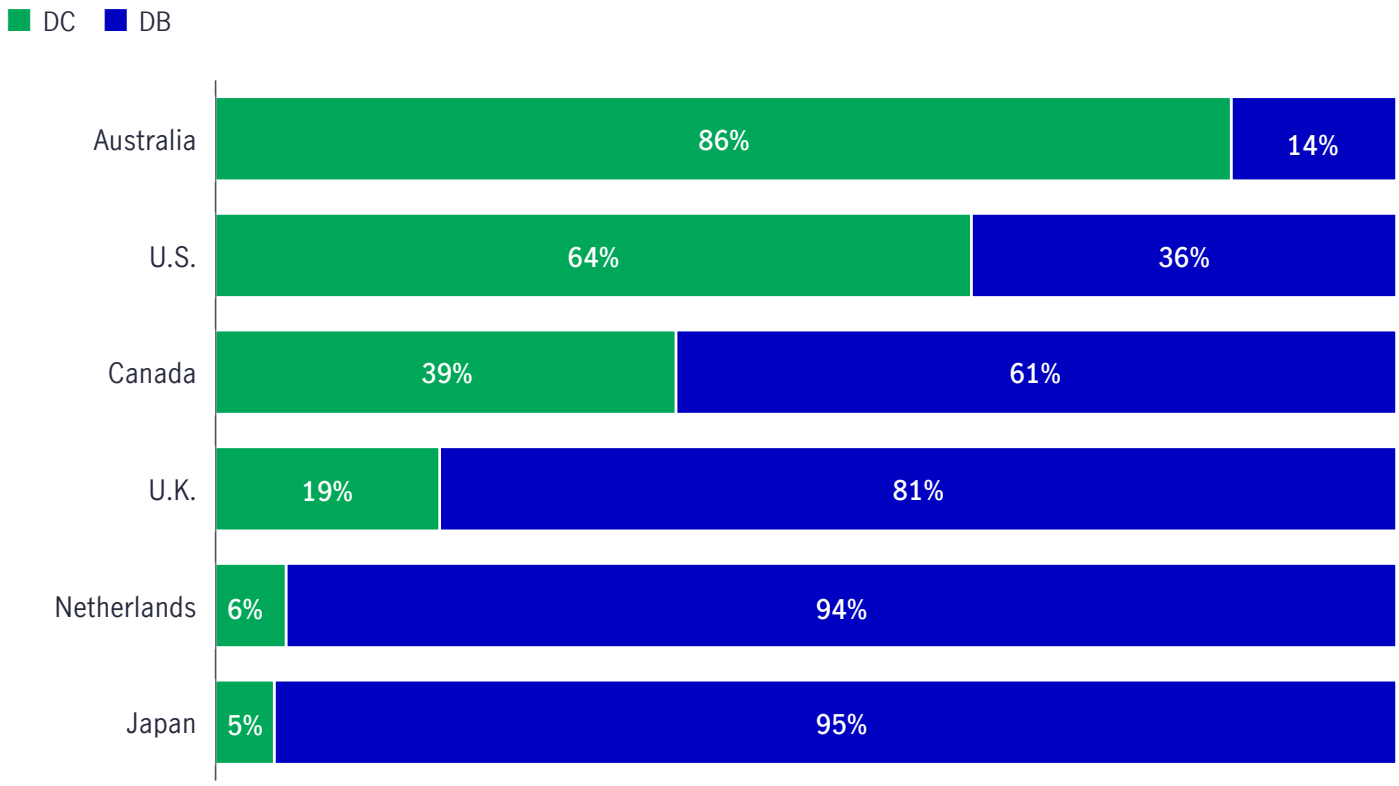
On the rise: U.S. inflation at a multidecade high



Source: U.S. Bureau of Labor Statistics, as of April 2022. CPI refers to the Consumer Price Index. It is not possible to invest directly in an index. Past performance does not guarantee future results.

Even small increases in inflation can have outsize consequences for defined benefit (DB) plans: Unlike defined contribution (DC) plans, which place the burden of risk and costs on the plan member, a corporate DB plan will leave sponsors on the hook for any costs generated by rising inflation, and those costs could be prohibitive, particularly for index-linked plans. Although DB plans are becoming increasingly rare, they still account for the majority of assets in many countries, including Canada, the Netherlands, the United Kingdom, and Japan. Retirement assets in the United States are largely held in DC arrangements, but U.S. DB plans still account for some $3.3 trillion in assets.

