



# Global Matters 32

## Infrastructure, interest rates & inflation

October 2021

**Infrastructure, interest rates and inflation: 3 dynamics that are commonly linked, but often in an incomplete manner that does not reflect the full story of their correlation. Economic conditions over the past 5 years have been relatively benign, meaning the relationship between these 3 factors has not been a major market focus. However, with the spread of the COVID-19 virus and associated government response, that environment has begun to show signs of change. In particular, inflation pressures have begun to emerge, along with market discussions surrounding the direction of interest rates.**

We have previously examined the infrastructure/interest rates/inflation dynamic in Global Matters articles published in April 2016 ([Listed infrastructure investment and rising interest rates](#)) and April 2018 ([Is infrastructure a bond proxy?](#)). In this article, Sarah Shaw (4D's Global PM & CIO) Greg Goodsell (4D's Global Equity Strategist) and the 4D investment team revisit and expand that earlier work.

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In order to properly examine the infrastructure/interest rates/inflation dynamic, we wanted to firstly provide a brief backdrop of the prevailing macro-economic environment and how we perceive key factors playing out.

## Global economic outlook



GDP growth in 2021 looks like being curtailed somewhat compared with expectations 6 months ago, as the Delta variant continues to spread and supply chain disruptions put pressure on prices. However, despite the ongoing presence of the pandemic, the outlook for 2021 remains robust and we remain optimistic about the outlook for the global economy and infrastructure asset class for 2022 and beyond. The latest (September 2021) OECD GDP growth forecasts, shown below, are supportive of our view.

### Real GDP growth projections

*% change, year-on-year*

	2020	2021	2022		2020	2021	2022
<b>World</b>	-3.4	5.7	4.5	<b>G20</b>	-3.1	6.1	4.8
<b>Australia</b>	-2.5	4.0	3.3	<b>Argentina</b>	-9.9	7.6	1.9
<b>Canada</b>	-5.3	5.4	4.1	<b>Brazil</b>	-4.4	5.2	2.3
<b>Euro area</b>	-6.5	5.3	4.6	<b>China</b>	2.3	8.5	5.8
<b>Germany</b>	-4.9	2.9	4.6	<b>India*</b>	-7.3	9.7	7.9
<b>France</b>	-8.0	6.3	4.0	<b>Indonesia</b>	-2.1	3.7	4.9
<b>Italy</b>	-8.9	5.9	4.1	<b>Mexico</b>	-8.3	6.3	3.4
<b>Spain</b>	-10.8	6.8	6.6	<b>Russia</b>	-2.5	2.7	3.4
<b>Japan</b>	-4.6	2.5	2.1	<b>Saudi Arabia</b>	-4.1	2.3	4.8
<b>Korea</b>	-0.9	4.0	2.9	<b>South Africa</b>	-7.0	4.6	2.5
<b>United Kingdom</b>	-9.8	6.7	5.2	<b>Turkey</b>	1.8	8.4	3.1
<b>United States</b>	-3.4	6.0	3.9				

4 Note: \*India projections are based on fiscal years, starting in April. The European Union is a full member of the G20, but the G20 aggregate only includes countries that are also members in their own right. Spain is a permanent invitee to the G20. World and G20 aggregates use moving nominal GDP weights at purchasing power parities. Source: OECD Economic Outlook database.

Our optimism for an ongoing recovery stems from the following.

- **COVID-19 vaccines are being deployed globally with high and increasing vaccine rates emerging**

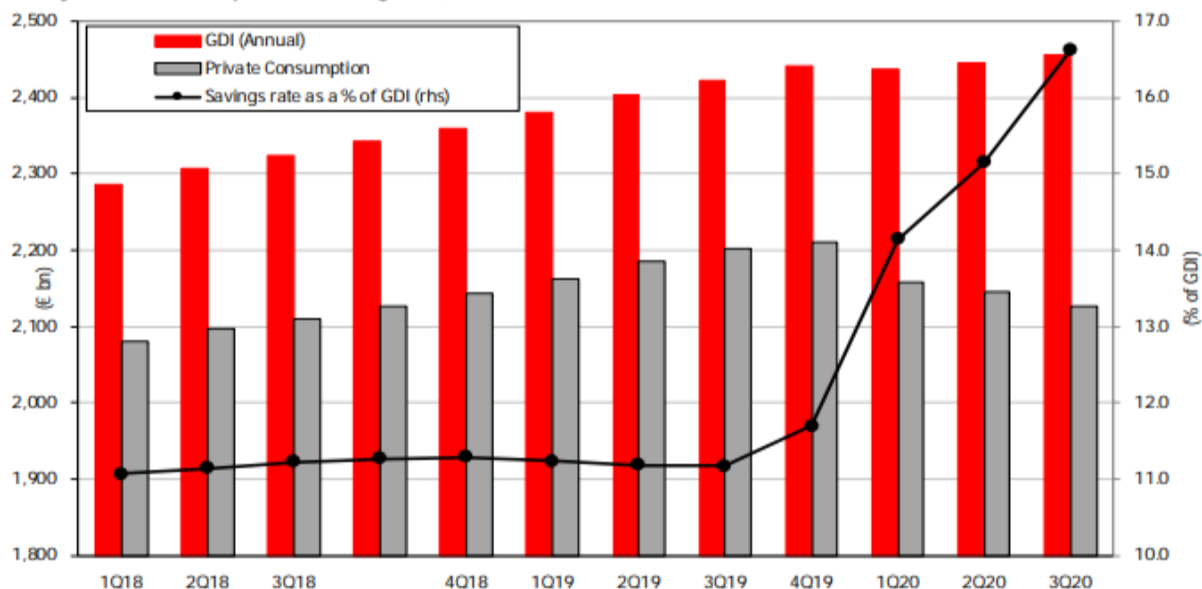
COVID-19 vaccines have been developed in record time, are now being deployed and are proving to be very effective in preventing severe onset of the disease. You can be certain that vaccine versions 2.0+ are currently being developed, along with other modes of COVID treatment. This is truly remarkable and should hopefully see the currently rampant virus gradually tamed.

Bloomberg reports (September 2021) that India will restart exports of COVID-19 vaccines for the World Health Organization's Covax initiative, even as it races to inoculate its own adult population. Italy has started giving third doses of vaccines to its most vulnerable citizens. The US will soon allow most foreign air travellers to enter as long as they're fully vaccinated; and it has added a testing requirement for unvaccinated Americans. The UK has also significantly simplified its travel rules and restrictions along with many parts of South America, and even Australia is hinting at a 2021 international re-opening. The Pfizer-BioNTech vaccine was deemed safe and produced strong antibody responses in children ages 5 to 11 in a large-scale trial, according to the companies: findings that could pave the way to begin vaccinating grade-school kids. US regulators are expected to decide soon on whether and how booster shots should be administered in the US, where the death toll has surpassed that of the 1918 influenza outbreak.

- **As vaccine percentages rise, lockdowns lift – which sees a huge demand boost**

As the level of vaccinations around the world rises and greater acceptance of living with the virus emerges, lockdowns gradually get lifted – releasing an immediate boost of pent-up demand and adding to the recovery. This quantum of pent-up demand is illustrated in the following chart, which shows a rapidly accelerating savings rate (as a % of GDP) in Germany in 2020 as lockdowns held consumer spending in check.

