2.4 THE TREATMENT OF RISK, UNCERTAINTY AND COMPLEXITY IN PROJECT FINANCE: A BANKER'S PERSPECTIVE

Mark Lemmon

Introduction

A large international bank exists to make profits for its shareholders – most specifically to optimise returns on the amount of capital it has available to deploy given the level of risks it undertakes in doing so. It must take other stakeholders appropriately into account of course when seeking to optimise returns for shareholders. Among these are its clients, who will be the source of future profits, always assuming the right balance is achieved between responding innovatively and competitively to each client's needs for banking services while not under pricing in response to unreasonable relationship pressures. With an eye on all stakeholders, a large banking group also needs to nurture a reputation for conducting business to the highest possible standards of honesty and integrity and with due care for the environmental and social impact of its own direct operations and the impact of the operations of the clients which it supports.

Such a bank is a portfolio of various product businesses, each using different amounts of capital and facing different risk profiles in undertaking their work and generating revenues. Key among the tasks of senior management of a major international banking group is to determine the amounts of capital to devote to each of the products and to set appropriate return targets for each of them with a view of achieving the right balanced portfolio mix of products and risks and to optimising the returns on capital from the overall portfolio.

I will address the treatment of risk, uncertainty and complexity from the perspective of project finance – one product business within the overall portfolio of a large international bank. Although the portfolio of risks which a project finance banking business takes on is only a subset of the larger group of risks which exist within the much wider portfolio of the whole banking group, the generic goals of such a business are analogous to the goals of the whole group. The mindset and tools with which a bank project finance business measures risks and uncertainties have elements which are specific to the products it provides and the business it undertakes. The generic motives for assessing risk however are held in common with all banking businesses and with the overall portfolio objectives of the bank. These are to evaluate the risks of each case it considers so it can create the optimum transaction structure for its clients within the limits of risk it is prepared to undertake and measure the amount of the bank's capital required for each case so that it can set a price for its support which will achieve or exceed the target return on capital which has been set by senior management.

The approach to assessing risk and addressing complexity and uncertainty

Greenfield and brownfield infrastructure assets, developed and owned by the private sector, are typically funded using capital structures with high levels of 'senior debt'[1] leverage. Infrastructure is used here to refer to major power, energy, social accommodation and some telecoms sector investments as well as for major transportation projects. The debt arranged for such transactions is typically limited recourse – that is to say that the senior debt is repaid only with cashflows derived from the infrastructure asset itself together with tightly delineated additional contingent equity and/or contractual support. Levels of senior debt can range from c. 70% of the total funding requirement for a project exposed to (for an infrastructure asset) a relatively high level of business / market risk to more than 90% for PPP style infrastructure projects with low levels of business risk. This compares to, say, 0% to 40% for a typical investment grade corporate financing, and, say 40% to 60% for a typical 'leveraged' corporate financing.

High levels of gearing significantly reduce the weighted average cost of capital, something which is both desirable and necessary for the financing of infrastructure projects because:

- infrastructure assets typically earn relatively low levels of return on capital, and therefore low costs of capital are required in order for them to be provided economically;
- private sector owners and financiers of infrastructure assets are often competing (directly or indirectly) against government funding or ownership, and therefore low funding costs are required to be competitive;
- infrastructure assets often require large amounts of capital and the use of debt allows significantly more capital to be deployed than would be possible using non-debt sources alone.

However, a high levels of debt brings with it potentially high levels of financial risk. As debt service payments represent a fixed and unavoidable cashflow cost, for any given asset a higher level of debt means higher debt service payments and therefore a greater risk of debt service default in the event of any impairment to the cashflows generated by the asset.

These levels of debt are possible for many specific cases because financiers within the project and infrastructure finance teams of major financial institutions have developed a high level of skill in assessing the risks inherent in infrastructure projects and in ensuring that project structures are robust enough to manage and mitigate these risks whilst maintaining payment of the levels of debt service arising from high leverage.

Below the general approach senior debt financiers typically take to assess project risks is outlined, together with some of the structuring techniques that can be used to respond to risks. Subsequently more specific areas of risk are listed, and for each type of risk reviews examples of techniques that may be appropriate for its management are noted.

