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Global Matters 34

2022 outlook

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4D infrastructure

A Bennelong boutique

2022 is shaping up as potentially another challenging year, with the combined effects of the ongoing COVID crisis together with evolving inflationary pressures presenting governments and central banks around the world with some challenging policy decisions. In this article, Sarah Shaw (4D's Global PM & CIO) and Greg Goodsell (4D's Global Equity Strategist) examine these near-term issues.

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2022 outlook

While the pandemic in all its forms will prevail longer than was initially hoped, the effective development and deployment of vaccines and treatments means the world will increasingly move to an environment of living with and managing the virus – reverting from a pandemic to an endemic. We continue to believe that the global economy will ultimately emerge stronger for the experience. The huge amount of fiscal and monetary stimulus is still to be fully deployed in economic terms with, of course, much of that spending focused on badly needed infrastructure investment around the globe. All this investment will be a strong positive for the global economy over coming years, improving efficiency, productivity and output. In addition, many of the changes that have been forced on businesses by the pandemic will, we believe, lead to a stronger, more efficient economic environment post the virus. As such, we remain generally positive on the economic outlook for 2022 and beyond.

However, the two key factors dominating economic discussions and providing some near-term threat to a generally robust outlook as we enter 2022 are COVID-19 (again) and evolving inflationary pressures.

COVID-19/Omicron variant

We have always argued that the COVID-19 issue will pass, but it is clearly taking longer than we initially expected and has not been without obvious personal and economic pain, including its impact on global growth. It does seem that some of the countries affected earliest by the Omicron variant, such as South Africa, are now starting to show signs that the current wave might have peaked, providing some comfort that other countries will survive yet another wave. We expect that further variants will emerge and the battle to fight it will continue. Ultimately, we all need to learn to live with COVID.

We believe the global economic recovery is continuing, although the Omicron wave has likely pushed out the timing of the full recovery. However, once we move to a more stable environment where we learn to live with the virus, infrastructure in all its forms remains integral to a sustained economic recovery and returning society to '*situation normal*'. We have consistently maintained that there is no global growth recovery without roads, railways, pipelines, power transmission networks, communication infrastructure, ports and airports.

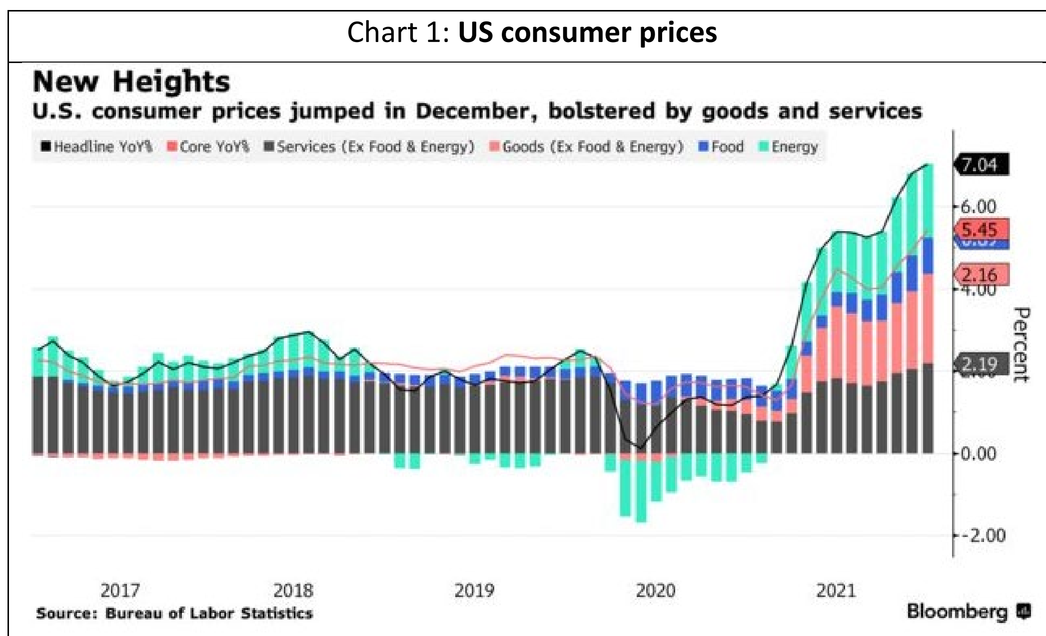
While the ongoing COVID saga keeps pressure on equity markets, we continue to believe it represents a unique buying opportunity for infrastructure investors. The infrastructure investment thematic has not been derailed by COVID, but rather has been enhanced by the pandemic – huge government stimulus programs are fast-tracking infrastructure investment (in particular the energy transition), increasingly

stretched government balance sheets will see a greater reliance on private sector capital to build much-needed infrastructure, and the interest rate environment remains supportive of infrastructure investment and valuations.

Global inflationary forces

Over recent months, global inflation has been emerging as a key economic risk. In the US in December 2021, consumer prices accelerated at the fastest pace since 1982, hitting 7% (annualised), bolstering expectations that the Fed will increase rates in March. The US is not alone, with inflation picking up around the world and seeing interest rates already on the move (Brazil, UK) or with expectations of moves in 2022.

Chart 1: **US consumer prices**



Broadly, the price increases are being driven by a combination of supply chain disruptions, causing critical supply shortages of key items (such as computer chips), together with the huge global monetary stimulus pushing up the amount of money in the global economy, with inflationary forces being the consequence (e.g. Australian house prices). Importantly, we are also seeing real wage pressure in certain industries and markets as a result of the combination of COVID disruptions and job rotations as stimulus flows through. This is compounding near-term inflationary pressure.

Central banks are already beginning to tighten monetary policy in an attempt to curtail these inflationary forces. After its January 2022 Fed meeting, Chair Jerome Powell said the Fed is ready to raise rates in 2 months. He spoke after the FOMC communicating that it would hike *'soon'* and then shrink its bond holdings. Mr Powell declined to rule out tightening at every meeting this year, said officials may have to move sooner and faster on shrinking the central bank's US$8.9 trillion balance sheet, and warned there's a risk of a prolonged period of surging prices.

The risk now is that if the Omicron variant continues to spread, this may itself lead to a crimping of global growth just as central banks take their feet of the stimulus pedal, compounding the slowdown.

Ultimately, we believe central banks will act prudently and cautiously in easing policy. We are also of the belief that they 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.

