

April 2020 / Research Report

THE IMPACT OF COVID-19 ON EUROPEAN PRIVATE INFRASTRUCTURE

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1 / Executive Summary¹

- The recent outbreak of Covid-19 is having substantial repercussions on economic growth, and we believe that the global economy may be heading towards a recession.² We are witnessing a number of fiscal and monetary measures in support of the economy put in place by governments and central banks. However, risks remain skewed to the downside, due to the unprecedented, simultaneous sudden stop of several developed economies, and the potential ramifications of the crisis.
- We expect supportive liquidity and financing conditions for high quality infrastructure assets. However, we have recently witnessed volatility in credit spreads, particularly in the North American high yield energy sector, in conjunction with the recent sharp fall in oil prices and increased counterparty risk expectations.³
- Some sectors, particularly transportation, are experiencing substantial demand cyclicality in the current crisis. Air travel seems particularly impacted, and IATA expects a fall in passenger volumes of up to 24% in 2020, a market scenario that may put several airlines under material stress.⁴ While the movement of people seems severely impacted, we are observing that movement of goods has remained relatively resilient so far, supporting port and rail freight operations. Power demand and peak power prices have seen a substantial reduction across European markets due to lower industrial production, while baseload prices have so far been more stable.⁵ Some sectors, such as regulated networks, should remain largely unaffected by the current crisis. Other sectors, such as digital infrastructure, are demonstrating their essential nature in current market conditions, and may be benefitting from the crisis, as digitalisation and remote working shall increase data consumption patterns across several countries.⁶
- Although it may appear difficult in current conditions, it is important to focus on the long-term when it comes to private infrastructure investment. For example, notwithstanding the current disruption, the air travel industry is still expected to benefit from a material surge in passengers over time, driven by demographic factors, liberalisations and the Asian markets doubling in size by 2035.⁷
- In the context of the current crisis, private infrastructure may provide a safe haven to investors. Assets are generally underpinned by regulated or contracted cash flows, supporting long-term return visibility. Private infrastructure assets are valued on a fair value basis. As a result, we expect short-term volatility of financial markets not to have a material impact on private infrastructure valuations. However, if valuations on listed markets settle at a level materially lower compared with pre-Covid-19 levels, private infrastructure valuations may adjust downwards over the course of 2020.
- As in every crisis, this market environment may bring disruption, but also opportunities, including new assets coming to the market, opportunities to generate alpha, or potentially better entry prices in a market that had historically experienced an increase in average valuations. Investors may factor into valuations an expected, substantial reduction in dividend payments for 2020 in certain sectors, particularly airports.⁸ However, we believe that business plans across most infrastructure assets should remain largely resilient with regard to medium-term assumptions, supporting valuations and underpinning the relevance of private infrastructure as a yielding asset class for long-term investors. We now expect interest rates to remain lower for longer, an assumption that should contribute to support valuations, due to lower discount rates once the direct effects of Covid-19 on economic activity fade.

¹ Any forecasts provided herein are based on DWS's opinion at time of publication and are subject to change.

² Based on Oxford Economics, as at 23 March 2020.

³ Based on IHS Markit and Bloomberg, as at 23 March 2020.

⁴ International Air Transport Association, as at 5 March 2020. There is no guarantee the forecast shown will materialise.

⁵ Based on Bloomberg, as at 23 March 2020.

⁶ Bloomberg, "Internet Traffic is Surging but the Pipes Aren't Bursting Yet", 20 March 2020.

⁷ Bloomberg, Asia Air Travel Boom, December 2018. There is no guarantee the forecast shown will materialise.

⁸ Based on data of the International Air Transport Association, as at 23 March 2020. There is no guarantee the forecast shown will materialise.

Past performance is not a reliable indicator of future returns. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

2 / Economic Impact⁹

The recent outbreak of Covid-19 may have substantial repercussions on global economic growth and on financial markets. Due to the complexity of the virus' dynamics, it is difficult to assess the timing and the extent of economic consequences, but we believe that in 2020 the global economy may be heading towards a global recession.¹⁰

Our base case assumes substantial economic impact in the first half of 2020, and a progressive improvement in economic conditions towards the end of the third quarter of 2020. Nevertheless, this crisis represents the first, unprecedented case in recent history of a simultaneous, sudden stop of some of the most developed economies globally. Due to the potential ramifications of the crisis, risks remain skewed to the downside in terms of severity and length of the downturn, making a slower, U-shaped recovery possible.¹¹

In China, following the outbreak of Covid-19 at the end of December 2019, lockdown measures lead to a sudden stop of large parts of the economy across several parts of the country. As at the end of March, these measures seem to be effective in the containment of the Covid-19 spread, and there is evidence that economic activity has partially resumed. This includes construction work across several infrastructure projects in the rail, road and renewables sectors.¹² The speed of the Chinese recovery supports our view of a possible V-shaped economic recovery also in Europe, although the extent and timing of measures in Europe may be different from China.