Different strokes: the DC/DB asset split across markets



Source: Manulife Investment Management, Thinking Ahead Institute, as of December 2021. DC refers to defined contribution. DB refers to defined benefit.

Unsurprisingly, many plan sponsors are now asking whether they should adjust their investment policy to account for rising inflation and, if so, what changes might be effective. In this paper, we share our research into just how sensitive DB plan liabilities are to inflation increases—index linked or otherwise—and the asset classes that can help mitigate those risks.

How sensitive are DB plan liabilities to inflation?

A rise in inflation can have a number of consequences for DB plans, depending on both the structure of individual plans and how long high inflation lasts. Naturally, a plan that automatically links benefits to the CPI will be faced with greater costs than those without indexation. Similarly, a plan made up of mostly retired members will fare better than one with a younger membership.

Danger signs: key inflation risks for DB plans

CPI

Some plans provide auto-indexation to CPI to help protect members' benefits from the impact of inflation.

Salary

When inflation rises, so do salaries. This can impact plans that base member benefits on final average salaries

Duration

Pension plans are not obliged to match CPI rises for retiree members' benefits, but the costs will be higher for plans with a younger membership.

For illustrative purposes only.

That's not to suggest that plans without indexation benefits will escape unscathed, however: Any DB plan that bases its members' benefits on their final average salary will likely see liabilities grow thanks to future salary increases that typically accompany high inflation. The cost will have to be incurred eventually.

In order to gauge just how significant these costs could be, we ran a series of calculations using two distinct plans:

1 Retiree plan—Comprises only retired plan members

2 Active plan—Comprises only active (i.e., working) plan members

First, let's take a look at what a transitory increase in inflation (inflation increases but returns to normal within 12 months) might mean for our plans. Quantifying the impact on pension plan liabilities in this instance is fairly straightforward, as actuarial assumptions for inflation should remain unchanged (for our calculations, we've set this at 2%).

For example, if a plan indexes retirees' annual benefits to the CPI, the increase to the plan's liabilities as a result of rising inflation would be calculated as follows:

Realized inflation – Expected inflation assumptions used by the actuary = Liability increase (%)

So if we assume a world of 7% realized (though transitory) inflation in which actuarial inflation assumptions are 2%, the liability increase for both the active and retiree plans would be calculated as follows:

7% – 2% = 5%

But the formula changes if the plan does **not** offer indexation. In this case, we need only consider the impact of the **active participants**, as salaries are affected by inflationary pressures. For the purposes of this analysis, we've assumed that the salaries of active members will increase broadly in line with any CPI increase. So here we use the same formula as above, but we include an additional factor: the proportion of plan liabilities that stems from active participants—we call this the proportion of active liabilities, or PAL.[1] For a plan that **doesn't** offer indexation, our formula now becomes:

Realized inflation – Expected inflation assumptions used by the actuary x PAL = Liability increase (%)

Where PAL = Market value of active participants' liabilities / Total market value of plan liabilities

In our cases, the retiree plan has no active members and its PAL is 0, while the PAL of the active plan is 1, as all of its members are active.

As we would assume, our index-linked pension plans bear the brunt of rising inflation, with liabilities rising by 5% for both active and retiree plans. If our plans **did not** offer automatic indexation, the retiree plan would see no increase in its liabilities (since its PAL is 0), while the active plan would see a rise of 5% (since its PAL is 1).

Transitory inflation	With indexation	Without indexation
Retiree plan	5%	0%
Active plan	5%	5%

The new normal? Estimated impact of longer-term inflation

But what about a world of **persistently** high inflation? Such a scenario would naturally have a far greater impact on our DB plans' liabilities, largely due to the increase in the actuarial assumptions used to establish the present value of future benefit payments.[2] We therefore need to incorporate a factor called liability inflation duration (LID), which is a measure of the sensitivity of the plan's liabilities to changing inflation rates.[3] The higher the figure, the greater its sensitivity to changing inflation rates.

In our examples, with indexation, the retiree plan LID is 9.3 and the active plan LID is 25.7. Without indexation, the retiree plan LID is 0.0 (i.e., its plan isn't affected by changing inflation as it has no active members and no requirement to index retiree members' payments to inflation), while the active plan LID is 14.6.