But just at the present, uncertainty prevails and caution is warranted. In this regard, infrastructure is an asset class that can do well in an inflationary environment and we believe it is a sensible portfolio allocation at the current stage of the economic cycle. As discussed in a number of our previous Global Matters

articles, many infrastructure stocks have built-in inflation protection, either directly linked to tariffs or indirectly through their regulatory construct.

As such, in an inflationary scenario some parts of the infrastructure universe, namely *User Pays*, may enjoy the perfect storm over the short/medium term –interest rates supportive of future growth, economic activity flowing through to volumes, and explicit inflation hedges through their tariff mechanisms to combat any inflationary pressure they may experience.

In contrast, *Regulated Utilities* can be more immediately adversely impacted by rising interest rates/inflation because of the regulated nature of their business. 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, 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, when the changing inflationary environment is acknowledged by the regulator and approved to be incorporated in 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. 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.

The differences between User Pay and Regulated Utility assets should see certain sub-sets fundamentally outperform during a rising inflation/interest rate period due to a more immediate and direct inflation 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.

Key ongoing macro themes

While COVID/Omicron and inflation expectations dominate current day-to-day equity market discussions, there are a number of other important investment thematics in play that will impact decisions for decades to come. Many of these themes are long-term positives for infrastructure investment. Over the past 6 years 4D has addressed a range of such issues and we revisit a number of them in the **Annexure** so as to provide more detail on our current portfolio thinking and positioning.

However, in summary, current investment forces that we at 4D find particularly interesting include the:

- ***re-opening trade –*** capturing the stimulus and pent-up consumption around the world;
- ***global need*** for infrastructure investment;
- ***emerging middle class,*** which offers a huge opportunity with infrastructure both a driver and a first beneficiary of improved living standards;
- ***global population growth*** but with changing demographics – the West is getting older, but much of the East younger;
- ***active positioning for inflation/interest rates*** – with current overweights to the inflation trade;
- ***emerging markets*** – the recent underperformance of emerging market infrastructure equities is not warranted given the attractive earnings fundamentals and long-term sector dynamics; and
- ***energy transition*** - environmental and climatic challenges underpins the need for even more spend on infrastructure.

What could derail our outlook?

While we are generally optimistic regarding 2022 and beyond, there is no doubt that we have had a couple of tumultuous years. There are a number of residual factors that could adversely affect our view, including:

- ***whether COVID-19 vaccines are effectively deployed globally*** and in a timely manner, delivering the expected health benefits and leading to subsequent economic recovery;
- ***governments and central banks prematurely taking their feet off the 'go' pedal*** before the global economy has the opportunity to properly get back on its feet;
- ***the actual shape of the economic recovery***, which is crucial, remains to be fully seen (V, U, L or W);
- ***President Biden is unable to make diplomatic progress*** and we see renewed Chinese/US tensions on a variety of issues: trade, Hong Kong, South China Sea, COVID-19 origins;
- ***the current standoff with Russia and the Ukraine*** could deteriorate further, dragging in Europe and potentially NATO involvement;
- ***longer-term, how all the massive global fiscal stimulus*** (much of which will be sourced from central banks) is paid for;
- **the question of whether '*Modern Monetary Theory'*** will earn its stripes; or will too many dollars chasing too few goods see currencies devalue and inflation escalate ('Monetarism' and Milton Friedman's economic theories)?;
- ***whether inflation comes back faster than anticipated***, forcing central banks to act ahead of plans via interest rate increases; and
- ***if so, these rate increases could place pressure on borrowers*** of all types who, given recent history, would be very unaccustomed to a rising interest rate environment.

We continue to monitor the near and long-term trends and will actively position accordingly as events unfold.

Conclusion

In terms of investment opportunities, we're still spoilt for choice, with significant value having emerged across the entire infrastructure universe as a result of the ongoing pandemic and increasing macro concerns. Despite the near-term concerns, we remain generally optimistic about the global recovery story. Our portfolio remains diversified, with a strong bias to attractively valued, high quality names with solid balance sheets and superior management teams. We remain overweight User Pay and real return Utilities in the current inflationary environment, while capitalising on significant long-term thematics across the portfolio.

For more insights from 4D Infrastructure, visit 4dinfra.com

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Annexure: Long-term investment forces currently in play

In this Annexure we revisit a number of other, longer-term themes that remain in play for the global economy, providing a significant investment opportunity for infrastructure operators.

Global wealth and the global economy continue to grow

Global wealth tripled in the last two decades, with the US falling behind as China took over the top spot. Net worth worldwide rose to US$514 trillion in 2020 from $156 trillion in 2000. China accounted for almost one-third of the increase, according to a report by the research arm of consultants McKinsey & Co. that examines the national balance sheets of ten countries representing more than 60% of world income.

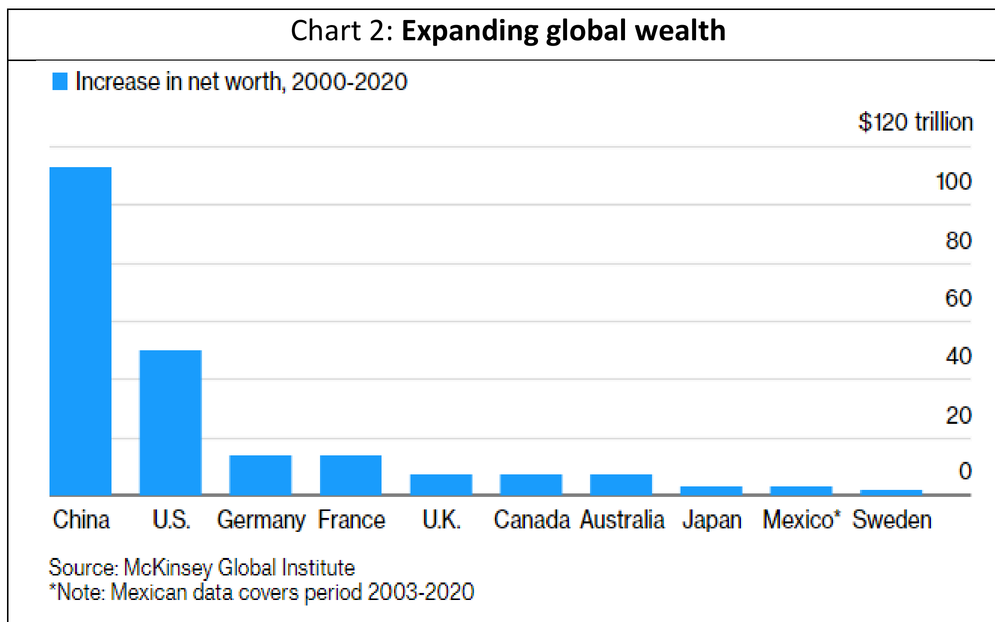


Chart 2: **Expanding global wealth**

The world economy is set to surpass US$100 trillion for the first time in 2022, two years earlier than previously forecast, according to the Centre for Economics and Business Research (CEBR). Global GDP will be lifted by the continued recovery from the pandemic, although if inflation persists it may be hard for policy makers to avoid tipping their economies back into recession, the London-based think tank said. The forecast is in line with estimates of the IMF, which also predicts global GDP measured in US$ and in current prices will pass US$100 trillion in 2022. In its annual *World Economic League Table*, the CEBR also predicted:

