



Testing Infrastructure's Resilience Amid Heightened Uncertainties

Key Takeaways

- ▶ We tested the short- and long-term return profiles of infrastructure against a backdrop of changing macroeconomic factors, examining infrastructure's strength in different inflation, GDP growth and bond yield scenarios.
- ▶ In short-term scenarios like a severe credit event, quantitative tightening and stagflation, and in long-term scenarios like financial repression, deglobalisation and climate inflation, the effect of the changes in macro variables on infrastructure returns is positive in most cases.
- ▶ Active rebalancing of subsector exposure to optimise portfolio outcomes given the conditions of each scenario results in a reasonable improvement in investor outcomes, suggesting active management of listed infrastructure provides the greatest flexibility to navigate varying macroeconomic scenarios.

While the future is impossible to predict, scenario analysis can help understanding how return profiles might fare in a range of scenarios. This is all the more important in a moment of heightened macroeconomic uncertainty such as the world faces today, when significant inflation, interest rate and recession risks are calling into question both short-term and long-term assumptions about markets and the global economy.

We examined short- and long-term economic scenarios to test infrastructure's strength amid potentially dramatic changes to the economic regimes of recent decades. Testing three key variables — inflation, real GDP growth and the change in 10-year nominal bond yields — our analysis indicates infrastructure returns demonstrate resilience to several challenging short- and long-term macroeconomic changes.

The performance of infrastructure in six scenarios represents the value investors might expect from actively managed infrastructure portfolios, in particular ones unconstrained by a benchmark and investing in listed as opposed to unlisted infrastructure.

How Macroeconomic Forces Affect Infrastructure

It's helpful to briefly describe the effects of inflation, real GDP growth and changes in 10-year nominal bond yields on infrastructure returns, and how and to what extent variations in these factors are transmitted to infrastructure. For each we can distinguish, broadly, between regulated and contracted utilities and more economically sensitive user-pays infrastructure such as airports, toll roads and rails.

Inflation

For utilities with "real" regulation (e.g., U.K. water and energy), prices (flowing to revenues) and asset base values are indexed to inflation annually, leading to a direct pass-through of inflation. For utilities with "nominal" regulation (e.g., U.S. water and energy), allowed return on equity targets, operating cost bases and capital expenditure forecasts are adjusted at each regulatory reset (on average every two to three years), leading to a lagged and indirect pass-through of inflation.

For user-pays infrastructure assets, companies have a variety of pass-through mechanisms. For example, toll road companies generally have the most direct pass-through, as they are able to increase tolls for inflation changes every quarter or year.

Real GDP Growth

Utilities with either "real" or "nominal" regulation tend to have little long-term exposure to GDP, although a high-growth economy will require additional energy infrastructure and therefore result in higher asset base growth for local utilities.

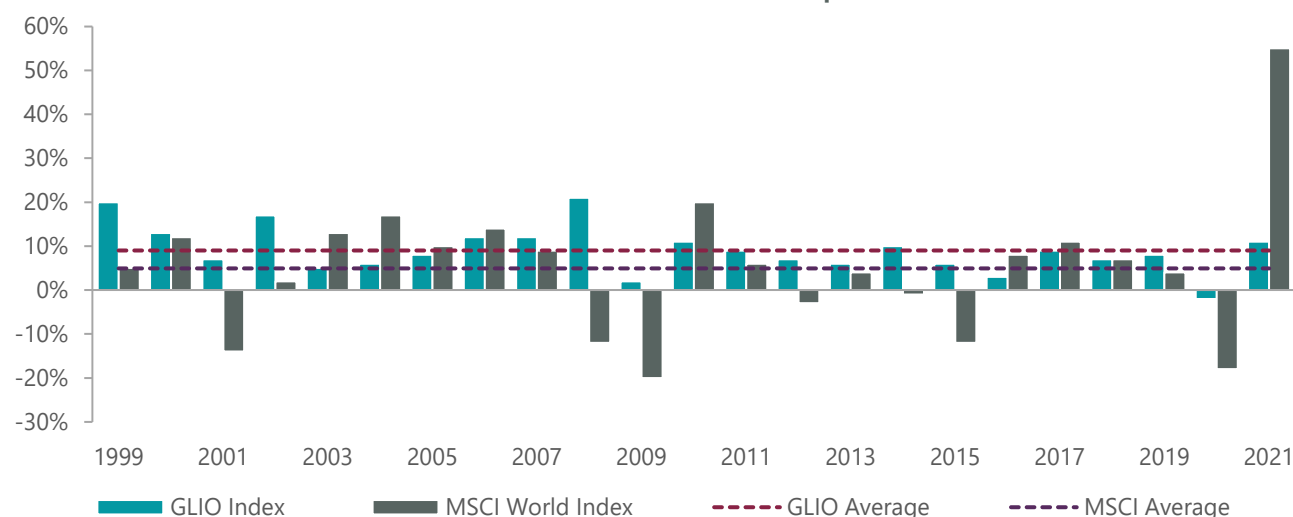
User-pays infrastructure companies are exposed to GDP growth. While the pricing of their services is generally set by regulation or concession contracts, they are exposed to the business cycle impact on toll road traffic or airline passengers passing through airports, and so on.