In the case of persistently high inflation, we can now calculate the liability increase with this formula:

Change in inflation assumptions x LID
= Liability increase (%)

For our calculations, we assume a long-term persistent inflation of 2.5% (i.e., a 0.50% increase). As an example, the liability increase for the active plan with indexation is therefore:

0.05% x 25.7% = 12.85%

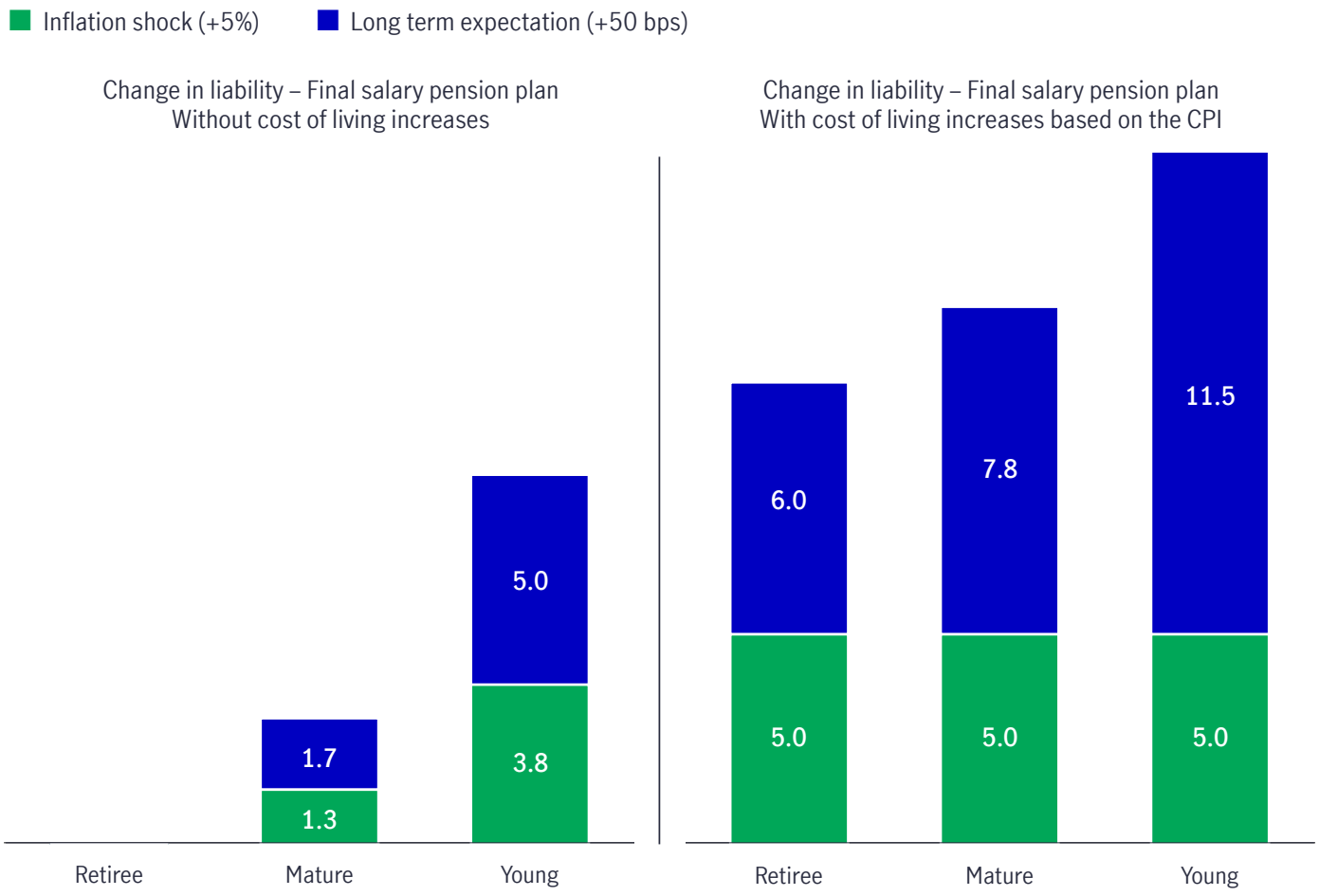
Persistent inflation	With indexation	Without indexation
Retiree plan	4.65%	0.00%
Active plan	12.85%	7.30%

If we include costs incurred by current (or transitory) inflation figures together with our calculations based on a persistent inflationary environment, we can see just how severe things might look for DB plans. The retiree plan would see a 9.65% increase in liabilities if it were index linked; the active plan with indexation would bear the largest impact: a 17.85% increase in its liability.