- China will overtake the US in 2030, two years later than forecast a year ago;
- India will regain 6th position from France next year and become the third largest economy in 2031, a year later than previously predicted;
- the UK is on track to be 16% larger than France in 2036 despite Brexit;
- Germany will overtake the Japanese economy in 2033; and
- climate change will lower consumer spending by US$2 trillion a year on average through 2036 as companies pass on the cost of decarbonising investment.

Bloomberg Economics forecasts that in the decade ahead, the world economy is expected to average annual growth of around 3.2%, slightly below the average of 3.5% in the period from 2010-2019. Beneath that headline figure, the situation in major economies will continue to shift: China will still outperform, though with growth on a slowing trajectory as debt, demographics and reduced catch-up space drag; and advanced economies, burdened with ageing populations, are on a slowing path, with growth in the next decade expected to average 1.6%.

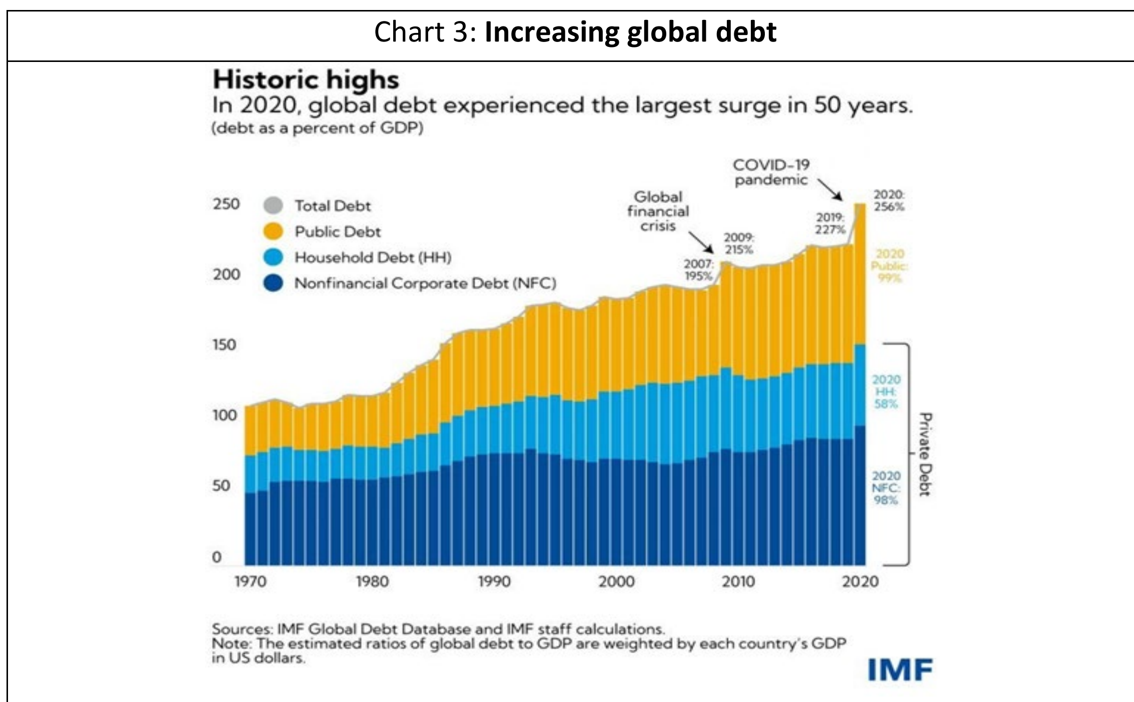
Infrastructure implications

This ongoing global economic growth and wealth creation is a clear positive for the infrastructure asset class as the growth will drive necessary investment in the sector. In particular, the growing presence of emerging market economies is positive for 4D as EMs are an important component of our investment universe.

But all this economic growth is being accompanied by increased global debt

The 2021 update of the ***IMF's Global Debt Database*** reports the largest one-year debt surge in the post-World War II era. As countries were hit by the pandemic, global debt rose by 28% to US$226 trillion, or 256% of GDP in 2020. Borrowing by governments accounted for slightly more than half of this increase, as global public debt jumped to a record 99% of GDP. The share of public debt in global debt reached new highs not seen in more than 50 years, reflecting a large cumulative increase since the GFC. Private debt, on the other hand, rose at a more moderate pace from 164% to 178% of GDP, in the same period or up 10% in 2020, partly reflecting the support of central banks and government. The rise in debt varied significantly across countries given very unequal capacity of governments and central banks to support households and businesses during the pandemic and a deep economic recession.

Chart 3: **Increasing global debt**



Infrastructure implications

We have been highlighting for some time that the rising public sector debt load may lead to more privately funded infrastructure projects, as governments around the world grapple with the debt burden and turn to increased private sector involvement.

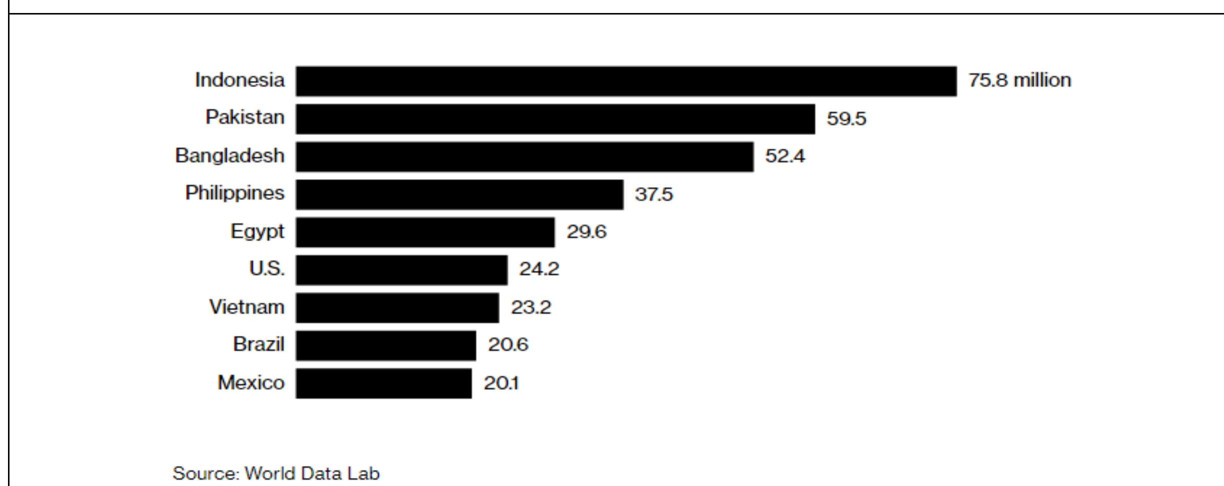
The emerging middle class, especially in Asia