Changes in Nominal Bond Yields

Utilities generally have their allowed returns (whether real or nominal) adjusted at each regulatory reset. This does lead to some lag to changes in bond yields, but generally has an immaterial impact on fundamental valuations. It is worth noting that generally utilities are not materially exposed to increased costs of financing (that is, the interest cost of debt in their capital structure) as these costs are either hedged out to the regulatory reset date or considered a pass-through to consumer bills.

User-pays infrastructure companies are exposed to changes in bond yields as they are unable to reprice their services based on changes in bond yields. The exception is those companies that include some portion of regulated services, such as the aeronautical business segments within airports.

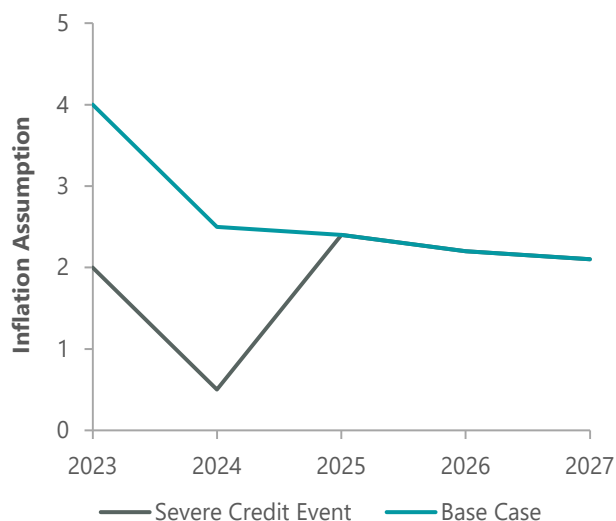
Exhibit 1: Year Over Year EBITDA Growth for Infrastructure and Global Equities 1999-2021



As of 31 December 2021. Source: Global Listed Infrastructure Organisation (GLIO). Comparison of Year-on-Year EBITDA¹ for the GLIO Index (Infrastructure) and MSCI World Index (Global Equities).

¹ EBITDA is earnings before interest, taxes, depreciation and amortisation. This earnings measure removes some of the impact of different accounting standards applied across different regions and sectors.

Exhibit 2: The Inflation Assumption Under The Severe Credit Event Scenario



Source: ClearBridge Investments. Please see note on page 7 regarding scenario analysis and future investment results.

These transmission mechanisms are key to delivering a more stable earnings profile to infrastructure companies relative to other equities. Exhibit 1 highlights the stability of infrastructure earnings since 1999, with only one negative year, in 2020, caused by the pandemic.

With the basic transmission mechanisms of these three key economic variables in mind, we can look at how today's cyclical and future structural macroeconomic uncertainties might affect infrastructure portfolios.

Infrastructure Return Implications: Cyclical Scenarios

Cyclical scenarios are shorter term, encompassing the next couple of years. In assessing the impact of these changes, we have adjusted assumptions in our financial models for the years 2023-24 (inclusive); these then revert to our current medium and longer-

term assumptions. For example, Exhibit 2 highlights the adjustment to the inflation assumption to simulate a severe credit event scenario in our financial models.