[1] This is a class of debt that has priority with respect to interest and principal over other classes of debt and over all classes of equity by the same issuer. In the event of financial difficulties or liquidation of the borrower's assets, holders of senior debt will have a priority claim. Because senior debt has a relatively secure claim, it is less risky from the point of view of the lender and it pays a lower rate of interest compared with debt of the same issuer having a subordinate claim (Scott, 2003).

Risk assessment and structuring responses

As the repayment of limited recourse debt is limited to the combination of cashflows arising from infrastructure asset and defined additional contracted support a rigorous approach to the identification and assessment of risks is required. Once risks are quantified and understood they can be assessed against the contingencies within the project structure and the allocation of those risks to the various project parties. The detailed structuring of the debt then responds to this 'net' risk position.
This general approach can be described as:

Risk assessment – the detailed review of individual risks to establish a range of likely outcomes: base case, downside, upside, worst case, etc. Debt financiers will typically focus on a base case outcome for a risk (i.e. the 'most probable' outcome) and critically on a range of downsides, e.g. 'reasonable worst case' and 'absolute worst case' outcomes. These outcomes are expressed as financial projections and analysed using long-term cash flow forecast models that show the financial consequences of a particular risk emerging over the life of the debt service or asset – perhaps up to 35 or 40 years for the longest term transactions. In order to assist them in their assessment of risks, financiers will typically commission due diligence reports from independent experts covering technical, market, legal and insurance (and if necessary other) aspects of the project which seek to identify and quantify project risks from the point of view of the respective consultant.

Contingency assessment – base case project cashflows contain contingencies in a number of areas such as:

- ***cover ratios***, i.e. cashflows in a particular period over and above those required to meet scheduled debt service – cover ratios are relevant if costs increase or revenues are lower than in the base case as a result of risks emerging as they measure the surplus cashflow available to absorb the additional costs arising from risks before debt service is threatened;
- ***tail,*** i.e. cashflows generated later than the last period of scheduled debt service – tail is relevant if it becomes necessary to reschedule debt repayments as a result of delay or inability to pay during the scheduled debt service period;
- ***reserves,*** i.e. cash held in reserve in the event of unexpected additional costs or shortfalls in revenues – reserves can be specific, e.g. maintenance or change in law cost reserves, or general, e.g. a debt service reserve;
- ***contingencies,*** i.e. areas of the base case cashflow assumptions which are prudent and contain contingency – examples might include a cashflow forecast which assumes a revenue start date later than that included in the construction timetable or project cost assumptions that include explicit safety margin;
- ***equity,*** i.e. contractual provisions that require the contribution of base (or additional) equity or other cashflows from project participants in the event that specific project risks and/or cashflow shortfalls occur.

As contingencies are always used up before debt service is threatened contingencies can be directly compared to the levels of identified risk using cashflow models to test whether the occurrence of particular risk can be withstood.

Contractual allocation – not all risks are suitable to be managed solely (or at all) through cashflow contingencies: unsuitable risks tend to be risks which are either unmanageable by the borrower because of their nature, or which are too great in effect to be managed by the

borrower. Examples of risks which fall into both the 'unmanageable' and the 'too great' include insured risks and construction risks. These risks are typically contractually allocated to parties who are able to manage and/or price such risks. For the examples mentioned, insured risks are typically allocated to insurance companies through insurance subcontracts, and construction risks are typically allocated to construction subcontractors.

Contractual risk allocation can be very finely tuned through complex contractual provisions within the concession agreement and subcontracts entered into by limited recourse borrowers to allow risks to be shared and capped between different parties within the project arrangements. These parties usually (but not always) include, in addition to the borrower itself, a concession grantor, a construction contractor, an operator, insurers and equity providers, and risks are allocated according to the willingness and capability of each of these parties to manage and price the risks in question.

Contractual risk allocation also seeks to minimise conflicts of interest between the various project parties and to align incentives where possible, for example by allocating construction cost risk to the construction contractor so as to reduce the (mis)incentive for the construction contractor to inflate construction costs to increase its own revenues at the expense of the borrower.

