RED PAPER

QIC

Goldilocks and the Three Scenarios

AN INFLATIONARY STORY FOR INSTITUTIONAL INVESTORS

CONTENTS

1

Introduction

Introduction

For decades, inflation has been a distant concern for institutional investors, hiding in the fringes of low probability risk.

But in response to COVID-19, unprecedented stimulatory fiscal and monetary policies have been unleashed upon the world's economies at a time when supply-side bottlenecks are also plaguing the global economy. Not surprisingly, these combined demand-side and supply-side shocks are catapulting inflation out from the shadows and firmly into the spotlight. Preparing for inflation is now a primary consideration for institutional investors.

By mapping out alternative pathways for potential inflation outcomes, this Red Paper – **Goldilocks and the Three Scenarios: An Inflationary Story for Institutional Investors** – aims to empower influential investment decision-makers so they can establish plans for a range of scenarios, while also providing guidance if one scenario starts to look more probable.

Our aim is to examine the impact on returns for key asset classes and analyse the robustness of multi-asset portfolios, under the different inflation scenarios.

We also examine which alternative asset classes and active management strategies can help investors mitigate against inflationary risk by studying returns over a five-year period, on a whole of portfolio outlook, as well as examining the benefits of actively managed infrastructure, real estate, fixed income, private debt and private equity asset classes.

1.1 Pathways to Inflation: Our Scenarios

We recognise the pathway to higher persistent inflation is not unique; there are many possibilities.

Rather, we are looking to establish some discrete risk scenarios that may serve as book ends of probability for our clients. As an example, this paper seeks to show how an aggressive scenario such as Stagflation could occur, by indicating a possible pathway if a Benign Inflation Overshoot was not properly managed or escalated beyond the control of central bank reaction functions.

Of course, it is the extent to which these shocks are enduring that is concerning investors and central banks. Even in the event that the shocks are enduring, the reaction of central banks, investors and financial markets will also influence the outcome.

METHODOLOGY

Extended periods of elevated global inflation have not been experienced for many years.

Since then, much about the global economy and financial markets has changed:

- Global economies are far more integrated through chains of supply and demand
- Labour markets and wages are less sensitive to fluctuations in unemployment rates and price movements
- Central banks have clear inflation targets among their policy mandates
- Global financial markets are more highly correlated and advanced technology transmits information across the globe at the speed of light
- China now accounts for around 20% of the global economy
- The global economy is responding to its first pandemic in 100 years.

The distance between inflationary experiences and changes to the structure of the global economy weakens the applicability of historical analyses.

Instead, we use a large scale global macro econometric model, NiGEM, that:

- Captures current international trade and financial market linkages across countries
- Captures the interaction between the supply and demand sides of economies
- Explicitly models central bank monetary policy and government fiscal policy and integrates policy outturns into the behaviour of investors, businesses and households
- Integrates financial market outturns into the behaviour of businesses and households
- Generates growth, inflation and interest rate outturns consistent within a country, across countries and across time.

The output of the scenario analyses of NiGEM are then used as inputs into the valuation models of the major asset classes including equities, government and corporate bonds, infrastructure and real estate.

Key inputs from our macroeconomic scenarios are cash rates, rates of inflation and measures of economic activity such as GDP, Gross Operating Surplus, wage growth, retail sales, cash rates, inflation and exchange rates.

The asset valuation models produce both nominal and real returns for each asset class, where we use a five-year geometric average of our inflation projections to derive the real returns from the nominal returns.

1.1 Pathways to Inflation: Our Scenarios (continued)

The pathway forward will depend on the interplay of a range of demand-side, supply-side and policy influences, including:

- Government fiscal settings
- Central bank policy reactions
- Household and business balance sheets, savings rates and expenditure levels
- Global energy prices
- Global food, metals and minerals prices
- Global supply chains and international trade linkages
- Financial market responses.

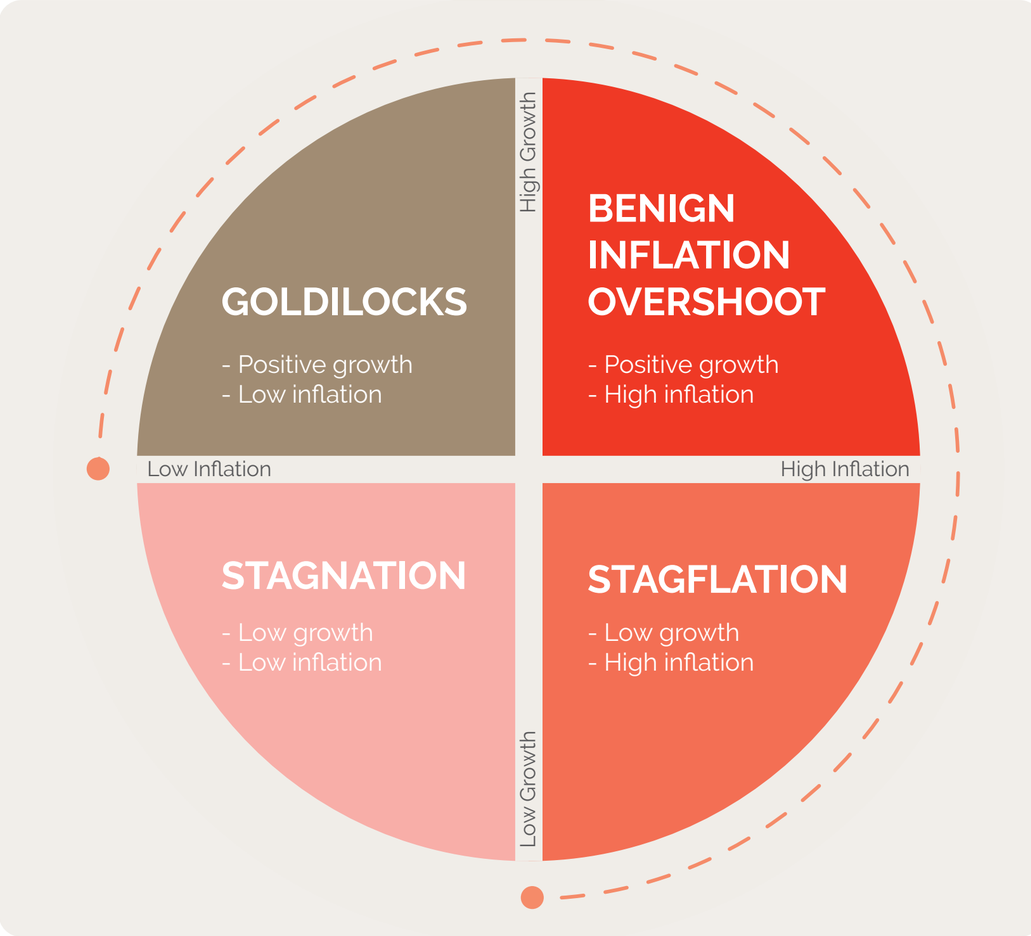
Our pathways to inflation depend on how these supply and demand side catalysts interact with policy decisions and financial market reactions.

We have created four inflation scenarios:

- Goldilocks
- Stagnation
- Benign Inflation Overshoot
- Stagflation.

We see linkages between these scenarios that define a path from one scenario to another. The framework depicted to the right highlights the various inflationary scenarios juxtaposed against inflation and growth outcomes.

Figure 1 – Goldilocks and the Three Scenarios: An Inflationary Spectrum for Institutional Investors



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Summary of Findings

Stagnation Scenario

Growth-Inflation Parameter

Low growth

Low inflation

What Happens?

Investors will see a return to pre-COVID trends in the global economy.

We would also expect the below target inflation outturns to be reinforced and ultimately continue to weigh on consumer inflation expectations.

Central Bank Response

Central banks will be required to keep policy rates lower for longer given the subdued inflation outlook and bond yields remaining substantially lower.

Fixed income

- Both nominal and real returns are higher than the Goldilocks view.
- Significant carry over the five years from credit and rates, rally in credit spreads.
- Active alpha to be made from long rates, short inflation, defensive credit.

Equity

- Equities underperform on a nominal basis relative to the Goldilocks scenario due to lower expected earnings which are a factor of lower growth, though real returns are largely the same as Goldilocks given the low inflation.

Infrastructure

- The performance in the Stagnation scenario relative to Goldilocks for infrastructure assets is very modestly negative due to lower inflation and economic growth.
- We see transport assets as relatively more exposed to lower real GDP growth in the analysis.
- The energy and utilities sector will be expected to experience a modest negative impact for regulated assets, lower interest rates will drive lower WACCs and revenues for contracted assets (which are often inflation linked) will be reduced due to lower inflation.

Real estate

- Weaker occupier demand and income, but lower interest rate settings mitigate any material valuation impact, providing nominal and real returns that are marginally weaker than the Goldilocks view.
- Likely that some retail would be relatively less impacted due to non-discretionary sales and consumption.

Private debt

- On one hand, low interest rates and inflation mean that defaults will remain low and even over-leveraged businesses which would have otherwise failed over the last decade will continue to muddle through.
- Offsetting this is the fact that floating rate loan returns will continue to be restricted by low base rates. Investors accessing higher value add strategies which benefit from higher margins will be better placed in this scenario.

Private equity

- Nominal and real returns are less than the Goldilocks view, though the negative inflationary and growth impacts are offset by lower interest rates.

Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

Benign Inflation Overshoot Scenario

Growth-Inflation Parameter

Positive growth

High inflation

What Happens?

Investors will witness cyclical factors push inflation higher in the near-term.

We would expect substantial fiscal stimulus to deliver a significant near-term demand boost alongside elevated commodity prices and persistent supply bottlenecks, product shortages and elevated freight costs.

Central Bank Response

Central banks operate under the belief the inflation spike is transitory and slow in starting to hike interest rates. They will subtly engage in financial repression in an attempt to "deflate away" this elevated government debt.

As a result we predict long-run inflation expectations to drift higher by 1ppt and central banks ultimately deciding to lift their inflation targets by 1ppt to avoid having a tighten policy excessively and spark a recession.

Ultimately, central banks will quickly and successfully re-anchor inflation expectations at this higher level, normalising the increased interest rates.

Fixed income

- Interest rates rise more quickly but credit spreads are aided by higher growth. Under this inflationary scenario, we uncovered the second-best nominal returns, but all indices experienced a negative IRR in real terms over the five-year period. This is because rates will go higher under this scenario than in the Stagnation case.
- Active alpha to be made from short interest rate duration, active credit, long BEIs.

Equity

- Equities marginally outperform Goldilocks on a nominal basis. Nominal returns are negatively impacted by higher discount rates; however, the impact is more than offset by the positive earnings outlook for equities as inflation is passed through to earnings. Real returns are lower than in the Goldilocks scenario.

Infrastructure

- Higher nominal and real returns relative to Goldilocks are driven by the accretive combination of higher inflation with only moderate changes in interest rate.
- Looking at real returns, the positive performance relative to Goldilocks is less significant than for the nominal returns due to the higher inflation in this scenario.

Real estate

- Stronger nominal and real returns relative to Goldilocks: higher inflation lifts rents across all sectors, while resilient growth supports fundamentals.
- With central bankers keeping real interest rates low, investors will bolster demand in the hunt for yield.

Private debt

- Average credit quality deteriorates as company costs and revenues are affected by inflation.
- Default rates rise with the impact being most severe in highly leveraged strategies.

Private equity

- Nominal returns are slightly stronger than Goldilocks though real returns are weaker. Portfolio companies with pricing power can raise prices with inflation.

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Stagflation Scenario

Growth-Inflation Parameter

Negative growth

High inflation

What Happens?

Although central banks will quickly re-anchor inflation expectations, they will continue to rise given the loss of central bank credibility and persistent strong inflation outturns.

Central Bank Response

Central banks will be forced to raise rates much more sharply and tip the economy into recession. There will be temporary higher, bond term premiums as well as a spike in credit spreads and equity risk premiums while equity market will fall sharply.

Governments will be forced to pull additional fiscal tightening levers to preserve fiscal sustainability.

Central banks will ultimately be successful in re-anchoring inflation expectations at 1ppt above a base case forecast, but only after the global economy experiences a severe recession (although smaller than the 1970s).

Fixed income

- Heavily impacted returns in all indices from the selloff in rates without a corresponding rally in credit – more lost from rates duration than in other scenarios.
- Weaker returns relative to Goldilocks across nominal and real returns.
- Active alpha to be made from cash overweight, long inflation, short duration, defensive credit.

Equity

- Equities are negatively impacted by lower expected economic growth (a recessionary period) and higher discount rates, and lower in both real and nominal terms.

Infrastructure

- The negative impact from higher discount rates, higher cost of debt and lower economic growth are almost entirely offset by the positive cashflow impacts from higher inflation. Nominal returns are higher relative to Goldilocks, though real returns are relatively lower from inflation.
- For prudent asset managers, the negative impacts from cost of debt would be able to be mitigated by active capital management. This could potentially lead to upside for infrastructure portfolios in this scenario.

Real estate

- Higher interest rates impacting valuations combined with higher inflation (and economic downturn) provide a lower real return outlook for real estate compared to the Goldilocks view.
- Retail – specifically retail exposed to *non-discretionary spending* – will be slightly more resilient then other sub-sectors.

Private debt

- Impacts will be like Benign Inflation Overshoot but accentuated as corporate cash flows don't enjoy the uptick seen from higher GDP as in the Benign Inflation Overshoot case.
- Floating rate debt will be more insulated from underperformance given the impact of rising base rates (in Benign Inflation Overshoot and Stagflation) flowing through to a higher running yield on performing loans.
- LBO sector particularly at risk given the high leverage from low rates and excess liquidity over the last few years.

Private equity

- Lower real and nominal returns due to increased rates – impacting valuations and multiples, and growth.

Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

3

Goldilocks and the Three Scenarios

Goldilocks and the Three Scenarios

The scenarios, their drivers and the links between the scenarios are described below.

GOLDILOCKS

Inflation is transitory. On the supply side, bottlenecks and shortages resolve themselves. On the demand side only 70% of the Biden fiscal package passes into law (i.e., US$2.7 trillion) and households only gradually reduce their excess savings.

The combination of an easing of supply side constraints and a reduced US fiscal stimulus package allows central banks to maintain loose monetary policy while keeping inflation expectations contained at close to their long run inflation targets. The recovery of the global economy continues to restore economic activity to potential and labour markets to full employment. Low (and in most developed countries negative) real interest rates and a recovering economy are supportive of risk asset valuations.

STAGNATION

A return to low growth and low inflation is incorporated in this scenario. The most likely catalyst for Stagnation is a further COVID wave over the northern hemisphere winter that proves resilient to vaccines (or where the efficacy of vaccines wanes).

