

May 2023

European Private Infrastructure Debt

A capital efficient asset class for insurance companies with potential ESG access

Over the past decade, allocations to private infrastructure loans have become increasingly popular with institutional investors. According to Preqin, assets under management in Europe have increased by more than 55 billion Euros since 2012¹. The appeal of the asset class is based on its unique characteristics such as stable cash flows, low default/loss rates, potentially strong ESG credentials, an attractive yield premium compared to equivalent corporate bonds and the ability to actively manage long-term liabilities. This paper is intended to take a more comprehensive look at the economic prospects of the asset class and examine the treatment of private infrastructure loans under Solvency II frameworks as well as the Risk-Based Capital (RBC) regimes in Asia-Pacific.

An anecdotal question among investors is whether the market for private infrastructure debt will continue to grow. From DWS's perspective, the rise in inflation levels and interest rates has created an attractive macro environment for private infrastructure debt. In an environment with late-cycle risks, it seems sensible to invest in an asset class that can potentially add stability and resilience to an overall portfolio.

What is infrastructure?

At DWS, an asset has to meet the following criteria to be classified as infrastructure:

- Assets that provide an essential and/or highly valued service to the economy or community,
- Assets in a regulated operating environment or an environment with high barriers to entry for competition,
- The potential to generate a stable, predictable income stream, and
- Assets that are backed by tangible assets.

In particular, the first criterion is a fundamental reflection of the resilient characteristic of private infrastructure debt. The financial development of infrastructure assets is usually lowly correlated to the overall business cycle. Even in times of crisis and market stress, a natural demand subsists for electricity or fast broadband. As a result, solar/wind parks or fibre optic networks should

continue to generate stable cash flows to service outstanding debt.

The European infrastructure market has substantially transformed over the recent years. Historically, institutional investors allocated strongly in "Core" infrastructure loans e.g. financing to utilities, prime airports or public-private partnerships (PPPs).

After the Global Financial Crisis (GFC) in 2007/08, the investment pattern changed as the low interest rate environment made investments into private infrastructure debt quite attractive. The introduction of Basel III also resulted in a reduction of long-term lending activity by banks.

However, the financing gap was quickly bridged with capital from institutional investors, particularly from the insurance segment. The possibility to achieve attractive positive risk-adjusted returns in an environment with negative base rates has significantly increased appetite to add exposure to Core Infrastructure Debt. As a result, this has led to margin compression after the end of the European debt crisis. Consequently, yield levels, especially in the renewable energy space, receded.

To maintain return levels that can provide an attractive premium over comparable publicly-held corporate bonds, many investors started to go down the risk spectrum by

¹Source: Preqin, EUR 55mn increase related to period from December 2012 to September 2022.

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considering infrastructure categories such as “Core-Plus”, “Value-Add” or “Opportunistic”. However, segments like Core and Core-Plus remain most relevant for insurance companies, as usually only high-quality private senior infrastructure loans can be associated with lower capital charges (e.g. in the context of Solvency II).

Increased investment opportunities with ESG flavour

Private infrastructure debt is largely associated with energy transition, digital modernisation and social change. Investors have the opportunity to finance specific infrastructure projects or medium-sized infrastructure companies. The ongoing demand for financing can also lead to increased sector diversification. In Europe, the current energy crisis has emphasised the need to become energy independent and less reliant on fossil fuels, especially from countries outside the European Union.

Similarly, there are other sectors in need of transformation. The Covid crisis has made it clear that there is a strong need for the availability of secure, reliable and fast broadband, which will require the expansion of fibre optic networks and 4G/5G telecommunication towers. There is also great demand for social infrastructure.