In Europe, Covid-19 has manifested itself initially as “supply-side” shock, as exports from Chinese manufacturers reduced significantly. China represents the largest global supplier of capital goods, accounting for a substantial part of Europe's electronics imports of the auto industry, and for the majority of the key components of the renewable energy industry, such as photovoltaic panels. This effect should continue to unfold over the coming weeks, disrupting greenfield infrastructure projects under construction, and may exacerbate across several European countries, as non-strategic industries are locked-down.¹³

IMPACT OF COVID-19 OUTBREAK ON GLOBAL ECONOMY

(Summary)

Supply side	Demand side
<ul style="list-style-type: none"> — Delays in supply of components due to workforce shortage and value chain disruptions — Decline in industrial production — Uncertainty affects business investment 	<ul style="list-style-type: none"> — Consumption slowdown due to fear, quarantine restrictions and aversion to public gatherings — Cancellation of vacation and business travel — Declining consumer confidence
Monetary and fiscal policy	Financial markets
<ul style="list-style-type: none"> — Lower interest rates across major central banks — Extension of Quantitative Easing (QE) by ECB — Looser fiscal policy and ad-hoc tax relieves — Support measures to hard-hit sectors (e.g. airline industry) 	<ul style="list-style-type: none"> — Volatility in commodity markets — Volatility in equity markets and flight to quality — Comparatively resilient yields for investment grade bonds — Widening in high yield bond spreads (e.g. U.S. oil & gas)

Source: DWS, Oxford Economics, Bloomberg, IHS Markit, as at 23 March 2020

⁹ Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

¹⁰ Based on DWS, Oxford Economics, Bloomberg, as at 16 March 2020. There is no guarantee the forecast shown will materialise.

¹¹ Based on DWS, Oxford Economics, Bloomberg, as at 16 March 2020. There is no guarantee the forecast shown will materialise.

¹² Rail Journal, “China resumes work on rail construction projects”, 25 March 2020.

¹³ Based on DWS, Oxford Economics, Bloomberg, as at 16 March 2020. There is no guarantee the forecast shown will materialise.

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We have witnessed a number of monetary relief packages in support of the economy, with the Fed and the Bank of England reducing interest rates, and the ECB injecting substantial liquidity. We expect central banks around the world to put in place additional measures over the coming weeks as the economic impact of the coronavirus becomes clearer. These measures may have a limited effect on relieving the “supply-side” shock, but may contribute to relieving the “demand-side” shock, and importantly, should provide liquidity to the system and to corporates. Because of the considerable expansionary monetary policy measures put in place, we expect interest rates to remain lower for longer, underpinning the case for private infrastructure investment. While the recent fall in oil prices may reduce inflation, substantial monetary policy stimulus poses a question on future inflationary pressures once economic activity resumes.¹⁴

Governments have also substantially increased fiscal spending to support economies. The European Commission recently decided to waive the stability pact, to allow governments across Europe to respond to the crisis and increase public spending.¹⁵ The increase in government deficits and debt levels resulting from the response may be substantial in certain cases, and may pose an additional question mark on medium-term recovery prospects in Europe.¹⁶ In our view, economies with lower fiscal capacity and comparatively weaker economic growth may be exposed to an increase in long-term government bond yields due to a perceived increase in country risk, weighing on growth expectations, investment levels, and ultimately expected rates of return for private infrastructure investment. We also believe that these countries may increasingly look at infrastructure investment to support economic growth.¹⁷

MEDIUM-TERM EXPOSURE OF KEY EUROPEAN ECONOMIES TO COVID-19 OUTBREAK (By Country)

	Credit Rating (S&P)	Debt/GDP ¹	10Y Government Bond yield		GDP growth 2020F-2025F
	Mar'20	Mar'20	Dec'19	Mar'20 ²	Mar'20
Norway	AAA (Stable)	44.6%	1.2%	1.0%	1.6%
Denmark	AAA (Stable)	31.1%	-0.1%	-0.1%	1.7%
Sweden	AAA (Stable)	37.2%	0.1%	0.0%	1.8%
Netherlands	AAA (Stable)	48.0%	0.0%	-0.1%	1.2%
Germany	AAA (Stable)	58.1%	-0.2%	-0.3%	1.0%
Finland	AA+ (Stable)	59.6%	0.0%	0.1%	1.0%
United Kingdom	AA (Stable)	85.6%	0.8%	0.5%	1.5%
Belgium	AA (Stable)	97.9%	0.1%	0.2%	1.3%
France	AA (Stable)	100.8%	0.1%	0.1%	1.4%
Spain	A (Stable)	96.5%	0.5%	0.7%	1.4%
Portugal	BBB (Positive)	116.4%	0.4%	0.9%	1.1%
Italy	BBB (Negative)	136.3%	1.4%	1.7%	0.5%

Source: DWS, Oxford Economics, S&P, Bloomberg, as at 23 March 2020. Notes: 1. Maastricht definition, except for Norway. 2. As at 23 March 2020. Past performance is not a guide for future results. There is no guarantee the forecast shown will materialise. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

¹⁴ Based on DWS, Oxford Economics, Bloomberg, as at 16 March 2020. There is no guarantee the forecast shown will materialise.

¹⁵ ANSA, “Von der Leyen activates stop-Pact clause”, 20 March 2020.

¹⁶ Based on DWS, Oxford Economics, Bloomberg, as at 16 March 2020. There is no guarantee the forecast shown will materialise.

¹⁷ DWS, Oxford Economics, as at 16 March 2020. Opinions and forecasts may never materialise.

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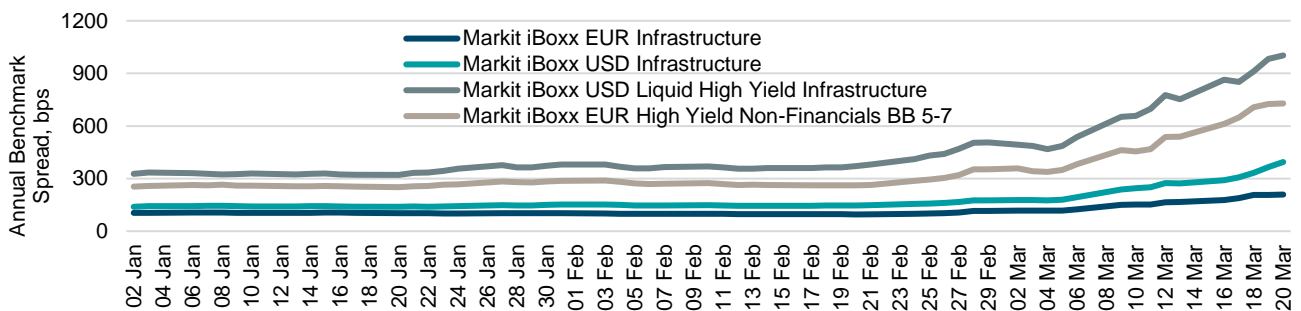
3 / Impact on Infrastructure by Sector¹⁸