Germany – GDI vs Consumption and Savings Rate, 2018-4Q20



Source: Statistisches Bundesamt and Santander.

- **Huge fiscal and monetary stimulus will continue to propel global economic growth**

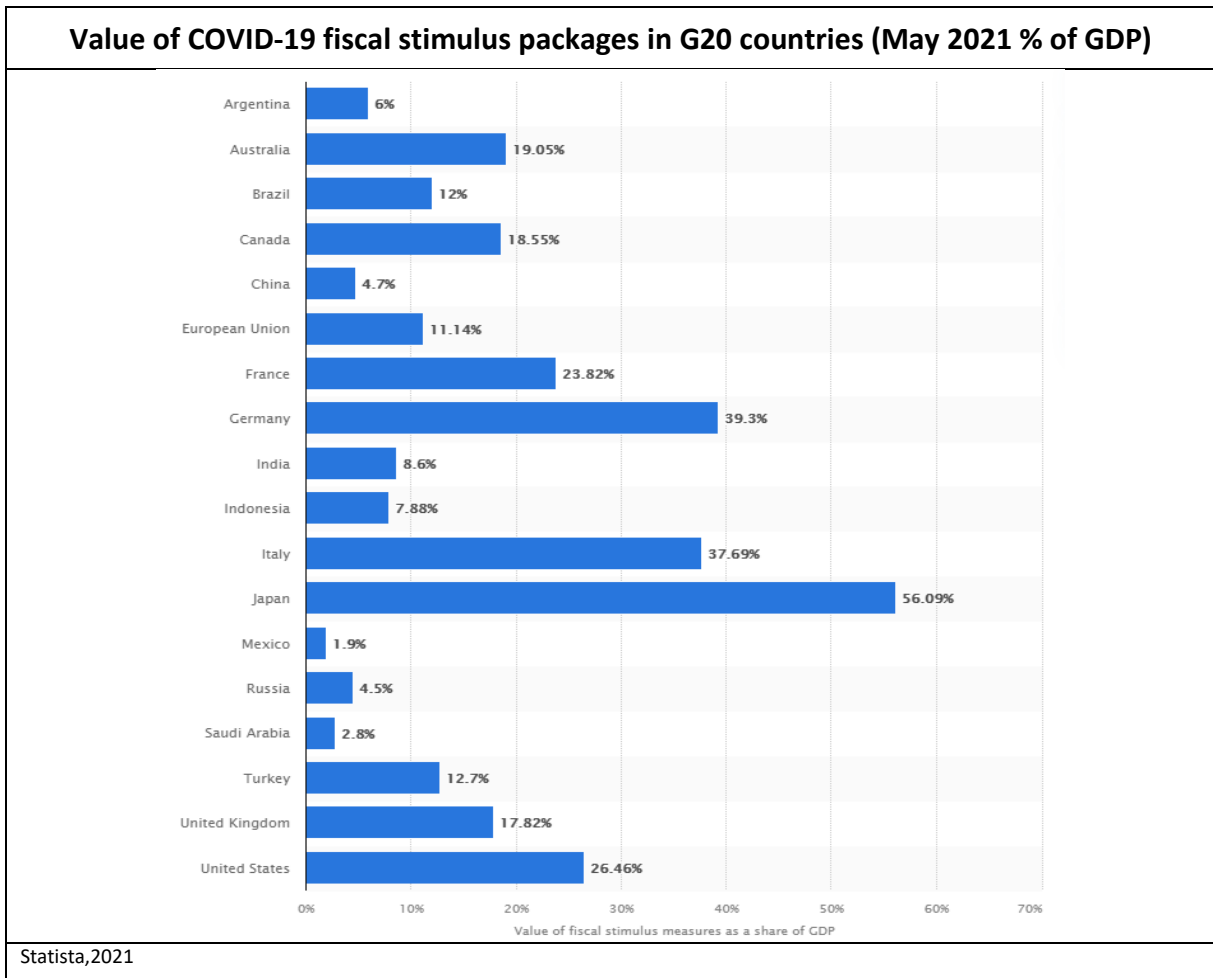
Prior to the advent of the Delta strain, it was beginning to look as if significant global fiscal and monetary stimulus would begin to be wound back. However, that does not look to be the case now. For example, UBS<sup>1</sup> estimates that, in aggregate, only 8% of last year's stimulus will have been reversed by the end of 2021. Of course, that is largely because the virus keeps flaring up and because severe mobility restrictions have been reimposed by numerous countries at some point this year while they rush to vaccinate the populous. This has necessitated extending last year's support schemes and the approval of some new ones, pushing the adjustment out to 2022.

According to the IMF<sup>2</sup>, since March 2020 governments have spent ~US\$16 trillion providing fiscal support amid the pandemic, and global central banks have increased their balance sheets by a combined US\$7.5 trillion. Budget deficits are the highest they have been since World War II and central banks have provided more liquidity in the past year than in the past 10 years combined. However, this was necessary – IMF research indicates that if policymakers had not acted, last year's recession, which was the worst peacetime recession since the Great Depression, would have been three times worse. The world lost US\$22 trillion in output as a result of COVID-19, relative to what the IMF expected in January 2020.

Governments around the world are no doubt looking forward to the economic rebound and the return of consumption and inflation as they seek to reduce their debt burden and wind back support.

<sup>1</sup> UBS: Global Fiscal Stimulus Tracker – the 'fiscal cliff' looms (again), September 2021

<sup>2</sup> IMF: Seizing the Opportunity for a Pro-Growth, Post-Pandemic World, July 2021



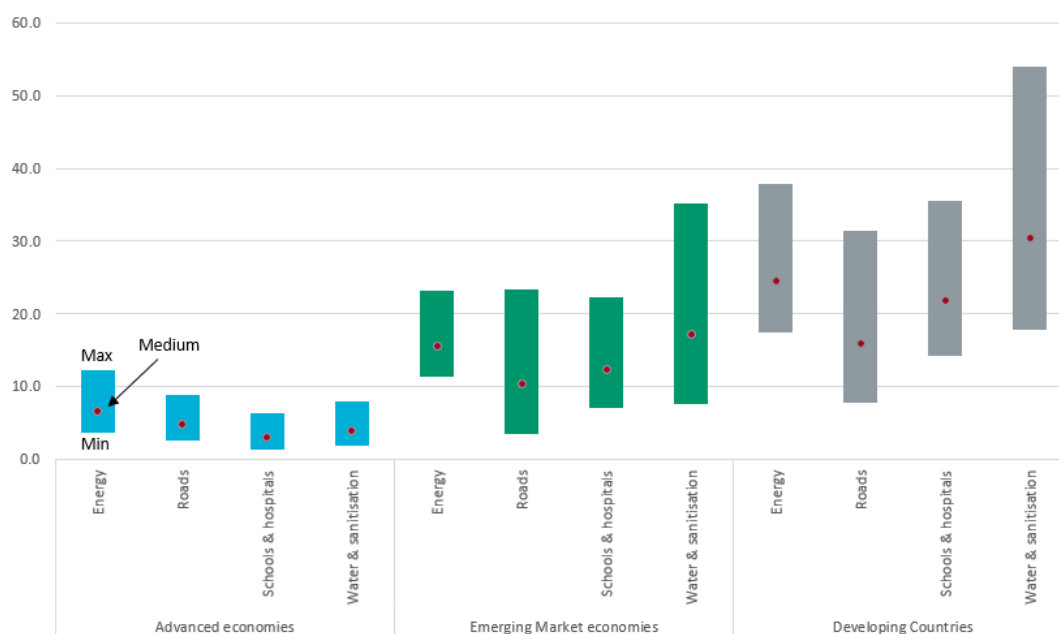
- **Infrastructure investment is key to the longer-term global solution**

While we think the pandemic will last longer than was initially hoped, we believe the global economy will ultimately emerge stronger for the experience. The huge amount of fiscal and monetary stimulus is still to be fully felt in economic terms with much of that spending focused on essential infrastructure investment around the globe, including the green energy transition.