The shorter-term cyclical scenarios assessed include:

- **Severe credit event:** This scenario assumes conditions similar to the Global Financial Crisis, with a fundamental break in the financial system and high illiquidity in bond markets. It likely involves a hard landing as inflation falls, real GDP growth declines substantially and bond yields also edge down as central banks step in to provide liquidity to key markets.
- **Quantitative tightening:** This assumes the Federal Reserve and other central banks continue to raise interest rates and run off their balance sheets because growth is resilient and inflation is slow to recede. Inflation rises, bond yields rise even further, and real GDP growth eventually slows.
- **Stagflation:** In this scenario inflation starts to rise again, forcing interest rates up, while tighter financial conditions lead to recessionary conditions along with rolling credit events, but there is little room for the Fed to pause or ease monetary conditions. Inflation and bond yields rise while real GDP growth declines substantially.

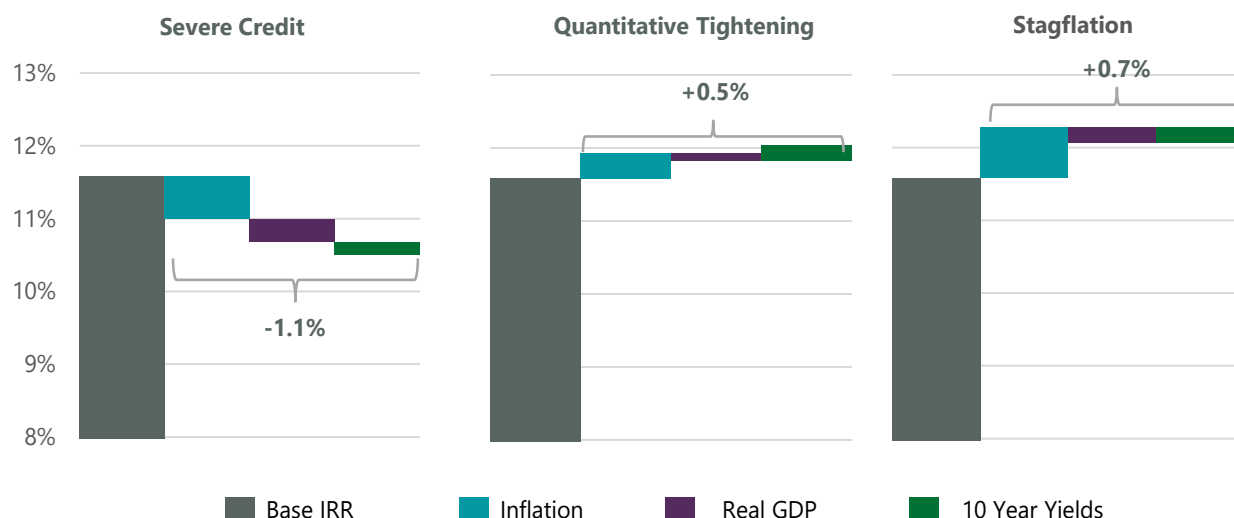
We assess the impact of these scenarios based on the change in the expected return relative to the return under the base case for the ClearBridge Global Infrastructure Income Strategy (Exhibit 4). The Strategy is most sensitive to changes in the inflation assumption, with a skew to the upside meaning that increases in inflation result in an outsize increase in valuation (and returns) relative to the same size inflation decrease. This is a result of some companies (e.g., toll roads) having minimum price increases in their concession contracts. The Strategy is approximately three times more sensitive to inflation than similar changes in the real GDP or bond yield assumptions.

Exhibit 3: Cyclical Macroeconomic Scenarios, Adjustment to Assumptions for 2023-2024

Adjustment (in basis points)	Inflation	Real GDP	Bond Yields
Severe Credit Event	-200	-300	-100
Quantitative Tightening	+100	-100	+200
Stagflation	+200	-200	+200

Source: ClearBridge Investments. Please see note on page 7 regarding scenario analysis and future investment results.

Exhibit 4: Cyclical Scenario Return Implications: ClearBridge Global Infrastructure Income Strategy

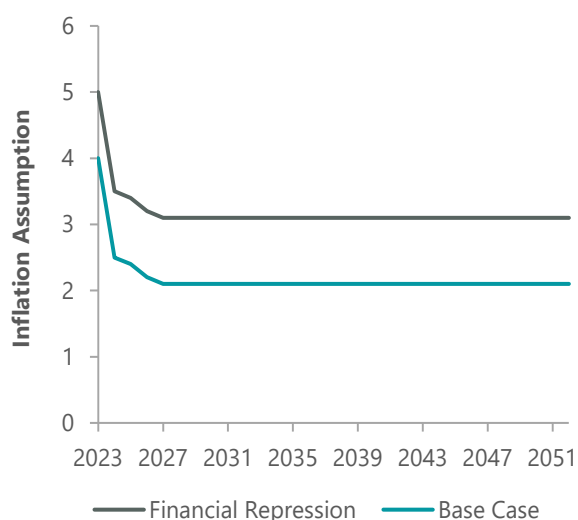


Source: ClearBridge Investments. Calculated return implications are five-year annualised. The scenario analysis is not actual performance achieved by any ClearBridge clients. Please see note on page 7 regarding scenario analysis and future investment results.