Combined transitory and persistent inflation	With indexation	Without indexation
Retiree plan	9.65%	0.00%
Active plan	17.85%	12.30%

Of course, most plans aren't composed of either 100% retired or 100% active members; generally, they have a mix of both. In this case, how do our formulas change? Fortunately, the calculations are fairly simple: We simply need to multiply the liability increase by the plan's PAL.

Feeling the burn: how sensitive are DB plan liabilities to rising inflation?



Source: Manulife Investment Management, June 2022. Bps refers to basis points. CPI refers to the Consumer Price Index. It is not possible to invest directly in an index. Past performance does not guarantee future results.

Recall that the PAL for the active plan was 1 and 0 for the retiree plan. But if a plan had, say, 70% active members and 30% retiree members (and if we assume that this plan's PAL is the same ratio), then we multiply the liability increase by 0.7; for example, the active plan with indexation saw a liability increase of 17.85%, but if that plan instead had a PAL of 70%, the liability increases by 12.5% (i.e., 17.85% x 0.7) instead.

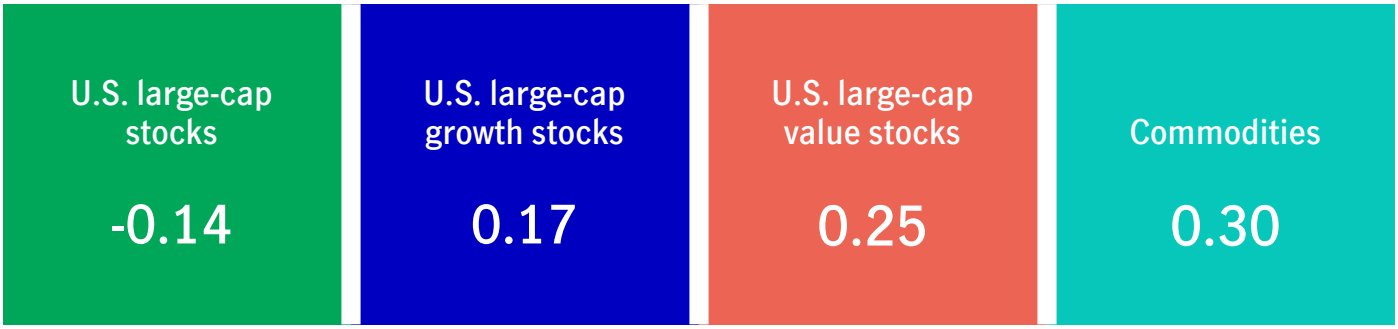
Our findings might make for uncomfortable reading, but it's important to note that although CPI-linked plans clearly fare worse in an inflationary environment, those not offering indexation could still incur liability increases of over 12% in some circumstances. In light of these stark figures, it's understandable that many plan sponsors will be asking if there's anything they can do to minimize the impact on their future funded ratio.

Looking ahead: investment strategies for an inflationary environment

Ideally, investors could offset the effects of higher inflation by investing in asset classes that can deliver higher returns. But due to the correlation between different asset classes, relying on riskier assets alone without a corresponding change in overall risk profile may not be enough to compensate for the increase in inflation.

For example, people often talk about the relationship between inflation and bond yields, but this correlation is moderate at best. Over the past 40 years, we've seen a correlation of about 0.48 between headline CPI and U.S. 30-year bond rates, with the relationship weakening as we move closer to the short end of the yield curve. The relationship breaks down further if we consider riskier assets such as stocks. In the same 40-year timeframe, the correlation with the CPI has been barely noticeable for broad U.S. equities (-0.14), U.S. growth stocks (0.17), and U.S. value stocks (0.25). It does begin to look a little better for commodities (about 0.30), but not necessarily enough for us to consider them to be a perfect inflation hedging tool over the long run.