By 2027, the EU green transition will require EUR 349bn investments each year in the transport, buildings, power, and industrial sectors. Part of this will be financed by the EU, leaving an investment gap of EUR 250bn to meet these targets and require private sector support.²

From our point of view, investments in private infrastructure loans offer investment opportunities that appear aligned with the European transformation

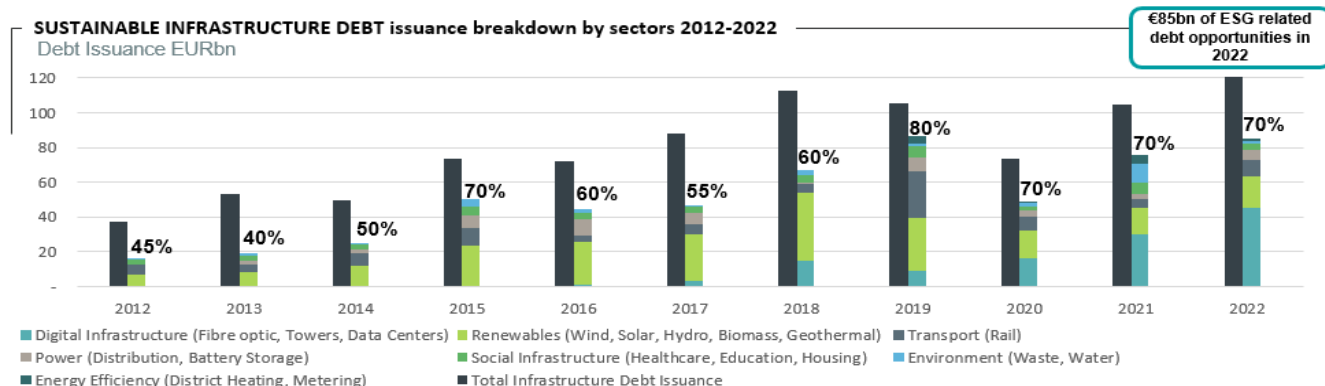
initiative. Over the past decade, for example, the market has experienced an increased supply of ESG-focused infrastructure loans and strong interest from institutional investors for investments in sustainability-themed investment sectors. While the annual transaction volume of ESG loans was only EUR 17.5 billion in 2012, it has grown to EUR 84 billion in 2022 with the trend to rise further over the coming years.³

On average, ESG transactions already account for approximately 60% of the infrastructure loan supply (see chart). This development is accompanied by steadily increasing sector diversity. Accordingly, investors can theoretically be provided broad and diversified access to the European infrastructure loan market with a focus on ESG. This can, therefore, allow asset managers to develop portfolios with a focus on traditional sectors such as renewable energy or transportation, but also innovative sectors such as digital infrastructure, social infrastructure, waste to energy, data centres or electric charging stations.

Economic advantages of infrastructure loans

DWS believes that private infrastructure loans can offer the following financial benefits to investors:

- Consistent illiquidity premium compared to equivalent publicly-traded corporate bonds,
- Low historical default and loss rates to liquid corporate bonds with similar credit quality,
- Credit profile with a relatively high degree of resilience including periods of rising inflation, and
- Lowly correlated to default rates of non-financial corporate bonds.



²Source: State of Climate Action 2022 | State of Climate Action 2022 | World Resources Institute (wri.org); Climate & Company study for Agora Energiewende “Critical review of the potential contribution of the European Commission proposal for an EU Recovery and Resilience Programme and a new Multiannual Financial Framework to achieving the objectives of the Green Deal and the 2030 and 2050 climate targets”

³Source: DWS, InfraDeals download, as of December 2022. Past performance is not indicative of future returns.

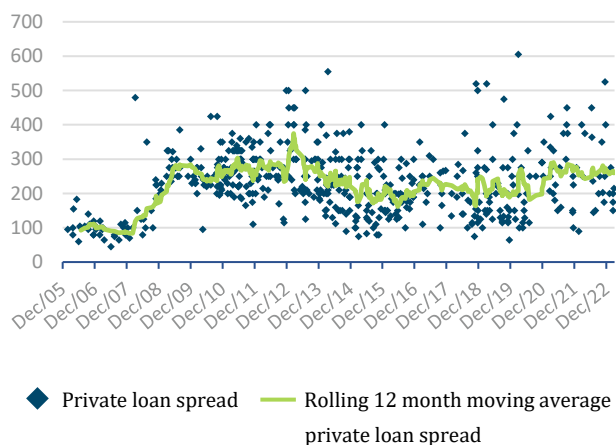
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Consistent illiquidity premium

The current interest rate environment is certainly not comparable to the low interest rate environment of the last decade. Investors are currently in a market environment of rising inflation and interest rates. As a result, the Euribor 6-month interest rate has increased by more than 300 basis points since the beginning of 2022.