The 1.1% reduction in the expected five-year annualised return under the severe credit event scenario implies that this scenario would be “priced into markets” with a 5%-6% selloff² in the current price of stocks in the Strategy.

The impact of these scenarios on the ClearBridge Global Infrastructure Value Strategy is detailed in Exhibit 8 in the Appendix.

Exhibit 5: The Inflation Assumption Under the Financial Repression Scenario



Source: ClearBridge Investments. Please see note on page 7 regarding scenario analysis and future investment results.

Infrastructure Return Implications: Structural Scenarios

Structural scenarios are longer term in nature and broadly result in a global economy that looks materially different than the current or recent regime. In these scenarios market expectations incur a permanent adjustment of a given macro factor, which defines market and economic conditions beginning in 2023 and running for the life of our financial models (generally 30+ years). For example, Exhibit 5 highlights the impact of the financial repression event scenario on the inflation assumption in our financial models.

The longer-term structural scenarios assessed include:

- **Financial repression:** This assumes central banks and governments allow inflation to run hotter but keep bond yields artificially low to inflate away the debt/GDP ratio. Inflation rises, bond yields drop, while real GDP growth is flat.
- **Deglobalisation:** In this scenario, as countries re-shore or nearshore economic activity, the fracturing of global trade results in lower growth and similar though more volatile inflation. Together these create greater sovereign risk, resulting in higher bond yields.
- **Climate inflation:** Here global spending to support the energy transition results in the global economy running hot: GDP growth, inflation and bond yields all rise as new infrastructure is funded.

In Exhibit 7, we show the expected return impact of the three structural scenarios outlined above for the ClearBridge Global Infrastructure Income Strategy.

Exhibit 6: Structural Macroeconomic Scenarios, Adjustment to Assumptions for 2023 and Beyond

Adjustment (in basis points)	Inflation	Real GDP	Bond Yields
Financial Repression	+100	-	-100
Deglobalization	-	-100	+100
Climate Inflation	+100	+100	+100

Source: ClearBridge Investments. Please see note on page 7 regarding scenario analysis and future investment results.

The return of the Strategy is positively correlated to temporary changes in the bond yield assumption (Exhibit 4 above), whereas long-term changes in the bond yield assumption result in a negative correlation (Exhibit 7 below). This is an outcome of the nature of regulation for Strategy companies and a recognition that the securities will be sold with a materially different cost of capital at the end of the five-year investment period than at the beginning of the period.

The impact of these scenarios on the ClearBridge Global Infrastructure Value Strategy is detailed in Exhibit 9 in the Appendix.

Return Implications: Summary

As we can see, the effect of the changes in macro variables is positive in most cases. In the short-term cyclical scenarios, a severe credit event is detrimental to infrastructure returns, while stagflation is the most positive. This makes sense due to the significant weighting of utility companies in the Strategy where inflation is passed through in higher prices and