A growing middle class, especially in emerging markets and Asia, has been an underlying theme in 4D's investment strategy since our inception.

This thematic remains intact despite COVID, reports Bloomberg. More than 1 billion Asians are set to join the global middle class by 2030, according to a study released in September 2021. The middle class – households where per-capita spending is between US$11 and US$110 a day – amounts to some 3.75 billion people this year, according to the World Data Lab. That cohort is projected to keep growing through 2030, with India and China, the most populous countries, adding about three-quarters of a billion members

between them. Outside of the world's most populous countries, the following chart shows where the global middle class is forecast to grow most over the coming decade.

Chart 4: **Forecast growth in the global middle class over the next decade (ex China & India)**



The other biggest contributors to growth are also in Asia. They include countries like Indonesia – projected to have the world's fourth-biggest middle class by 2030, overtaking Russia and Japan – and Bangladesh, which is set to rise up the rankings faster than any other nation. It's forecast to jump from 28th to 11th place, adding more than 50 million middle-class consumers. Asian countries already make up more than half of the world's middle class, but they account for only 41% of that group's consumer spending, according to the study. The share is set to exceed 50% by 2032. China, India and the US are projected to retain the top 3 rankings as countries with the largest middle-class populations according to World Data Lab. Slow or negative population growth in some advanced economies will lead to a shrinking middle class in countries like Japan, Germany, Italy and Poland.

Infrastructure implications

A larger middle class in a country drives consumption patterns that require improved and expanded infrastructure to meet their new, more affluent status, including international travel (airports and ports), domestic travel (airports and roads), or just increased quality of life and domestic consumption (new and greener power supply, clean reliable water, waste treatment). Bloomberg reports that Boeing expects Chinese airlines will need 8,700 new aircraft for a total cost of US$1.47 trillion by 2040 – involving a doubling in the country's commercial fleet size – thanks to a projected boom in air travel. In all, China's demand for wide-body aircraft is likely to account for 20% of global deliveries. Keeping in mind that passport ownership in China is still below 10%, the opportunity set for global travel in coming years is significant. India is about 5-10 years behind China and the rest of the emerging world is contributing to the story. COVID may delay this trend, but we don't believe they will be derailed longer term.

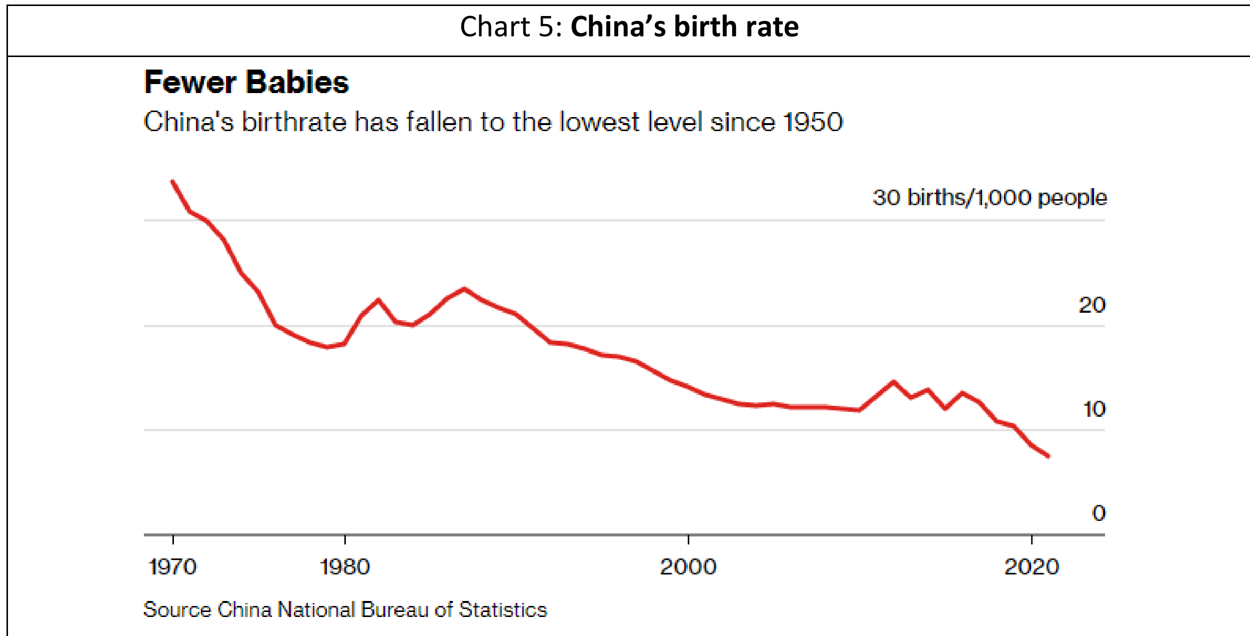
Global demographics more generally: ageing populations

Global demographics are also changing, with increasingly ageing populations in developed nations. ***The US population grew at the slowest rate*** on record in 2021 as slowing migration, an ageing population and low birth rates were exacerbated by the COVID pandemic, US Census Bureau data shows. The population expanded by just 0.1% or 392,665 people in 2021, a smaller increase than during the influenza pandemic and World War I in the early years of the last century. It's also the first time since 1937 that the population has expanded by less than 1 million.

The US is not alone, with slow or negative population growth in a number of key economies including Japan, Germany, Italy and China.