Recent IMF research<sup>3</sup> shows how effective such expenditure is in boosting jobs and growth. When governments invest in infrastructure, they create many new jobs (see graphic below). The IMF evaluated the direct employment effect of public investment in the key infrastructure categories of electricity, roads, schools, hospitals, water and sanitation. Using data from 41 countries over 19 years, the IMF estimates that US\$1 million of public spending in infrastructure creates 3-7 jobs in advanced economies, 10-17 jobs in emerging market economies, and 16-30 jobs in low-income developing countries. Overall, the IMF estimates that 1% of global GDP in public investment can create more than 7 million jobs worldwide through its direct employment effects alone. The infrastructure spend economic ‘multiplier’ is significant.

<sup>3</sup> IMF: Putting Public Investment to Work, August 2021

**Jobs multiplier – job content per \$1 million of additional investment**



Sources: Compustat, Orbis and IMP staff calculations

• **Infrastructure stimulus packages in practice**

After months of negotiations, Bloomberg reports (August 2021) the US Senate passed a US\$1.2 trillion infrastructure plan (US\$550 billion in new federal investment) that would represent the biggest burst of spending on US public works in decades. The bipartisan 69-30 vote marked a significant victory for President Joe Biden’s economic agenda. The bill still faces hurdles in the House, but if the package clears both chambers it includes new spending for roads and bridges, power grid upgrades and broadband expansion.

Similarly, India, Reuters reports (August 2021), will launch a 100 trillion rupee (US\$1.35 trillion) national infrastructure plan that will help generate jobs and expand use of cleaner fuels to achieve the country's climate goals, PM Narendra Modi said. The infrastructure program, called ‘Gati Shakti’, will help boost productivity of industries and boost the economy, Mr Modi said during his speech at the Independence Day celebrations in New Delhi: ‘We will launch a masterplan for Gati Shakti, a big program ... (it) will create job opportunities for hundreds of thousands’. Boosting infrastructure in Asia's third largest economy is at the heart of Mr Modi's plan to pull back the country from a sharp, COVID driven economic decline.

These recent infrastructure specific programs follow the EU, which was a very early proponent of the infrastructure led recovery having launched its €750bn Next Generation EU recovery fund in H2 2020.

**Inflation is the key risk**

Critical to the positive scenario outlined above is the issue of inflation. The past 6 months has seen some inflationary spikes which are raising concerns. There are two broad schools of thought regarding inflation.

**1. Inflation is here to stay**

This view is that inflation is here, if not to stay, then for a long time – possibly in a 1970s type double digit inflationary scenario. This argument has its origins in the huge amount of fiscal and monetary stimulus that has occurred so far (see above). All these dollars need to go somewhere and one argument is that we will see permanent, wide-spread inflationary pressures.

## 2. Current inflationary spikes are transitory driven by the unique environment we are in

This argument, which can probably be seen as consensus (the US Fed, IMF, RBA, ECB are in this camp), is that there are no broad spread inflationary pressures on wages and that current inflationary blips are driven by things such as the 2020 economic numbers being so distorted by COVID that when we look at the yoy change in 2021, the resultant answer is not representative of the underlying environment.

Another argument for the current inflationary forces being transitory is that the ‘supply chain disruptions’ caused by the pandemic have contributed to recent price hikes. Bloomberg reports (August 2021) that these disruptions remain prevalent in the global economy. Chip shortages that have held back automakers and computer manufacturers are getting worse. Chip lead times, the gap between ordering a semiconductor and taking delivery, increased by more than 8 days to 20.2 weeks in July from the previous month. That gap was already the longest wait time since tracking this data began in 2017. Shortages of microcontrollers, logic chips that control functions in cars, industrial equipment and home electronics jumped in July. Even Toyota is affected. The automaker warned it will suspend output at 14 plants across Japan and slash production by 40% due to supply disruptions, including chip shortages.

Our view is that the recent inflationary spikes are transitory and will gradually ease over time. However, this is not to say we don’t expect a modest level of inflation to gradually return – this is what central banks are targeting, and what we would like from an infrastructure investment perspective. Given the quantum of stimulus yet to flow through into the real economy, coupled with the huge pent-up consumption demand reflected in deposit rates having spiked through the pandemic, we do expect some inflationary pressures will emerge over time. While we will be monitoring this closely, we are currently in the camp of near-term inflationary spikes, with a gradual return of sustained modest inflation over time. As such, we don’t see central banks being forced into any drastic action such as near-term interest rate hikes. We are also of the belief that central banks may let inflation run somewhat ahead of target over the short to medium term, to assist in the reduction of headline nominal government debt to GDP levels.

OECD September 2021 inflation forecasts are shown below.

### CPI inflation projections

% change year-on-year, colours indicate the direction of revisions since the June 2021 Economic Outlook

	2020	2021	2022		2020	2021	2022
<b>G20</b>	2.7	3.7	3.9				
<b>Australia</b>	0.9	2.3	1.8				
<b>Canada</b>	0.7	3.1	2.8				
<b>Euro area</b>	0.3	2.1	1.9				
<b>Germany</b>	0.4	2.9	2.1				
<b>France</b>	0.5	1.9	1.4				
<b>Italy</b>	-0.1	1.6	1.6				
<b>Spain</b>	-0.3	2.4	1.9				
<b>Japan</b>	0.0	-0.4	0.5				
<b>Korea</b>	0.5	2.2	1.8				
<b>United Kingdom</b>	0.9	2.3	3.1				
<b>United States</b>	1.2	3.6	3.1				
<b>Argentina</b>	40.4	47.0	48.3				
<b>Brazil</b>	3.2	7.2	4.9				
<b>China</b>	2.5	1.2	2.2				
<b>India*</b>	6.2	5.9	5.5				
<b>Indonesia</b>	1.9	2.2	2.9				
<b>Mexico</b>	3.4	5.4	3.8				
<b>Russia</b>	3.4	6.1	5.5				
<b>Saudi Arabia</b>	3.4	2.9	1.4				
<b>South Africa</b>	3.3	4.2	4.4				
<b>Turkey</b>	12.3	17.8	15.7				

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Note: \*India projections are based on fiscal years, starting in April. The European Union is a full member of the G20, but the G20 aggregate only includes countries that are also members in their own right. Spain is a permanent invitee to the G20. Difference in percentage points, based on rounded figures. There is no comparison available for Saudi Arabia: the June 2021 Economic Outlook did not include projections for inflation.  
Source: OECD Economic Outlook database.