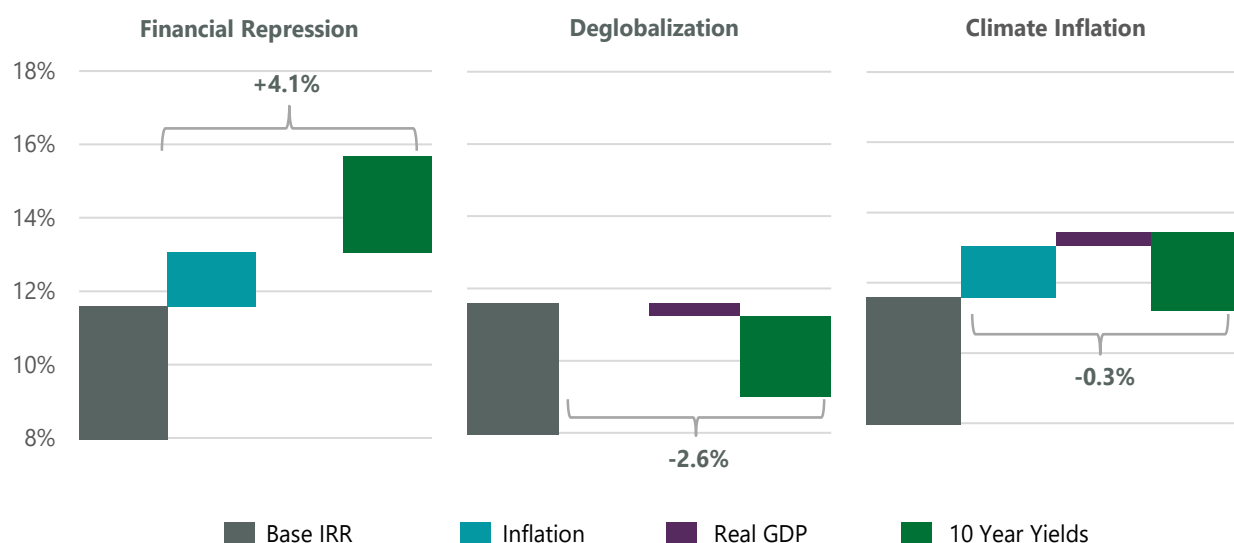
valuations are positively correlated to short-term bond yield changes.

In terms of structural changes, financial repression represents a solidly positive outcome for infrastructure returns, as the scenario would likely result in an upward revaluation of all financial assets as the “risk-free” rate would likely be reassessed downward. Deglobalisation is a substantial headwind, however it still provides investors with an expected return of about 9% per annum of a five-year investment horizon as shown in Exhibit 7.

Impact of Active Portfolio Rebalancing

Economic sensitivity varies across infrastructure subsectors as previously explained. As macroeconomic forecasts are updated in financial models, valuation signals will reflect these new assumptions (e.g., an increase in airport traffic in a more buoyant economy or an adjustment to allowed returns for a utility) and an active infrastructure manager will be able to adjust portfolio exposures in response.

Exhibit 7: Structural Scenario Return Implications: ClearBridge Global Infrastructure Income Strategy



Source: ClearBridge Investments. Calculated return implications are five-year annualised. The scenario analysis is not actual performance achieved by any ClearBridge clients. Please see note on page 7 regarding scenario analysis and future investment results.

The effect of active rebalancing of utilities and user-pays exposure to optimise portfolio outcomes given the conditions of each scenario results in a reasonable improvement in investor outcomes. For the ClearBridge Global Infrastructure Income Strategy, a meaningful improvement in the return outcome can be achieved. In the climate inflation structural scenario, the outcome changes from an expected reduced return to an increase in the expected return.

These results are consistent with our experience that active management, unconstrained by reference to a market index, provides the greatest flexibility to navigate varying macroeconomic scenarios.

While all investors undertake varying levels of scenario analysis when making investment decisions, listed infrastructure investors enjoy an advantage in this respect over their private market counterparts. Listed portfolios can be reallocated and exposures optimised based off the latest scenarios and valuation signals much more easily than private market portfolios, which need to acquire or dispose of underlying assets. In addition, certain types of infrastructure assets are more readily accessible in listed markets than private markets, further reinforcing the complementary nature of public and private infrastructure allocations, a topic we have previously explored in detail.

Assumptions

The cyclical scenarios have been developed around periods of history and reflect largely observable movements in the macro factors. The structural scenarios represent different economic environments we could move into, although they are not drawn from historical context (although some have argued the Financial Repression case could look like the period immediately post World War II).

The severe credit event is assumed to be a period similar to the Global Financial Crisis (GFC). To assess the movement in factors we look at the GFC and rebound, comparing 2007 (calendar year average) factors with the two-year period from September 2008 to June 2010 (inclusive).

- Inflation averages 3.1% in 2007 and 1.0% from 3Q08 to 2Q10; we have rounded the difference (2.1%) to a decline of 200 bps.
- GDP averages 2.0% in 2007 and -1.0% from 3Q08 to 2Q10; the difference is a decline of 300 bps.
- Bond yields average 4.6% in 2007 and 3.3% from 3Q08 to 2Q10; we have rounded the difference (1.3%) to a decline of 100 bps.