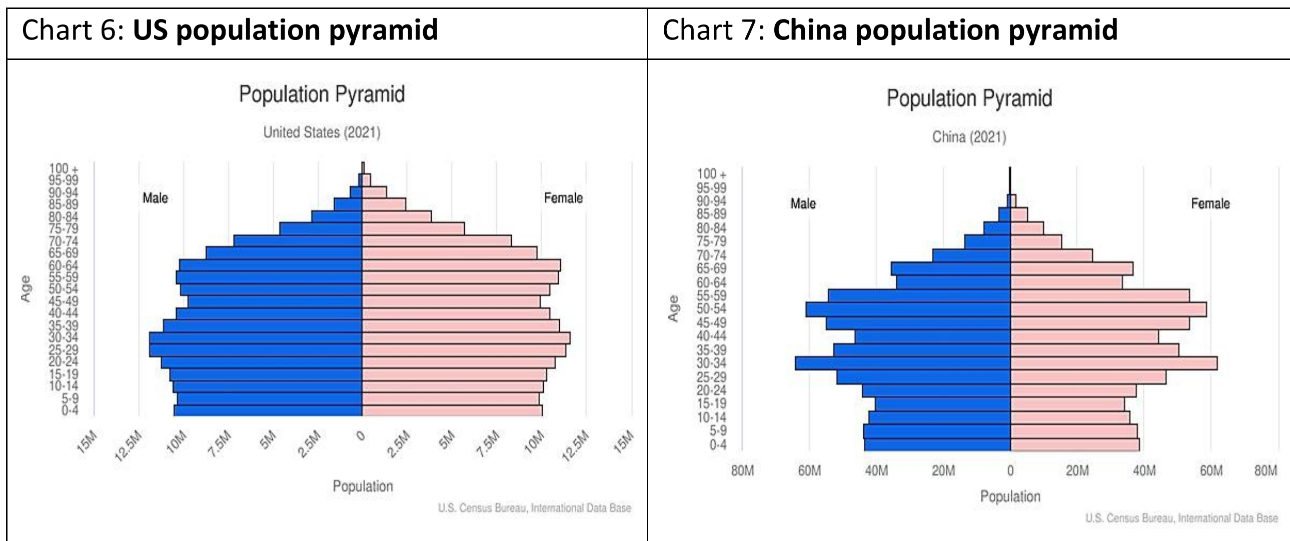
Bloomberg reports that China's birth rate dropped to a new low in 2020, confirming the demographic challenge facing the government as it tries to deal with a shrinking labour force and ageing population. There were just 8.5 births/1,000 people last year, the lowest in data back to 1978, according to the latest yearbook from the National Bureau of Statistics.

Chart 5: **China's birth rate**



Some demographers estimate the Chinese population could start falling as soon as 2022.

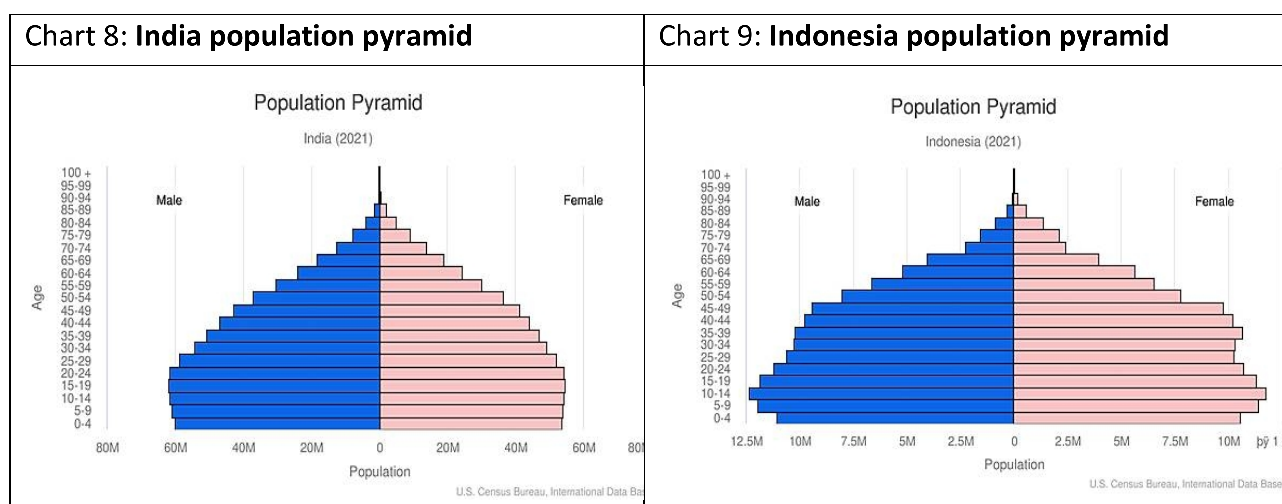
Chart 6: **US population pyramid** | Chart 7: **China population pyramid**



In contrast, much of the rest of the emerging world is driving global population expansion, with many having a young and dynamic population to support ongoing economic evolution and the emergence of the middle class.

This is illustrated in the population pyramids for India and Indonesia below. In contrast to the 'tapering' evident in the US and Chinese pyramids above – which show a younger but smaller cohort coming through – India and Indonesia's pyramids generally continue to 'bulge', indicating a larger, young cohort is in train for an extended period.

Chart 8: **India population pyramid** | Chart 9: **Indonesia population pyramid**



Infrastructure implications

Deteriorating demographics and slowing population growth are a negative for global GDP growth and equity markets in general. However, this can be partially offset by an evolving middle class and improved social policies which is more supportive of the EM economies than developed nations.

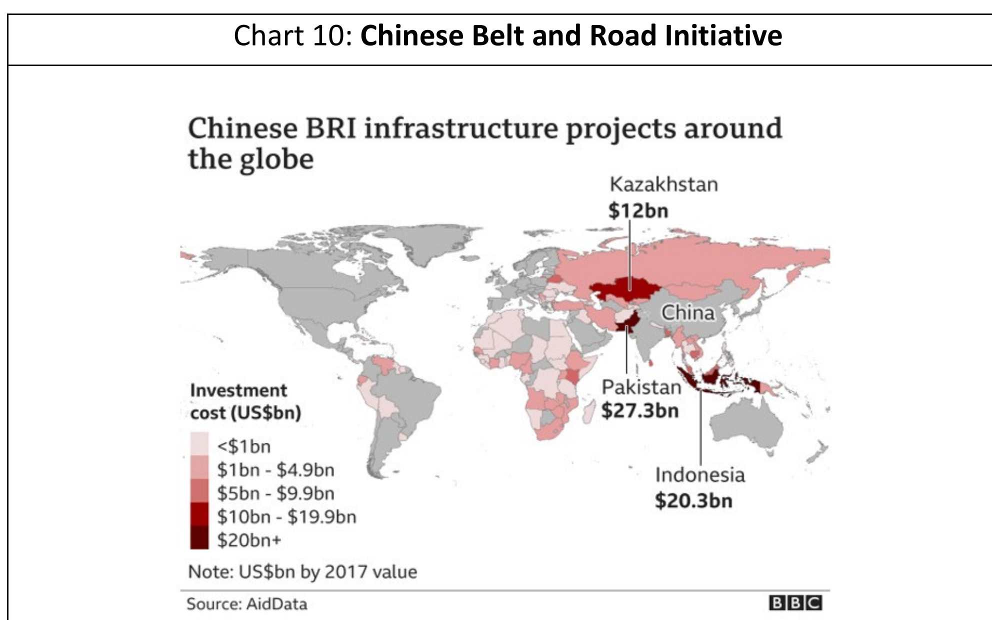
Expanding infrastructure spend around the world