Infrastructure has historically proven resilient throughout macroeconomic cycles.¹⁹ However, the Covid-19 crisis represents an unprecedented case of a simultaneous, sudden stop to economic activity across several countries. Airports are mostly impacted by the lockdown and should experience a severe contraction in 2020, beyond what we observed historically and during the 2008 GFC. IATA expects a fall in passenger volumes of up to 24% in 2020, a market scenario that may put several airlines under material stress, and may lead to defaults or nationalisations.²⁰

Other transport sub-sectors may be less impacted directly by the Covid-19 crisis, but should experience an element of revenue cyclicity in current market conditions in our view. Toll roads or passenger rail are witnessing a material reduction in the movement of people that should impact earnings in 2020. The movement of goods has so far remained largely unaffected by the crisis, and we anticipate this scenario to continue, supporting rail freight and port operations. Nevertheless, new lockdown measures of non-strategic industries across several European countries may impact production and hence reduce freight volumes over the coming weeks.²¹ The power industry is experiencing a decrease in demand due to lower industrial production, and a consequent shaving in peak power prices.²² Digital infrastructure assets' operations should remain largely unaffected by the current crisis and may benefit from a surge in demand due to increased usage of digital services.

How the crisis may impact earnings should also depend on the contractual nature of infrastructure assets. Merchant assets, such as power generation may be the most exposed to a downturn due to demand and price reductions. Regulated networks, including water, electricity and gas remain largely unaffected by the current market conditions, as for most infrastructure essential services with the government as a counterparty. Contracted assets should have a level of protection to earnings, particularly for take-or-pay contracts, but may be exposed to an increase in counterparty risk, as off-takers may default, or may be unable to honour contracts, a risk that we believe may be higher for assets with a limited number of small counterparties.

INFRASTRUCTURE DEBT SPREADS (January 2020 – March 2020, Benchmark Spread*)



Notes: * Benchmark spread defined as premium in basis points above the yield of risk-free government bond. Source: IHS Markit, as at 23 March 2020.

¹⁸ Any forecasts provided herein are based on DWS's opinion at the time of publication and are subject to change.

¹⁹ DWS, "Private infrastructure and business cycles", 23 September 2019.

²⁰ International Air Transport Association, as at 5 March 2020. There is no guarantee the forecast shown will materialise.

²¹ Based on Oxford Economics, Bloomberg, as at 23 March 2020.

²² Based on Oxford Economics, Bloomberg, as at 23 March 2020.

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We have recently observed a widening in credit spread also for infrastructure assets.²³ The situation may vary on an asset-by-asset basis, but we expect financing conditions to remain largely supportive for high quality, investment grade infrastructure assets, particularly as lenders should take a through-the-cycle credit view and liquidity should remain accessible.

Nevertheless, as highlighted by the recent widening in credit spreads, assets in the high yield infrastructure market may be experiencing some pressure in the current market environment, particularly as they approach refinancing, due to lower expected earnings or generally higher leverage. With further uncertainties arising from the recent drop in oil prices, we believe that high yield shale midstream assets in North America may experience substantial pressure on earnings notwithstanding the contracted nature of their business, often underpinned by take-or-pay contracts, due to higher counterparty risk in the shale extraction and production (E&P) sector. Credit spreads have widened materially in the region.²⁴

Infrastructure is an operational asset class, and managers may have several levers to pull, including operating costs reductions or capex re-profiling to support businesses in the short term. We may observe substantial reductions in dividends for 2020 across sectors that are more severely impacted, such as airports, but across other sectors dividend payments in 2020 should prove more resilient. The Covid-19 crisis may bring substantial disruption over the course of 2020. Nevertheless, as the crisis fades over the coming quarters, lockdown measures are lifted, and economic activity resumes, we expect demand for infrastructure assets to recover relatively rapidly, supporting earnings fundamentals. As a result, we expect earnings to gradually converge towards pre-crisis business plan assumptions, as long-term business fundamentals remain largely supportive across most infrastructure sectors.

COVID-19 IMPACT ON TRANSPORTATION ASSETS

Sector	Sub-sector	Covid-19 Impact
Transport ²⁵	Airports	<ul style="list-style-type: none"> - Severe drop in global PAX, up to -24% YoY in 2020 due to lockdown measures. - Some airlines may experience liquidity constraints and defaults during 2020. - Gradual recovery in traffic in H2 2020 as lockdown measures lifted. - Long-term: global long-term expansion of air travel industry remains unchanged.
	Ports	<ul style="list-style-type: none"> - Trade only partially impacted by lockdown measures supporting freight volumes. - Lower industrial production may increasingly weigh on freight volumes. - Revenues remain somewhat shielded due to diversification and long-term contracts, but impact may differ substantially by port. - Improving situation in China may support trade volumes in Q2 2020. - Long-term: strategic relevance of ports in global trade remains unchanged.
	Toll roads	<ul style="list-style-type: none"> - Substantial drop in light vehicle volumes in areas affected by lockdown measures. - Reduction in heavy vehicles due to lower trade and industrial production, concentrated in areas impacted by closure of non-strategic industry. - Toll collection temporarily suspended for some toll roads. Gradual recovery in traffic as lockdown measures lifted, but speed of recovery may differ by region and span of economic downturn. - Long-term: toll roads to remain resilient, with traffic growing in line with GDP.
	Rail	<ul style="list-style-type: none"> - Long-distance passenger rail partially impacted in countries affected by lockdown. - Commuter rail may be heavily impacted in areas affected by lockdown. - Intermodal shift from toll roads to rail partially offsets impact from lower industrial production and trade on freight volumes. - Gradual recovery in traffic in H2 2020 as lockdown measures are lifted. - Long-term: resilience of industry unchanged. Liberalisations support opportunity set.

