WHITEPAPER

The case for infrastructure investing

Building for the long term

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For today's investor

Contents

The case for infrastructure investing: building for the long term

Low bond yields and episodes of volatility across most asset classes make finding value in today's markets a real challenge for investors.

Infrastructure is a diverse and versatile asset class that could help investors meet their intended outcomes, whether providing attractive risk adjusted returns or as part of a cash flow management strategy.

Infrastructure is critical in determining the productivity and sustainability of an economy, but after almost a decade of underfunding, infrastructure in many developed economies is ageing. Economies in transition also have significant funding requirements as they spin out networks of essential services. Over the next 15 years, there is expected to be a funding shortfall of $3.3 trillion for the development of utilities, transport, energy and social infrastructure around the world.[1]

Although governments have tended to supply the bulk of funding in the past, the role of the private sector is increasing. The essential nature of infrastructure, with services supplied in regulated markets with limited competition, can generate predictable cash flows for long term investors. Optimal assets have bond-like characteristics, generate stable income and have better yields than investment grade bonds.

With a thorough understanding of regulatory frameworks and sector-specific risks, infrastructure investments can:

- Generate long-dated cash flows as part of a cash flow management strategy
- Enhance the resilience of portfolios in recession
- Improve diversification
- Capture illiquidity premia e.g. through private infrastructure investment
- Finance a more sustainable economy

1. Bridging Global Infrastructure Gaps. McKinsey Global Institute, as at June 2016.

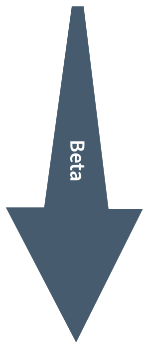
Opportunities in a diverse universe

All infrastructure investments are income producing, but not all investment opportunities are alike. It is possible to compare how various sub-sectors might be exposed to different risk factors, as in the matrix below.

"The infrastructure universe is wide ranging and constantly evolving. Each sector has its unique set of risk and rewards."

Figure 1. **Comparing risk exposures across the infrastructure sector**

Sector	Regulatory Risk	Volume Risk	Technology Risk	Commodity Exposure	Currency Risk
Social infrastructure	2	1	1	1	1
Energy transmission	3	1	1	1	1
Road PPP	2	1	1	2	1
Renewable (fixed tariff)	3	1	1	1	1
Water	3	1	1	1	1
Renewable (no tariff)	2	1	1	3	1
Toll road	1	3	2	2	1
Airport	2	3	2	1	2
Telecom network	3	2	3	1	1
Port	1	4	2	3	2



1 represents lowest risk. 4 represents highest risk. Source: Aviva Investors, for illustrative purposes only.

Although infrastructure investments generally have low correlation to the wider economy, sensitivity to the market can be stepped up by taking part in transactions exposed to trade and economic activity, such as ports and airports. Conversely, correlation to the market can be reduced further by allocating in lower volatility sectors, such as social infrastructure.

Understanding the nature of cross-sensitivities is critical. An investor in a road developed under a public-private partnership (PPP) will not see revenues decrease in a recession, for instance, unlike a toll road owner. Fewer road users might even mean lower maintenance costs and improved cash flows.

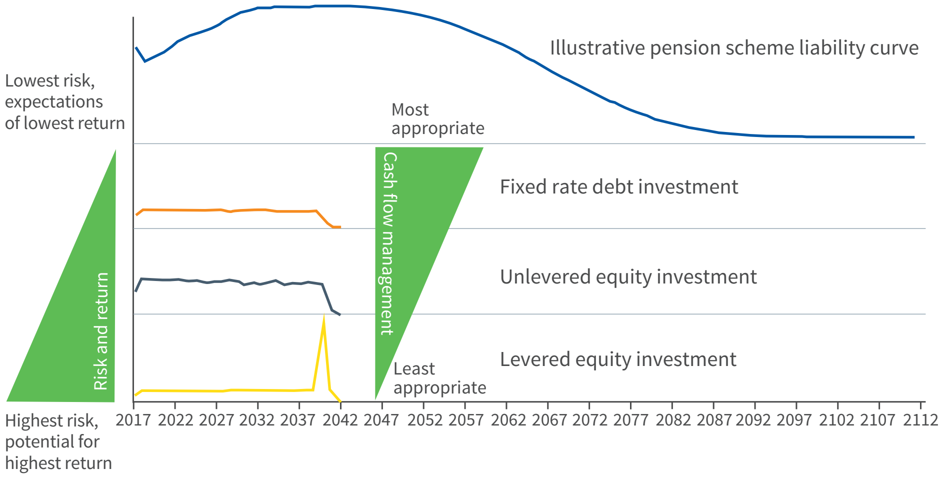
Meeting investment outcomes through infrastructure investing