Infrastructure spending continues to increase around the world. After months of negotiations, ***the US Senate passed a US$1.2 trillion infrastructure plan*** (US$550 billion in new federal investment) that will represent the biggest burst of spending on US public works in decades. The package includes around US$110 billion in new spending for roads and bridges; US$73 billion for power grid upgrades; US$66 billion for rail and Amtrak; $65 billion for broadband expansion; US$55 billion for clean water; and US$39 billion for transit. They have since followed up with a US$1.75 trillion '*Build Back Better'* Bill that they are looking to push through Congress. This includes a further $550 billion of dedicated infrastructure spending in the form of Clean Energy Tax credits.

Similarly, Reuters reports that ***India 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.

The EU has revealed details of a new €300bn (£255bn; US$340bn) global investment plan, described as a '*true alternative*' to China's Belt and Road strategy, reports the BBC. European Commission President Ursula von der Leyen said the *Global Gateway* scheme should become a trusted brand. China has funded rail, roads and ports but has been accused of leaving some countries saddled with debt. The Commission chief said countries need *'trusted partners'* to design projects that were sustainable. The EU is looking at how it can leverage billions of euros, drawn from member states, financial institutions and the private sector. This will largely take the form of guarantees or loans, rather than grants. Mrs von der Leyen said the EU wanted to show that a different, democratic approach could deliver on projects that focused on tackling climate change as well as global health security and sustainable development for developing countries.

Chart 10: **Chinese Belt and Road Initiative**



Even in Australia, the ***May 2021 Australian Federal Budget*** saw the Commonwealth Treasurer identify an additional A$15.2 billion investment over 10 years on major infrastructure projects and kept the 10-year plan at A$110 billion. This will spearhead the Federal Government's efforts to boost both jobs and productivity in the COVID-affected national economy.

Infrastructure implications

This type of infrastructure investment by governments is beneficial to both the publicly listed and private infrastructure sectors as it improves economic efficiency and enhances GDP growth, thereby benefiting GDP-correlated '*User Pay'* infrastructure assets. Further, the Utility sector is directly benefiting as much of the stimulus supports a faster green energy transition. This improves the investment outlook for those Utilities capitalising on the opportunity via new renewable generation, grid strengthening and security of supply, as well as exploring new technologies in a government subsidised environment. It also leads to a pool of possible future privatisation candidates, which would see the asset class continue to expand.

The infrastructure investment multiplier

Recent IMF research[1] shows that when governments invest in infrastructure, they create many new jobs. 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.

[1] The Direct Employment Impact of Public Investment, IMF (Marian Moszoro), 6 May 2021

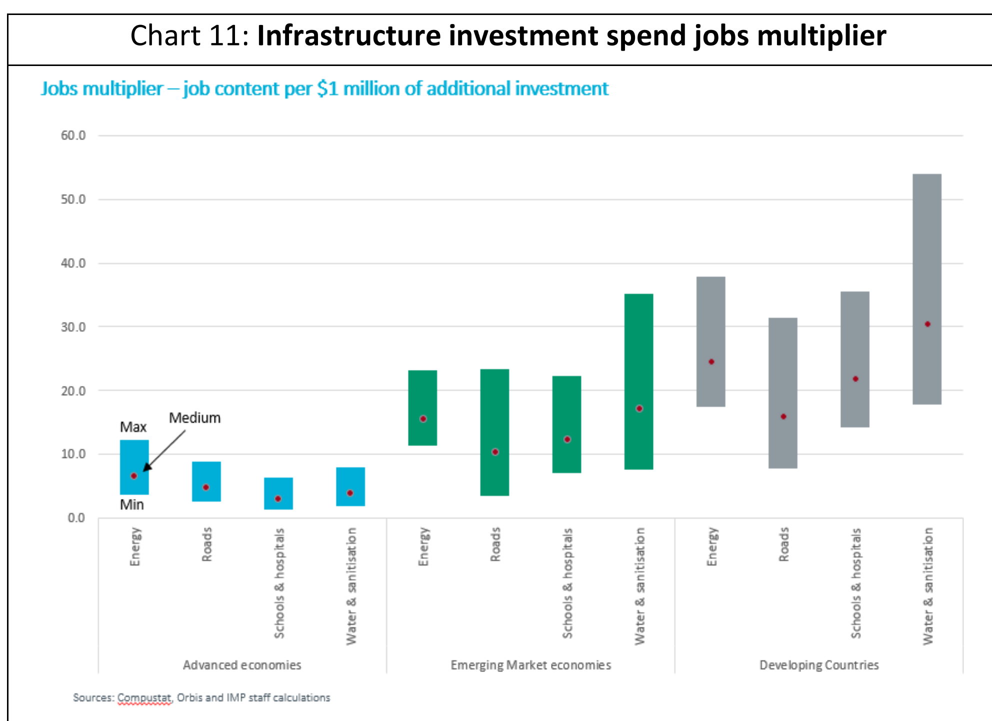


Chart 11: **Infrastructure investment spend jobs multiplier**

Infrastructure implications

Infrastructure is clearly a direct beneficiary of this spending, but also benefits from the enhanced economic activity in the demand profiles of user pay assets and energy sources.

The emerging market infrastructure opportunity

Despite ongoing emerging market equity market underperformance, we remain positive on the EM infrastructure fundamentals. The combination of strong near-term earnings outlook (absolute and relative) and long-term growth thematics support emerging market infrastructure valuations. We believe the market concerns on near-term economic pressures are overdone for the EM infrastructure names, and they are looking attractive at present.