Over the past 15 months, we have seen a significant increase of target returns for Senior infrastructure loans, driven by the rise in base rates. Investors can therefore again achieve yield levels that were accessible almost 10 years ago.

Spread development in basis points for private infrastructure loans (Europe)



Source: Inframation News, March 2023.

The ability to invest in fix and floating rate loans also allows investors to position themselves more defensively towards future interest rate changes. Regardless of the interest rate environment, private infrastructure loans with senior investment grade quality should realise a premium of 100-150 basis points over comparable liquid corporate bonds.

Lower historical loss rates than public corporate bonds

Infrastructure loans with investment grade quality generally have similar historical average default rates as non-financial corporates with similar credit quality. However, below investment grade infrastructure loans have significantly lower default rates compared to their non-financial corporate counterparts. According to Moody's data in the following charts, the average historical default rate for

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infrastructure loans rated BB/Ba2, is less than half the level of non-financial corporate bonds with the same credit rating.

One year default and loss rates infrastructure loans

	Default rate	Loss rate
Infrastructure loans BBB	0.15%	0.07%
Non-Financial Corporates BBB	0.09%	0.06%
Infrastructure loans BB	0.38%	0.15%
Non-Financial Corporates BB	0.82%	0.50%

In addition, senior infrastructure loans have higher recovery rates compared to non-financial corporate bonds due to the real asset collateral in the event of a default.

Comparison recovery rates infrastructure loans and corporate bonds

	Senior Secured	Senior Unsecured	Sub-ordinated
Infrastructure loans	68%	57%	34%
Non-Financial Corporates	55%	38%	33%

Source: Moody's default and recovery rates (1983-2020)

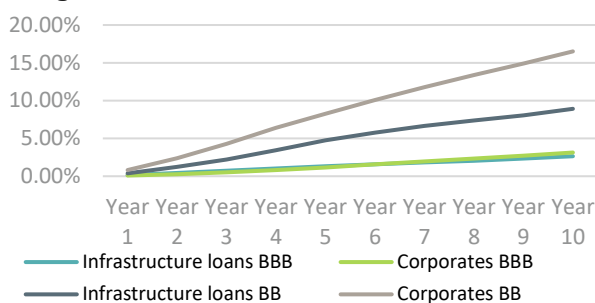
Consequently loss rates are comparable between infrastructure loans and non-financial corporates with investment grade credit quality. Loss rates are however significantly lower in the speculative-grade segment of the market for infrastructure debt

The resilient nature of infrastructure loans is also evident over time. In case of financing for infrastructure projects, the amortising repayment structure leads to a constant improvement in the credit profile with a flattening effect for cumulative default levels.

It is important to note that the default and loss rates listed above are based on historical data for the past 37 years. Investors need to be mindful whether historical default rates are representative for the current market environment. For example, the rating agency Fitch expects default rate of 2.50-3.50% in 2023 for speculative corporate bonds in Europe. This is expected to increase to 3.0-4.0% in 2024.⁴

As part of the underwriting process, lenders can also require the inclusion of financial covenants, to ensure the payment of interest and principal over time. Loans are also secured with real assets, which gives investors better possibilities to recover a significant amount of their nominal capital in case of a restructuring or default scenario.

Average cumulative default rates



Source: Moody's default and recovery rates (1983-2020)

The key factors why default and loss rates are lower for infrastructure loans is driven by key characteristics specific to the asset class. For example, borrowers are usually well-funded mono- or oligopoly businesses. In addition, revenues are very often contractually guaranteed including inflation linkage, while demand is inelastic.