In this scenario, we expect central banks will be required to keep policy rates lower for longer given the subdued inflation outlook and bond yields remaining substantially lower than in our Goldilocks scenario. In effect, the Stagnation scenario looks very similar to growth and inflation outturns of the five years that preceded COVID.

In the Stagnation scenario, central banks are forced to inject more liquidity into the economy and to signal lower cash rates for longer, thereby flattening the yield curve relative to our Goldilocks scenario. The fall in interest rates outstrips the fall in inflation expectations and lower real interest rates.

Lower real interest rates act as an offset to the impact of falling rates of growth on asset valuations, much the same as we have witnessed over the decade following the GFC.

BENIGN INFLATION OVERSHOOT

The pathway from Goldilocks to Benign Inflation Overshoot is via:

- Ongoing demand shocks as we allow the full Biden administration fiscal package to pass into law and increased spending out of US household savings
- Higher commodity prices over the medium term.

The weight of the additional expenditures prolong the duration of elevated headline inflation. Central banks, however, maintain a loose monetary policy stance to avoid choking off the economic recovery.

Central banks justify their policy response as being consistent with “average inflation targeting” (AIT), i.e., allowing for compensating higher inflation rates during economic recovery to offset low rates during weak economic growth. As a consequence, inflation expectations begin to drift higher, but in an orderly fashion, re-anchoring at the upper bounds of the central banks’ target ranges (typically around 3%).

Goldilocks and the Three Scenarios (continued)

As growth recovers and wages rise, central banks respond by raising interest rates, but at a pace that is consistent with inflation expectations at the higher (stable) level, in line with AIT. The outcome is low real yields (remaining negative in most developed economies over the medium term) and recovering economic growth that support risk asset valuations, although at a higher level of interest rates and inflation.

STAGFLATION

The pathway from Benign Inflation Overshoot to Stagflation requires two key developments:

- On the supply-side of the economy, bottlenecks become more entrenched (see Breakout Box on page 13: *Supply Chain Disruptions Powering Energy Security Concerns*) than in the Benign Inflation Overshoot scenario, prolonging the spike in inflation.
- A loss of confidence by financial markets in the ability of central banks to control inflation, leading to a de-anchoring of inflation expectations and spikes in risk premia on financial assets.

As a result of the surge in inflation expectations, central banks are forced into a sharp tightening of monetary policy, leading to a spike in interest rates. The supply-side nature of the inflationary shocks that are prolonging higher inflation dulls the efficacy of tighter monetary policy in taming inflation, but does work to weaken growth, which leads to stagflation.

High and persistent inflation, de-anchored inflation expectations, rising interest rates and slowing growth undermine investor confidence leading to a rise in risk premia. As the rise in nominal interest rates begins to outpace the rise in inflation, real interest rates rise. In most developed economies this leads to the real interest rate shifting from negative to positive territory. The combination of slowing growth, rising real interest rates and risk premia create a generally adverse environment for asset valuations.

Goldilocks and the Three Scenarios (continued)

Figure 3.1 – US 3-Month LIBOR

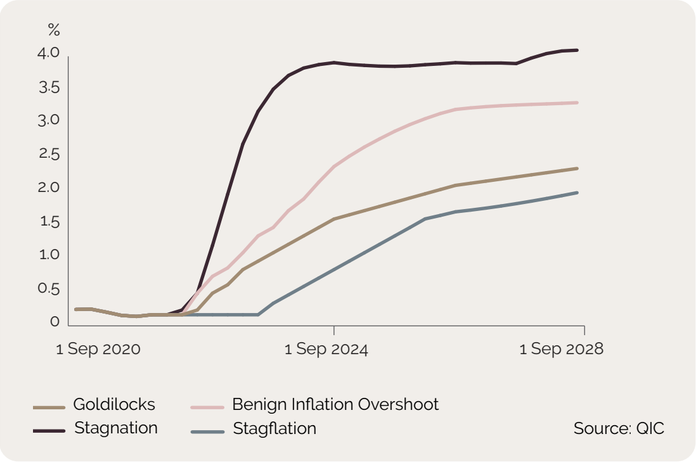


Figure 3.2 – US GDP

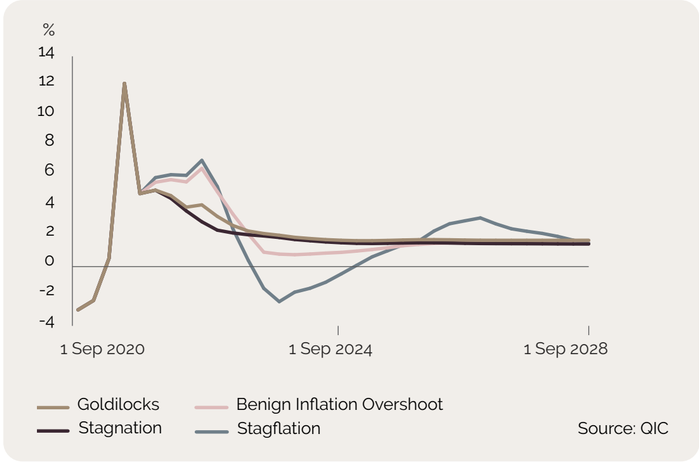


Figure 3.3 – US 10-Year Government Bond

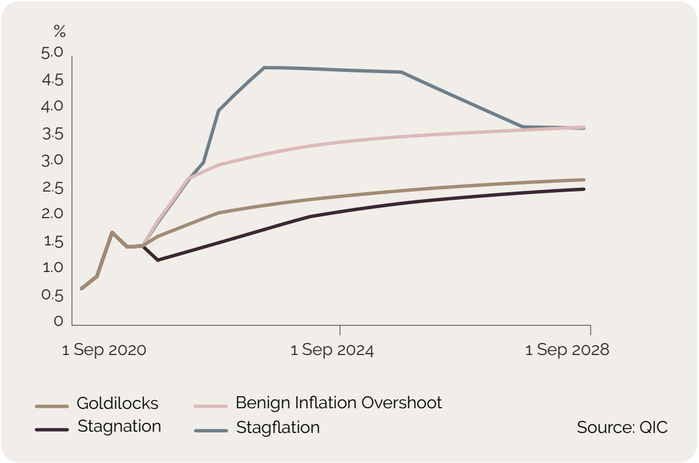
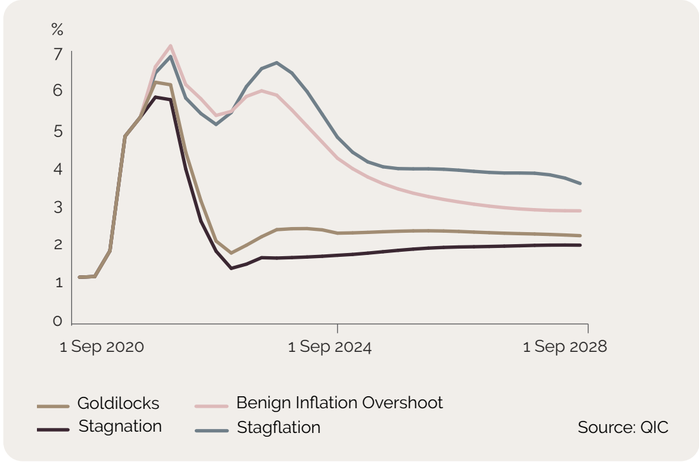


Figure 3.4 – US CPI



Goldilocks and the Three Scenarios (continued)

Supply Chain Disruptions Powering Energy Security Concerns

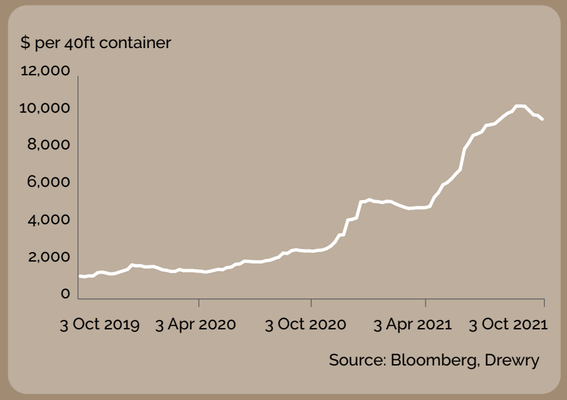
The global supply chain has been experiencing significant congestion which has translated into high freight costs over the last 12 months. At the end of September 2021, more than 650 vessels of the major shipping lines were anchored off ports around the world waiting to be unloaded[1], with these delays translating to significant shipping cost increases and landside congestion. The World Container Index, an average of eight major East-West trades used as a general indicator of container trade pricing, is up 292% versus September 2020.

Each individual trade lane has seen significant price rises. This trend is consistent across other forms of shipping, with the Baltic Dry Index[2] (an ocean freight benchmark for the price of shipping raw materials) up over 700% against January 2020 and recently (1 October 2021) reaching the highest level since September 2008.

The driving forces behind the continued supply chain disruption we see today are complex, commencing in early 2020 with the COVID-19 pandemic beginning to take hold.

- During pandemic lockdowns, unexpected demand increases occurred throughout 2020, government fiscal packages were made available to households and businesses, and workers staying at home shifted consumption from services to goods.
- We are also witnessing a stretched supply side, with COVID-induced constraints such as limited worker migration and employees who cannot work.

Figure 3.5 – World Container Index: Assessed by Drewry



What are the flow-on impacts for energy?

The Bloomberg Commodity Spot Index comprises a basket of 23 energy, metals and agricultural raw materials contracts and in October jumped to an all-time high, surpassing 2008 and 2011 peaks set during the commodity super-cycle. In Europe, wholesale natural gas prices also almost tripled their previous all-time high.

Driving these issues for the energy sector was shipping disruption as imports of natural gas and coal are critical for energy security for many countries across Asia and Europe. This is especially relevant as reserves of natural gas and coal were running at all-time lows during 2021 following the unexpectedly-strong energy demand during the economic recovery that was coupled with lower than usual generation from renewable sources in some regions.

Supply chain disruptions outside of the shipping industry have also played a role, including:

- Safety incidents and extreme weather at Chinese and Indonesian coal mines
- Disruption in European gas transmission
- Maintenance of Norwegian gas fields and processing stations
- Maintenance of European nuclear generators
- Trucking constraints in the UK and Mongolia.

1 https://seaexplorer.com/
2 https://tradingeconomics.com/commodity/baltic

Goldilocks and the Three Scenarios (continued)

Stagflation in the 1970s

Stagflation is the economic phenomenon of simultaneous stagnation and inflation, punctuated by high levels of unemployment. An extreme version of this scenario scarred the economic landscape in the 1970s when unemployment and inflation surged in unison, leading to a recession that devastated much of the western world. The 1970s stagflation event is widely accepted as the result of disruptive government policies, supply-side oil shocks and inconsistent monetary policy.

HOW IT STARTED

FISCAL TRIGGER: FREEZE

In 1971, US President Richard Nixon aimed to break the cycle of wage hikes and inflation that had persisted for three years by announcing a 90-day freeze on all prices and wages. This was a largely popular move and helped him gain a second term in office; although once he was re-elected the freeze ended.

What economic modellers and policymakers failed to realise though was during this freeze, demand had steadily grown, putting a critical strain on supplies. When the economy thawed in early 1973, prices and inflation surged. Any subsequent attempts at price controls were only loosely adhered to with many businesses ignoring directives to freeze wages and price controls.

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OIL PRICES: COSTS SPIKED

Soon after, a series of embargoes from some OPEC members created a sharp spike in the global price of oil. Given the involvement of oil in global manufacturing, production and transportation, prices jumped while concurrently increasing the cost of production. This rendered production less profitable.

While prices grew, growth stagnated and affected all commodities reliant on oil and shipping. Rising costs were passed on to consumers, eroding their purchasing power and reducing economic productivity.

Labour suppliers largely resisted the Fed's reductions in real wages, cutting even further into profits and leading to lay-offs.

The effects only worsened as expectations of higher inflation grew, creating a form of 'cost-push' inflation. There was no shock in demand, yet the pressures from rising raw materials, production and the supply-chain diminished aggregate supply and advanced inflation.

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MONETARY TRIGGERS: STOP-GO

Resulting monetary policy directives only exacerbated the economic impacts. In what is now referred to as 'stop-go' monetary policy, the Fed's attempts to curb stagflation only exacerbated the issue as they alternated between fighting inflation and unemployment.

In the "go" periods, the Fed would lower interest rates to target lower unemployment. Then, when inflation mounted further, a "stop" period was implemented with higher interest rates to reduce inflation.

Attempts to cut interest rates to spur output were ineffective as production was constrained by high oil prices. The volatile measures and stickiness of prices led businesses to simply maintain high prices, even with lower rates – sending inflation past 12% by the end of the 1970s.

HOW IT ENDED

Before the 1970s stagflation event, the prevailing economic sentiment was that recession and inflation were mutually exclusive. This event forced economists to re-examine their theories and modelling while the Fed recognised its monetary policy playbook required an update. In the early 1980s, US Fed Chair Paul Volcker implemented contractionary monetary policy measures to curb inflation. He was of the belief that controlling inflation should be the Fed's primary objective – but it came at a cost. His monetary policy, which pushed the Fed funds rate as high as 20% in 1980, led to a severe "necessary" recession in the US and other western countries.

But it worked. The US inflation rate fell from 13% in 1980 to 3% in 1983, effectively ending the stagflation era.

Goldilocks and the Three Scenarios (continued)

MODELLING EXTREME STAGFLATION

We recognise the stagflation experienced in the 1970s and 1980s had very specific drivers and as such may be difficult to replicate in contemporary times. Nevertheless, it is important to learn from history and to that end, we model the current economic framework going through this period.

However, in the severe Stagflation scenario, the de-anchoring of inflation expectations leads to a much bigger wage/price spiral more akin to the experience of the 1970s/1980s.