Source: DWS, International Air Transport Association, Bloomberg, Moody's, as at 23 March 2020. Opinions and forecasts may never materialise. Past performance is not a reliable indicator of future returns. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

²³ Based on IHS Markit, as at 23 March 2020.

²⁴ Based on IHS Markit, as at 23 March 2020.

²⁵ Based on a number of sources, including Bloomberg, Eurostat and Moody's Investors Service data, as at 23 March 2020.

COVID-19 IMPACT ON POWER, UTILITIES AND NETWORKS ASSETS

Sector	Sub-sector	Covid-19 Impact
Power, Utilities & Networks ²⁶	Power generation	<ul style="list-style-type: none"> - Power demand decreasing by 5%-10% due to lower industrial production, particularly across areas affected by lockdown of non-strategic industry. - Peak power prices experiencing substantial reduction due to lower industrial production, while baseload prices proving more stable. - Merchant peak power generators substantially impacted while baseload capacity remains mostly unaffected. - Most European utilities partially hedge power prices one year ahead, with merchant exposure being around 25% of EBITDA. Contracted assets may be exposed to counterparty risk. - CO₂ prices within EU Emissions Trading System (ETS) decreased to EUR 15.5 per tonne from ca. EUR 23 in March due to lower power demand, possibly jeopardising the speed of the energy transition process in the short-term. - As economic activity surges power prices to recover alongside CO₂ prices. CO₂ prices may eventually be supported by the introduction of a floor mechanism within the ETS scheme. - Long-term: Path to energy transition unchanged as coal continues to be phased out supported by policy and energy efficiency and capacity markets develop further.
	Renewables	<ul style="list-style-type: none"> - Greenfield renewable projects may be impacted by delays in provision of essential components. - Merchant projects impacted by declines in power prices while subsidised projects should remain largely unaffected. - Power price reductions may impact grid parity assumptions for greenfield projects under development in the short-term. - Long-term: Energy transition policies and falling renewables equipment costs continue to support the industry.
	Energy-from-Waste (EfW)	<ul style="list-style-type: none"> - Lower industrial production may impact industrial waste volumes. Domestic waste volumes may remain largely unaffected, and gate fees contracts with municipalities provide price stability. - Decline in power prices may impact revenues from merchant power sales, but most EfW plants supported by medium-term take-or-pay contracts and hedging policies. - Sale of steam to industry may be impacted by lower industrial production in the absence of take-or-pay contracts, while steam sold to district heating customers remains unaffected. - Potential increase in counterparty risk for contracted power and steam with industrial counterparties. - Industrial waste volumes to recover as non-strategic industry lockdown measures are lifted and economic activity surges. - Long-term: EfW expected to remain a key pillar of circular economy policies, as landfill closures or taxes in Europe support the need for new EfW capacity and recycling in markets with waste treatment under-capacity.
	Midstream (North America)	<ul style="list-style-type: none"> - Fall in energy demand due to global slowdown, record high oil production and falling prices may put significant pressure on North American shale oil & gas E&P industry. - Midstream assets largely protected by medium-term, take-or-pay contracts, but increase in counterparty risk and E&P industry defaults possible. - Long-term: structurally lower oil prices may pose a threat to the future expansion of the North American shale industry, jeopardising medium-term economic growth prospects.
	Regulated networks	<ul style="list-style-type: none"> - Regulated electricity, gas and water networks not impacted by Covid-19 outbreak, as RAB-based regulation supports volume neutrality of earnings. - Long-term: Strategic relevance of networks remain unchanged, with material investment required across electricity grids to support renewables. Interest rates lower for longer may impact regulated returns further in the medium term.

Source: DWS, Bloomberg, Moody's, as at 23 March 2020. Opinions and forecasts may never materialise. Past performance is not a guide for future results. There is no guarantee the forecast shown will materialise. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

²⁶ Based on a number of sources, including Bloomberg, Eurostat and Moody's Investors Service data, as at 23 March 2020.

COVID-19 IMPACT ON DIGITAL INFRASTRUCTURE ASSETS (By Sector)

Sector	Sub-sector	Covid-19 Impact
Digital infrastructure ²⁷	Telecom towers	<ul style="list-style-type: none"> - Telecom towers largely unaffected by Covid-19 outbreak. Long-term contracts with tenants, concentrated mainly in the telecom and media sector should support revenues. - Long-term: strategic importance of telecom tower sector should remain unchanged, and supported by digitalisation and rollout of 5G requiring increased investment.
	Data centres	<ul style="list-style-type: none"> - Data centres may benefit from Covid-19 outbreak, as social distancing and lockdown measures support increases in data storage requirements.²⁸ - Colocation data centres located in strategic areas supported by customer diversification, while wholesale data centres with customer concentration may experience increased counterparty risk as businesses may be impacted by the downturn. - Long-term: industry is expected to continue developing supported by a rapid digitalisation megatrend requiring a substantial increase in low latency data storage.
	Fibre	<ul style="list-style-type: none"> - Fibre may benefit from Covid-19 outbreak due to higher data consumption as consumers and businesses likely to increase broadband usage due to social distancing and lockdown measures. - Short-term growth in business segment may be capped by small and medium enterprises postponing the purchase of bulk data connections due to downturn. - Long-term: industry expected to continue growing supported by a rapid digitalisation megatrend requiring substantial fibre rollout, but 5G may threaten fibre to the home FTTH.²⁹

Source: DWS, Bloomberg, Moody's, as at 23 March 2020. Opinions and forecasts may never materialise. Past performance is not a guide for future results. There is no guarantee the forecast shown will materialise. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

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²⁷ Based on a number of sources, including Bloomberg, Eurostat and Moody's Investors Service data, as at 23 March 2020.