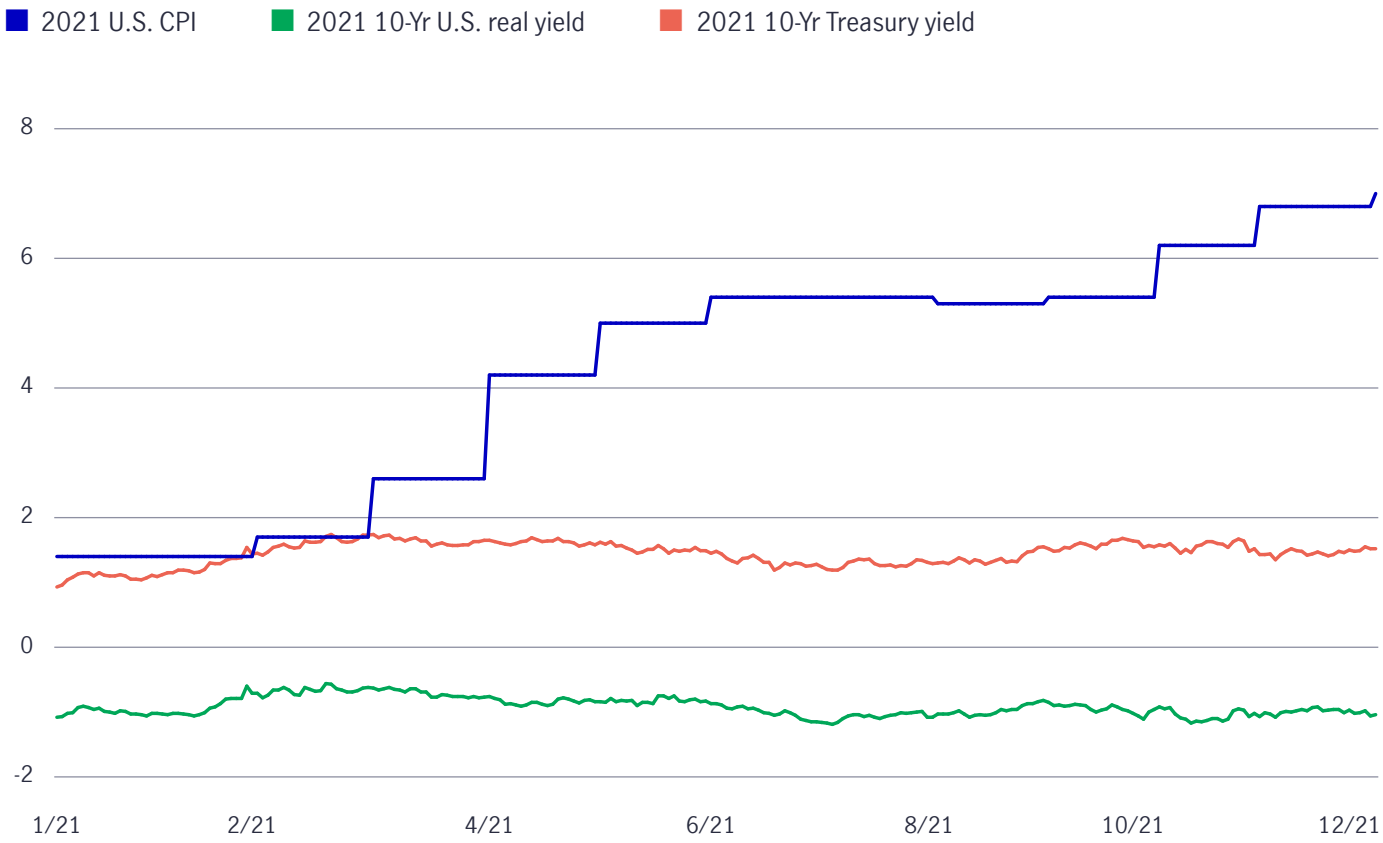
Correlation between the U.S. CPI and ...



Source: Manulife Investment Management, Macrobond, as of February 7, 2022. Correlation coefficients are based on monthly returns over 40 years. U.S. large-cap stocks are represented by the S&P 500 Index, U.S. large-cap growth stocks by the S&P 500 Growth Index, U.S. large-cap value stocks by the S&P 500 Value Index, and commodities by the CRB Raw Industrials Index. It is not possible to invest directly in an index. Past performance does not guarantee future results.