## Infrastructure & interest rates

Whatever your view on the nature of the current inflationary spikes and outlook, from an investment perspective it is important to understand how infrastructure assets react in an inflationary environment.

A common dictum of listed equity investment is that infrastructure stocks under-perform as interest rates and inflation rise. This is often associated with the perception of these stocks as being a '*bond proxy*'. The logic then flows that, just like a government bond, as interest rates rise, share (bond) prices fall as the present value of their '*fixed*' future cash flows is now worth less and the required yield from the asset has to increase.

However, many infrastructure stocks have built in inflation protection either directly linked to tariffs or indirectly through their regulatory construct. As such, in our inflationary scenario (outlined above) some parts of the infrastructure universe may enjoy the perfect storm over the short/medium term – namely low interest rates to support future growth, economic activity flowing through to volumes, and explicit inflation hedges through their tariff mechanisms to combat any inflationary pop we may experience.

To appreciate this dynamic, we need to segregate the infrastructure stock universe into its two key classes: **User Pay** and **Regulated Utilities**.

- **User Pays**

By their very function, **User Pay** assets are geared to capture GDP growth and wealth creation. Typical User Pay assets are toll roads, airports, railways and ports, whereby the user '*pays*' to use the asset. These stocks have a direct positive correlation with GDP growth (volumes) and often have built-in inflation protection mechanisms in their business models (tariffs). As interest rates/inflation increase over time, these protection mechanisms begin to kick in and positively impact earnings. This is then reflected in the relevant stock price and performance.

In addition, in recent years, management at these companies have generally been actively locking in medium to longer-dated fixed rate borrowings during this extraordinarily long period of very low global interest rates. As a result, the impact of higher interest rates on financials should be limited to the issue of new debt, mitigating any overall earnings impact.

- **Regulated Utilities**

In contrast **Regulated Utilities**, such as electricity, water and gas providers, can be more immediately adversely impacted by rising interest rates/inflation because of the regulated nature of their business. These assets are more '*bond proxy*' in nature, particularly over the shorter term. While they are slower to realise the benefits of economic growth, at the same time they are less exposed to economic contraction and benefit from lowering interest rates.

The flow through of inflation is dictated by whether the Utility's return profile is real or nominal. If the Utility operates under a real return model, then inflation is passed through into tariffs much like a User Pay asset. This model is more prevalent in parts of Europe and Brazil, for example, and limits the immediate impact of inflationary pressure – and in fact can positively boost near-term earnings. In contrast, if the Utility is operating under a nominal return model, it must bear the inflationary uptick reflected in certain costs until it has a regulatory reset (see below), when the changing inflationary environment is incorporated into new tariff/revenue assumptions. This nominal model is the standard model for the US Utility sector. As such, those Utilities in a real model will weather inflationary spikes a little better than their nominal peers.

However, in terms of interest rates shifts, the issues for both real and nominal models are consistent. For a Regulated Utility to recover the cost of higher interest costs, it must first go through its regulatory review process. This involves making submissions to the regulator, arguing that prevailing economic conditions have changed and it should be entitled to recover those increased costs via increased rate charges to its client base. While a regulator is required to have regard for the changing cost environment the Utility faces,



the process of submission, review and approval can take some time or can be dictated by a set regulatory period of anywhere between 1-5 years. In addition, the whole environment surrounding costs, household rates and utility profitability can be highly politically charged. As a result, both the regulatory review process and the final outcome can be quite unpredictable.

## How do User Pay & Regulated Utility assets perform during rising interest rates?

Having established the premise that User Pay assets offer more protection from rising interest rates and inflation while Regulated Utilities can be more vulnerable, we can test this thesis by examining how these two distinct asset sub-sectors have performed during previous periods of rising interest rates.

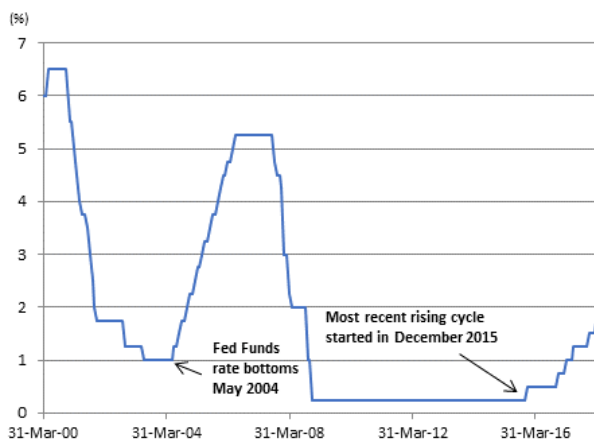
We examined this scenario back in April 2018 in our GM article [Is infrastructure a bond proxy?](#) We concluded that bucketing all infrastructure as a 'bond proxy' was a far too simplistic conclusion. Rather, the inherently different asset characteristics of User Pays vs Regulated Utilities, and the performance they deliver, mean infrastructure is an asset class that can be tailored to all stages of a market cycle. User Pay assets facilitate a portfolio being positioned for a GDP growth/rising interest rate/inflationary environment. Conversely, in more difficult economic times, possibly incorporating falling interest rates, Regulated Utilities offer an ideal defensive home given their earnings certainty, which are largely immune to the macro cycle.

Our earlier analysis holds true today, and so we revisit below how User Pay and Regulated Utility stocks performed following: a) a rising US Federal Funds (Fed Funds) rate, and b) rising 10-year US Government Treasury Bond (T-Bond) yields.

### Rising interest rate cycles in the US since 2000

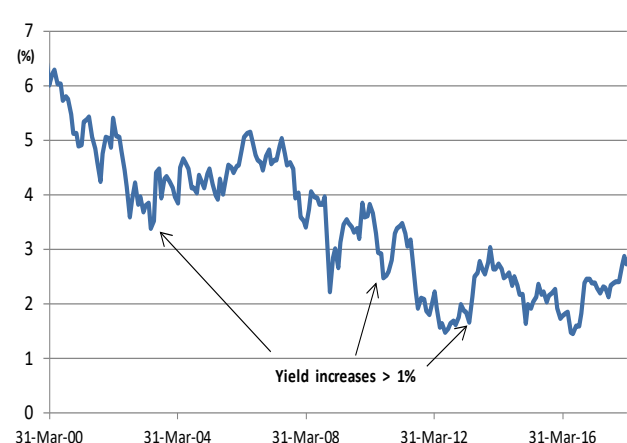
Since 2000, there have been two Fed Funds rate hike cycles (Chart 1) and three periods during which the US T-Bond yield rose by more than 1% over consecutive months (Chart 2).

**Chart 1: US Fed Funds rate from 2000**



Source: Bloomberg

**Chart 2: US 10-Year T-Bond Yield from 2000**



Source: Bloomberg

To test the thesis that User Pay assets can outperform in periods of rising interest rates/inflation, we:

- segregated 4D Infrastructure's investible universe<sup>4</sup> of ~300 global listed infrastructure stocks into User Pays (the '**4DUP index**') and Regulated Utilities (the '**4DUts index**'); and

<sup>4</sup> 4D investible universe as at 31 March 2018

- then examined how these two indices, as well as the S&P Global Infrastructure Index ('S&PI'), performed versus the MSCI World Index ('MSCI' – as a proxy for global equity market performance) during the above time periods – namely, rising Fed Funds rate and rising US 10-year T-Bond yields.