²⁸ Bloomberg, "Internet Traffic is Surging But The Pipes Aren't Bursting Yet", 20 March 2020.

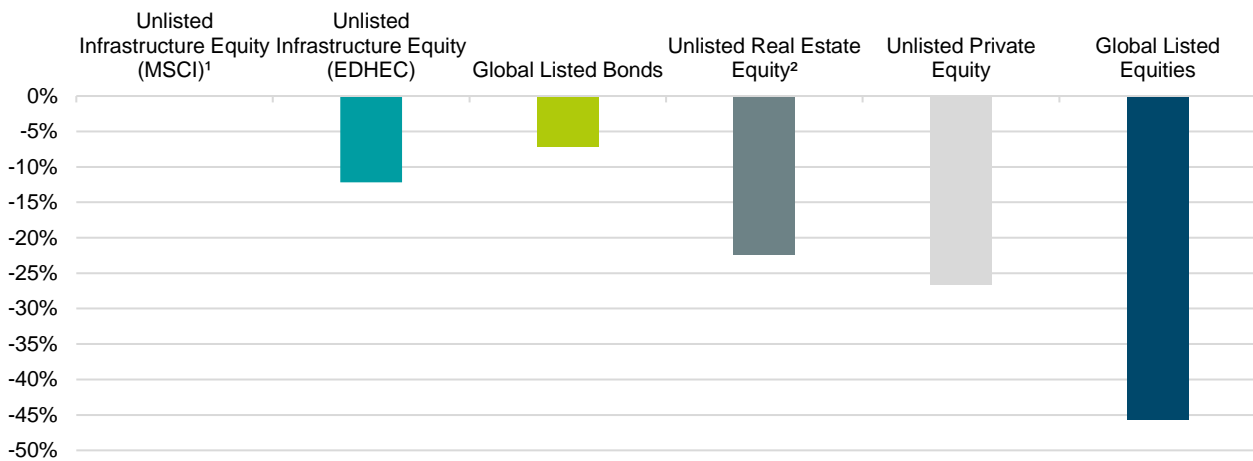
²⁹ FTTH = Fibre-To-The-Home.

4 / Impact on Long-Term Returns³⁰

Historical Return Profile: Due to the sudden stop of economic activity, the Covid-19 crisis may impact some private infrastructure sectors beyond what we observed during previous downturns, including the Great Financial Crisis (GFC). Nevertheless, as restrictions are gradually lifted over the coming months, we expect demand for private infrastructure assets to recover quicker than in other sectors of the economy.³¹

Private infrastructure assets include essential services with monopolistic features, and inelastic demand patterns. Therefore, looking at total returns, private infrastructure has historically exhibited resilience compared to other asset classes during periods of distress, as described by the maximum drawdown analysis highlighted below. Both the MSCI Global Infrastructure Asset Index and EDHEC Global Unlisted Infrastructure Equity Index suggest that historically private infrastructure total returns experienced comparatively lower maximum drawdowns.³²

HISTORICAL MAXIMUM DRAWDOWN COMPARISON* (March 2003 – June 2019, Based on quarterly data)



Notes: * the maximum drawdown represents the maximum observed loss from a peak to a trough. 1. Contraction of -0.07%. Index is available from March 2008 only. 2. Index is available from December 2007 only. Source: DWS, Bloomberg, MSCI, Dow Jones Brookfield, EDHEC, Preqin, as at June 2019. Quarterly data refers to the end of each calendar quarter. Listed Global Equities: MSCI AC World Index, Local; Unlisted Infrastructure Equity (MSCI): MSCI Global Infrastructure Direct Asset Index, Local; Unlisted Private Equity: PrEQIn Private Equity Quarterly Index; Unlisted Infrastructure Equity (EDHEC): EDHEC Global Unlisted Infrastructure Equity, Value-weighted, Local; Global Listed Bonds: Bloomberg Barclays Global Aggregate Total Return Index, USD; I; Unlisted Real Estate Equity Assets (MSCI): MSCI Global Property Fund Index Digest. Opinions and forecasts may never materialise. For illustrative purpose only. Past performance is not a guide for future results.

Historical Dividend Profile: Private infrastructure assets have historically provided relatively resilient income return.³³ In our view, most infrastructure sectors should be largely protected from the Covid-19 downturn as a result. Regulated networks, digital infrastructure and transportation assets predominantly exposed to freight should continue to exhibit a resilient dividend profile. Other sectors, including airports, and assets exposed to transport of people or merchant power generators may be more impacted by the downturn, and we expect that they may provide limited dividend payments to equity investors in 2020. Nevertheless, we expect dividend payments to gradually resume over the course of 2021 and gradually converge to pre-crisis business plan assumptions as the Covid-19 crisis fades.

³⁰ Any forecasts provided herein are based on DWS's opinion at the time of publication and are subject to change. Opinions and forecasts may never materialise.