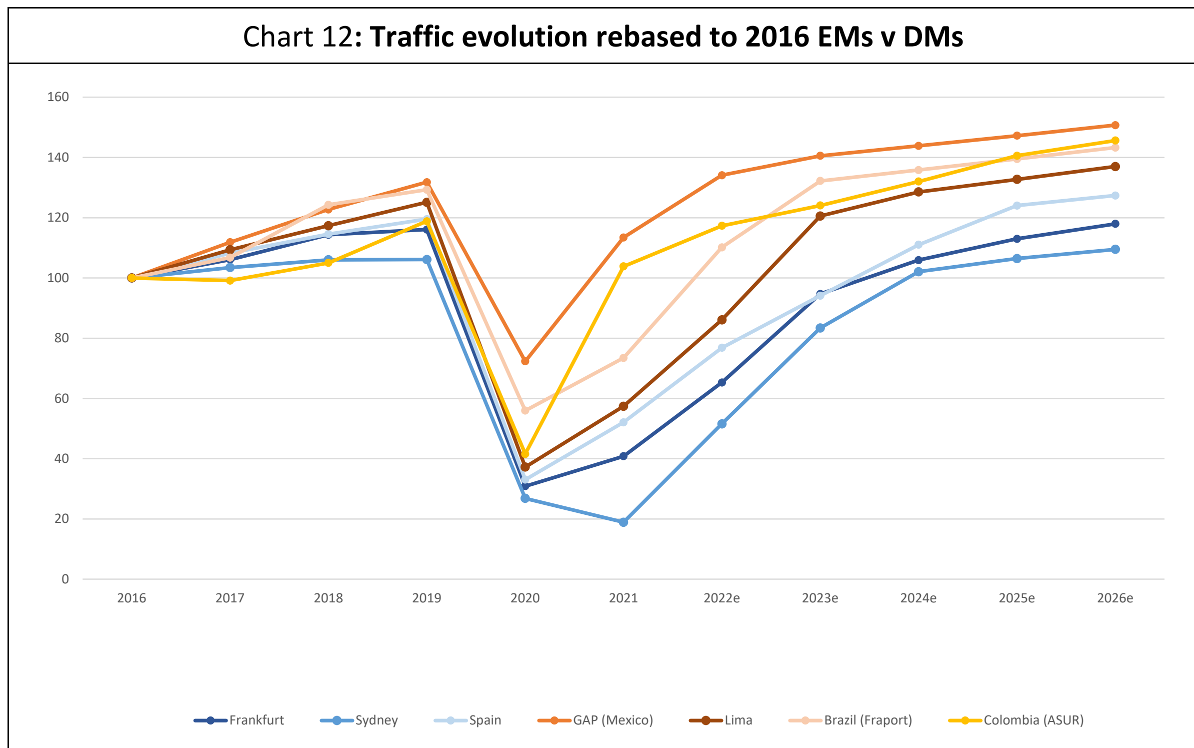
We have touched on the longer-term EM thematics throughout the report, but to recap:

- ***global population growth*** is coming from the emerging markets, supporting strong demographic evolution;
- ***the demographic trend and government initiatives*** are leading to a rapidly expanding middle class, with infrastructure a driver and first beneficiary; and
- ***governments have recognised*** that economic expansion and strong infrastructure go hand in hand, and are welcoming private sector capital in an effort to fast track their evolution.

Emerging markets are expected to report relatively strong growth as a consequence of the above thematics, altering the world economic order over the next decade. Further, the near-term global macro outlook does not derail this opportunity.

- ***Emerging markets' response to COVID-19 was to generally re-open faster*** as the populous (and government balance sheets) could not sustain long periods of lockdown. This has seen economic activity and volumes rebound relatively quickly in those countries that removed restrictions, limiting the detrimental impact of shutdowns on infrastructure earnings. The following chart highlights the air passenger evolution of a number of global airports and the speed with which some of the EMs have recovered – Mexico was already back to 2019 levels in December 2021.

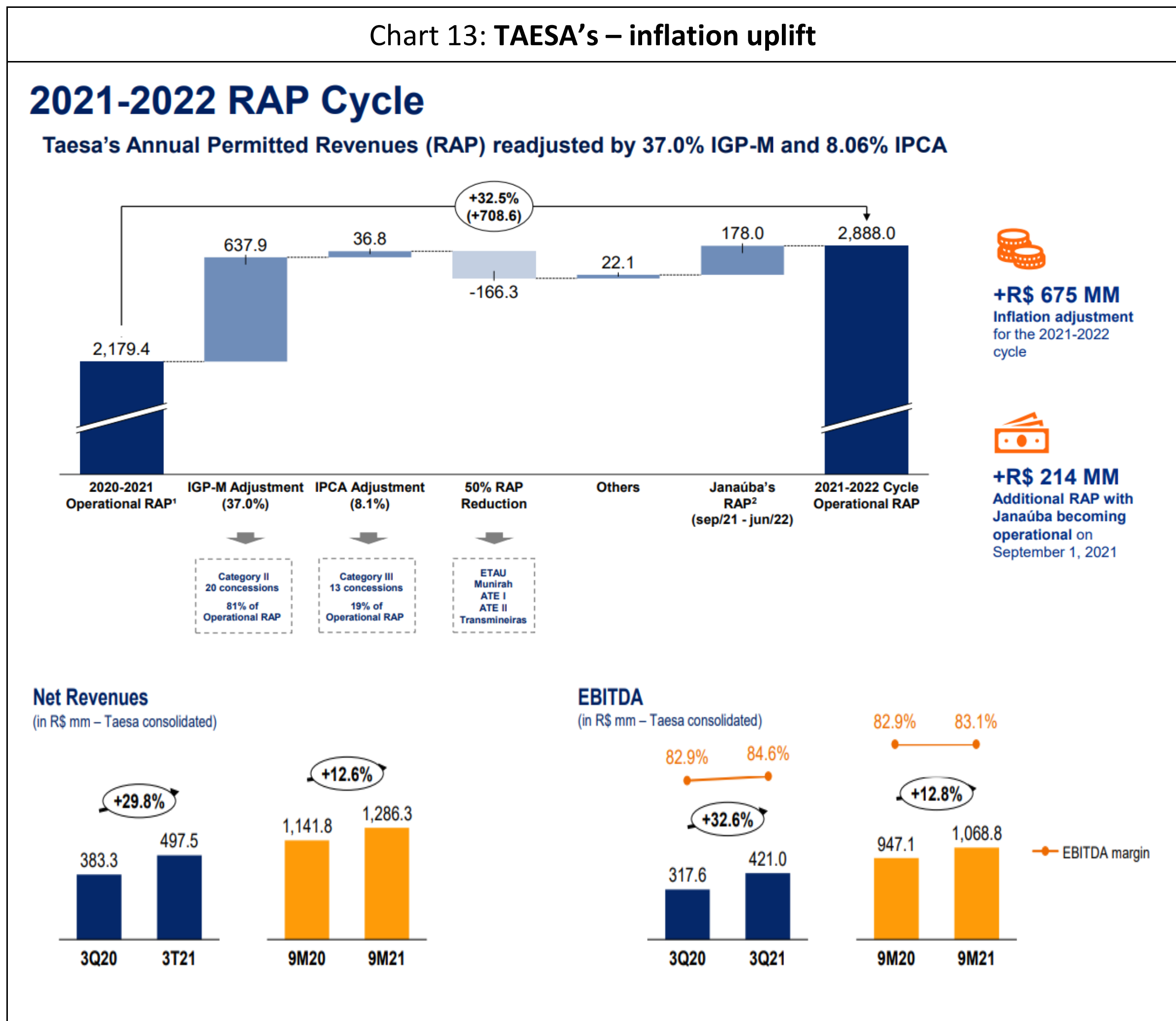
Chart 12: **Traffic evolution rebased to 2016 EMs v DMs**