So what are the alternatives? In this type of environment, inflation-protected securities such as U.S. Treasury Inflation-Protected Securities (TIPS) tend to spring to mind. They may sound like the perfect solution for investors but, unfortunately, it's not that simple. The yield offered on inflation-protected securities is usually lower than most fixed-income bonds without an inflation adjustment. Perhaps most important, just because inflation is high and rising, it doesn't mean that inflation-protected securities will automatically make money. The U.S. CPI climbed 7.0% over 2021, while the TIPS index returned just 5.5%.[4] As a result, a prudent strategy could be to discard the mark to market of these assets and instead aim to match their liability inflation with expected payments, holding them until maturity in order to provide an adequate inflation hedge.

No guarantees: just because inflation is high, it doesn't mean inflation-protected securities will deliver a good return



Source: Bloomberg, January 1, 2021 to December 31, 2021. CPI refers to Consumer Price Index. It is not possible to invest directly in an index. Past performance does not guarantee future results.

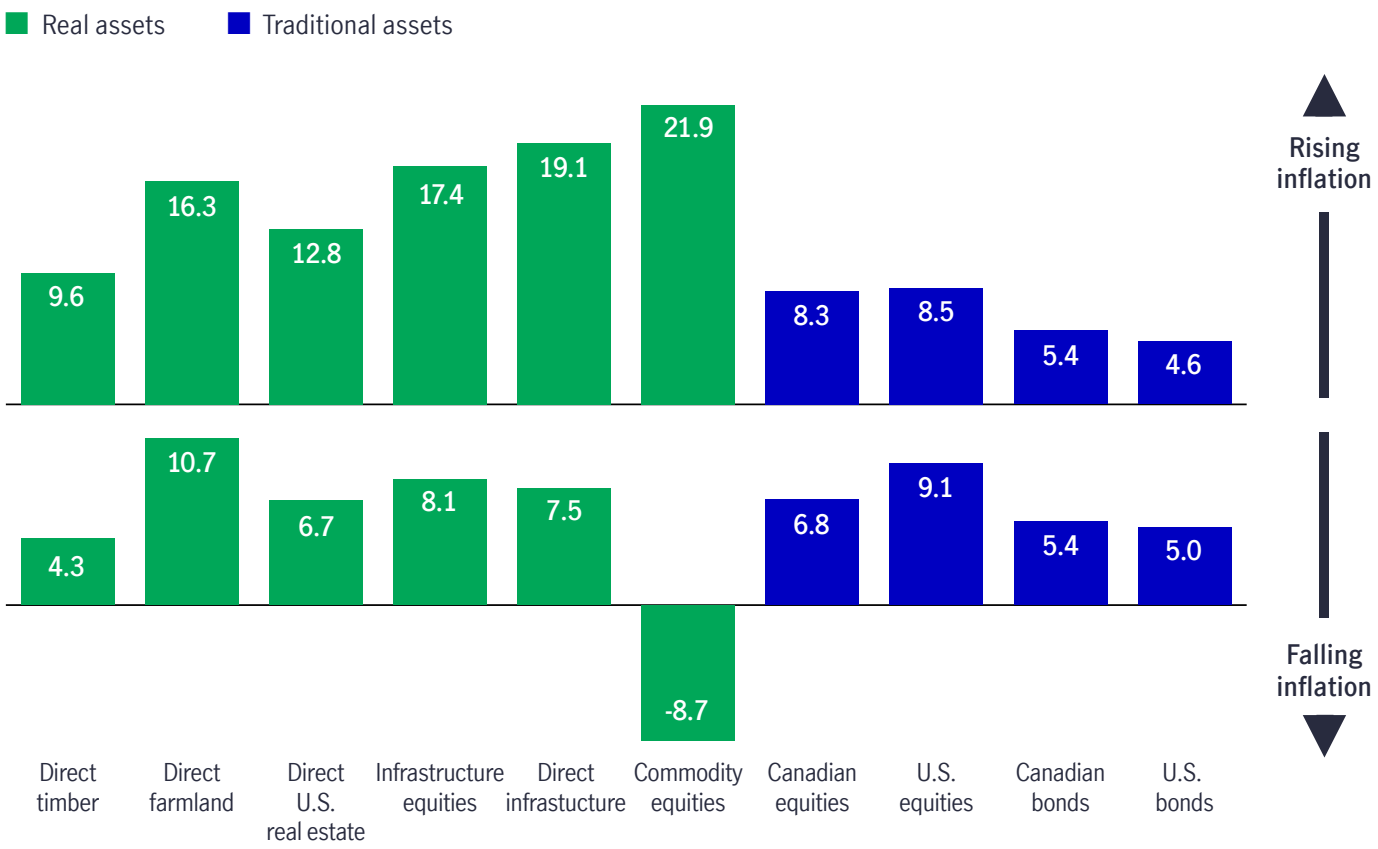
An approach that could be effective for some investors is the addition of synthetic exposure to inflation only; for example, in Canada this can be achieved by combining a long exposure to TIPS or real return bonds with a short position on Treasuries or Government of Canada bonds, respectively. In the United States and some other markets, the same objective can be achieved through the use an inflation overlay. It's important to note that investors would need to match the LID for these types of trade. This synthetic exposure would provide inflation protection similar to a long only position to index-linked securities, but with reduced capital requirements. The unused capital could then be redeployed into higher-yielding securities such as corporate bonds or even equities.