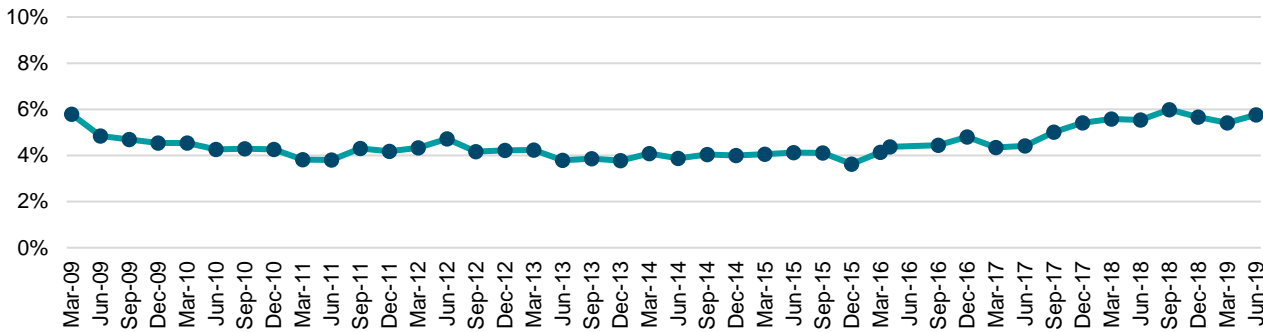
³¹ Based on DWS, Bloomberg, MSCI, Dow Jones Brookfield, EDHEC, Preqin, as at June 2019.

³² Based on DWS, Bloomberg, MSCI, Dow Jones Brookfield, EDHEC, Preqin, as at June 2019. The maximum drawdown represents the maximum observed loss from a peak to a trough.

³³ Based on MSCI Global Infrastructure Direct Asset Index, Income return, rolling annual, from March 2009 to June 2019. Past performance is not a guide for future returns.

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HISTORICAL PRIVATE INFRASTRUCTURE INCOME RETURN PROFILE (MSCI Global Infrastructure Direct Asset Index, Income Return, Rolling Annual, March 2009–June 2019)



Source: MSCI Global Infrastructure Direct Asset Index, Local, as at June 2019. Opinions and forecasts may never materialise. Past performance is not indicative of future results.

Valuations: The Covid-19 crisis may have substantial repercussions on financial markets. We have witnessed an increase in volatility, and a downward adjustment on valuations so far.³⁴ Private infrastructure assets are generally valued on a fair value basis. As a result, we expect short-term volatility of financial markets not to be reflected in private infrastructure valuations. It remains to be seen where eventually valuations stabilise across listed markets. If valuations on listed markets settle at a level that is materially lower compared with pre-Covid-19 levels, we believe that private infrastructure valuations may on average adjust downwards over the course of 2020.³⁵

Nevertheless, we expect the potential adjustment to be lower compared with listed equity markets, driven by the comparatively resilient dividend profile of private infrastructure assets. Investors may factor into valuations an expected substantial reduction in dividend payments for 2020 across some infrastructure sectors, but as the crisis fades over the course of 2020, dividends for most private infrastructure assets should resume, and converge with pre-crisis business plans, supporting valuations. Additionally, we note that we expect interest rates to remain lower for longer, an assumption that should support valuations due to lower discount rates and that underpins the relevance of private infrastructure as a yielding asset class for long-term investors.³⁶

Infrastructure is an idiosyncratic asset class, and investors should consider this top-down analysis as a broad indication only. Our scenario analysis below is taking into account a historical regression of valuations for private infrastructure with government bond yields, valuations on listed markets and macroeconomic conditions, including GDP growth. In our analysis, we consider two potential scenarios impacting private infrastructure transaction multiples: a V-shaped and a U-shaped recovery.³⁷

³⁴ Based on Bloomberg, MSCI, as at 30 March 2020.

³⁵ Based on historical analysis, we also note that there may be a time lag of up to two quarters between a substantial, protracted valuation adjustment in listed markets and a corresponding adjustment in private markets for private infrastructure.

³⁶ Past performance is not a guide for future returns. Opinions and forecasts may never materialise.

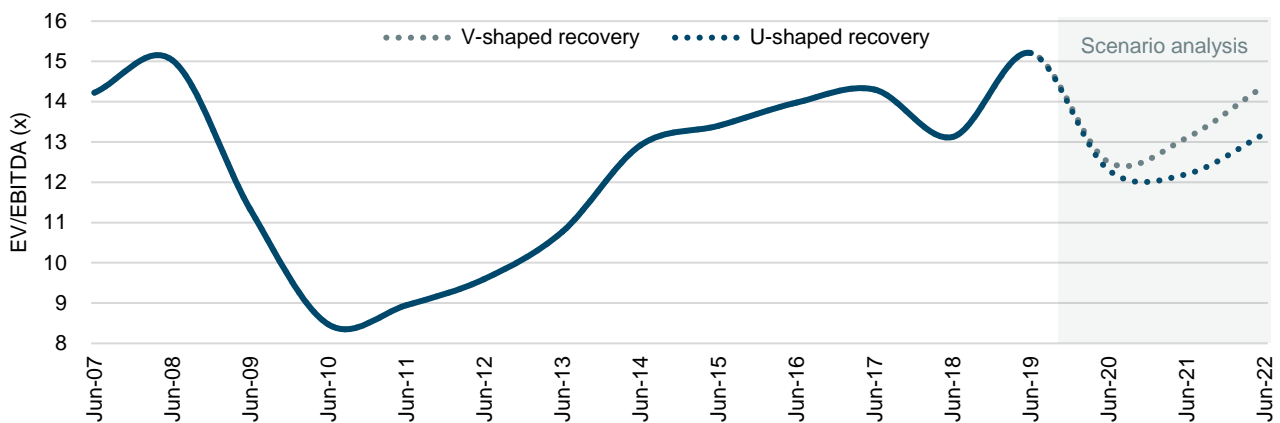
³⁷ There is no guarantee the forecast shown will materialise. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

Past performance is not a reliable indicator of future returns. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