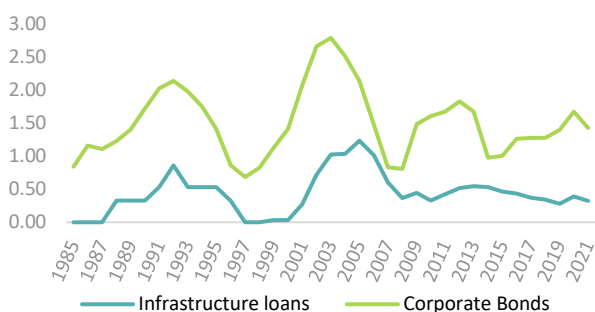
Resilient credit profile during periods of rising inflation

The asset class is also suitable for investors in an environment of rising inflation, as very often the contractual framework agreements enable companies to adjust prices in line with inflation. As a result, revenues are partially or fully hedged against changes in inflation, which means that loan repayments and interest payments have a more stable long-term profile.

Lowly correlated default rates

In addition, default rates of infrastructure loans are lowly correlated to default rates for corporate bonds, which also makes the asset class interesting from a diversification point of view. For example, the 1-year default rate on infrastructure loans has a correlation of 0.47 to non-financial corporate bonds.

Rolling average 5-year default rates



Source: S&P 2021 Annual Infrastructure Default and Rating Transition Study

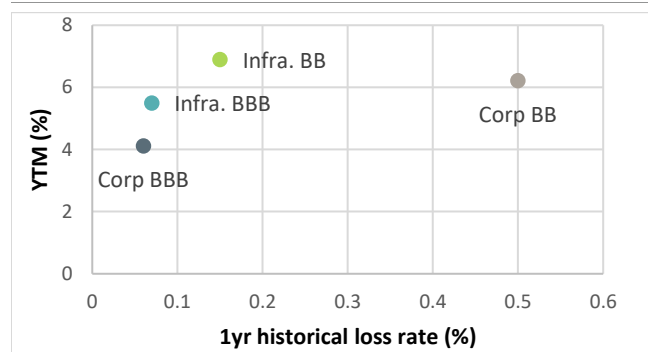
Higher yields with stronger credit profile compared to publicly-traded corporate bonds

In summary, the investment case for private infrastructure loans becomes particularly evident when considering default and loss rates. With a relatively lower risk profile compared to liquid corporate bonds, when considering default and loss rates but also default correlations, private senior investment grade infrastructure loans can deliver an illiquidity and complexity premium in the range 1.0-1.5% p.a.

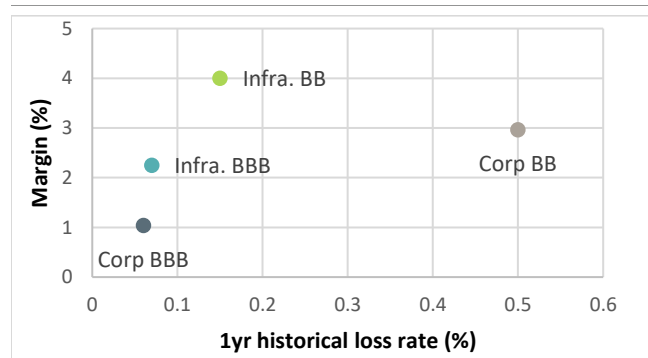
⁴ Source: Fitch, December 2022. <https://www.fitchratings.com/research/corporate-finance/us-euro-corporate-default-rates-to-continue-ascent-in-2023-2024-15-12-2022>

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YTM in comparison to historical loss rates: Private Infrastructure Debt vs. Non-financial Corporate Bonds



Margin in comparison to historical loss rates: Private Infrastructure Debt vs. Non-financial Corporate Bonds



Source: S&P 2021 Annual Infrastructure Default And Rating Transition Study

A simple calculation illustrates the attractiveness: the spread of private infrastructure loans in the BBB range are almost 32 times higher than the average historical 1-year loss rates. For equivalent liquid corporate bonds the number is only 17x, which highlighted the strong risk-adjusted nature of private infrastructure loans.