Generating long-dated cash flows as part of a cash flow management strategy

In a low yield world, the cash flows generated by infrastructure projects can be used to pay the cash flow liabilities of long term investors. For institutions working with compulsory indexation, cash flows with inflation-linked uplifts have obvious appeal.

Take a school project funded under a Public Private Partnership contract, for example. Once operational, this type of project is expected to generate stable cash flows over the 25-year term of the contract with the government. Typically, these projects have been financed by both equity and debt, with the predictable nature of the project allowing leverage of up to 90 per cent. Where and how the investor chooses to invest will determine the scale of risk and reward.

Figure 2. **Profiling pension liabilities and the cash flows generated by a 25-year UK PFI-financed school project**



For illustrative purposes only. Source: Aviva Investors, as at 31 January 2017.

> *"The cash flows generated by infrastructure projects can be used to pay the cash flow liabilities of long term investors."*

The most secure route to invest is via debt, but this is likely to generate the lowest returns. So far this has been the most common approach to generate liability matching cash flows. The yield is 1.7 per cent higher than the reference government bond (10-year gilt) in the example shown above.[2]

Investing in equity could deliver higher returns than debt, but with higher risk. Equity holders receive the upside potential from the project, but also bear the primary risk in the event that assets underperform. As the cash flows generated are volatile, and step up after the debt is repaid, this approach is unsuitable for cash flow management purposes. The illustrative internal rate of return (IRR) is 11 per cent.

2. Illustration based on an operational asset developed under the UK's Private Finance Initiative (PFI 1), closed in 2011. Investment returns shown in sterling terms gross of fees. Source: Aviva Investors.

An alternative approach is to invest on an unlevered basis, where the investor buys the whole capital structure and gains full control of the assets. This route can generate higher returns than infrastructure debt, while still providing a regular income stream. The project provides 25 years of stable, low-risk inflation-linked cash flows with returns of around seven per cent[2] annualised.

The stability and predictability of cash flows may be further enhanced by diversifying across a range of projects within and across sectors.

Overall, unlevered equity and debt investments in low risk sectors are likely to be most suitable for cash flow management purposes. Leveraged infrastructure investments may provide a higher headline return, but might be more severely impacted than unlevered equity or debt in an economic downturn or as interest rates rise.

2. Illustration based on an operational asset developed under the UK's Private Finance Initiative (PFI 1), closed in 2011. Investment returns shown in sterling terms gross of fees. Source: Aviva Investors.

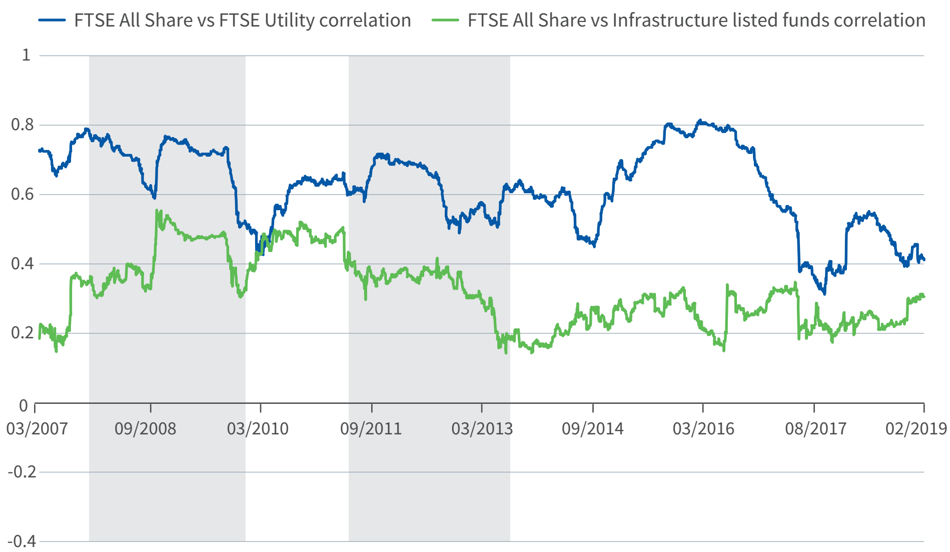
Enhancing resilience of portfolios in recession

