INFRASTRUCTURE DEBT PORTFOLIO CONSTRUCTION

In research drawn from the Investment and Governance Characteristics of Infrastructure Debt Instruments research chair at EDHEC-Risk Institute, supported by Natixis, Frédéric Blanc-Brude and Omneia Ismail discuss the risks in and portfolio diversification of infrastructure debt.

In recent research conducted with the support of Natixis, we examined the known investment characteristics and portfolio diversification properties of infrastructure debt. We focused on project finance debt since it represents the bulk of existing and, in all likelihood, future infrastructure debt.

Our objective was to highlight the credit risk characteristics for the purpose of institutional investing, in the context of the need for long-term assets creating predictable cash flows, both to manage liabilities and also to minimise exposure to capital market volatility. The research was conducted from a portfolio standpoint, on a held-to-maturity basis, because the distinctive nature of infrastructure project debt is best captured through the lens of credit risk.

We reviewed the conclusions of existing academic work on corporate financing and the role of banks in the decision to finance new projects and originate new loans in project finance. The corporate finance literature recognises the distinctive nature of project financing. In this context, we argue that infrastructure project finance debt is the result of specific choices about the financing of new investment projects by private firms or the public sector. It implies a preference for delegating this investment to a third party via a dedicated corporate structure. This, in turn, requires the selection of the project for dedicated limited-recourse financing by lenders, following the self-selection of project sponsors to invest equity at risk in a single-project, highly leveraged special purpose entity.

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As a consequence, we argue that the average infrastructure project financing, that is, the bulk of investable infrastructure securities, is unlikely to be the same thing as the average infrastructure project. Instead, only high-quality projects and managers should be found within structures that create such self-imposed, high-powered incentives and discipline mechanisms, while the rest of infrastructure projects are typically financed directly by the public sector.

Project finance, because it is single purpose, time-bound and self-contained, has to demonstrate financial viability ex ante with a high degree of probability. In other words, project finance leads to self-selection and signalling that should minimise the adverse selection and moral hazard which otherwise characterises corporate finance, especially on the credit side.

> **"THE EARLIER YEARS OF PROJECT DEVELOPMENT...** PROVIDE DIVERSIFICATION POTENTIAL IN A PORTFOLIO OF INFRASTRUCTURE DEBT

Project finance can be seen as a specific form of corporate governance, in which lenders play an instrumental role at the investment decision stage. We argue that the structuring of project finance debt can be described as an optimisation exercise in which lenders can set most of the parameters usually controlled by the management of the firm in classic corporate finance.

In particular, lenders can use the price and non-price dimensions of debt instruments, including maturity and repayment profiles, to maximise the net present value of project debt, while minimising credit risk through the use of covenants and extensive control rights over the project free cash flows. Hence, because of the endogenous nature of credit risk in project finance, infrastructure debt is fundamentally different from corporate debt.

Pricing, default rates and recovery levels

In the second part of our research, we analysed the determinants of project loan pricing, that is, the determinants of infrastructure project finance debt spreads over a benchmark rate. We conduct the first panel regression analysis of infrastructure loans and find that the turning of the credit cycle after 2008, while it contributed significantly to increasing the average level of credit spreads, did not change the relationship between risk factors and risk pricing in project finance.

In the third part, we reviewed one of the most comprehensive data sets on defaults and recovery in project finance from Moody's. The study reports low default rates in project finance and very high recovery levels. We conclude that the credit risk migration of project finance debt can be modelled as a continuous function of time from origination for the average individual loan, that is, as project loans mature they become systematically less likely to default.

Drawing from the credit risk literature we propose an expected return measure for an infrastructure debt portfolio, calculated as the difference between the credit spreads discussed previously and the expected loss, itself the product of probability of default and loss given default. We introduce a year-from-origination notation to account for the changing nature of credit risk in infrastructure debt as well as the presence of time-variant credit spreads.

Likewise, we propose a portfolio risk measure adapted from Altman: the unexpected loss measure as the product of the loss given default estimate and the variance of the probability of default, which follows a Bernoulli distribution and is thus easily calculated from observed or modelled probability of default. We conclude that the predictable credit risk migrations found in infrastructure debt match the observed changes in spreads that characterise debt pricing in project finance and that their combination can play an important role in a portfolio of infrastructure loans. Having determined an expected return and a credit risk measure for infrastructure project debt, we address the question of default correlations and portfolio construction in the fourth and final part of our research.

Using the Moody's results, we derive an empirical analysis of default correlations for project finance debt. We show that the lifecycle of project debt explains a significant proportion of default rates and thus signals a predictable decrease in default correlations with the lifecycle.

We also show that significant diversification potential exists across the project lifecycle. In particular, we conclude that the earlier years of project development during which project debt is more likely to default – but is also better remunerated – provide diversification potential in a portfolio of infrastructure debt. This dimension of infrastructure debt, because it is largely systematic and predictable, must be taken into account when building solutions for investing into infrastructure debt.

Transparency and stability

Our analysis points firmly in the direction of a potential consensus between institutional investors looking for long-term assets, such as infrastructure debt, and the public policy objective of having substantial amounts of new capital committed to building new infrastructure assets to support economic growth.

The mechanisms at play in project finance play a pivotal role to arrive at this result. For the convergence between institutional investor's needs and public policy to occur, projects must continue to be selected on the basis of their credit quality and risk should be priced adequately according to the systematic risk factors, both between projects and over their lifecycle.

The completion of the construction period in infrastructure project finance leads to a predictable credit risk migration across project and macro-level risk factors. So remunerating credit risk appropriately across the lifecycle allows investors to capture substantial diversification benefits and requires that construction risk (that is, new projects) be included in their portfolios.

In turn, the public sector can get new infrastructure built to support future growth. However, it must also commit to the quality and standardisation of the contractual frameworks used to procure these projects, to the stability of the regulatory framework and to a transparent and significant pipeline of future projects leading to new debt issuance, which will prove essential to maintain portfolios of infrastructure debt at the desired level of return and risk.