The quantitative tightening scenario is assumed to be a period similar to 2018, where the balance sheet run-off began in early 2018 as the Fed was raising rates. However, in late 2018 the Fed signaled a likely end to rate increases and in January 2019 Chair Powell confirm this (the Powell Pivot), although the balance sheet run-off continued into 2019. The case we are trying to approximate here is a continued tightening process, potentially caused by a resurgence in commodity prices, which could see the Fed continuing to raise rates and run off the balance sheet throughout 2023 and into 2024.

- Inflation moved from ~2% in 2H17 to ~3% in 3Q18, before the pivot started getting priced in, with the difference of ~1% rounded to 100 bps.
- GDP moved from ~3% in early 2018 to ~2% in mid-2019; we have rounded the difference of ~1% to 100 bps.
- Bond yields moved from ~2.25% in late 2017 to ~3.25% in late 2018, when the market began to price the chances of a pivot. We think bonds would have continued to rise without the pivot pricing. As a result we have run the case with a 200 bps increase. We do not believe inflation of GDP would have changed materially as the bond yield increase would have been a function of the market continuing to absorb the Fed selling bond securities (i.e., lower clearing price and higher yield).

The stagflation scenario we assume to be a period similar to the 1960s. Compared to the relative stability of the 1962-64 period, the 1966-67 period saw elevated CPI and bond yields and lower GDP growth. Most economists agreed that this period was a result of too accommodative monetary policy for too long. The initial stagflation (a term coined in 1965) was overtaken by energy-driven stagflation in the late 1960s and into the 1970s. Given this is a cyclical stagflation case, we have chosen the mid 1960s as the model for how the economic factors may react.

- Inflation averages 1.2% in 1962-64 and 2.9% in 1966-67, with the difference of 1.7% rounded to an increase of 200 bps.
- GDP averages 5.5% in 1962-64, 6.5% in 1965 and 4.7% in 1966-67, which we assume to be a 200 bps decline.
- Bond yields moved from below 4% in 1962 to 5.7% by the end of 1967, which we assume to be a 200 bps increase.

The financial repression scenario represents a case where governments/central banks choose to de-lever their economies by running inflation above target for a long period of time (or changing the inflation target as is starting to be discussed now), while constraining the level of bond yields (for example with yield curve control). While real GDP is not affected, nominal GDP is higher because inflation is higher and the debt/GDP ratios are calculated off the nominal GDP numbers. The higher inflation feeds into higher wages, resulting in a closing of the wealth divide and savers are penalised with the lower bond yields. The closest period in history is arguably the period immediately post World War II where monetary policy was allowed to run more loosely; however, it is not possible to find a “baseline” period to measure the changed macro factors against.

The deglobalisation scenario represents a case where the world takes a few decades to reverse globalisation. This would result in unproductive expenditure to bring manufacturing closer to end markets (re-shoring or near-shoring) and result in higher debt levels (and credit spreads, representing additional capital expenditure that doesn't lead to increase revenues) to fund this expenditure.

The climate inflation scenario represents a case where governments choose to borrow to spend on green infrastructure and decarbonisation projects. In this instance public spending (or incentivisation under Inflation Reduction Act equivalents) causes economies to run hotter (higher CPI and GDP) but higher debt levels result in additional risk premium to sovereign yields.

The base case returns for each strategy reflect the weighted average IRR from each underlying holding from our financial models in local currency.