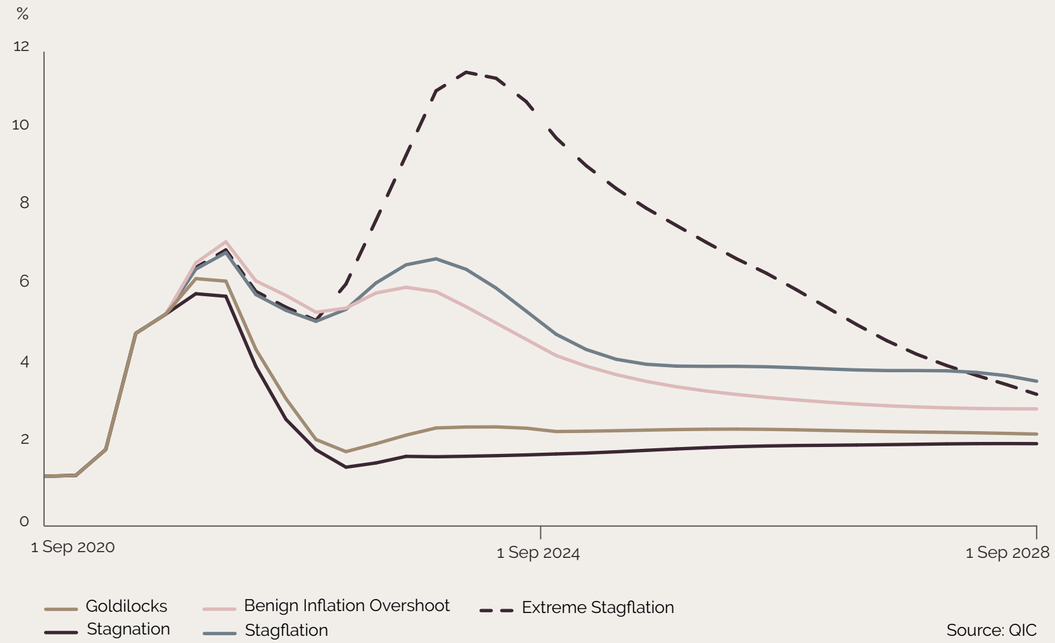
Wage growth responds more quickly to the rising inflationary environment, while governments move quickly to index minimum wages to the inflation rate given growing inequality amongst low-income workers.

Productivity falls sharply, reducing potential growth in the global economy, pushing up unit labour costs and compressing profit margins.

Global central banks are forced to raise interest rates sharply and keep them elevated to keep a lid on inflationary expectations.

The global economy experiences a severe recession and unemployment rises sharply. Inflation expectations remain elevated and only gradually recede, eventually returning to a level one percentage point higher than current targets after eight years.

Figure 3.6 – US CPI: Extreme Stagflation



Goldilocks and the Three Scenarios (continued)

Risks to Watch: Energy Security

In a year of swirling risks, the rapid rise in the prices of the world's energy complex is yet another shock for investors to navigate. With WTI oil prices passing US$80/bbl[3] (a price last seen seven years ago), the pressure on inflation is mounting around the globe.

However, the epicentre of energy price pressure is Europe, where wholesale power costs have surged over 150% this year. The main driver of the hike has been gas prices, which have risen by around 400% since the start of the year.

A range of factors have conspired to drive gas prices higher. Foremost is the fall in gas inventories to their lowest levels as Norway undertook maintenance work on its gas fields and processing stations and as Russia rebuilt their own inventories.

This has occurred at the same time as Europe emerges from the COVID pandemic and the economy re-opens, boosting energy demand. Additionally, EU electricity generation has been hit by an intermittency problem due to the slowest wind speeds in the North Sea in 20 years, leaving idle a large proportion of Europe's wind turbines.

Security of gas supply has also been a problem. Apart from Norway, Russia is the other large gas supplier to the European energy complex and volatility of Russian supply may indeed extend beyond Russia's own restocking needs.

The key here is the gas pipelines from Russia to Europe. The main pipeline to Europe now is through Russia's adversary Ukraine.

Clearly, President Putin would like to cut Ukraine out of the supply chain. Russia has built an alternative pipeline under the Bering Sea called Nord Stream 2 and is keen to open it and bypass Ukraine.

President Putin has suggested that Europe's gas supply problem could be resolved if Europe fast tracked the permitting process that would allow Nord Stream 2 to open; thereby allowing an increase in gas supply from Russia. But for this to occur, regulators would have to fast track various elements of certification that would create tensions within the EU and its allies including the US. It would appear President Putin is using his control over gas supplies as a political tool.

This has seen demand for coal and LNG surge in China, delivering massive price hikes for those commodities and contributing further to global energy price pressure. Rising energy prices are adding to other inflationary pressures arising from supply-side bottlenecks as manufacturing production lags demand as economies re-open.

The best-case scenario is the jump in energy prices is temporary and price pressure will abate once Norway's supply is back on-line and environmental factors limiting renewable energy supply pass. This is certainly the view of most economists.

But the current crisis does show that severe energy supply constraints are increasingly possible and that inflationary spikes can happen again in the future.

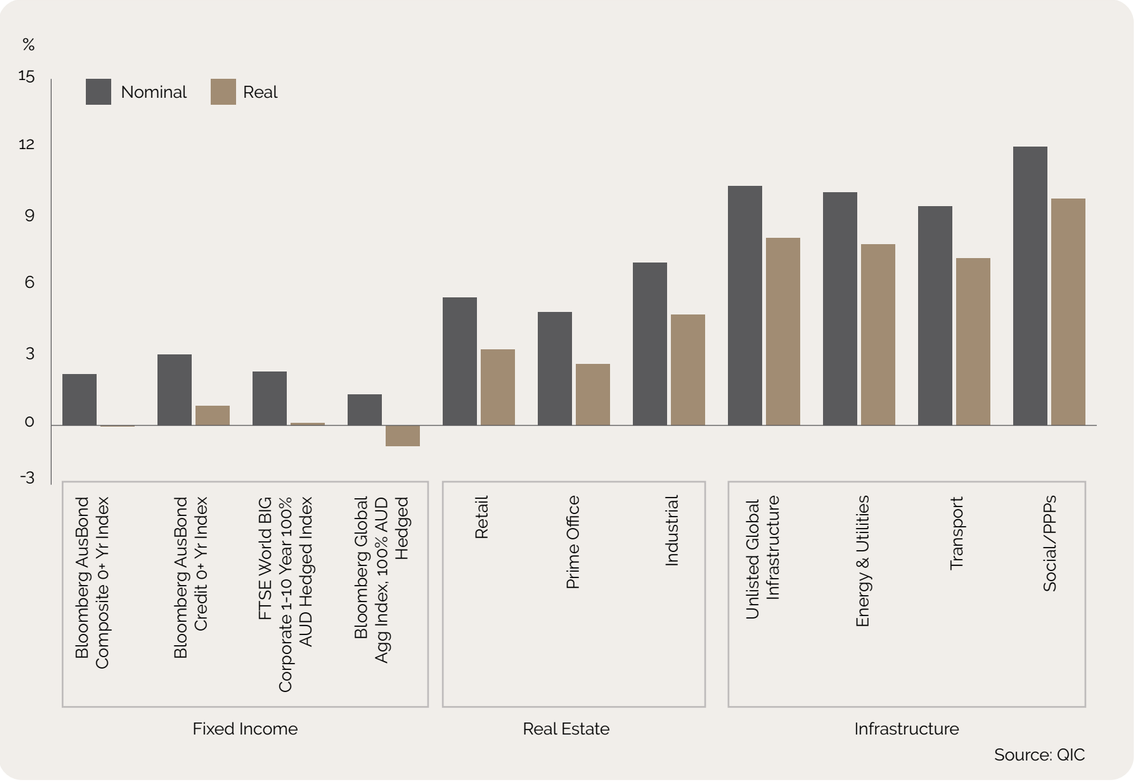
The current European energy crisis has brought energy storage into sharp relief as the technological limitation of shifting rapidly to renewable energy. We expect a push to speed up the development of technology for large storage capacity from renewable energy sources will be a key outcome from the Europe energy crisis. The incentive for governments to promote such technology no longer hinges solely on achieving environmental goals, but also mitigating inflation and geopolitical risks.

3 As at 11 November 2021

3.1 Asset Class Returns Under Goldilocks

This paper has modelled asset class returns under the macroeconomic scenarios described above. This section summarises the economic outcomes, central bank responses and asset class returns under each scenario.

Figure 3.7 – Goldilocks 5-Year Annualised Returns



Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.
Fixed income indices are based on the benchmark returns in the scenarios only. No active management is assumed (see further details on the added value of active management). Modelled real estate returns are approximated on the assets represented by the MSCI All Property Australia Index and then levered up assuming 20% debt at the fund level. The infrastructure returns are based on QIC assets.

4

The Portfolio Perspective

The Portfolio Perspective

Later in this paper we will examine the features of real assets and the benefits of active management in rates and credit that can help manage inflation uncertainty ex ante.

We find that these assets have inherent benefits through different inflationary scenarios, particularly those assets with:

- Hard indexing of cashflows to CPI
- Regulation such that their cashflows are based off a regulated WACC which accounts for inflation
- Low beta to economic cycle e.g., non-discretionary retail or social infrastructure or energy and utilities infrastructure
- Medium- to long-term debt financing that is either hedged or fixed rate.

But before we consider this analysis, we first answer an important question: how should investors think about portfolio weighting to these assets in a way that can best inflation-proof the outcomes but also yield the best results if inflationary pressures are transitory? What mix of assets can reward in the more Benign Inflation Overshoot scenarios but also mitigate losses in the more extreme?

To that end, this paper will now examine how a **"naïve" portfolio of 60/40 would return** in each scenario and compare it to the outcomes of adding more real assets over the portfolio in each inflation scenario.

These asset class returns were then aggregated into three model portfolios, each with differing weights to real assets.

Our key assumptions for this analysis:

- Asset class models were constructed to measure asset class returns for each of the inflationary scenarios relative to Goldilocks.
- For simplification, we have shown only one index per asset class – using the sub-asset class data from the asset class analysis but weighting it up to the asset class level:
  - Fixed income: 100% on Barclays Global Agg
  - Real estate: 1/3 each for real estate, office, industrial
  - Infrastructure: as per QIC portfolio weighting
  - Equity: S&P 500
  - No cash holdings are assumed.

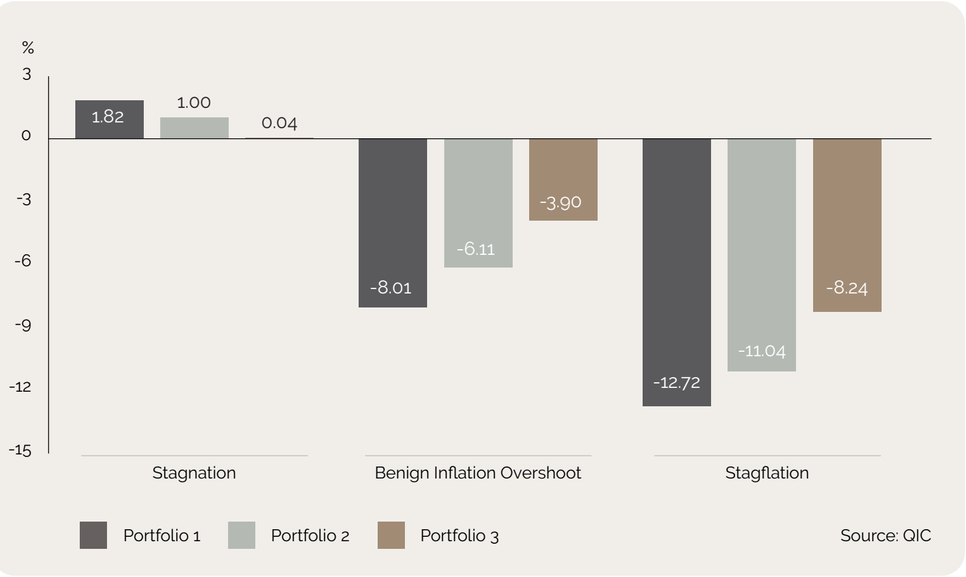
4.1 Portfolio Construction: Real Returns

For the purposes of this paper, we have modelled the following portfolios.

Table 4.1 – Portfolio Modelling

Portfolio	Equities	Infrastructure	Property	Fixed Income
1	60%	0%	0%	40%
2	50%	10%	10%	30%
3	25%	25%	25%	25%

Figure 4.1 – Portfolio Returns: Deviation from Goldilocks (5-year, cumulative real returns)



We know that adding in real assets to a 60/40 portfolio is useful from a generic risk/return perspective as the assets are not perfectly correlated with listed markets and an illiquidity premia can be earned. It is not a new story that diversification is valuable. However, in this paper we are specifically looking to test each portfolio's sensitivity to inflation shocks.

To that end, firstly we assess how the portfolios compare in the inflationary scenarios relative to the Goldilocks scenario. Figure 4.1 shows the expected difference in real wealth of each portfolio relative to the Goldilocks baseline scenario over a five-year horizon.

In terms of broad asset class movements under each scenario:

- **Stagnation:** Growth and inflation are low and fixed income outperforms equities. Real assets underperform equities. In real terms, fixed income and equities still yield a positive return, although in nominal terms only fixed income has a positive return.
- **Benign Inflation Overshoot:** In both real and nominal terms infrastructure and real estate have positive returns and outperform fixed income and equities as their cashflows remain quite resilient through the inflationary spike. Fixed income experiences a negative return in real terms but equities still yield a small positive real return.
- **Stagflation:** Equities and fixed income struggle given the increase in inflation and the lower growth. The real assets of infrastructure and real estate outperform and have positive returns in real terms but negative in nominal.

Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

4.1 Portfolio Construction: Real Returns (continued)

Figure 4.2 shows the relative deviations from the Goldilocks case of portfolio 2 to portfolio 1 and then portfolio 3 to portfolio 1 under each inflation scenario.

This allows us to clearly address the question of "in the different inflationary scenarios, do the portfolios with more real assets (2 and 3) demonstrate more outperformance compared to their 'Goldilocks' case than portfolio 1?" The portfolio with the most outperformance offers the strongest inflation protection.

In short, it is evident having more real assets in the portfolio creates a more stable outcome.

Our analysis shows that by adding real assets, a portfolio has an asymmetrically better payoff in different inflationary outcomes than just the 60/40 portfolio. To explain further:

- In the Benign Inflation Overshoot and the Stagflation cases, investors are approximately 4% better off in real wealth over the five years by having a strong weighting to real assets in the portfolio.
- Stagnation is the only scenario in which investors will not fare as well as the 60/40 portfolio, but we found the cost of diversifying into portfolio 3 versus portfolio 1 is limited. For instance, including real assets in the portfolio costs 1.8% in real terms over the five years.