Source: Company filings. Note: Selection of EMs only representative of those that re-opened relatively quickly.

- ***Government stimulus*** packages are in place to support ongoing economic evolution via infrastructure spending (e.g. India's $1.35trn package, China's 14th 5 year plan, Brazil's privatisation process).
- Like elsewhere, ***infrastructure stocks are hedged against inflationary pressures*** and in fact inflation can be positive for infrastructure valuations. Using Brazilian transmission operator TAESA as an example, the chart below shows that the company's annual revenue was adjusted by R$675mn or 31% in July 2021 to account for the surge in inflation indices. This increase is locked in for the remaining life of the concessions. With margins at >80%, even with cost inflation, EBITDA and margins are expanding significantly. While debt also has an inflation link, as inflation ultimately dissipates and interest rates normalise (estimated for 2023 in Brazil) the financing impact also dissipates – that is, the tariff impact is locked in for the life of the concession while the financing impact reverts in a normalised world, seeing an overall improvement in NPV. While this is an extreme example, as with the developed world, emerging market infrastructure stocks can benefit from the current inflationary environment and at worst are hedged against the risk while benefiting from the economic rebound.

Chart 13: **TAESA's – inflation uplift**



Source: TAESA Q3 21 presentation

Infrastructure, inflation and rising interest rates

We addressed this issue for the third time in our ***October 2021 Global Matters 32*** article, arguing that infrastructure is an ideal asset class in which to be invested in an inflationary environment. We also discussed it above under the near-term inflation thematic.

To briefly revisit historical support for our thesis, 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 below.

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

Period 1: FF rates start increasing in May 2004						
	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
Outperformance	**12.4**	**9.0**	**13.6**	**4.3**	**6.5**	**4.7**
Outperform v MSCI	***Yes***	***Yes***	***Yes***	***Yes***	***Yes***	***Yes***
Period 2: FF rates start increasing in November 2015						
	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
Outperformance	**5.1**	**12.8**	**7.4**	**5.5**	**-5.5**	**-4.7**
Outperform v MSCI	***Yes***	***Yes***	***Yes***	***Yes***	***No***	***No***

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.

Further, 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** below.

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

Period 1: US 10-year T-Bond yields start increasing in May 2003						
	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
Outperformance	**1.5**	**-7.9**	**-2.3**	**1.3**	**2.3**	**2.0**
Outperform v MSCI	***Yes***	***No***	***No***	***Yes***	***Yes***	***Yes***
Period 2: US 10-year T-Bond yields start increasing in August 2010						
	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
Outperformance	**-3.0**	**-15.3**	**-6.7**	**8.0**	**10.2**	**2.5**
Outperform v MSCI	***No***	***No***	***No***	***Yes***	***Yes***	***Yes***
Period 3: US 10-year T-Bond yields start increasing in April 2013						
	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
Outperformance	**-2.8**	**-8.8**	**-6.2**	**2.8**	**4.5**	**3.1**
Outperform v MSCI	***No***	***No***	***No***	***Yes***	***Yes***	***Yes***

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 4D User Pays index (4DUP) which outperformed the MSCI in all four measured periods;
- but the ***performance of the 4D Utilities Index (4DUts) and S&PI was 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.

Infrastructure implications

We believe this analysis supports our thesis that User Pay assets are resilient through periods of rising interest rates/inflation and can provide the outperformance sought. In contrast, Regulated Utilities are more inclined to demonstrate the '*bond proxy'* profile, and within the utility space we favour real return utilities in an inflationary environment over nominal.

Decarbonisation

Another key global area of focus for us is of course climate change and decarbonisation, and the significant opportunity it represents for infrastructure investors. In October 2020, we published a ***Global Matters*** article titled '*Decarbonisation and the infrastructure investment opportunity'* in which we discussed how investors wanting to be part of the decarbonisation investment thematic should look to infrastructure as a means of participating. Put simply, the world cannot achieve Net Zero carbon by 2050 unless there is a huge investment in the infrastructure solution.

While the speed of ultimate decarbonisation remains unclear, there appears to be a real opportunity for multi-decade investment as every country moves towards a cleaner environment. Energy transition and decarbonisation of the power sector is an obvious thematic and will have the greatest impact on countries looking for Net Zero. However, other forms of infrastructure, namely transportation, also have a key role to play.

Further, as already discussed the decarbonisation thematic is directly benefiting from the COVID-19 stimulus, with much of it supporting a faster green energy transition. This improves the near-term investment outlook for those companies capitalising on the opportunity.

Infrastructure implications

Decarbonisation must happen, and the goal of Net Zero is not achievable without the right forms of infrastructure investment across both the energy and transport sectors. This represents a significant opportunity for infrastructure investors such as 4D, who want to be part of the solution. We prioritise both countries and companies with strong management teams, defined strategic environmental goals that integrate with complete ESG policy, strong balance sheets to support much needed investment, and those that are best in class within their sector in building a sustainable infrastructure footprint. This applies whether it be pure play renewable operators, toll roads supporting electric vehicles and a reduction in congestion, or airports that are themselves targeting Net Zero.