To better understand the performance behaviour of the indices, we separated performance over the first six months and second six months (i.e. months 7–12) after rates started increasing.

### Rising rates 1: Two Fed Fund rate hike cycles since 2000

As shown in **Chart 1** above, since 2000 there have been two periods in which the US Fed Funds rate rose by more than 1% over consecutive months. The performances of our infrastructure indices vs the MSCI during these periods are shown in **Table 1** below.

**Table 1: MSCI World v 4DUP, 4DUts & S&PI**  
Relative performance from the date the US Federal Funds rate started rising

<i>Period 1: FF rates start increasing in May 2004</i>						
	Performance months 1–6 (%)			Performance months 7–12 (%)		
	4DUP	4DUts	S&PI	4DUP	4DUts	S&PI
Index performance	21.6	18.2	22.8	6.8	9.0	7.2
MSCI World	9.2	9.2	9.2	2.5	2.5	2.5
<b>Outperformance</b>	<b>12.4</b>	<b>9.0</b>	<b>13.6</b>	<b>4.3</b>	<b>6.5</b>	<b>4.7</b>
<b>Outperform v MSCI</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<i>Period 2: FF rates start increasing in November 2015</i>						
	Performance months 1–6 (%)			Performance months 7–12 (%)		
	4DUP	4DUts	S&PI	4DUP	4DUts	S&PI
Index performance	5.5	13.2	7.8	8.9	-2.1	-1.3
MSCI World	0.4	0.4	0.4	3.4	3.4	3.4
<b>Outperformance</b>	<b>5.1</b>	<b>12.8</b>	<b>7.4</b>	<b>5.5</b>	<b>-5.5</b>	<b>-4.7</b>
<b>Outperform v MSCI</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>No</b>

Source: Bloomberg. We used the S&P Global Infrastructure Index (S&PI) as a proxy for global listed infrastructure performance; it only became available in November 2001, but is the longest running index for GLI stocks. The 4DUP and 4DUts indexes are market cap weighted. All performance numbers are total return, converted to US\$ equivalent using Bloomberg formulas.

### Rising rates 2: Three periods where the US 10-year T-Bond yield rose by 1% since 2000

**Chart 2** shows that since 2000 there have been three periods during which the US T-Bond yield rose by 1% over consecutive months. Performance of our infrastructure indices during these periods is in **Table 2**.

**Table 2: MSCI World v 4DUP, 4DUts & S&PI**  
Relative performance from the date the US 10-year T-Bond yield started rising

<b>Period 1: US 10-year T-Bond yields start increasing in May 2003</b>						
	Performance months 1–6 (%)			Performance months 7 – 12 (%)		
	4DUP	4DUts	S&PI	4DUP	4DUts	S&PI
Index performance	16.4	7.0	12.6	9.4	10.4	10.1
MSCI World	14.9	14.9	14.9	8.1	8.1	8.1
<b>Outperformance</b>	<b>1.5</b>	<b>-7.9</b>	<b>-2.3</b>	<b>1.3</b>	<b>2.3</b>	<b>2.0</b>
<b>Outperform v MSCI</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Period 2: US 10-year T-Bond yields start increasing in August 2010</b>						
	Performance months 1–6 (%)			Performance months 7 – 12 (%)		
	4DUP	4DUts	S&PI	4DUP	4DUts	S&PI
Index performance	23.3	11.0	19.6	-0.9	1.3	-6.4
MSCI World	26.3	26.3	26.3	-8.9	-8.9	-8.9
<b>Outperformance</b>	<b>-3.0</b>	<b>-15.3</b>	<b>-6.7</b>	<b>8.0</b>	<b>10.2</b>	<b>2.5</b>
<b>Outperform v MSCI</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Period 3: US 10-year T-Bond yields start increasing in April 2013</b>						
	Performance months 1–6 (%)			Performance months 7 – 12 (%)		
	4DUP	4DUts	S&PI	4DUP	4DUts	S&PI
Index performance	7.2	1.2	3.8	9.4	11.1	9.7
MSCI World	10.0	10.0	10.0	6.6	6.6	6.6
<b>Outperformance</b>	<b>-2.8</b>	<b>-8.8</b>	<b>-6.2</b>	<b>2.8</b>	<b>4.5</b>	<b>3.1</b>
<b>Outperform v MSCI</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

Source: Bloomberg. See further comments in Table 1.

## Performance conclusions

As evident in **Table 1**, a rising US Federal Funds rate:

- **did not significantly impact** the performance of the 4DUP, which outperformed the MSCI in all four measured periods;
- but the **performance of the 4DUts and S&PI** were not as strong, significantly underperforming the MSCI during months 7-12 of the November 2015 rate hike cycle.

In contrast, **Table 2** suggests that rising US Bond yields are far more influential for listed infrastructure equity market performance. Notably:

- the **4DUP outperformed** the MSCI over four of the six measured time periods, underperforming only during the first six months of Periods 2 and 3, and recovering much of that underperformance during months 7-12; and
- **both the 4DUts and the S&PI underperformed** the MSCI during the first six months of each of the three periods of rising yields before outperforming during months 7-12.

We believe this analysis supports our thesis that User Pay assets are resilient through periods of rising interest rates/inflation and can provide the out-performance sought. In contrast, Regulated Utilities are more inclined to demonstrate the 'bond proxy' profile.

## Infrastructure & inflation: stock case studies

Looking at the issue now at a company level, we used 3 test case scenarios to attempt to illustrate the fundamental impact of higher inflation leading to faster than anticipated increases in interest rates on 3 quite different infrastructure assets – Transurban, CMS Energy and SNAM. A summary of the impact on revenue, EBITDA and earnings (NPAT) over the next 3 years, as well as to the 5-year IRR, is depicted below.

- **Analytical framework**

The analysis below is measured relative to our current 4D Base Case company forecasts. Key assumptions and test cases are summarised below, keeping all other assumptions constant (e.g. GDP growth).

**Base Case (current 4D forecasts):** Premised on inflation being transitory with a pop in 2021/22 before reverting to a more gradual path to long-term averages. In this scenario, interest rates gradually revert to a normalised level over a number of years.

**Test Case 1:** Explores the impact of inflation two percentage points above current Base Case assumptions for the next 3 years (2022-2024) before reverting to a normalised long-term level in response to interest rate moves. Bond rates move up by 1% in 2022 (relative to current assumptions) and a further 1% in 2023 before reverting to long-term averages in 2025 (ahead of the timeline in our Base Case). In this case, the higher 2022 bond rate will also impact the discount rate used to value long-term cash flows and will see our cost of equity move up 0.5%<sup>5</sup> pa. This test case assumes inflation moves interest rates but the interest rate response works to bring inflation back to long-term averages.

**Test Case 2 (extreme case):** Inflation is three percentage points above our Base Case assumptions for the next 3 years and remains 1% above long-term averages, with bond rates moving up 1% in each of 2022, 2023 and 2024 before stabilising 1% above our long-term assumptions.

- **Summary results**

We believe the results of the above test cases applied to our 3 stocks, shown below, support our view that inflation and indeed interest rates do not need to be negative for infrastructure assets in terms of earnings and/or long-term valuations. Instead, the impact is very much dependent on the type of infrastructure asset (as illustrated in the table below). Detailed results can be found in the appendix.