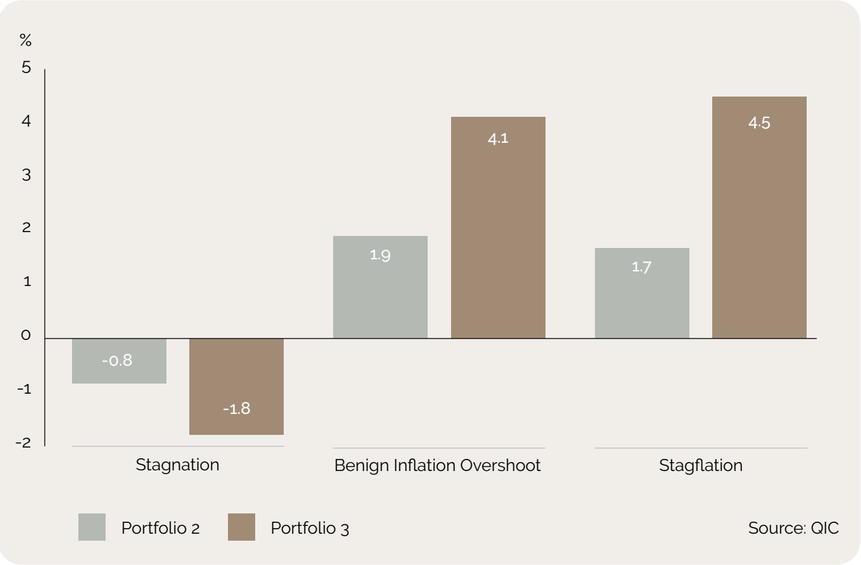
It is important to point out that this analysis is all *relative to the Goldilocks case*, so we are controlling for the extra return potentially available from diversifying into real assets due to active management or illiquidity premium.

Our analysis is designed to focus on the inflationary benefit or cost only.

In summary, it is difficult to forecast even in normal times, let alone against the novel forces currently at play with a global pandemic, the swathe of fiscal and new monetary policy responses, supply chain disruptions and a jagged recovery. Today's investment landscape feels even more complex.

This is against the additional context that trading as the inflation scenario becomes clear is not without cost.

Figure 4.2 – Relative Performance to the 60/40 Portfolio of the Real Asset Portfolios vs Goldilocks (5-yr Cumulative, Real Return)



There are costs of trading and tax when shifting assets in a strategic asset allocation which can become meaningful.

The wise course of action would be to construct a portfolio for a range of inflationary outcomes, such as those profiled in this paper. **The moral of the story of Goldilocks and the Three Scenarios** is that adding real assets will set an investment portfolio up for outperformance under a wider range of higher inflation outcomes.

We will now look deeper into the various asset class implications for infrastructure, real estate, fixed income, private debt, private equity and natural capital to see how they behave through Goldilocks and the Three Scenarios.

5

Asset Class Implications

5.1 Fixed Income

5.1.1 Goldilocks

For the purposes of this paper, analysis in respect to Fixed Income has been completed on passive benchmarks listed in the table below.

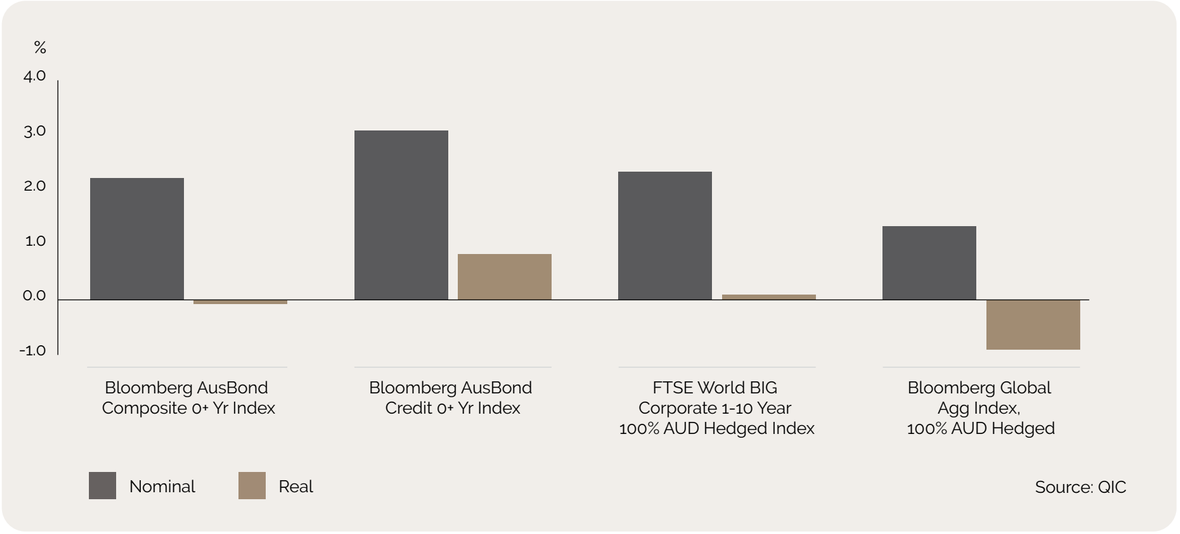
Table 5.1 – Fixed Income Passive Benchmarks

Index	% Credit	% Rates	Fix/ Floating	Duration
BBG Ausbond Comp 0+ yr	17.11	82.89	Fixed	5.91
Ausbond Credit 0+ Yr Index	99.64	0.28	Fixed	3.93
FTSE World Big Corporate 1-10Yr 100% AUD Hedged	100.00	0.00	Fixed	4.49
BBG Barclays Global Agg 100% AUD Hedged	32.07	67.93	Fixed	7.46

Index data as of 22 Sept 2021
Source: Bloomberg

To model the forecast return in fixed income, we have used the Aladdin Risk Management tool and input shocks into the system based on the constant risk factors (credit and rates) present across the indices. The shocks were derived from the rates, inflation and GDP movements in the economic scenarios. Using these index outcomes, nominal and real returns are as illustrated in the chart below.

Figure 5.1 – Fixed Income 5-Year Annualised Returns: Nominal vs Real Returns



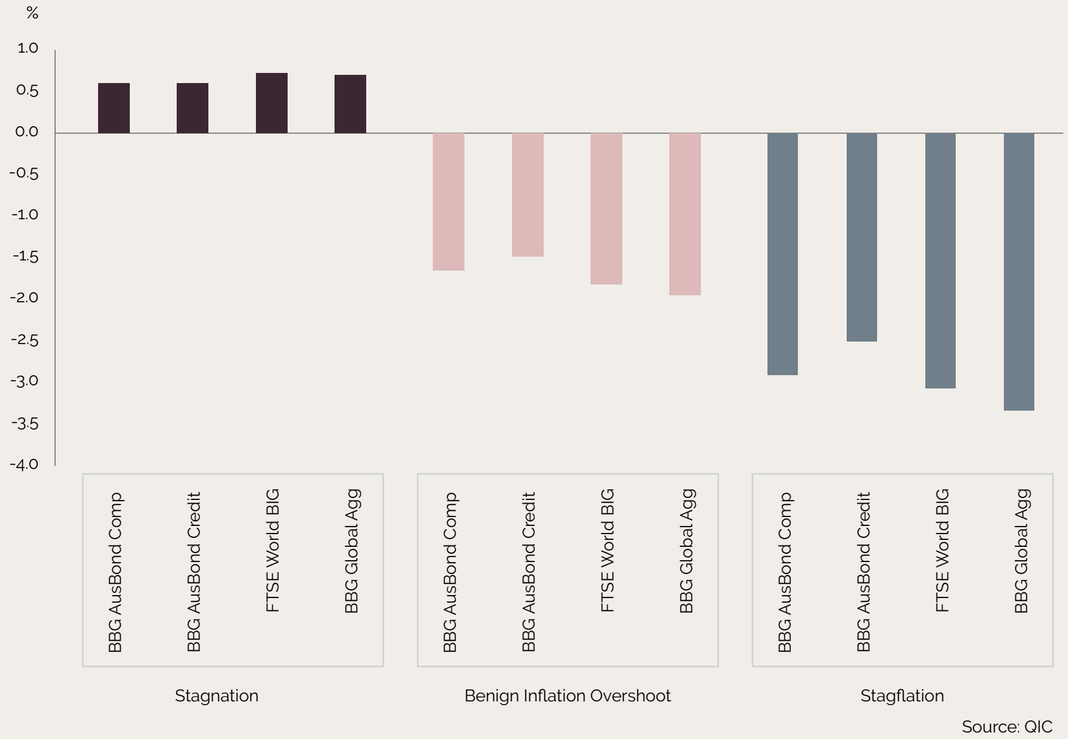
Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

5.1 Fixed Income (continued)

5.1.1 Goldilocks (continued)

The deviations from the Goldilocks case for the different inflation scenarios are shown in the chart below.

Figure 5.2 – Fixed Income 5-Year Annualised Returns (Real): Change from Goldilocks



Source: QIC

Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

FIXED INCOME THROUGH GOLDILOCKS AND THE THREE SCENARIOS

Given interest rates rise in the majority of scenarios, the passive indices are likely to experience capital losses given the interest rate duration they carry. However, an active manager skilled in the use of a broad range of fixed income instruments can deploy them to manoeuvre through, and even profit from, inflation shocks. For example, an active manager can actively position long or short inflation via break-even inflation instruments that are liquid, particularly in the US, Europe and Australia, via the physical inflation-linked bond market or inflation swaps.

Other tools that can be deployed include:

- Dialling down exposure to interest rate duration will provide opportunities as well as threats
- Harvesting a credit risk premium will remain key over the long term
- Sector allocations will require strong credit analysis
- Fundamental credit analysis will remain a strong value add across all scenarios.

We believe actively managed fixed income markets will remain an attractive asset class in the coming years across our various scenarios. In extreme scenarios, we can see that interest rate risk should be limited, whilst credit risk continues to add value.

5.1 Fixed Income (continued)

5.1.2 Stagnation

Interest rates rise only slowly over time and credit spreads rally.

Under the Stagnation scenario, fixed income returns perform the strongest of all scenarios. Both nominal and real returns recording higher results than Goldilocks due to smaller rises in interest rates and thus smaller resulting losses from rates duration.

Investors also would enjoy significant carry over the five years from credit and rates holdings. In the more credit heavy indices of FTSE World Big Corp and BBG Ausbond Credit, investors enjoy even more performance from the rally in credit spreads.

What would an active manager look to do if this scenario became more probable?

- Overweight long rates
- Short inflation
- Fundamental credit analysis will remain a strong value add across all scenarios
- Long credit risk premia especially in defensive credit.

5.1 Fixed Income (continued)

5.1.3 Benign Inflation Overshoot

Interest rates rise more quickly but credit spreads are aided by higher growth.

Under this inflationary scenario, we uncovered the second-best nominal returns, but all indices experienced a negative IRR in real terms over the five-year period. This is because rates will go higher under this scenario than in the Stagnation case.

We expect this result as positive nominal returns are driven by rates and credit carry. However, the sell-off in rates will also be more prevalent than in the Stagnation case given better economic growth.

What would an active manager look to do if this scenario became more probable?

- Less interest rate duration or short interest rate duration if possible
- More active credit
- Long BEIs.

5.1 Fixed Income (continued)

5.1.4 Stagflation

Interest rates rise aggressively as central banks act but there is also a temporary rise in the bond term premia and a spike in credit spreads.

As a result, the curve initially steepens quite significantly, impeding indices with high duration. Credit spreads are challenged.

This is a tough scenario for all risk markets and the selloff in rates without a corresponding rally in credit means fixed income is no exception.

There will also be more loss from rates duration than in the Benign Inflation Overshoot and Stagnation scenarios with negative nominal returns in Global Agg, impacted by its higher interest rate duration.

However, we also see the spread widening will only contribute a relatively small amount to the risk – signalling the importance of credit, given the carry that is achieved. We acknowledge the importance of credit sector selection in this environment as industries that are highly cyclical will underperform the more defensive industries.

What would an active manager look to do if this scenario became more probable?

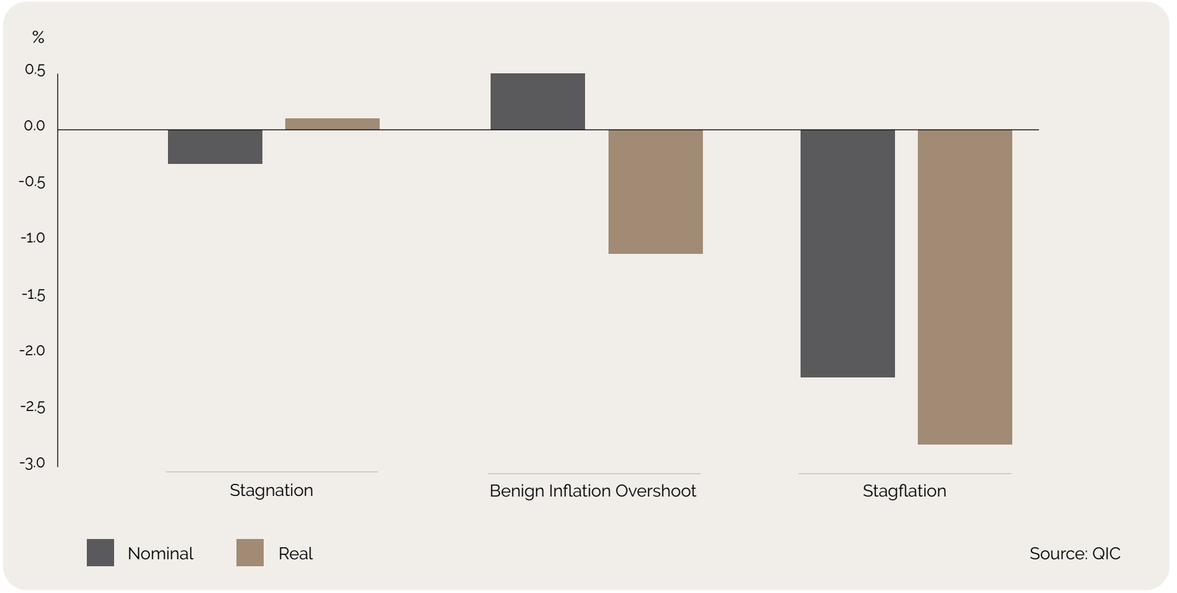
- Overweight cash
- Long inflation break-evens
- Short interest rate duration
- Tilt towards defensive credit industries.

5.2 A Quick Word on Listed Equity

KEY FINDINGS

- In the Stagnation scenario equities underperform relative to the Goldilocks scenario in nominal terms due to lower expected earnings which are a factor of lower growth.
- In the Benign Inflation Overshoot scenario, equities marginally outperform the nominal Goldilocks scenario. They are negatively impacted by higher discount rates relative to the Goldilocks scenario however the impact is more than offset by the more the positive earnings outlook for equities as inflation is passed through to earnings, though this pushes down real returns relative to Goldilocks.
- In the Stagflation scenario, equities are negatively impacted across both nominal and real returns by lower expected economic growth (a recessionary period) and higher discount rates.