About the Author



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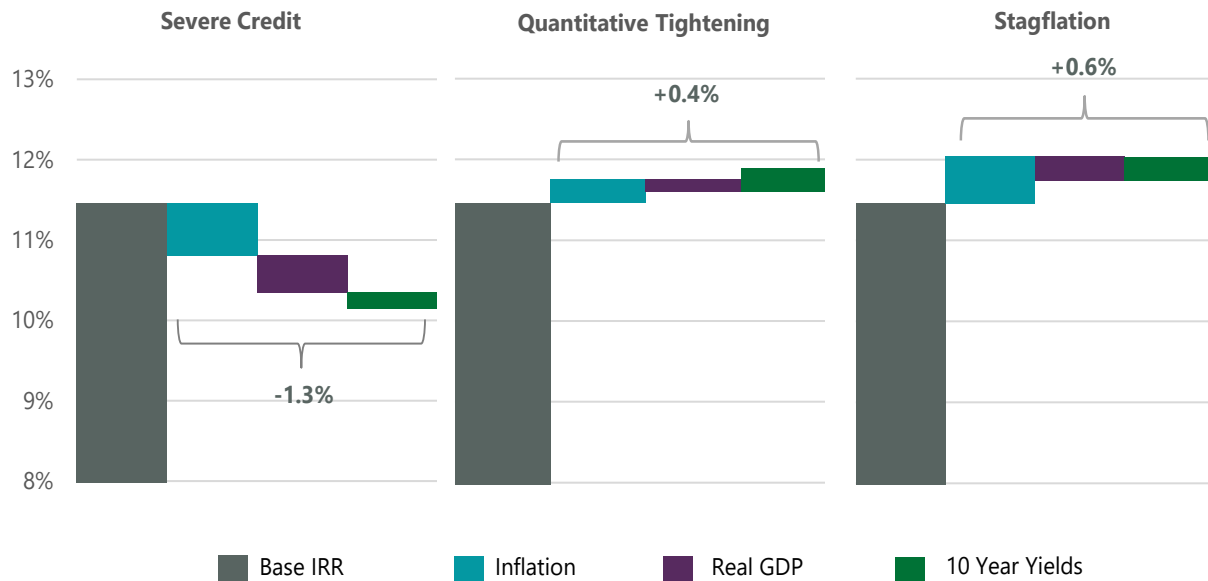
- 28 years of investment industry experience
- Co-founded RARE Infrastructure in 2006
- Bachelor of Laws and Bachelor of Commerce from the University of Auckland

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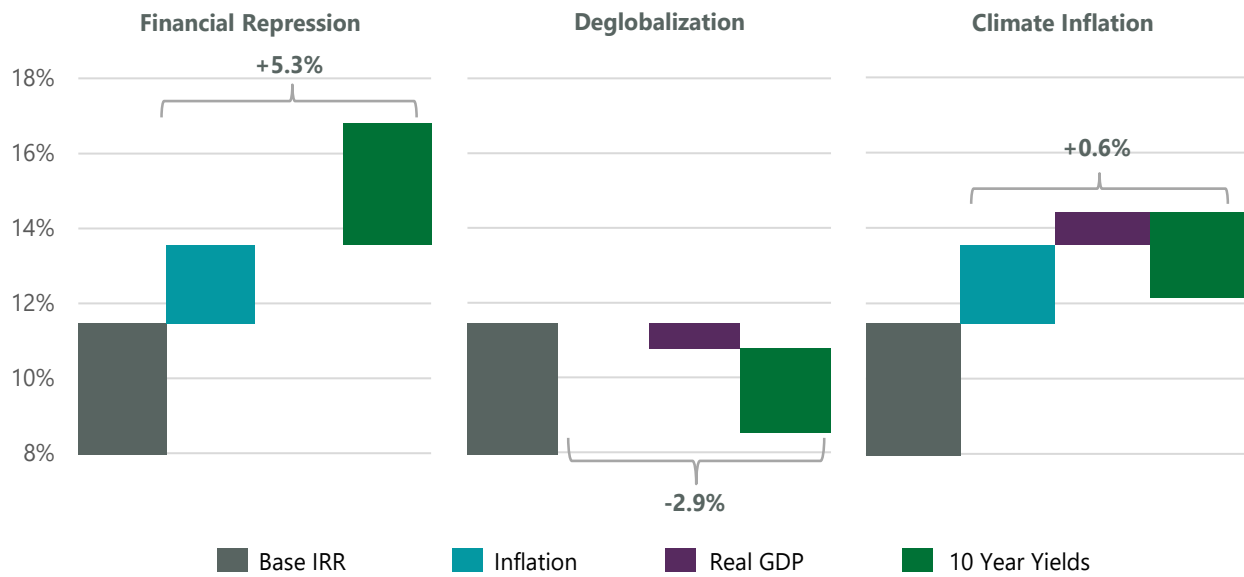
Appendix

Exhibit 8: Cyclical Scenario Return Implications: ClearBridge Global Infrastructure Value Strategy



Source: ClearBridge Investments. Calculated return implications are five-year annualised. The scenario analysis is not actual performance achieved by any ClearBridge clients. Please see note on page 7 regarding scenario analysis and future investment results.

Exhibit 9: Structural Scenario Return Implications: ClearBridge Global Infrastructure Value Strategy



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