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<sup>5</sup> 4D does not use spot bond rates as the starting point for our DCF analysis. Rather, as we see a reversion to norm in economic data over the life of our cash flow models, we also use a normalised bond forecast as the starting point for our discount rate. This 'normalised' bond rate is an average of spot and the long-term bond rate; hence the impact to discount rates, relative to our Base Case, is only 50bps, not the full 100bps.

**Table 3: Stock case studies: summary results v 4D Base Case assumptions**

Stock	Asset type	Test Case 1 results	Test Case 2 results
<b>Transurban</b> (Australia)	User Pays	Y1, Y2 & Y3: EBITDA & NPAT <b>increase</b> across all 3 years 5-year IRR -28bp	Y1, Y2 & Y3: EBITDA & NPAT <b>increase</b> across all 3 years 5-year IRR +111bps
<b>CMS Energy</b> (US)	Nominal return Regulated Utility	Y1, Y2 & Y3: EBITDA & NPAT <b>decrease</b> across all 3 years 5-year IRR -190bps	Y1, Y2 & Y3: EBITDA & NPAT <b>decrease</b> across all 3 years 5-year IRR -271bps
<b>SNAM</b> (Italy)	Real return Regulated Utility	Y1: EBITDA & NPAT <b>decrease</b> Y2 & Y3: EBITDA <b>increases</b> Y2 & Y3: NPAT <b>decreases</b> in Y2 before <b>increasing</b> in Y3 5-year IRR -64bps	Y1: EBITDA & NPAT <b>decrease</b> Y2 & Y3: EBITDA & NPAT both <b>increase</b> 5-year IRR +266bps
<b>Test case assumptions</b>	<b>Test Case 1:</b> Inflation 2% above current Base Case assumptions for the next 3 years (2022-2024) before reverting to a normalised long-term level. Bond rates move up by 1% in 2022 and a further 1% in 2023 before reverting to long-term averages in 2025 (ahead of the timeline in our Base Case).		<b>Test Case 2:</b> Inflation 3% above Base Case assumptions for next 3 years and remains 1% above long-term averages, with bond rates up 1% in 2022, 2023 and 2024 before stabilising 1% above our long-term assumptions.

Source: 4D Analysis

## Overall conclusion

We believe the global economic recovery is continuing, although the Delta strand of the COVID virus has likely pushed out the timing of the full recovery. This may cause some unease in equity markets, which had already largely 'baked in' a 'V' shaped economic recovery.

Inflation remains a key risk, although we believe current inflationary spikes are transitory. However, even if we do enter a period of sustained inflation, we believe infrastructure is the ideal asset class to take shelter in given its explicit or implicit hedges.

In this article we have looked to outline the important differences between User Pay and Regulated Utility assets, and why we believe certain sub-sets should outperform during a rising inflation/interest rate period due to a more immediate and direct hedge. At 4D we remain overweight User Pay assets and within the Regulated Utility sector favour those with real returns. However, should the market overreact to the economic outlook we would use it as a buying opportunity across all sectors.

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## Appendix – detailed case study results and analysis

### Case study 1: pure User Pay asset – Transurban Group (TCL-AU)

Transurban Group is Australia's largest privately-owned toll road developer, owner and operator. The company has a presence in 5 markets across Australia and North America, with interests in 23 concessions within Sydney, Melbourne, Brisbane, the Greater Washington Area and Montreal. TCL has a significant pipeline in development and delivery across these jurisdictions, requiring deployment of capital and debt over the near to medium term. Its existing network has an average remaining concession life of ~30 years.

TCL has a somewhat unique portfolio of assets whereby, depending on the concession, annual toll increases may allow for inflation (typical for road concessions), the higher of an agreed percentage (4%) or actual inflation, or a fixed increase (4.25%). The latter two tolling arrangements are particularly attractive, as in low inflation environments tolls still move up by 4-4.25% pa.

In the **Test Case** scenarios, we analysed the impact of increases to both government bond yields and inflation in all 3 of Transurban's geographic markets (Australia, United States & Canada). The results are summarised in Table 4 below, illustrating the impact on TCL's forecasted proportional revenues, EBITDA and earnings. We also highlight the valuation implications from such scenarios.

In high inflation environments, inflation is fully passed through in all but 2 concessions which have the fixed cap<sup>6</sup>. The vast majority of these concessions stipulate that tolls cannot be lowered as a result of deflation. Historically, traffic growth has been relatively predictable and collectively, as a network, has outpaced GDP growth.

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## TOLLING ESCALATION



MOTORWAY	ESCALATION	MOTORWAY	ESCALATION
M2	Tolls escalate quarterly by the greater of quarterly CPI or 1%	West Gate Tunnel <sup>1</sup>	Tolls escalate quarterly by an equivalent of 4.25% per annum from construction completion to 30 June 2029 and quarterly CPI thereafter
LCT	Class A tolls escalate quarterly by quarterly CPI. Class A tolls cannot be lowered as a result of deflation. Class B tolls escalate quarterly by the greater of quarterly CPI or 1%.	Logan Motorway	Tolls escalate annually by Brisbane CPI. The toll cannot be lowered as a result of deflation
CCT	Tolls escalate quarterly by quarterly CPI. The toll cannot be lowered as a result of deflation	Gateway Motorway	Tolls escalate annually by Brisbane CPI. The toll cannot be lowered as a result of deflation
ED	Tolls escalate quarterly by the greater of a weighted sum of quarterly AWE and quarterly CPI or 1%	Clem7	Tolls escalate annually by Brisbane CPI. The toll cannot be lowered as a result of deflation
M5 West	Tolls escalate quarterly by quarterly Sydney CPI. The toll cannot be lowered as a result of deflation	Go Between Bridge	Tolls escalate annually by Brisbane CPI. The toll cannot be lowered as a result of deflation
M7	Tolls escalate or de-escalate quarterly by quarterly CPI	Legacy Way	Tolls escalate annually by Brisbane CPI. The toll cannot be lowered as a result of deflation
NorthConnex	Tolls escalate quarterly by the greater of quarterly CPI or 1%	AirportlinkM7	Tolls escalate annually by Brisbane CPI. The toll cannot be lowered as a result of deflation
M4	Tolls escalate annually by the greater of CPI or 4% to December 2040; the greater of CPI or 0% per annum to concession end	95 Express Lanes <sup>2</sup>	Dynamic, uncapped
M8 and M5 East	Tolls escalate annually by the greater of CPI or 4% to December 2040; the greater of CPI or 0% per annum to concession end	495 Express Lanes <sup>3</sup>	Dynamic, uncapped
M4-M5 Link and Rozelle Interchange <sup>1</sup>	Tolls escalate annually by the greater of CPI or 4% to December 2040; the greater of CPI or 0% per annum to concession end	A25	Tolls escalate annually at Canadian CPI. Additional toll escalation applies when peak traffic volumes (for peak tolls) or total daily traffic volumes (for off-peak tolls) reach pre-determined thresholds
CityLink	Tolls escalate quarterly by an equivalent of 4.25% per annum to 30 June 2029 and quarterly CPI thereafter		