Under the V-shaped recovery scenario, we assume recovery of economic conditions towards the end of 2020. In the context of structurally lower valuations on listed markets, we would expect average private infrastructure valuations to adjust from EV/EBITDA levels of 15x to 12.5x, before they eventually recover and converge to the historical 3-year average of 14x.³⁸

However, should the downturn protract itself into 2021, as we assume under our U-shaped scenario, our regression analysis signals that average valuations for private infrastructure may bottom at 12x, and recover more gradually over the course of the subsequent quarters of 2021. We note that none of these scenarios assumes a decline in valuation multiples close to the GFC levels, particularly as we assume that liquidity and financing conditions remain favourable.³⁹

SCENARIO ANALYSIS: EUROPEAN PRIVATE INFRASTRUCTURE EV/EBITDA MULTIPLES
 (Annual historical average for 2007-2019, scenario analysis for 2020-2022)



Source: DWS proprietary database of European unlisted infrastructure transactions, based on publicly available transaction information from various sources, including Infrastructure Journal, InfraNews, Reuters, 23 March 2020. For illustrative purpose only. V-shaped recovery assumes a recovery of economic conditions towards the end of 2020. U-shaped recovery assumes a prolonged economic downturn spilling into 2021. Opinions and forecasts may never materialise. Past performance is not a guide for future results. There is no guarantee the forecast shown will materialise. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

Long-Term Return Expectations: In our view, as in every crisis, this market environment may bring disruption, but also opportunities, including new assets coming to the market, an opportunity to generate alpha, or potentially better entry prices in a market that had experienced an increase in average valuations in the recent past like for other asset classes. The chart below describes our revised 2020 levered, entry IRR⁴⁰ assumption for private infrastructure under our V-shaped recovery scenario, compared with our December 2019 assumptions. In our view, the change in long-term entry return assumptions will be positive, but may be relatively limited from a long-term investor perspective, underpinning the resilience of long-term returns for the asset class. For core infrastructure assets⁴¹, higher expected entry returns may be largely a result of a widening in ten-year government bond yields observed during the first quarter of 2020 and conservatively assumed to continue over the remainder of the year.

³⁸ There is no guarantee the forecast shown will materialise. Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

³⁹ Past performance is not a guide for future returns. Opinions and forecasts may never materialise.

⁴⁰ IRR = Internal Rate of Return.

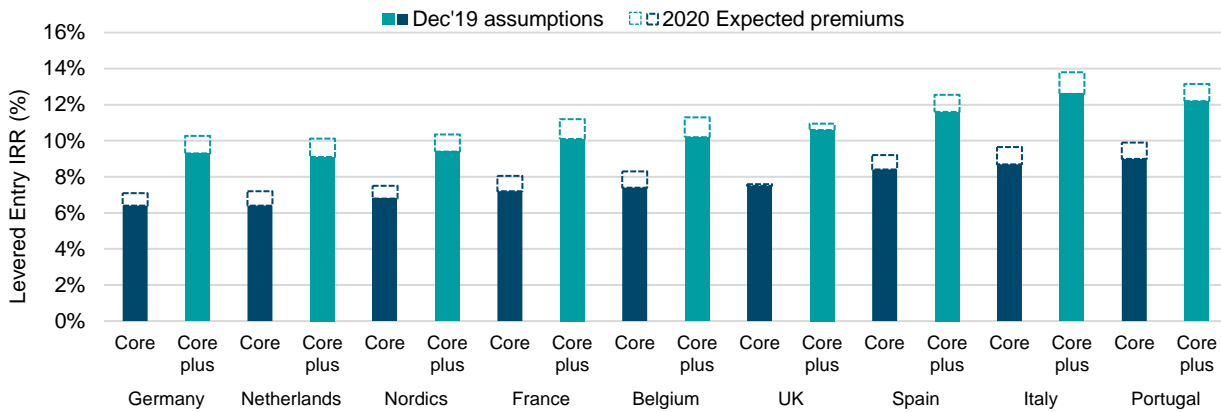
⁴¹ Core Infrastructure includes brownfield assets in geographically mature markets, with significant component of income yield, predictable and regulated revenues, long-term investment horizon, and an investment grade rating profile.

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We assume higher government bond yields to be reflected in entry valuations and higher entry dividend yields, while we assume a minimal reduction to dividends for 2020. For core plus assets⁴², the expected increase in levered entry IRRs should be largely a result of a widening in ten-year government bond yields, and a material haircut expected in dividends for 2020 triggered by the impact of the Covid-19 crisis on earnings. We believe that both aspects may be factored in higher entry dividend yield expectations.⁴³

We now expect interest rates to remain lower for longer, an assumption that should contribute to support valuations, due to lower discount rates once the direct effects of Covid-19 on economic activity fade.⁴⁴

SCENARIO V-SHAPED RECOVERY: ENTRY IRR RETURN ASSUMPTIONS
 (% , 2020, Estimate by Strategy and by Country, Levered, Average)



Source: DWS proprietary database, based on DWS proprietary methodology for ranking unlisted infrastructure sectors as at 23 March 2020. Valuations for 2020 are based on a ten-year dividend discount model and a terminal value at exit. Dividend yields, leverage, growth, exit assumptions and discount rate vary by country and sector as at 23 March 2020. Dividends for core plus in 2020 are assumed to be reduced. There is no guarantee the forecast shown will materialise. Past performance is not a guide for future returns.

⁴² Core plus infrastructure includes brownfield assets with some development risk, in mature markets, with relatively predictable revenues and income and capital, generally contributing equally to total return.

⁴³ There is no guarantee the forecast shown will materialise. Past performance is not a guide for future returns.

⁴⁴ There is no guarantee the forecast shown will materialise. Past performance is not a guide for future returns.