Infrastructure can provide a defensive foundation in a portfolio, helping to enhance diversification and generating largely predictable income flows with lower volatility.[3]

Comparing the past performance of an illustrative basket of infrastructure equity funds and the wider UK equity market average (FTSE All-Share Index) shows that the infrastructure funds achieved higher cumulative returns than the equity market, with significantly lower volatility. The infrastructure funds also showed low correlation with UK equities through both positive and negative credit cycles. Correlation remained below 0.5 during years of low or negative growth (highlighted by the grey bars in the illustration below), and remains lower than the correlation between the FTSE Utilities Index and FTSE All-Share index during the last 12 years.

> *"Infrastructure has helped protect portfolio value in past downturns.[5]"*

Figure 3. **Rolling annual correlation between FTSE indices and infrastructure equity**



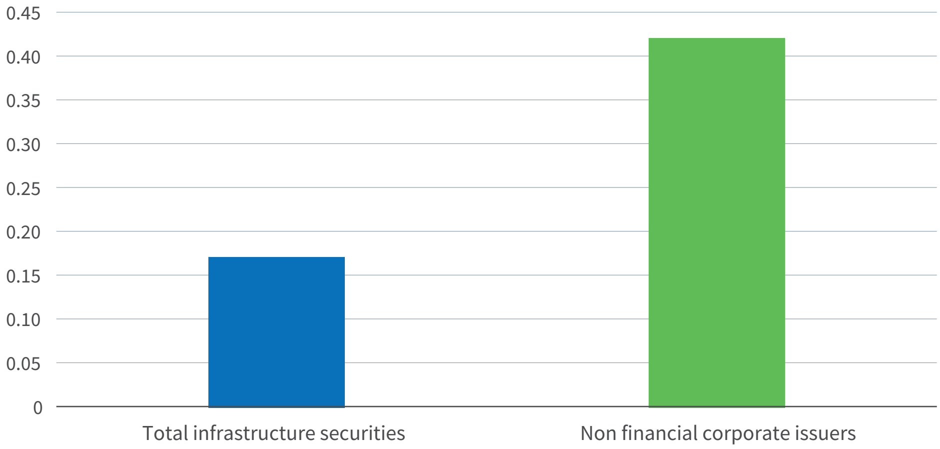
For illustrative purposes only. Source: Aviva Investors, as at 28 February 2019.

On the debt side, infrastructure has helped protect portfolio value in past downturns, as infrastructure securities tend to experience fewer downgrades than the wider market.[4] During the 2008-09 recession, for example, infrastructure bonds experienced negligible rating changes, while non-financial corporate securities were downgraded by 0.7 notches on average. That relative resilience can help cushion the impact of recession.

Studies analysing long term averages over five years showed that infrastructure debt rating, an indicator of its risk, is 2.5x more stable than the rating of debt issued by non financial corporate issuers (Figure 4).

3. Cumulative return of a basket of funds including HICL Infrastructure Company Ltd. International Public Partnerships Ltd. GCP Infrastructure Investments Ltd. And John Laing Infrastructure Fund, weighted by fund size, compared with the cumulative return from the FTSE All-Share and FTSE Utilities indices from 28 March 2006 to 28 February 2019. Source: Bloomberg, as at 28 February 2019.
4. Moody's Corporate and Infrastructure Default Studies 2015.
5. **Past performance is not a guide to future returns**

Figure 4. **Average 1 year rating volatility**



Source: Moody's Investors Service Infrastructure Default and Recovery Rates, 1983-2016.

Two portfolios of the same duration (10 years) and rating (A-), with one invested in infrastructure bonds and the other in corporate bonds, would be expected to behave differently in recession. Credit spreads would be expected to widen in both portfolios, with the lower quality credits widening more than those of higher quality. For example, in the last three months of 2008, BBB credit spreads widened by 222 basis points versus 141 basis points for A- rated credits.[6] However, past experience suggests that the corporate portfolio might be more vulnerable to downgrades, so the infrastructure portfolio would be likely to hold its value better.