Source: Transurban, FY21 Results Presentation, August 2021

**Table 4: Transurban (TCL AU) – current price A\$14.00**

	Base Case	Test Case 1	Variation	Test Case 2	Variation
	<i>Current 4DI forecasts (inflationary pressure temporary)</i>	<i>Inflation and interest rates 2% above Base Case for 3 years before reverting to long-term averages</i>	<i>% change</i>	<i>Sharp spike in inflation and interest rates with a sustained up-tick in both at 1% above long-term averages</i>	<i>% change</i>
<b>Year 1 (A\$m)</b>					
Revenue	2,706.8	2,725.3	<b>0.68%</b>	2,734.6	<b>1.03%</b>
EBITDA	1,943.9	1,955.3	<b>0.58%</b>	1,961.0	<b>0.88%</b>
NPAT	-483.7	-473.1	<b>2.20%</b>	-467.5	<b>3.35%</b>
<b>Year 2 (A\$m)</b>					
Revenue	3,307.2	3,353.5	<b>1.40%</b>	3,376.9	<b>2.11%</b>
EBITDA	2,515.9	2,542.6	<b>1.06%</b>	2,556.1	<b>1.60%</b>
NPAT	33.3	52.0	<b>56.36%</b>	68.0	<b>104.36%</b>
<b>Year 3 (A\$m)</b>					
Revenue	3,724.9	3,800.7	<b>2.03%</b>	3,839.6	<b>3.08%</b>
EBITDA	2,893.9	2,937.9	<b>1.52%</b>	2,960.5	<b>2.30%</b>
NPAT	327.4	357.1	<b>9.08%</b>	383.2	<b>17.04%</b>
<b>Valuation 5-year IRR %</b>	10.29%	10.01%	<b>-0.28%</b>	11.40%	<b>1.11%</b>

Source: 4D Infrastructure forecasts as at 30 Sept 2021

\* Note 1: Year 1, 30 June 2022

\*\* Note 2: Proportional Revenue, EBITDA & Earnings Used

### • Revenues

Assuming no changes to traffic forecasts in the Test Case scenarios, a two percentage point increase in inflation provides a minor benefit to proportional revenues in each year. The forecasted proportional revenues increase because in approximately 60% of TCL's toll road concessions (~45% of FY22e proportional revenues) they pass through inflation increases via toll escalations. On the other 40% of TCL's road concessions (~55% of FY22e proportional revenues) they have the right to increase tolls by the higher of an agreed percentage (4-4.25%), or actual inflation. In Test Case 2, inflation doesn't exceed the higher of 4% or 4.25%, limiting the operational upside relative to Base Case for 55% of revenues. In Test Case 2 they benefit from the inflation uptick on all but 2 concessions which have capped increases.

### • EBITDA

While the revenue uptick is capped as discussed above, the opex reflects the full pass through of inflation. This translates into proportional EBITDA improvement, but EBITDA margin contraction relative to our Base Case. This is attributable to the majority of proportional revenues being derived from concessions which already have toll escalations at an agreed percentage in excess of inflation. There is no change to the tolls on these concessions relative to our Base Case as a result of the inflation increase per the test scenarios. That is, TCL's Base Case already factors in a CPI + toll hike.

### • Net income

The earnings growth reflects TCL's strong operational leverage as the EBITDA increases flow through to the bottom line, partly offset by slight increases in interest costs. In the near-to-medium term, an increase in Treasury yields has little implication for TCL's existing debt and interest expense profile, as 99.8% of TCL's debt is interest rate hedged (30 June 2021). The only impact to earnings comes from new debt issues at a higher cost.



Over the longer term as debt matures and rolls over, in Test Case 2 interest rates will be higher than currently forecast, but this is more than offset by the improved operational leverage.

- **IRR valuation**

In terms of valuation impact, Test Case 1 reduces the 5-year IRR valuation by ~28bps. This is attributable to the higher equity discount rate, valuing cashflows that are boosted only in the interim before reverting to long-term averages.

However, in Test Case 2 of sustainably higher inflation and interest rates, valuations increase despite the cost of equity increasing by 1%. This is due to the higher long-term cash flows mitigating the higher discount rate.

- **TCL conclusion**

Evident through our case study analysis, as a User Pays asset with concession contracts stipulating the pass-through of inflationary fluctuations (or higher), Transurban is relatively shielded from interest rates/inflation increases over time. Inflation increases have a positive impact on earnings and operational leverage outweighs interest rate increases over the longer term, whilst in a deflationary environment the majority of concessions are protected by either a pre-agreed percentage increase or nil floor.

### Case study 2: nominal return Regulated Utility – CMS Energy (CMS-US)

CMS is a regulated Utility with a single operating jurisdiction in Michigan, USA. CMS, like the majority of US regulated Utilities, operates under a nominal return regulatory model. It has the ability to file regulatory rate cases to recover costs and investment as required, but historically filed every 2-3 years. Post the filing of a rate case, the regulator, the Michigan Public Service Commission (MPSC), usually takes approximately 12 months to complete a review of the filing and adjusts customer rates accordingly. Power and fuel costs are updated and recovered automatically on an annual basis.

In the test case scenarios, we have assumed that it would take 2 years for CMS to recover increasing O&M costs (from inflation) in customer bills. The increase in inflation and base Treasury bond yields would also put significant upward pressure on customer bills, impacting affordability. As a result, the likelihood of the MPSC allowing debt and equity returns to increase by the full increase in base Treasury yields is likely to come under scrutiny, particularly assuming the very sharp move of >3-4 percentage points<sup>7</sup> since the last regulatory rate review in late 2020. To represent this, we have assumed that the allowed return on equity and allowed cost of debt stays constant over the 2021-2025 period, although in reality there could be upside to this assumption. We have allowed benign increases in allowed regulatory returns in later years, in line with the increase in long-term base rates.

In reality, pressure from increasing inflation and base Treasury yields is not applied to company earnings *ceteris paribus*. In this inflationary environment, the economy is likely growing strongly. Regulatory bodies may have less concern regarding customer affordability, and therefore be more open to passing through increasing base rates to allowed regulatory returns. As such, we believe our analysis is a worst case regulatory outcome for the scenarios in play.

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<sup>7</sup> Test Cases assumes US Treasury yields of 4.1-5.1% pa at the time of regulator rate case submission compared to 0.9% pa when the allowed ROE was set in 2020.

**Table 5: CMS Energy (CMS US) – current price US\$59.73**

	Base Case	Test Case 1	Variation	Test Case 2	Variation
	<i>Current 4DI assumptions (inflationary pressure temporary)</i>	<i>Inflation and interest rates 2% above Base Case for 3 years before reverting to long-term averages</i>	<i>% change</i>	<i>Sharp spike in inflation and interest rates with a sustained up-tick in both at 1% above long-term averages</i>	<i>% change</i>
<b><u>Year 1 (US\$m)</u></b>					
Revenue	6,895	6,900	<b>0.07%</b>	6,902	<b>0.10%</b>
EBITDA	2,679	2,649	<b>-1.11%</b>	2,634	<b>-1.67%</b>
NPAT	751	714	<b>-5.01%</b>	702	<b>-6.58%</b>
<b><u>Year 2 (US\$m)</u></b>					
Revenue	7,108	7,119	<b>0.16%</b>	7,125	<b>0.24%</b>
EBITDA	2,893	2,832	<b>-2.11%</b>	2,801	<b>-3.18%</b>
NPAT	850	767	<b>-9.69%</b>	743	<b>-12.58%</b>
<b><u>Year 3 (US\$m)</u></b>					
Revenue	7,321	7,125	<b>1.37%</b>	7,472	<b>2.07%</b>
EBITDA	3,104	3,092	<b>-0.40%</b>	3,086	<b>-0.61%</b>
NPAT	941	881	<b>-6.46%</b>	845	<b>-10.27%</b>
<b><u>Valuation 5-year IRR %</u></b>	16.4%	14.5%	<b>-1.90%</b>	13.7%	<b>-2.71%</b>

Source: 4D Infrastructure forecasts as at 30 Sept 2021

- **Revenues**

The increase in inflation in both Test Cases doesn't change revenues from the regulated business of CMS in the years of 2022 and 2023, with the only improvement driven from CMS' small unregulated business. Regulated revenue in 2024 increases to facilitate the recovery of increased O&M expenses through customer bills as the regulatory rate case filing is implemented.