When conducting the same comparison for BB ratings the spread for private infrastructure loans is 27 times higher than the average historical 1-year loss rates. On the liquid side for non-financial corporates it is only 6 times.

The comparison is already impressive on the basis of average historical loss rates. Given the expectations for default rates over the next 12-24 months as outlined earlier in the paper, the investment case for infrastructure loans becomes even more evident, especially when looking at the higher quality part of the market.

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Solvency II regulation

Private infrastructure loans offer Solvency II investors an attractive opportunity to offset their usually long-term liabilities with long-term investments that promise attractive returns despite their often low-risk nature. The special treatment introduced for certain infrastructure assets since 2017 results in significantly increased capital efficiency, which can meaningfully increase the attractiveness of private infrastructure loans compared to other asset classes.

Classification of infrastructure assets under the Solvency II framework

Since 2017, the Solvency II regulation has allowed investors to apply reduced capital charges for infrastructure investments under certain conditions. This applies to both types of infrastructure exposure, i.e. equity and debt (bonds and loans).

Under Solvency II there are basically four options how private infrastructure loans can be treated from a capital requirement perspective in relation to spread risk:

1. Loan is guaranteed by a public institution, which qualifies for a spread stress factor of 0 (zero),
2. Loan is provided to a Qualifying Infrastructure (QI) project,
3. Loan is provided to a Qualifying Infrastructure Company (QIC), and
4. Infrastructure loans that do not fall under any of the first three categories can be classified as Non-Qualifying Infrastructure.

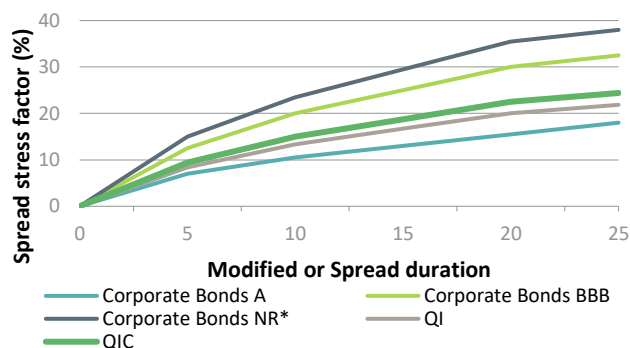
Category 1 is usually associated with project finance transactions, which can be at a municipal or regional level, but can also be related to the financing of international export businesses. Due to the complex nature of such loans, public guarantees are quite common for this type of financing. While this can lead to advantageous capital treatment under Solvency II, the range of such financing opportunities is often limited, as these segments are usually still heavily dominated by banks due to their high capital efficiency under Basel III.

On the other hand QI and QIC offer greater sector diversity with usually higher margins for lenders. Additionally, the spread stress factor for these types of loan opportunities is significantly reduced, which results in a high degree of capital efficiency for insurance companies, also in comparison to other asset classes such as publicly-traded corporate bonds.

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But even if infrastructure loans do not fall under categories 1-3, risk-return profiles and diversification opportunities can be quite attractive for investors. For example, by going down the capital structure and across the risk spectrum, investments into junior infrastructure debt can deliver a higher level of income, while the underlying project remains stable from a credit and cash flow perspective.

Spread stress factor for QI and QIC loans in comparison to liquid corporate bonds



*Non-rated. Source: Delegierte Verordnung (EU) 2015/35, May 2023.

Preferred treatment under Solvency II – which criteria need to be fulfilled and what are the benefits for QI/QIC?

In order to apply reduced capital requirements for the spread risk of private infrastructure loans, insurance companies are obliged to assess the suitability of such investments based on defined criteria.

For example, QI loans need to prove that cash flows generated by the infrastructure asset are sufficient enough to service all financial obligations even under stress scenarios. On the other hand, QIC loans need to provide evidence that the majority of their income is linked to an

infrastructure asset and based within the European Economic Area (EEA) or the OECD.