6. Based on Bank of America Merrill Lynch Sterling non-financial Corporate Index from 30 September 2008 to 30 December 2008.

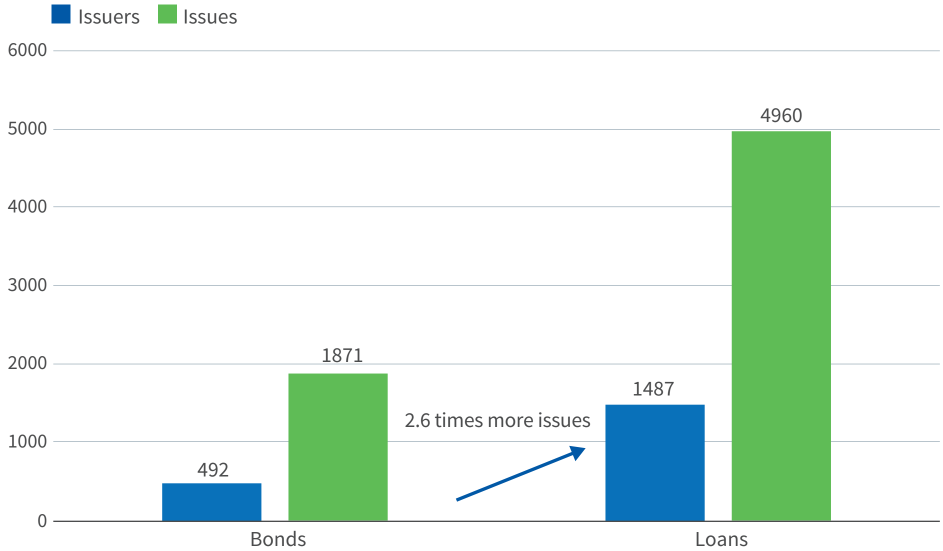
Improving diversification

Infrastructure investments are available in both private and public forms. Although the public market has greater trading volume, new debt issuance is typically limited to a small number of issuers, mainly in utilities and transport.

The private market offers a much wider range of opportunities. By accessing the private debt market, which has had around three times more issuers than public markets in the past decade, investors can enhance portfolio diversification. Many of the opportunities available are simply not available elsewhere - the majority (89 per cent) of the private loan borrowers did not issue publically during that period.

"Although the public market has greater trading volume, new issuance is typically limited to a small number of issuers, mainly in utilities and transport. The private market offers a much wider range of opportunities."

Figure 5. **Outstanding European infrastructure debt issued since 2007**
Number of issuers and issues



Source: Bloomberg, as at end of February 2019.

The potential for actual credit losses, particularly from project finance loans, also compares favourably with the wider credit market. Between 1992 and 2014, for example, the recovery rate for project finance loans was better than that for defaulted corporate bonds (80 per cent vs 43 per cent). That remained the case in downturns, when the recovery of corporate bonds tended to deteriorate.

Figure 6. **Recovery after default, in downturns and correlation with OECD GDP growth**

	Annual recovery rate (Ave. 1992-2014 (%))	Recovery in downturn (2001-2002 & 2008-2009 (%))	Correlation with GDP
Project finance loans	80%	84%	0.1
All bonds	43%	30%	0.28

Source: Moody's Default and Recovery Rates, OECD, as at 31 December 2015.