- **EBITDA**

The increases in inflation are reflected in O&M expenses from 2022. Revenues are not adjusted to account for this increase in costs until 2024. EBITDA therefore falls in 2022-23. With the adjustment to revenues, EBITDA in 2024 recovers to near Base Case levels.

- **Net income**

In 2022 and 2023 the increases to inflation and base Treasury yields combine to reduce net income against the Base Case scenario. This incorporates the adjustments made to EBITDA driven by the increase in inflation, combined with increases in cost on the issuance of new debt, with existing debt not impacted due to its fixed interest cost nature. Revenues in 2024 have been adjusted to recover the increased O&M expenses, but not the increase in new debt finance costs, resulting in under-recovery of interest expense compared to the Base Case scenario – with net income underperforming the Base Case.

- **IRR valuation**

In terms of valuation impact, the test cases reduce the 5-year IRR valuation. This is the combination of the cashflow impacts (short term in Test Case 1 and longer term in Test Case 2) together with the higher discount rate to value cashflows discussed above in the 'Analytical framework' section.

- **CMS conclusion**

The scenario analysis shows that the earnings of nominal return Utilities are likely to be negatively impacted by rising inflation and interest in the short term due to delays in recovery through updated regulatory assessments. Longer-term regulatory bodies should allow companies to recover increased costs due to inflation from customer bills – although it's unclear whether customer affordability will inhibit regulators from allowing companies to increase their regulatory return levels in line with increasing base interest rates. We have conservatively assumed that this will be moderated by regulators, negatively impacting valuations due to increasing valuation discount rates. As such, there is potential upside for Utilities to the degree that they are allowed to pass through their increased funding costs to customers. Further, history suggests that the market over-reacts to interest rate shifts and these stocks end up over sold relative to the valuation impact, which could provide a buying opportunity.

### Case study 3: real return Regulated Utility – SNAM (SRG-IM)

SNAM is a Regulated Utility controlling the largest gas transport network in Europe. Its core assets are in Italy where it is responsible for gas transmission, storage and regasification activities. Outside Italy it owns stakes in gas infrastructure assets across Europe and the Middle East.

Italian Utilities like SNAM are typically insulated (and can actually benefit) from inflation as they operate under a real return framework. This means annual inflation indexation is applied to the regulated asset base on which a real return is earned. Returns are determined under a 6-year WACC regulatory period, with an interim adjustment on several parameters every 3 years. There are also separate regulatory periods of between 4-6 years. Each regulatory period defines the broader tariff framework including incentives. Allowed opex is determined at the start of the regulatory period and is adjusted for inflation less an efficiency factor.

	Base Case	Test Case 1	Variation	Test Case 2	Variation
	<i>Current 4DI assumptions (inflationary pressure temporary)</i>	<i>Inflation and interest rates 2% above Base Case for 3 years before reverting to long-term averages</i>	<i>% change</i>	<i>Sharp spike in inflation and interest rates with a sustained up-tick in both at 1% above long-term averages</i>	<i>% change</i>
<b>Year 1 (€\$m)</b>					
Revenue	2,767	2,762	-0.17%	2,760	-0.25%
EBITDA	2,236	2,231	-0.25%	2,228	-0.38%
NPAT	1,067	1,054	-1.23%	1,051	-1.52%
<b>Year 2 (€\$m)</b>					
Revenue	2,843	2,864	0.72%	2,874	1.08%
EBITDA	2,321	2,339	0.80%	2,349	1.21%
NPAT	1,099	1,097	-0.21%	1,103	0.39%
<b>Year 3 (€\$m)</b>					
Revenue	2,912	2,969	1.95%	2,998	2.96%
EBITDA	2,403	2,454	2.12%	2,480	3.21%
NPAT	1,129	1,129	0.04%	1,158	2.60%
<b>Valuation 5 year IRR %</b>	13.1%	12.5%	-0.64%	15.8%	2.66%

Source: 4D Infrastructure forecasts as at 30 Sept 2021

- **Revenues**

There is a small increase in revenues in both test cases as the higher inflation supports growth in the asset base. The unregulated business in the near term has a faster growth trajectory independent of inflation and so isn't impacted by the change in inflation in the near term.

- **EBITDA**

The increase in inflation is reflected in expenses, with a similar impact as revenues. We are conservative in our estimates in assuming margins in the regulated business stay constant and SNAM doesn't outperform its allowed opex. At the same time, EBITDA margins are slightly impacted as SNAM faces more competition in its unregulated/new businesses.

- **Net income**

The increases to inflation and bond yields have a small impact on interest costs as the cost of new debt becomes more expensive. Nevertheless, the company has strong financing in place with a large proportion of fixed rate debt at very low rates, so the impact on earnings is again minimal. Currently the company has an average debt maturity of ~6 years at an average cost of less than 1%, which is amongst the lowest in the industry.

- **IRR valuation**

In terms of valuation impact, in Test Case 1 the 5-year IRR valuation reduces by ~64bps. This is attributable to a higher discount rate in an environment where inflation reverts to long-term averages. As the long-term cashflows are largely unaffected from the change in variables, the only real valuation change comes from the increasing discount rate.

In the Test Case 2 scenario of sustained higher inflation and interest rates, the 5-year IRR valuation increases by ~260bps. The ongoing inflation adjustment in the RAB over the long term supersedes the impact of increased funding costs and higher discount rate used in the valuation.

- **SRG conclusion**

The scenario analysis above supports our assertion that increases in inflation and Treasury bond yields will more negatively impact the earnings (as measured by EBITDA and net income) of nominal return Utilities compared to real return Utilities in the short term. Over the long term, the impact will be influenced by how direct the link is between regulatory returns and macro data points and the ability for the Utilities to fully pass on the economic shifts in a timely manner.

The valuation of nominal return Utilities is impacted by the increase in assumed future interest expenses (current debt costs are hedged), but more significantly so from the increase in discount rate used to value cashflows. These impacts are only partially offset by an increase in allowed regulatory returns in the longer term as they have historically proven to be somewhat inelastic to increases/decreases in base Treasury yields. This has benefited in an interest rate declining environment, but will now be a headwind in an interest rate rising environment. By contrast, the real return Utilities tend to have a more fluid and direct link to economic data points which automatically flow through into returns and resets, allowing them to more quickly adjust to a new environment (both positively and negatively).