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5 / Appendix

Index	Calendar Annual Performance					YTD Jun-2019
	2014	2015	2016	2017	2018	
MSCI Global Quarterly Infrastructure Asset Index, Local	15.46%	17.98%	15.22%	13.15%	11.87%	7.20%
EDHEC Global Unlisted Infrastructure Equity, Value-weighted, Local	30.11%	2.23%	12.42%	7.43%	1.53%	7.89%
Bloomberg Barclays Global-Aggregate Total Return Index Value Unhedged, USD	0.59%	-3.15%	2.09%	7.39%	-1.20%	5.57%
Markit iBoxx USD Infrastructure	9.99%	-3.86%	10.31%	7.60%	-3.34%	10.86%
MSCI Global Property Fund Index Digest	11.88%	12.25%	7.86%	8.64%	8.12%	3.07%
PrEQIn Private Equity Quarterly Index	11.84%	10.45%	10.55%	19.20%	10.89%	7.18%
MSCI AC World Index, Local	9.89%	1.81%	9.66%	20.40%	-7.19%	16.27%
Markit iBoxx EUR Infrastructure	6.54%	9.27%	10.28%	19.96%	7.22%	5.78%
Markit iBoxx USD Liquid High Yield Infrastructure	10.09%	8.72%	11.34%	22.71%	9.60%	9.48%
Markit iBoxx EUR High Yield Non-Financials BB 5-7	8.66%	0.87%	11.21%	6.42%	-3.54%	8.80%

Source: DWS, IHS Markit, Bloomberg, MSCI, EDHEC, Preqin, as at June 2019. Past performance is not a guide for future results.

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Rolling Annual Performance						
Index	Jun-2014	Jun-2015	Jun-2016	Jun-2017	Jun-2018	Jun-2019
MSCI Global Quarterly Infrastructure Asset Index, Local	14.52%	18.65%	16.04%	12.55%	12.49%	13.25%
EDHEC Global Unlisted Infrastructure Equity, Value-weighted, Local	23.93%	12.68%	25.62%	-8.21%	5.87%	15.12%
Bloomberg Barclays Global-Aggregate Total Return Index Value Unhedged, USD	7.39%	-7.09%	8.87%	-2.18%	1.36%	5.85%
Markit iBoxx USD Infrastructure	9.36%	0.59%	8.88%	3.21%	-1.05%	11.56%
MSCI Global Property Fund Index Digest	11.12%	12.42%	10.33%	7.71%	8.78%	7.01%
PrEQIn Private Equity Quarterly Index	21.52%	11.77%	5.44%	17.59%	16.55%	10.79%
MSCI AC World Index, Local	21.43%	8.74%	-2.63%	19.79%	11.39%	6.73%
Markit iBoxx EUR Infrastructure	8.45%	2.44%	6.10%	0.64%	1.04%	5.65%
Markit iBoxx USD Liquid High Yield Infrastructure	12.16%	2.61%	4.43%	9.98%	4.16%	10.61%
Markit iBoxx EUR High Yield Non-Financials BB 5-7	14.18%	3.62%	4.90%	9.78%	-0.55%	8.14%

Source: DWS, IHS Markit, Bloomberg, MSCI, EDHEC, Preqin, as at June 2019. Past performance is not a guide for future results.

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Research & Strategy—Alternatives

OFFICE LOCATIONS:

Chicago

222 South Riverside Plaza
34th Floor
Chicago
IL 60606-1901
United States
Tel: +1 312 537 7000

Frankfurt

Taunusanlage 12
60325 Frankfurt am Main
Germany
Tel: +49 69 71909 0

London

Winchester House
1 Great Winchester Street
London EC2N 2DB
United Kingdom
Tel: +44 20 754 58000

New York

875 Third Avenue
26th Floor
New York
NY 10022-6225
United States
Tel: +1 212 454 3414

San Francisco

101 California Street
24th Floor
San Francisco
CA 94111
United States
Tel: +1 415 781 3300

Singapore

One Raffles Quay
South Tower
20th Floor
Singapore 048583
Tel: +65 6538 7011

Tokyo

Sanno Park Tower
2-11-1 Nagata-cho
Chiyoda-Ku
18th Floor
Tokyo
Japan
Tel: +81 3 5156 6000

TEAM:

Global

Kevin White, CFA

Co-Head of Research & Strategy
kevin.white@dws.com

Simon Wallace

Co-Head of Research & Strategy
simon.wallace@dws.com

Gianluca Minella

Head of Infrastructure Research
gianluca.minella@dws.com

Yasmine Kamaruddin

Global Strategy
yasmine.kamaruddin@dws.com

Americas

Brooks Wells

Head of Research, Americas
brooks.wells@dws.com

Liliana Diaconu, CFA

Office Research
liliana.diaconu@dws.com

Ross Adams

Industrial Research
ross.adams@dws.com

Ryan DeFeo

Property Market Research
ryan-c.defeo@dws.com

Ana Leon

Retail Research
ana.leon@dws.com

Joseph Pecora, CFA

Apartment Research
joseph.pecora@dws.com

Europe

Tom Francis

Property Market Research
tom.francis@dws.com

Martin Lippmann

Property Market Research
martin.lippmann@dws.com

Farhaz Miah

Property Market Research
farhaz.miah@dws.com

Aizhan Meldebek

Infrastructure Research
aizhan.meldebek@dws.com

Siena Golan

Property Market Research
siena.golan@dws.com

Asia Pacific

Koichiro Obu

Head of Research & Strategy, Asia Pacific
koichiro-a.obu@dws.com

Natasha Lee

Property Market Research
natasha-j.lee@dws.com

Seng-Hong Teng

Property Market Research
seng-hong.teng@dws.com

Hyunwoo Kim

Property Market Research
hyunwoo.kim@dws.com

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