Let's consider a final salary pension plan, for example, fully indexed to the CPI, and targeting an asset allocation of 60% in equity and 40% in fixed income. A traditional option for the plan could be to replace its fixed-income allocation with exposure to inflation-linked bonds; alternatively, it could add a synthetic exposure by adding a 40% inflation overlay. In both cases, we should see a similar reduction in the volatility of the funded status, but by using the synthetic option, the plan has also freed up capital to invest in higher-yielding assets, which could result in higher returns over the long run.

The benefits of real assets

Another investment category that can provide a useful hedge against inflation is real assets. Over the past 20 years in rising inflation regimes, real assets such as real estate and infrastructure have provided a good hedge against inflation, outperforming traditional asset classes such as equities and fixed income.

Let's get real: real assets offered stronger returns when inflation was rising

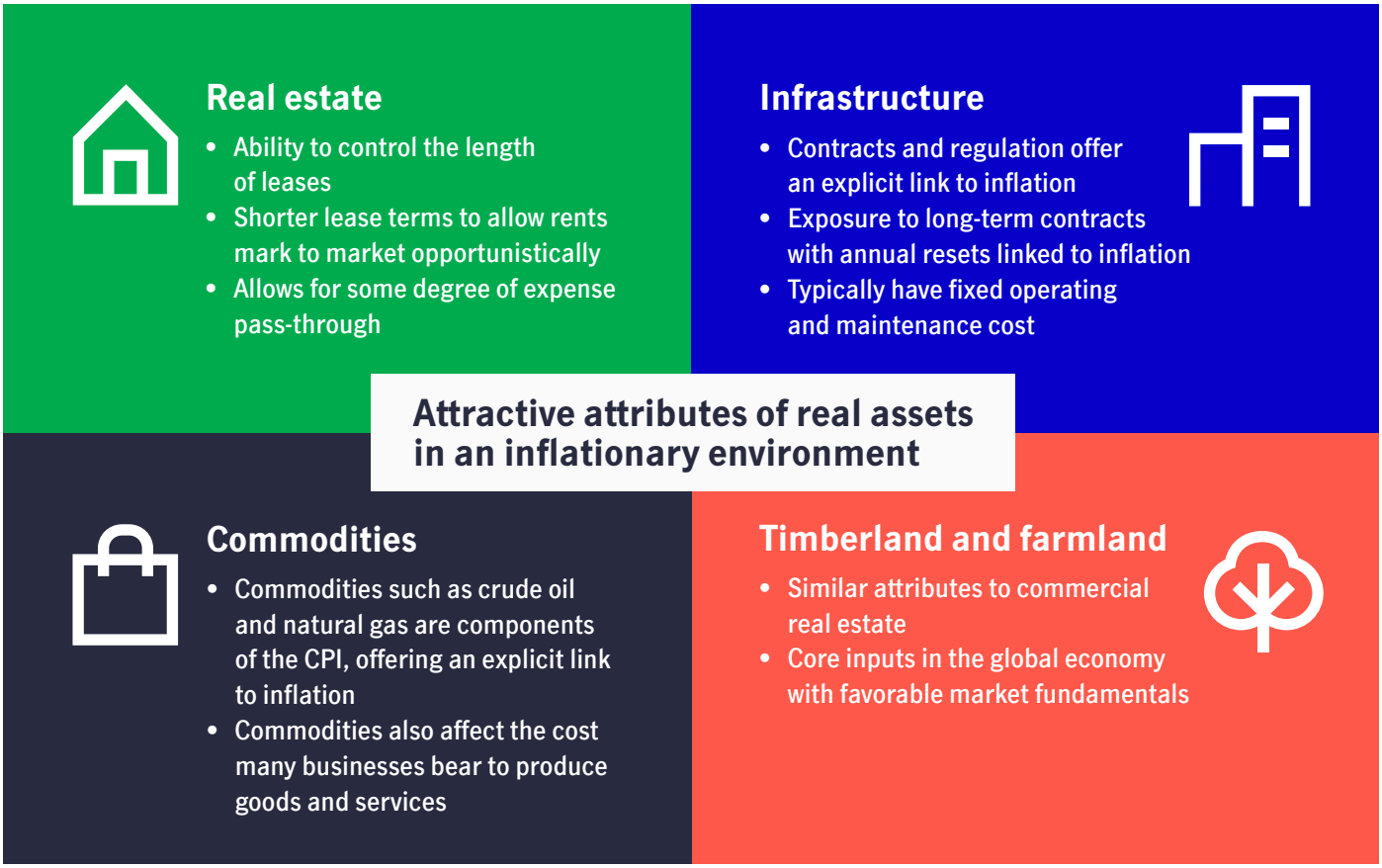


Source: Morningstar Direct, average 12-month rolling annualized returns from June 30, 2001 to June 30, 2021. Returns in U.S. dollars for representative indexes: farmland, NCREIF Farmland Index; U.S. real estate, NCREIF US Real Estate Index; infrastructure equities, S&P Global Infrastructure TR Index; timberland, NCREIF Timberland Index; commodities, S&P GSCI TR Index; U.S. bonds, Bloomberg U.S. Aggregate Bond Index; U.S. equities, S&P 500 Index; direct infrastructure: Burgiss Global Infrastructure Pooled Composite Index. Returns in CAD for representative indexes: Canadian equities, S&P/TSX Composite TR Index; Canadian bonds, FTSE Canada Universe Bond Index. U.S. Consumer Price Index (CPI) data is from the U.S. Bureau of Labor Statistics. Rising inflation is defined as periods in which the annual U.S. CPI is greater than 2.5%, and falling inflation is defined as periods in which it's less than 2.5%. It is not possible to invest directly in an index. Past performance does not guarantee future results.

Real estate, for example, is generally considered to be an asset class that can deliver consistent, real (i.e., inflation-adjusted) income in many different rate environments. Since the previous peak of interest rates in the United States in 1981, quarterly real income returns on U.S. real estate investments have averaged about 3.84% on an annualized basis.[5] Real estate's propensity to deliver consistent inflation-adjusted returns is in no small part thanks to its ability to help protect against the detrimental effects of inflation.