For both QI and QIC other criteria, that go beyond project or company-specific requirements, there are also insurance company considerations. They need to provide evidence that infrastructure loans are to be held until maturity. The spirit of the regulatory framework under Solvency II emphasises that the insurance company is accountable for the assessment of infrastructure loans and cannot outsource this to a third-party (e.g. asset manager).

Furthermore, the loan itself has to meet certain criteria. If the loan has an official external rating, it needs to be of investment grade quality. However, if the loan is unrated, which is usually the case, the loan has to be senior within the capital structure.

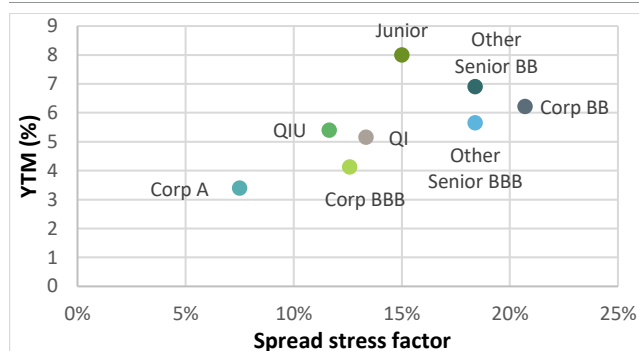
Investment managers with expertise in insurance regulation can assist insurers with a proper assessment of QI and QIC loans under Solvency II. This can serve as guidance for insurance companies when classifying such investments as part of the internal audit and accounting process. Through a checklist insurance companies can provide sufficient evidence to support why an investment has been classified as QI or QIC to justify the application of a reduced spread stress factor.

How attractive are private infrastructure loans compared to other asset classes under Solvency II?

Compared to traditional liquid asset classes, private infrastructure debt investments are not only potentially attractive from an economic perspective but also offer regulatory benefits.

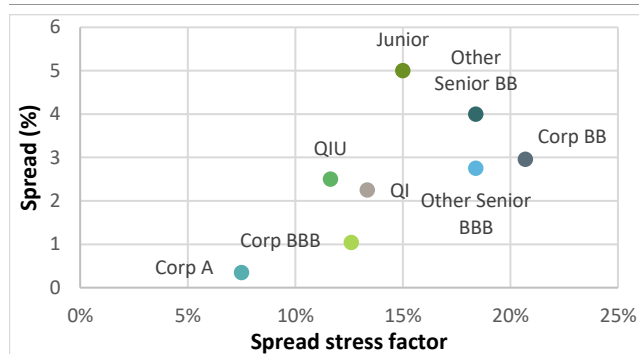
Next to the attractive risk-adjusted nature of the asset class, evident in the premium over equivalent publicly-traded bonds with low historic default and loss rates, it is also a capital efficient investment from a regulatory perspective. In particular senior infrastructure loans can benefit from regulatory upside when considering YTM/Margin levels in relation to the spread stress factor. It also allows for an efficient matching of long-term liabilities, clearly beneficial to insurance companies with a life background.

Yield comparison to spread stress factor: QI and QIC loans versus other asset classes



Source: DWS, Bloomberg. Stand May 2023

Margin comparison to spread stress factor: QI and QIC loans versus other asset classes



Source: DWS, Bloomberg. Stand: May 2023

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Treatment of private infrastructure loans under risk-based capital (RBC) regimes in Asia-Pacific

Most jurisdictions in Asia-Pacific have recently implemented – or are currently in the process of implementing – more advanced risk-based capital (RBC) regimes under which an insurance company must hold capital for the risk that it takes, including investment risks. In many cases, the new regimes are based on – or are at least inspired by – the global Insurance Capital Standard (ICS), which in turn has similarities with Europe’s Solvency II regime.

Classification of private infrastructure loans under RBC

Unlike Solvency II in Europe, most RBC regimes in Asia-Pacific do not allow for reduced capital charges for qualified infrastructure debt investments that would reflect the potentially lower credit risk of loans collateralized by infrastructure assets with stable cash flows. Hence, loans to infrastructure (project) companies are usually treated in the same way as other uncollateralized loans made to corporates. However, also some jurisdictions in Asia-Pacific are currently exploring more beneficial capital charges for qualified infrastructure investments including Japan, Hong Kong and Singapore. Also, South Korea’s new K-ICS regime already allows for reduced capital charges for some infrastructure investments.