Figure 5.3 – Equities Annual Deviation from Goldilocks Nominal and Real Returns (5yr)



Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

5.3 Infrastructure

Infrastructure returns remain robust in both nominal and real terms in all scenarios due to strong inflation linked revenues and resilience to increases in interest rates. While the analysis for this paper has been undertaken on a five-year-basis to ensure alignment and consistency with other asset classes, infrastructure assets are by their very nature long term investments. Returns over this longer term horizon are even more positive for investors.

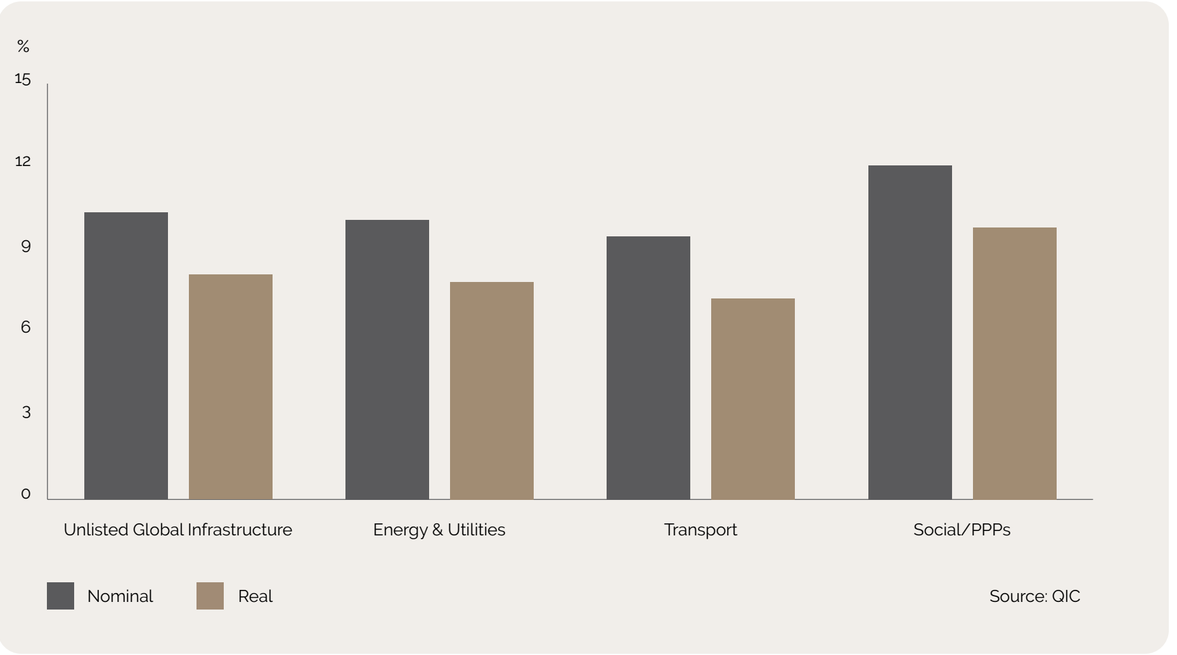
The analysis in this paper has been developed utilising data from QIC's investments across its managed infrastructure portfolios. We have also segregated the Goldilocks and the Three Scenarios analysis across our three core sectors: transport, energy and utilities and social infrastructure. Although we do note that given the heterogenous nature of the asset class, sector comparisons may not be representative of all assets within the respective sector.

To model the impact of each scenario, equity cashflows were shocked by updating macroeconomic inputs and demand forecasts in the underlying corporate models for each of QIC Global Infrastructure's (QIC GI) infrastructure assets. Discount rates were also shocked based on forecast changes in risk free rates, which we assume flow through to the discount rates applied by independent valuers. In practice, any increases in discount rates are ultimately at the discretion of independent valuers, who may choose to "look through" rapid increases in risk free rates if they are expected to be transitory or if the resultant discount rates would be inconsistent with observable market pricing.

All impacts were measured as changes in IRR relative to the Goldilocks scenario, over a five-year period and also on a long-term hold basis. All IRRs are based on local currency returns, excluding any potential foreign exchange hedging uplift which may be realised in practice through hedging.

5.3.1 Goldilocks

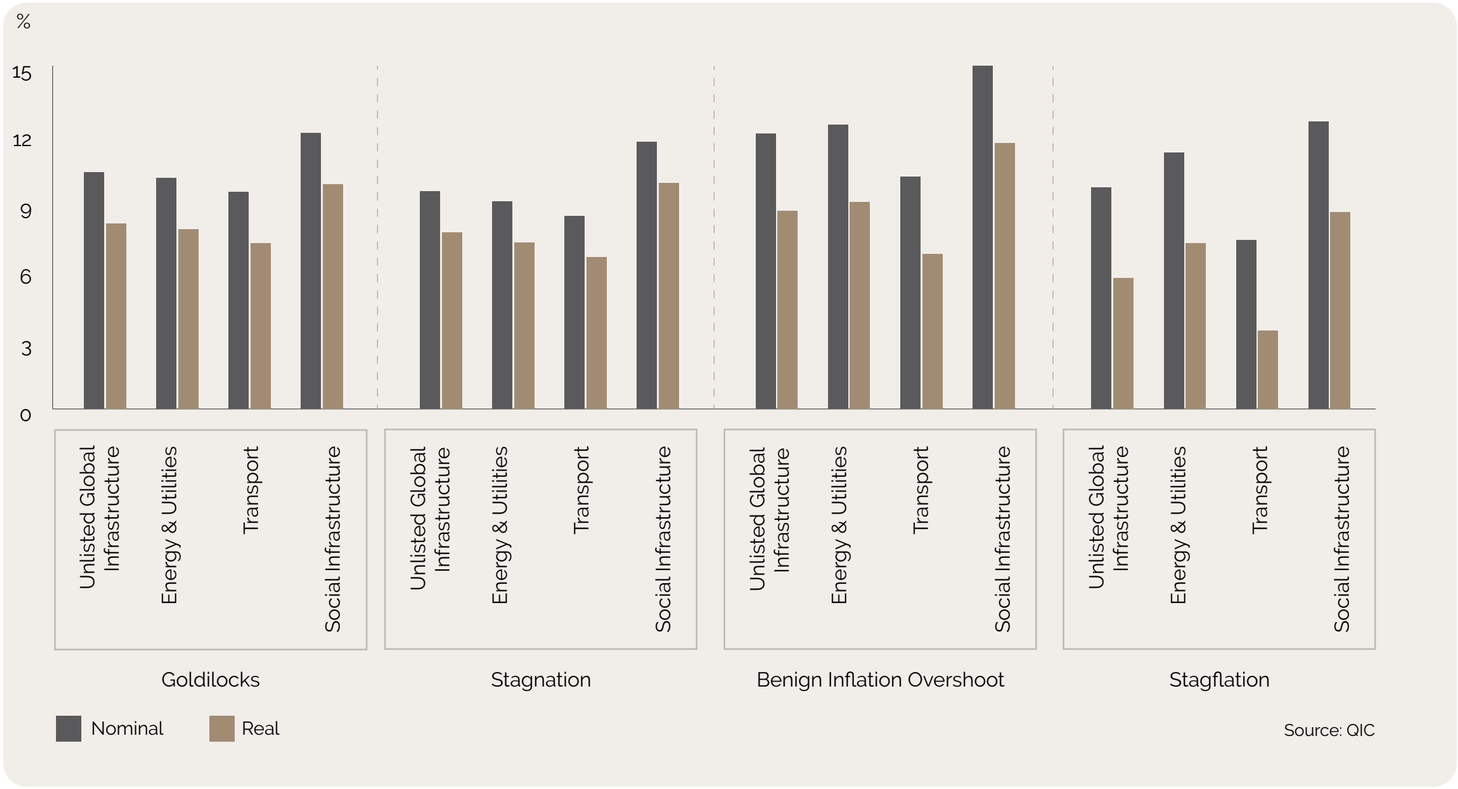
Figure 5.4 – Infrastructure Long-Term Hold IRRS – Goldilocks: Base Case



5.3 Infrastructure (continued)

5.3.1 Goldilocks (continued)

Figure 5.5 – Infrastructure 5-Year Annualised Returns: Nominal vs Real



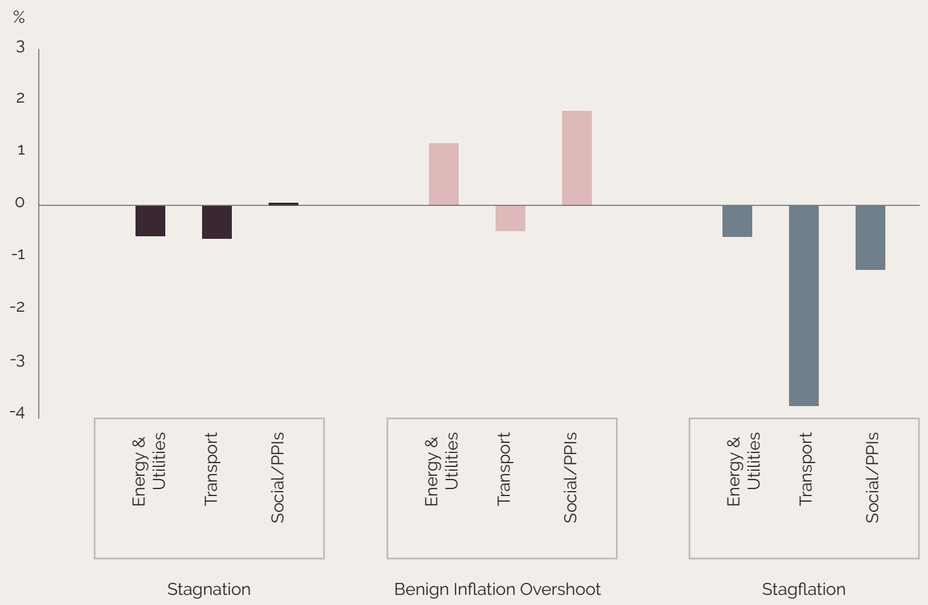
Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

5.3 Infrastructure (continued)

5.3.1 Goldilocks (continued)

The annualised deviations in five-year real returns from the Goldilocks case are illustrated in the chart below.

Figure 5.6 – Infrastructure 5-Year Annualised Returns (Real): Deviations from Goldilocks



Source: QIC

Infrastructure through Goldilocks and the Three Scenarios[4]

- Overall, returns remain robust in both nominal and real terms in all scenarios, due to strong inflation linked revenues and resilience to increases in interest rates.
- Over 90%[5] of QIC GI's infrastructure revenues have embedded inflation protection, primarily via explicit inflation indexation or regulatory pricing methodologies. By actively de-risking assets' capital structures through interest rate hedging and fixed rate debt, QIC GI has achieved an outcome where inflation sensitivity materially exceeds interest rate sensitivity (over 90%[6] of debt across QIC GI's portfolio is either fixed rate or hedged with a weighted average remaining tenor of seven years).
- The infrastructure asset class also benefits from assets that are regulated, with either formal regulatory regimes or 'shadow' regulatory pricing methodologies embedded in revenue contracts. This is most common within the utilities sub-sector and certain ports and airports. These assets are particularly resilient to shifts higher in inflation and interest rates, as revenues are expected to be escalated by inflation and also contain allowances for recovering any increasing cost of debt.
- We note that the GDP exposure of certain sub-sectors is also relevant for performance, with transport assets relatively more likely to experience demand impacts in lower growth scenarios compared to energy and utilities or social infrastructure. However, the monopolistic nature of transport infrastructure assets means that these assets are still highly defensive and form a key part of any diversified infrastructure portfolio.

Note: Past performance is not a reliable indicator of future performance.

4 Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.
5,6 Weighted average calculation weighted by QIC GI's aggregate proportionate exposure at 30 June 2021

5.3 Infrastructure (continued)

5.3.2 Stagnation

Weaker cashflows due to lower inflation and to a lesser extent lower growth, partially offset by the positive cashflow impacts from lower interest rates. Return impacts relative to Goldilocks are mitigated on a real basis by lower inflation. No change in discount rates assumed.

The performance in the Stagnation scenario relative to Goldilocks for infrastructure assets is very modestly negative due to lower inflation and economic growth, although we believe returns will still be robust with 9.50% nominal IRR based on our infrastructure portfolio on a five-year hold.

Lower inflation is the key driver of the negative impact from Stagnation relative to Goldilocks, as over 90% of our infrastructure revenues are inflation-linked.

On a real basis, underperformance relative to Goldilocks is less than on a nominal basis as the relative change in investment performance is offset by lower inflation relative to the Goldilocks scenario.

We see transport assets as relatively more exposed to lower real GDP growth in the analysis, noting we apply a permanent -25bps reduction to all volume growth rates over the life of the assets. The lower interest rates in the Stagnation scenario are on average, a net positive for our social and transport assets.

The energy and utilities sector will be expected to experience a modest negative impact from lower interest rates due to the greater exposure to regulated assets with revenues linked to a regulated WACC. Note we have not assumed any change in discount rates in the Stagnation scenario, despite the lower long-term interest rates relative to the Goldilocks baseline case. Any potential reduction in discount rates in this 'lower for longer' environment would represent upside to this modelling.

5.3 Infrastructure (continued)

5.3.3 Benign Inflation Overshoot

Generally positive for infrastructure due to the accretive combination of higher inflation with only moderate changes in interest rates.