Similarly, infrastructure assets such as utilities have a clear link to inflation baked in thanks to government regulation, concession agreements, or contracts. Those assets without a direct link often have the pricing power to pass on the impact of inflation to customers.

Easing the pain: how real assets can help reduce the effects of inflation



Source: Manulife Investment Management, June 2022. CPI refers to Consumer Price Index.

A well-stocked tool kit

As we've shown, inflation—particularly in the long term—can have a significant impact on the liabilities of DB plans, and while that impact will be felt most keenly by plans offering automatic indexation, those without indexation will also bear the cost further down the line due to salary increases.

While there are tools available that are specifically designed to protect against inflation, they come at a cost and with several caveats. In our view, portfolio diversification is key for long-term success. We don't necessarily believe that there's a single asset class that can be used as a stand-alone tool to compensate for higher inflation, and the right solution can vary widely depending on the plan sponsor's risk tolerance.

1 For simplification purposes, we assume the PAL is the same as the percentage of active members in the plan. In practice, they may differ. **2** The formula we've used for calculating LID is A ÷ B, where A = Liability value if the expected inflation increases by 1 basis point, minus liability value if the expected inflation falls by 1 basis point; and B = 2 x Liability value when there's no change in expected inflation. **3** We offer one caveat here: These formulas assume that the plan's actuary chooses to increase the inflation assumptions in a world of persistently high inflation. If the actuary chooses not to increase inflation assumptions, the change in liability would by definition be zero, although that could mean an increased risk of not meeting plan commitments and of future losses. **4** Bloomberg U.S. Treasury Inflation-Linked Bond Index. **5** Based on the income returns component of the NCREIF Property Index and U.S. quarter-over-quarter change in core CPI, as of Q2 2021.

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Manulife Investment Management

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