In absence of a dedicated capital charge, an infrastructure loan is treated in the same way as any other loan subject to a capital charge for its credit/spread risk. This capital charge can cover both the default-related credit risk and the risk of non-default-related spread widenings and is typically either determined by a factor-based approach or – in most cases – a stress-based approach. In a factor-based approach, there are prescribed capital charges for a loan that typically depend on its credit rating (if any). In a stress-based approach, an insurer typically has to re-value the loan using a prescribed credit spread widenings that again mostly depend on the loan’s credit rating. The capital charge is then defined as the loan’s decrease in value due to the stressed credit spread. Some RBC regimes do not require a full re-valuation of the loan but also allow for a simplified duration-based approach to approximate the loan’s decrease in value based on its (credit) duration.

Like other private loans, infrastructure loans are typically not rated by an external rating agency and only a few RBC regimes in Asia-Pacific allow for the use of internal ratings when determining a loan’s capital charge.

RBC implementation by country

Jurisdiction	Risk-based capital regime	(Expected) effective date
Australia	Life and General Insurance Capital Standard (LAGIC)	2013
China (Mainland)	C-ROSS Phase II	2022
Hong Kong SAR	Hong Kong RBC (HKRBC)	2024
Indonesia	Indonesia RBC	2017
Japan	Economic Value-based Solvency Regime	2025
Malaysia	Risk-based Capital Framework	2024
Philippines	Philippines RBC 2	2017
Singapore	Singapore RBC 2	2020
South Korea	K-ICS	2023
Taiwan	T-ICS	2026
Thailand	Thailand RBC 2	2019

Source: DWS, as of April 2023

In the absence of any rating, unrated loans would typically be treated like exposures rated BBB/BB, i.e. somewhere in the cross-over segment between investment grade and high yield instruments. Under those RBC regimes that will largely be based on the ICS (such as Japan, Korea and Taiwan), the capital charge also depends on the seniority of a loan with subordinated loans being treated like preferred equity, typically being subject to a higher capital charge.

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Summary

While Infrastructure Debt remains an attractive asset class for institutional investors, investors can now realise potentially higher returns due to the increase in base rates. From a relative perspective, there would be a preference for Senior Debt Loans as yields are now at a level last observed almost a decade ago and the credit profile remains highly resilient. Furthermore, DWS also has the view that the current paradigm of elevated interest rates in Europe is unlikely to change over the short- to medium-term as Central Banks are unlikely to reverse the current hiking cycle while inflation does not move back to target levels in a sustainable way. This environment would therefore support these debt instruments.

Throughout multiple crisis periods--the European Debt crisis, Brexit, Covid pandemic, and Ukraine war--Senior Infrastructure Debt has demonstrated long-term cash flow certainty as the asset class is lowly correlated to business cycles, particularly throughout bearish credit periods. In addition investors can benefit from the following economic advantages:

- Consistent illiquidity premium compared to equivalent publicly-traded corporate bonds,
- Low historical default and loss rates in comparison to liquid corporate bonds with similar credit quality,
- Credit profile with a relatively high degree of resilience including periods of rising inflation, and
- Lowly correlated to default rates of non-financial corporate bonds.

In addition to the mentioned economic advantages, private Infrastructure Debt offers attractive opportunities to insurance companies regulated under Solvency II. Private Infrastructure Loans model to be an efficient way to actively manage long-term liabilities while benefitting from reduced capital charges under the Solvency II framework. Despite the risk averse credit characteristics, insurance investors can harvest a premium against liquid sovereign and corporate bonds. As for Asia-Pacific, some countries have already aligned (e.g. South Korea) or are in the process (e.g. Japan, Hong Kong and Singapore) of aligning their local regulatory framework for insurance companies with elements of Solvency II regulation. Over time this might also lead to lower capital charges when investing into private Infrastructure Debt.

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