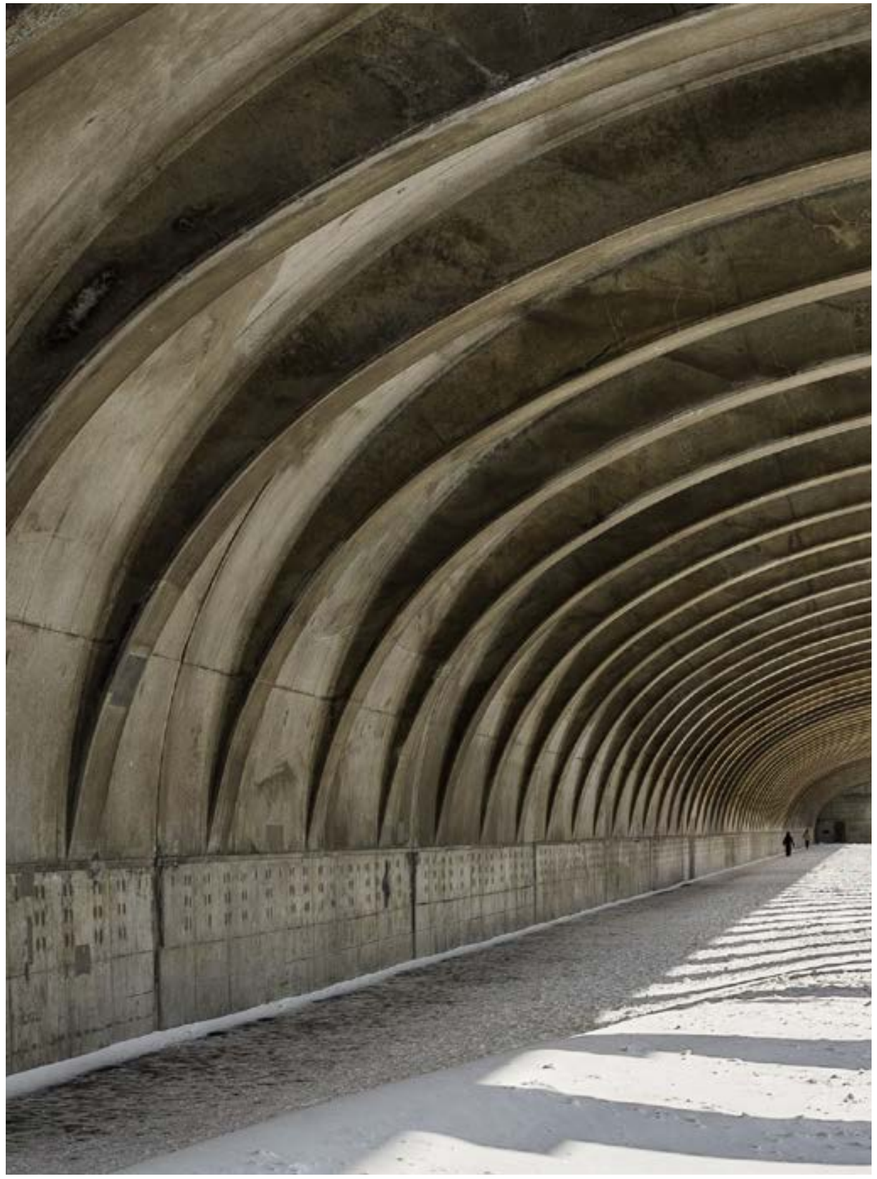
Returns are robust with approximately 12% nominal IRR for our infrastructure portfolio on a five-year hold. This includes the negative impacts from higher discount rates assumed in this scenario.

In the nominal analysis, the impact of higher discount rates is more than offset by the positive cashflow impacts from higher inflation, as over 90% of our infrastructure revenues are inflation-linked.

Looking at real returns, the positive performance relative to Goldilocks is less significant than for the nominal returns due to the higher inflation in this scenario.

The negative impact of higher interest rates on discount rates and the cost of debt are also offset by regulated assets with revenues set by a regulated WACC. This offset is particularly strong within the energy and utilities sector, and in some cases also the ports and airports sub-sectors within transport.

Negative impacts on cost of debt are also mitigated by our active capital management. Over 90% of debt across our infrastructure portfolio is either fixed rate or hedged, with a weighted average tenor of over seven years.



5.3 Infrastructure (continued)

5.3.4 Stagflation

Lower returns due to materially higher discount rates and lower growth but returns on both nominal and real basis remain positive, supported by significant cashflow accretion from materially higher inflation.

Our analysis found the Stagflation scenario is a tougher one for infrastructure over the five-year period. Yet, the findings also indicate a silver lining, as IRR remains positive over the period, both in real and nominal returns.

When we delved into the reason for this finding, we found that over five years, the negative impact of higher discount rates, higher cost of debt and lower economic growth were almost entirely offset by the positive cashflow impacts from higher inflation. As mentioned above, the strong inflation linkages of the assets' cashflows are the key driver of this. To emphasise the scale of earnings accretion due to inflation, we measured EBITDA in Year 5 for the aggregate QIC GI portfolio, which increased by 6.07% in the Stagflation scenario relative to the Goldilocks scenario.

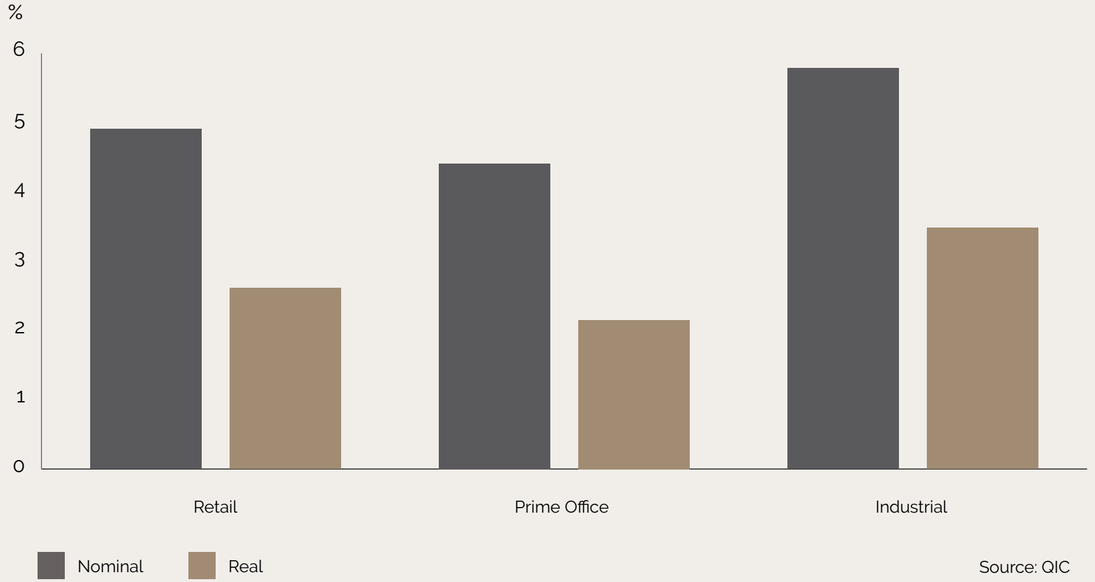
We found in our modelling that overall returns remained robust with 9.69% nominal IRR for our infrastructure assets in aggregate on a five-year hold, although down to 5.73% on a real basis on a five-year hold.

In the energy and utilities and social infrastructure sectors, **where our assets are largely uncorrelated to real GDP, the negative impact from higher discount rates and higher cost of debt are more than offset by the cashflow benefits of higher inflation.** Within energy and utilities, we also found interest rate impacts are heavily mitigated by the greater exposure to regulated assets.

5.4 Real Estate

We have modelled real estate returns approximated on the assets represented by the MSCI All Property Australia Index[7]. Modelled returns do not include gearing and may not be representative of levered real estate returns. The resulting returns are illustrated in Figure 5.7 (right).

Figure 5.7 – Real Estate 5-Year Annualised Returns: Goldilocks

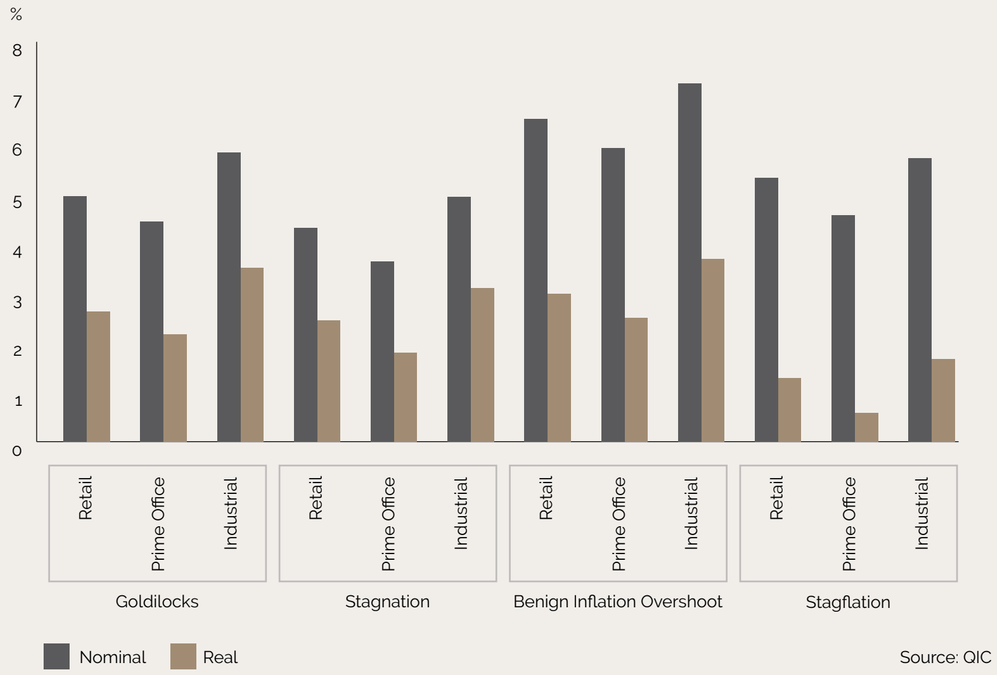


7 This represents prime office (Sydney, Melbourne, Brisbane and Perth), retail (super & major regional, regional, sub-regional and neighbourhood) and industrial (Sydney, Melbourne and Brisbane). Returns relative to Goldilocks have been estimated on an unlevered basis.

5.4 Real Estate (continued)

5.4.1 Goldilocks Case

Figure 5.8 – Real Estate 5-Year Annualised Returns: Nominal vs Real



Source: QIC

Real Estate through Goldilocks and the Three Scenarios

- Five-year annualised returns remain positive in both nominal and real terms in all scenarios, with real estate benefitting from inflation-linked rental income streams.
- Real estate assets perform favourably in the Benign Inflation Overshoot scenario. Higher inflation helps lift rents for all sub-sectors, while resilient economic growth supports underlying fundamentals. Valuations also benefit from a further compression in capitalisation rates due to the lower real interest rate environment.
- While a recessionary environment weighs on the near-term performance of real estate assets under a Stagflation scenario, real returns are expected to remain positive over a five-year horizon.
- A modestly lower return outlook compared to Goldilocks is expected under the Stagnation scenario. Softer economic growth weighs on occupier markets, while lower inflation also weakens nominal income returns.
- Returns on retail assets, and particularly neighbourhood centres which are typically less exposed to discretionary spending, would be more resilient than other real estate sectors under each scenario.
- More cyclically exposed industrial assets are expected to experience the biggest hit to real returns under the Stagflation scenario. Nonetheless, given the sector's current strong fundamentals, industrial real estate is expected to continue to outperform over a five-year horizon across all the scenarios.

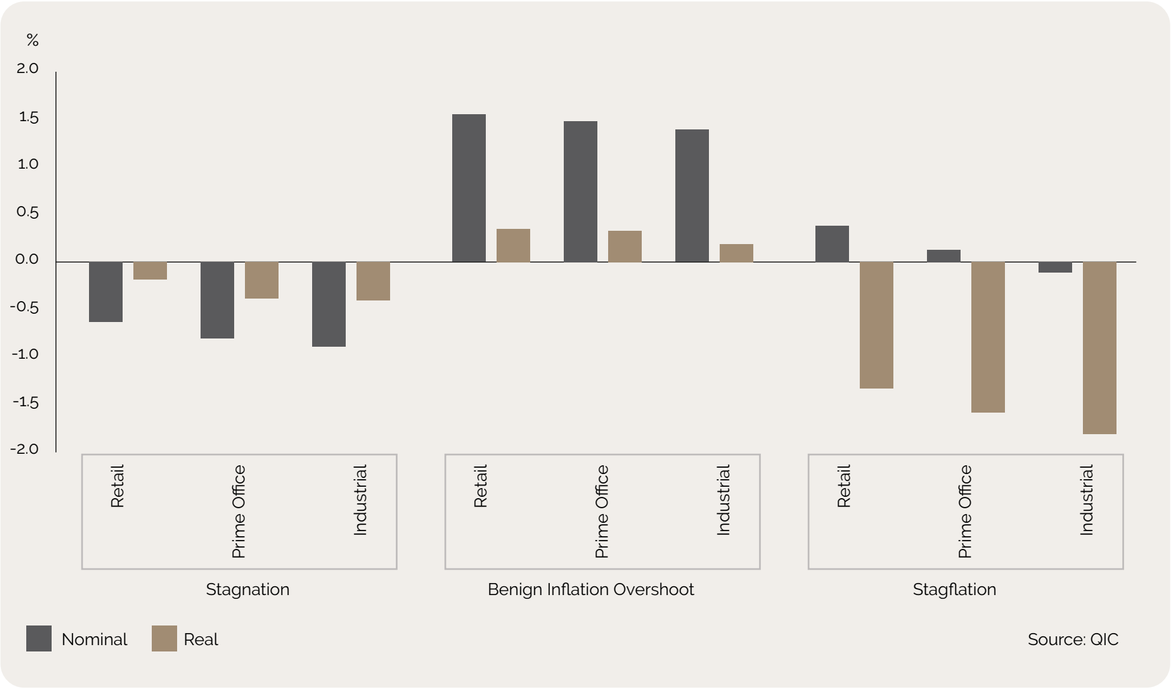
Note: Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

5.4 Real Estate (continued)

5.4.1 Goldilocks Case (continued)

Variations from the Goldilocks scenario are illustrated in the graph below.

Figure 5.9 – Real Estate 5-Year Annualised Returns (Nominal vs Real): Change from Goldilocks



Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

5.4 Real Estate (continued)

5.4.2 Stagnation

Weaker occupier demand and income, but lower interest rate settings mitigate any material valuation impact, providing positive returns that are marginally weaker than our real estate Goldilocks view.

Under the Stagnation scenario, all real estate sectors are expected to be weaker and provide lower returns than under the Goldilocks view, both in nominal and real terms. This is primarily due to lower economic growth which impacts employment, retail sales revenues and business activity and also drags on occupier demand, impacting real estate income returns with increasing vacancy rates and weaker rental growth.

However, it is assumed that central banks seek to keep rates lower for longer under the Stagnation scenario. This helps cushion the impact to real estate valuations. Overall, the real estate return outlook remains positive, albeit moderately lower than Goldilocks.

Across the core real estate sectors

When looking across the sectors, it is likely **retail** would be relatively less impacted under a Stagnation scenario. The retail sector, in particular neighbourhood centres, are less exposed to the slowdown in economic growth given more non-discretionary elements of consumption.