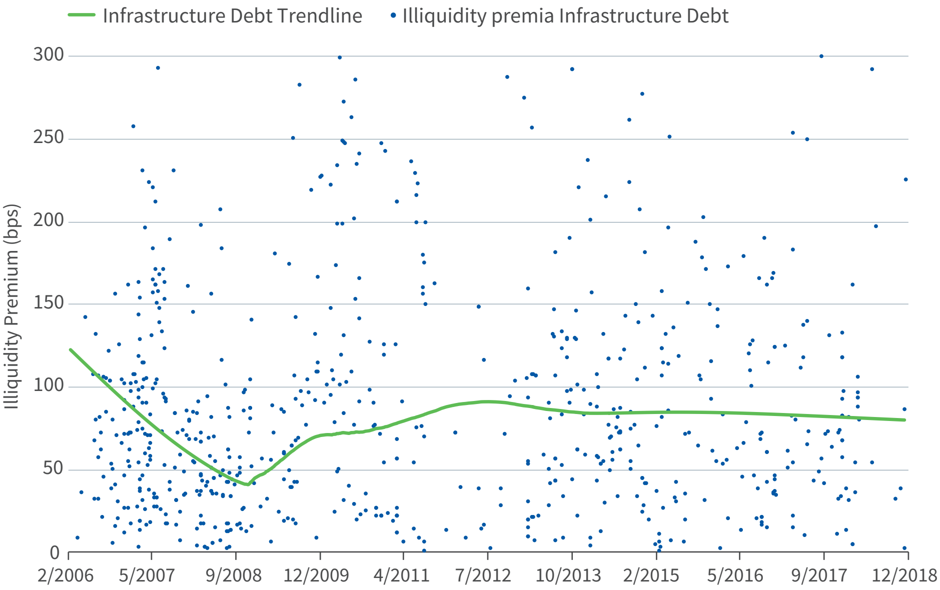
Capturing illiquidity premia

Private investments require significant resources to analyse, structure and negotiate. The added complexity in analysing regulation and contracts allows investors to secure an illiquidity premium for holding these assets.

There are many definitions of an illiquidity premium. At its most basic level, it can be defined as the excess return of private investment over a public benchmark that is comparable in terms of risk and duration. For debt, this translates into a higher return than comparatively rated corporate bonds, even before taking their lower risk characteristics into account. Although each infrastructure deal is unique, the essential difference is well established, as highlighted below.

> *"Private investments require significant resources to analyse, structure and negotiate. The added complexity in analysing regulation and contracts allows investors to secure an illiquidity premium for holding these assets."*

Figure 7. **Finding Illiquidity Premia**



Infrastructure debt: Reflects spread over risk-free rate in specific infrastructure debt transactions, with data compiled by IJ Global and Aviva Investors as at December 2018.

As private markets are less volatile than public markets, the illiquidity premium tends to narrow when public bond yields increase and widen when they ease. For this reason, while an illiquidity premium can be measured on individual assets, targets and performance might be more meaningful at a portfolio rather than asset level.

Financing a more sustainable economy

Driven by regulations and peer pressure, institutional investors are increasingly required to disclose how environmental, social and governance (ESG) issues and climate risk considerations are factored into their investment decisions. In addition to the alignment of investments to meet established climate change targets, ESG factors are also being more closely integrated into allocation decisions.

Under the Paris Agreement on Climate Change, signatories agreed to try to keep the average temperature increase across the globe below 2°C from its pre-industrial level. It is estimated that investments in renewables and energy efficiency must increase by at least one third in order to achieve this.

Many infrastructure sectors have significant environmental and social impact both during construction and operation. This impact can be positive, by delivering public services to society, for example, or enhancing productivity, but may also include risk factors such as noise during construction and emissions that must be assessed and mitigated. Experienced fund managers are increasingly integrating those factors into their due diligence.

By investing in public services and low carbon infrastructure, and recognising the importance of ESG criteria, investors can contribute to a well functioning economy and achieving sustainable development goals.

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Conclusion

Infrastructure is coming of age – investors seeking to fund long term liabilities are increasingly incorporating this asset class in the low risk, long duration part of their portfolio. Those providing essential services in markets with monopoly-like conditions or high barriers to entry can generate the kind of largely predictable cash flows that many long term investors are seeking. Inflation-protection and low correlation to developments in the wider economy are other key features with broad appeal.

Infrastructure offers a range of opportunities for return seekers, where the trade-off for greater complexity and illiquidity - particularly in private markets - can be reflected in the bottom line.

While levered investments might provide a higher headline return in the current low interest rate environment, they may be more severely impacted than unlevered equity or debt as interest rates rise or in an economic downturn.

To build a resilient portfolio, suitable resources and experience must be devoted to analyse, structure and manage these assets throughout their lives, with particular attention being paid to any changes to the regulatory environment. With these elements in place, access to a wide range of infrastructure investments can contribute to reducing asset volatility and delivering attractive and stable returns.

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