Given office vacancy rates are already in double digits across the major CBDs, a further deterioration in occupier demand under the Stagnation scenario is likely to weigh on the rental outlook in the **office** sector.

The **industrial** sector's higher exposure to economic growth is expected to lead to a marginally bigger downgrade compared to the other sectors. Nonetheless, on an absolute basis, the outlook for the industrial sector is likely to remain the strongest over a five-year horizon even under a Stagnation scenario. An ongoing search for yield by investors is likely to limit the valuation impact from deteriorating fundamentals, with significant capital appetite for investment in the industrial sector expected to continue under a Stagnation scenario.

Across the geographic markets

Specific market nuances have not been considered to assess the impact of a Stagnation scenario. Yet there is the risk that certain markets may be relatively more exposed to a slowdown in economic activity depending on how this is realised within the broader economy.

Under a Stagnation scenario it is unlikely a material change in investors' allocations for real estate and across individual sectors would be required, as investment performance is expected to remain mostly stable albeit at lower levels than projected under the Goldilocks view. Investment strategies targeting assets with strong underlying occupier demand or an opportunity for active management to underpin returns would remain relevant.

5.4 Real Estate (continued)

5.4.3 Benign Inflation Overshoot

With resilient economic growth and low real interest rates, heightened occupier and capital demand underpin relatively stronger real estate investment returns.

The Benign Inflation Overshoot scenario is more positive for real estate assets than what has been assumed in the Goldilocks view. This is because higher inflation helps lift market rents for all sub-sectors, while resilient economic growth supports underlying fundamentals.

And with central banks keeping real interest rates low and engaging in financial repression, investors are expected to ramp up their search for yield, supporting capital demand for real estate. Real estate capitalisation rates are expected to tighten further in the near-term, boosting valuations across the sector and supporting near-term returns. As a result, real returns are expected to be higher in a Benign Inflation Overshoot scenario compared to Goldilocks.

Sector overview

The **retail** sector is expected to benefit the most from a Benign Inflation Overshoot. Retail real estate has slightly better inflation protection properties, given the presence of turnover-linked rents and generally higher fixed rental escalations for speciality stores of 4-5% per annum.

The **office** sector is also expected to benefit under a Benign Inflation Overshoot scenario, although marginally less so than retail given average fixed rent escalations of 3.5-4.0% per annum. The **industrial** sector is expected to have slightly less inflation protection given lower rental escalations compared to the other sectors. While the presence of rental escalations impact rents under existing leases, all sectors benefit from higher market rents upon rental reviews and lease expiry.

Both retail and office assets are expected to benefit slightly more than industrial from a compression in capitalisation rates under the Benign Inflation Overshoot scenario, given an already positive outlook and relatively tighter spreads for the industrial sector.

Real estate investments will remain an attractive element within investors' portfolios under this scenario, providing real returns higher than under expected under Goldilocks. However, it must be noted that the inflation protection properties of each real estate asset will be heavily influenced by existing lease terms, such as whether the leases include fixed or CPI+ annual escalation clauses, the presence of rental reviews and the weighted average lease expiry of the asset. Active investment strategies can be employed to further enhance the inflation protection properties of real estate portfolios under a Benign Inflation Overshoot scenario.

5.4 Real Estate (continued)

5.4.4 Stagflation

Higher interest rates impacting valuations combined with higher inflation (and economic downturn) provide a lower real return outlook for real estate compared to the GRE Goldilocks view.

Under a Stagflation scenario, all real estate assets are expected to come under pressure. Unlike the Benign Inflation Overshoot scenario, the higher inflation forces central banks to tighten interest rates more aggressively over the medium-term to re-anchor inflation expectations. The Australian economy will fall into recession, weakening real estate fundamentals, and leading to lower real rental income. The resultant higher interest rate environment also leads to a widening in real estate capitalisation rates, weighing on valuations.

On a nominal basis, the five-year return outlook is broadly similar to the Goldilocks view of between 4-6 per cent across the real estate sub-sectors. The inflation protection properties of real estate assets are offset by exposure to the deteriorating growth outlook, leading to significantly lower real returns across the real estate sector. Nonetheless, the five-year real return outlook is expected to remain modestly positive under the Stagflation scenario.

While real estate assets will come under pressure during the Stagflation shock, the subsequent economic recovery will help support occupier demand and underlying fundamentals in real estate markets. The resultant higher rental incomes and an eventual stabilisation in interest rates will lead to a more positive longer-term return outlook for real estate assets.

Sector overview

The **retail** sector is expected to be slightly more resilient in the Stagflation scenario than other real estate sub-sectors. Retail assets tend to have better inflation protection properties, benefitting from leases tied to nominal turnover and higher fixed rental escalations. Furthermore, retail assets will tend to be less sensitive to the cyclical downturn in the economy, particularly neighbourhood centres given their exposure to non-discretionary spending.

The **office** sector is expected to be more exposed to the recessionary environment and the resultant sharp increase in unemployment. Vacancy rates are expected to climb significantly, weighing heavily on market face rents and offsetting the underlying inflation protection of office assets.

The **industrial** sector is expected to experience the biggest hit from a Stagflation scenario. Industrial assets tend to offer slightly less inflation protection and are more sensitive to cyclical economic conditions compared to the other sectors. As a result, five-year real returns are expected to be significantly lower than the Goldilocks scenario.

Active investment strategies for assets can be employed to mitigate the relatively lower returns under this scenario. Timing lease negotiations prior to the economic downturn to lock in rents with inflation linked escalations can help to cushion the impact of a Stagflation scenario.

5.4 Real Estate (continued)

Fixed Income, Infrastructure and Real Estate in an Extreme Stagflation Scenario

In an earlier break out box, we examined the extreme stagflation experience in the 1970s and 1980s. It was a perfect storm of events and given the development of economic theory and central bank reaction functions since then, we see the probability of a repeat as an extremely low probability scenario.

Nevertheless, it is important to learn from these events and understand how our current SAA decisions may fare even in this black swan event.

We model US CPI rising to over 11% and US 3-month LIBOR at approximately 9%. It should come as no surprise that it is a particularly vicious outcome – equity markets fall 10% per annum in real terms on an annualised basis over the five years relative to baseline, dragging down all risk markets with them.

In the total portfolio, relative to baseline, we lose the equivalent of approximately 45% in real terms cumulatively over the five years but note that performance is better with a heavier weighting towards real assets where relative losses are "only" in the vicinity of approximately 40% in real terms cumulatively over the five years.

What do we witness happening in the respective asset classes?

Fixed income

A significant sell off in 10-year rates (i.e., up to double digits in US). Curve steepening even though the cash rate does increase as well. Credit spreads widen.

The passive indices all lose similar amounts to the equity market due to the triple whammy of a sell off in duration, curve steepening and credit spread widening. Any carry benefit is overwhelmed.

Active management would add value by increasing the responses discussed in the Stagflation case – sticking close to cash but also shorting interest rate duration and going long inflation breakevens. Credit allocations with a more defensive bias will weather the lower growth better.

Equity

In the severe Stagflation scenario, equity returns are negatively impacted by the higher discount rates and lower expected economic growth (recessionary period).

Infrastructure

While this extreme Stagflation view may be positive for infrastructure on a nominal long-term hold basis across all three sectors, real returns are impacted and in the case of transport assets, become negative on a five-year hold.

Over five years the negative impact of higher discount rates, higher cost of debt and lower economic growth were almost entirely offset by the positive cashflow impacts from higher inflation.

In the energy and utilities and social infrastructure sectors, where our infrastructure assets are largely uncorrelated to real GDP, we recorded a negative impact from higher discount rates and higher cost of debt being offset by the benefits of higher inflation. Within energy and utilities, interest rate impacts were also heavily mitigated by the greater exposure to regulated assets.

Transport on the other hand relatively underperformed due to the assumed correlation with real GDP. Negative impacts on cost of debt were also mitigated by our active capital management.

Real estate

A severe hike in interest rates and economic downturn would materially negatively impact real estate returns as occupier demand subsides and valuations fall. However nominal returns remain positive.

A sharp increase in interest rates and a deep recession undermine real estate valuations, which could drop by up to 20% depending on the severity of this economic scenario.

Real returns will be particularly hard hit across all sub-sectors due to high rates of inflation, with negative real returns likely over five-year and 10-year periods on an annualised basis.

Under this scenario, the dramatic impact on real estate returns would be partially mitigated through reducing exposure to shorter lease expiries and assets requiring active management, with a preference for better quality core holdings.

Note: Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

5.5 Private Debt

For the purposes of this paper, we have not modelled Private Debt in the same way as fixed income, real estate or infrastructure. This is to recognise the private debt space is very broad with many different risk/return opportunities.

Rather, we see the scope of private debt sitting between traditional fixed income and unlisted equity. Thus, we take the lessons from the modelling on those asset classes and interpolate our own experience in managing these assets for key private debt implications.

5.5.1 Stagnation

Under the Stagnation scenario, we see the continuation of the low growth/low inflation environment as a neutral or positive factor for private debt.

On one hand, low interest rates and inflation means defaults will remain low and even over-leveraged businesses, which would otherwise have failed over the last decade, will continue to muddle through.

Offsetting this is the fact that floating rate loan returns will continue to be restricted by low base rates. Those investors with exposure to higher value-add strategies which benefit from higher margins will be better placed in this scenario.

The dangers for investors in this environment will be a continuation of high demand for aggressive credit strategies leading to excess liquidity and a continued erosion of underwriting disciplines. This would leave investors even more exposed when inflation eventually rises.

Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

5.5 Private Debt (continued)

5.5.2 Benign Inflation Overshoot and Stagflation

Private debt is not immune from the same impacts of rising inflation that typically play out in the traded credit space. As inflation rises, as in the Benign Inflation Overshoot and Stagflation cases, company costs and revenue will come under pressure leading to a deterioration in the average credit quality of private debt.

As this plays out, we will see default rates rise with the impact being most severe in highly leveraged strategies where there is less scope to absorb a downturn in earnings.

However, there are several key structural features of private debt which can serve to mitigate these impacts.

- For example, private debt strategies focusing on more **floating rate debt** will be more insulated from underperformance given the impact of rising base rates (e.g. Benign Inflation Overshoot and Stagflation cases) flowing through to a higher running yield on performing loans.
- **Credit quality.** Private debt is a broad church and covers a variety of risk exposures from senior secured debt, through mezzanine to distressed or special situation debt. Given the huge appetite from investors over recent years for private loans in the leveraged buyout sector, this is one area which we would see as particularly at risk. Fierce competition for assets driven by excess liquidity has flowed through to higher leverage in this sector together with a massive increase in **"covenant light" lending.** These two elements, we would argue, leave the leveraged loan space more exposed to a downturn than has previously been the case.

Impact of all the above will be greater in a Stagflation case as corporate cashflows do not enjoy the same uptick from higher GDP that they do in the Benign Inflation Overshoot case.

Of course, the potential stresses in private credit markets described above are exactly the environment distressed, opportunistic or "loan to own" managers wait for, and they would look forward to a rush of investment opportunities emerging.

As always, no matter the strategy being pursued, when reviewing the performance of private debt portfolios through periods of rising inflation, managers who have demonstrated the skills to construct portfolios which are positioned to perform through the credit cycle will see relative outperformance.

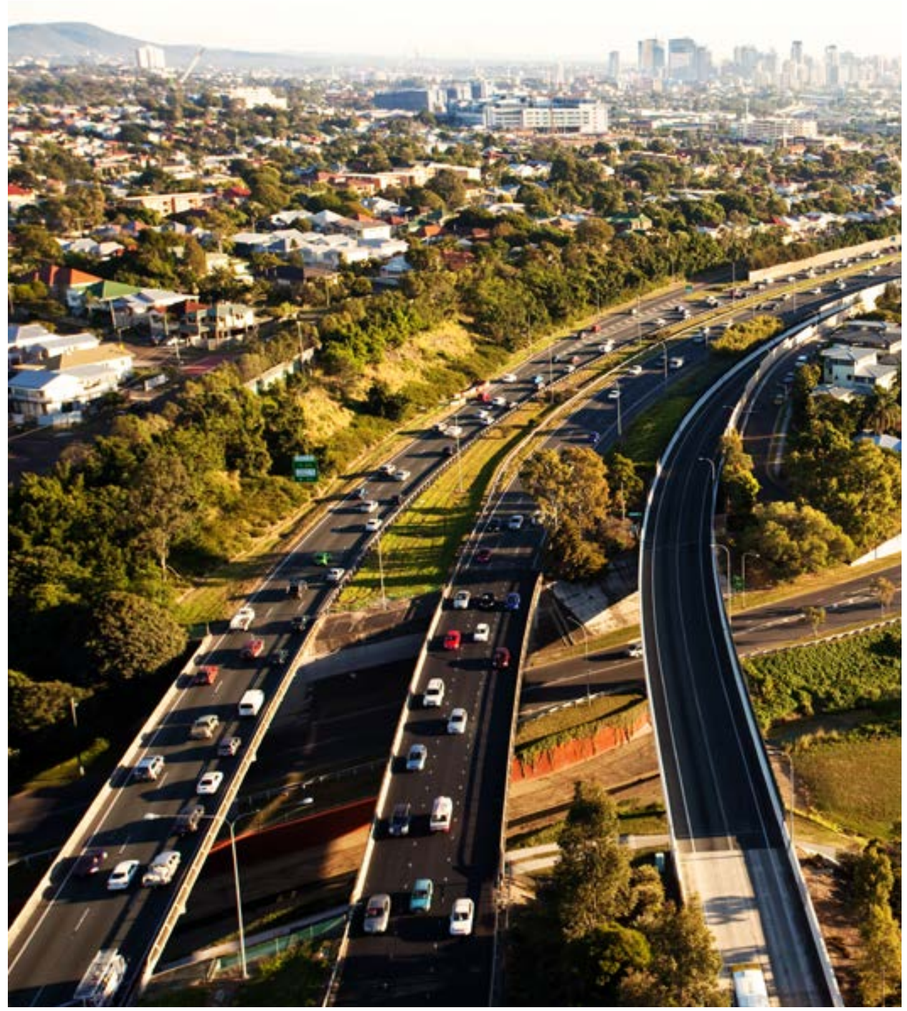
In particular, strategies with the following attributes should be well positioned to outperform their peers in this environment:

- **Well-structured covenant/security structures:** Where a credit is deteriorating due to the impacts of rising costs and lower revenue, a complete suite of legal protections will enable the manager to identify emerging issues and take proactive steps to protect the position for investors.
- **Appropriate leverage levels:** Even private debt strategies focused on sectors with greater earnings volatility, such as mid-market corporate loans, can continue to exhibit low default levels. This is most likely if the manager has maintained its underwriting discipline through the cycle and stress tested the ability of its assets to absorb the earnings shock which will typically accompany a fall in demand as inflationary pressures build.
- **Non-cyclical strategies such as infrastructure debt:** Many infrastructure assets will typically see earnings increase as inflation rises. Even where this is not the case, assets will typically have long term contracted cashflows protecting the business from the impact of falling demand. A well-structured investment in infrastructure debt will also incorporate a requirement that the borrower lock in its future interest rate exposure through either swaps or other derivatives thus mitigating the impact of rising interest costs.

5.5 Private Debt (continued)

5.5.3 Final Observations

Of all the available private debt strategies, **infrastructure debt** is arguably best positioned to benefit in a rising interest rate environment. Given the businesses or assets targeted by managers in this strategy are specifically chosen for their ability to perform through an economic cycle, infrastructure debt is well placed to continue to deliver consistent performance to investors in inflationary environments.



5.6 Private Equity

Our modelling shows that there is likely to be a downturn in the listed equity market in real returns in all of the scenarios except Stagnation. Further, there is likely to be a beta to private equity markets. However, this section discusses the value that can be added by strong manager and company selection but also, how some areas of the private equity spectrum may be more immune to extreme inflationary outcomes.

5.6.1 The Impact of Inflation and Interest Rates

Private equity tends to focus on investments where returns are driven by a combination of company specific value creation initiatives and/or industries and sectors supported by secular growth drivers. It targets companies typically with strong competitive positions, reflected in high gross margins and a degree of pricing power. In most cases, returns are expected to materialise over a long-term holding period, typically between four to six years.

The long-term nature of private equity means investments are typically underwritten with the possibility of shorter-term cyclical impacts in mind. It is highly likely a company will face varying macro-economic and interest rate environments over a given four to six year holding period, and this is typically factored into scenario modelling underpinning an investment. With patient funding structures at both the portfolio company and fund levels, private equity investments are relatively well placed to weather shorter term volatility that may impact individual investments.

We also expect private equity to be somewhat insulated from inflationary shocks, given both the sectors and types of companies it typically targets. Private equity tends to centre around industries such as technology, healthcare and services where there is less exposure to input cost volatility. Further, the focus on market-leading companies with demonstrable pricing power means any impact of input cost volatility is typically short-lived.

While private equity is synonymous with leveraged buyouts, an increasingly significant portion of this asset class is comprised of early-stage venture capital and growth investments.

The impact of inflation and interest rates is likely to differ substantially across the private equity funding continuum.

- **Leveraged buyouts** most often represent control investments in established companies, where returns are driven through a combination of company transformation and financial leverage. We would expect this part of the market to display the most direct linkage between returns and a changing interest rate and inflation environment.
- **Early-stage venture capital and growth investments** are centred around fast-growing companies and disruptive business models, most often enabled by new developments and/or applications of technology. Aside from the potential impact on valuation multiples, as influenced by prevailing interest rates, we see a less clear nexus between inflation and return in this part of the market, given the greater dependence on idiosyncratic return drivers.

With these caveats in mind, we expect that inflation is likely to impact private equity across four key areas:

- Leverage and debt availability
- Valuation multiples
- Portfolio company performance
- Fundraising/capital overhang.

5.6 Private Equity (continued)

LEVERAGE AND DEBT AVAILABILITY IMPACT

Buyout returns are somewhat sensitive to interest rate volatility. While leverage has become a less prominent driver of returns than was the case in the 1980s and 1990s, most buyout investments incorporate an element of leverage at the underlying portfolio company level. As a result, material rate movements are likely to have an impact on private equity returns, particularly in companies with unhedged floating rate exposure.

Given a relatively benign rate environment over the last two decades, less focus has been given to interest rate hedging strategies than was the case in the early days of the industry. Increased speculation around rising inflation (and interest rates) is likely to bring renewed focus on interest rate hedging practices.

Recent years have presented highly favourable conditions for borrowers, including private equity backed companies. As a result, a high degree of flexibility has been built into existing portfolio company debt structures. We expect that this will help insulate against the risks posed by near-term interest rate shocks, including in companies with unhedged rate exposure.

Longer term, however, significantly higher interest rates are likely to have a permanent adverse impact on buyout returns.

VALUATION MULTIPLES

Valuation multiples are likely to exhibit a degree of sensitivity to changing interest rates, insofar as they are reflective of expected returns and the implicit risk premium being applied to private equity assets. To the extent that rising interest rates lead to an increase in the required rate of return applied to private equity assets, we would expect a corresponding contraction in valuation multiples. This would have an impact across the private equity continuum, where valuation multiples are currently either at or approaching all-time highs.

PORTFOLIO COMPANY PERFORMANCE

It is difficult to generalise the likely impact of inflation, interest rates and GDP growth on private equity backed companies, given the range of industries, sub-sectors and business models that are addressed in the asset class. As already mentioned however, there is a common tendency to focus on companies that either have or are building market leading positions, with a focus on building strong competitive moats around these companies. This tends to afford a degree of pricing power, that allows for the impact of input cost increases to be passed through in the medium to long term. We believe that this provides a degree of protection against inflationary shocks.

Companies targeted by private equity tend to exhibit growth as a result of long-term themes that are more secular, as opposed to cyclical in nature. This includes themes such as the impact of technological change and changing demographics or patterns of consumer behaviour. As a result, the growth underwritten in these investments tends to be only indirectly linked to underlying GDP growth, and more dependent on the long-term persistence of underlying themes. Whilst there are exceptions, we believe this overarching tendency tends to insulate private equity returns from short term volatility in macroeconomic growth.

FUNDRAISING AND CAPITAL OVERHANG

Private equity has seen strong inflows in recent years, in large part due to the attractive absolute returns that the asset class has been able to deliver in an environment of low yields across competing asset classes. This dynamic could change in a rising rate environment, where other asset classes are able to deliver more compelling absolute returns. As a result, it is conceivable that rising interest rates could result in a decline in inflows to the private equity asset class. Longer term, this may provide a more compelling dynamic in terms of the supply of capital relative to the opportunity set being addressed, with a reduced capital overhead and a relative decrease in competition for private equity investments.

5.6 Private Equity (continued)

5.6.2 Modelling Potential Impacts

A stylised buyout underwriting model has been used to assess the potential impact of various growth, inflation and interest rate scenarios. It is important to note that this is to be viewed as the underwriting model through which an investment would typically be assessed – it is not a forecast of market valuation returns expected for the asset class. In that regard, this analysis differs to the other asset classes modelled in this paper.

The outputs presented reflect the unmitigated impact of each scenario on the underwriting case and should be viewed as directional guidance. Given the active approach to ownership applied in private equity, it is unlikely that any of these impacts would be left unaddressed in a portfolio company.

Key model assumptions:

- Entry valuation of 10x EV/EBITDA. Exit valuation adjusted to reflect prevailing interest rates at time of exit.
- Floating rate debt of 5x EBITDA at entry, priced at 500bps over reference rates.
- Revenue growth of GDP + 300bps
- Full pass through of COGS inflation
- Five-year hold period, Goldilocks returns of 24.1% IRR, 2.94x MOIC under Goldilocks assumptions. Entry at 31 December 2021, exit at 31 December 2026.
- Macro inputs (GDP growth, inflation, reference rates) based on a 50:50 weighting of forecasts for US and Europe.

Table 5.2 – Model Output

	Nominal IRR	Real IRR	Component drivers of deviation from real Goldilocks IRR: Rate	Inflation	GDP
Goldilocks	24.1%	23.2%			
Stagnation	23.5%	22.8%	1.11%	-0.71%	-0.78%
Benign Inflation Overshoot	24.6%	23.0%	-2.93%	3.12%	-0.45%
Stagflation	22.6%	20.4%	-3.95%	3.71%	-2.58%
Severe Stagflation	9.8%	3.6%	-13.55%	6.42%	-10.90%

Table 5.3 – Case Assumptions

	CPI CAGR 2021-2026	GCP CAGR 2021-2026	Reference rate at entry	Reference rate at exit	EV/EBITDA at exit
Goldilocks	1.98%	1.81%	-0.19%	0.99%	8.9x
Stagnation	1.52%	1.62%	-0.19%	0.60%	9.3x
Benign Inflation Overshoot	3.68%	1.68%	0.12%	2.38%	8.2x
Stagflation	4.29%	1.22%	-0.19%	2.42%	7.9x
Severe Stagflation	6.96%	-0.48%	-0.18%	6.14%	6.1x

Source: QIC

Results are simulated hypothetical results based on a QIC model that is subject to assumptions that may be inaccurate and/or affected by known or unknown risks. Modelled results are an example only and may differ materially from actual outcomes.

5.7 Natural Capital

CASE STUDY

Using Natural Capital to Seed Protection Against Inflation

We define natural capital as nature-based assets – such as land, soil, water, ocean, plants and animals – and which deliver value through economic, environmental and social returns. Natural Capital assets such as land produce both goods (food, fibre, timber) and services, including eco-system services, (carbon-sequestration, cleaner water, bio-diversity).

While these two return sources (i.e., agricultural goods and eco-system services) are actually mutually beneficial and highly inter-related, for the purposes of exploring their inflation correlation it is easier to split them into two.

Agriculture has a well-documented track record of performing well during periods of inflationary stress, with the NCREIF Farmland Index's Total Return consistently providing returns **more than double the inflation rate** since 1991[8].

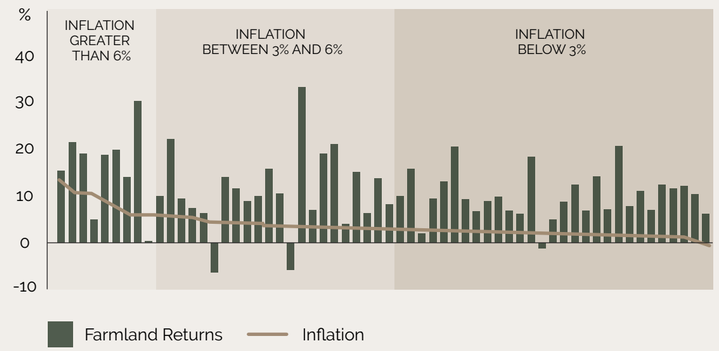
As the Figure 5.10 (right) also shows, agriculture returns have correlated positively with inflation, in no small part because increases in livestock or crop prices directly feed through to CPI measures, as so much of an average household's income is spent on food.

The second return source – eco-system services is more nascent, and does not have the benefit of years of historical empirical evidence. However the structural changes in our economy due to energy transition and the demand for support towards a net-zero economy are anticipated to fuel demand for these services, either regardless of the inflationary environment, or if the transition is more dislocated – because of the inflationary environment.

The combination of both these charts leads to the conclusion that agriculture provides a long-term inflationary hedge with strong commodity representation in CPI benchmarks (raw material/food), a strong historical correlation with inflation and a record of outpacing inflation rates over long-term in a variety of global market environments[9].

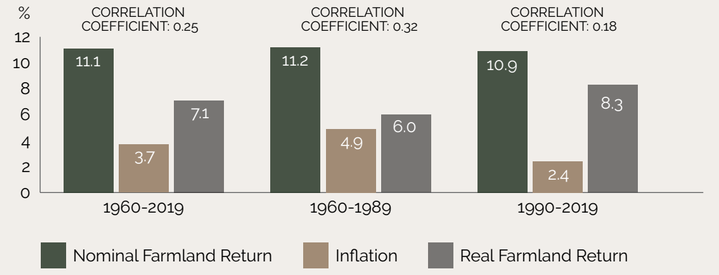
As such, natural capital assets should be added to the real asset mix to be considered by institutional investors when assessing how they can best prepare for Goldilocks and the Three Scenarios.

Figure 5.10 – Annual US Inflation Sorted from High to Lowest, and the Corresponding Annual Farmland Return: 1960-2019



Source: Morningstar, NCREIF and World Bank

Figure 5.11 – Annualised Farmland Returns and Inflations, and their Correlation Coefficient: Various Periods, 1960-2019



Source: Morningstar, NCREIF and World Bank

8 An Examination of Farmland Performance During Periods of Economic Turmoil (October 2020) AGIS Capital.
9 TIAA (2016) Historical returns between 1970-2014, Agri returns averaged 10.54%, more than twice the CPI at 4%. Agricultural assets had a higher positive correlation (0.65) with inflation than government bonds, gold or shares, some of which are negatively correlated with inflation.

6

An Investor Checklist

An Investor Checklist

Goldilocks and the Three Scenarios is a compelling inflationary story for institutional investors around the world. It highlights how real assets and the benefits arising from active management in rates and credit, can help today's investor navigate and manage inflation uncertainty, ex ante.

The story provided investors with three different inflationary scenarios – Stagnation, Benign Inflation Overshoot and Stagflation. By mapping out alternative pathways of potential inflation outcomes, we aimed to equip influential investment decision-makers with information to establish plans for a range of scenarios, while also providing guidance should one scenario starts to look more probable.

The Goldilocks and the Three Scenarios paper then reviewed the inflationary landscape from a portfolio perspective. It found investors' investment strategies would be strengthened in inflationary scenarios by the inclusion of real assets, particularly those with the following characteristics:

- Hard indexing of cashflows to CPI
- Regulation such that their cashflows are based off a regulated WACC which accounts for inflation
- Low beta to economic cycle e.g. non-discretionary retail or social infrastructure or energy and utilities infrastructure
- Medium- to long-term debt financing that is either hedged or fixed rate.

The paper found that by increasing portfolio weight to real assets, investors enjoyed stronger real returns in Stagflation and Benign Inflation Overshoot cases *even after controlling for the more common risk/return benefits of real assets* such as illiquidity premium or active management.

It also discussed the benefits that active management can play, for example the many levers that could be pulled in active fixed income that would enhance portfolio outcomes.

The paper then explored the impacts to the main characters of the story, the various asset classes – fixed income, infrastructure, real estate, private debt, private equity, and natural capital. It examined the impact on returns to key asset classes of the different inflation outcomes and discussed the key factors that could be called upon to enhance performance in the relevant inflationary environment.

Goldilocks and the Three Scenarios is a story filled with opportunity for institutional investors facing a complex and unknown inflationary environment. But they should bear in mind the following considerations to ensure they can prepare for a happy ending.

- The moral of the story for those assessing the investment landscape from the portfolio perspective is that adding real assets will set an investment portfolio up for outperformance under a wider range of higher inflation outcomes.
- Investors should consider those real assets which are actively managed as a lead character which can further help mitigate against inflationary risk.

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