Debt structuring – debt structures are developed to respond to the balance of risks assessed and the offsetting contingency and contractual allocations. Debt structures can be tailored in a number of key ways including:

- ***debt quantum*** – the total amount of debt that can be sustained by a particular project structure is assessed as the level of debt that can be repaid (to schedule) under all reasonable downside cashflow scenarios when all contingencies and risk allocation is taken into account. This tends to mean that projects with higher levels of inherent risks have lower levels of gearing than projects with lower levels of inherent risks. It is also worth noting that there is a direct relationship between debt quantum and certain types of cashflow contingency – project with lower levels of gearing will tend to have higher cover ratios than projects with higher levels of gearing and so will have a higher level of contingency to match against their higher levels of inherent risk.
- ***debt tenor*** – debt tenors can be extended for as long as cashflows from the project asset in question are reasonably predictable. For PPP style projects where cashflows are generated though fulfilling simple availability obligations under a long-term contract with certain income this is sometimes only constrained by the asset life itself and debt tenors can extend to 35 or even 40 years. However infrastructure assets exposed to greater levels of business (i.e. market demand) risk can justify only shorter debt tenors as cashflows become unpredictable beyond a shorter period.
- ***debt profiling*** – debt repayments can be profiled to match the forecast cashflows of the borrower – a simple example of this is the provision of grace periods until a construction period is forecast to be complete. A more complex example is the use of index-linked debt to better match the underlying cashflows of infrastructure assets, for example, where a toll road has the right to increase toll levels each year by general inflation. If debt tenors are significantly shorter than the projected total useful asset life then debt may move away from 'full repayment' style to include an element of 'bullet repayment' in which financiers make an assumption that new debt can be raised on maturity to repay the original debt.
- ***debt covenants*** – debt agreements can enforce the management of the borrower by requiring it to maintain levels of contingency through the life of the borrowing, for example by proscribing the payment of dividends in the event that cover ratios fall below

set levels, reserve accounts are not maintained, project performance is not to a high enough standard, subcontractors do not fulfil obligations, etc.

Specific risk analysis

Financiers will use a combination of the analysis and structuring techniques described in the section above to seek to ensure that debt service can be maintained as scheduled if any single risk occurs at an 'absolute worst case' level and if a number of risks occurs at the 'reasonable worst case' level.

This section reviews typical example project risks by type with examples and indicates examples of the type of techniques often applicable to that type of risk. It does not profess to be a comprehensive list of all possible risks.

It should be noted that project and infrastructure finance transactions tend to be highly bespoke. No transaction is the same as another and the risk solution applicable in one instance will not necessarily be appropriate for the next, even if the assets appear superficially similar. Obvious differences exist in terms of location (e.g. similar project to be built in different countries where different types and levels of political risks are faced) and in terms of transaction counterparties (e.g. different sponsors and developers with different capabilities, principles and track records). Nor is there a standard risk analysis framework that applies from bank to bank, institution to institution. While there is more or less a common language of project finance and lots of shared approaches (not least as individuals move their jobs from one institution to another) each financial institution has tended to develop its own individual model for analysing, assessing and quantifying risk within transactions. The analysis described is therefore necessarily generic, but it is important to have stressed the caveat of the vital importance of specific context to an adequate estimation of risk.

Construction risk

***Description*:** Construction risks encompass the risk that could lead to an infrastructure asset failing to be brought in to service at the right cost, at the right time, and to the right level of quality or performance.

***Risk assessment*:** Construction risks vary according to the complexity and scale of the construction requirement and the experience and capability of the construction contract in delivering such requirements. In most cases, construction risk can be quantified as the worst reasonably likely cost overrun or period of delay (e.g. the new road is completed but unforeseen problems mean that the cost is higher and the opening is late). In rarer cases, there may be foreseeable cases in which full completion cannot be achieved (e.g. the new power station is operational, but the expected efficiency cannot be fully achieved).

***Contingency assessment*:** Construction risks are not typically addressable by contingencies – as cashflows only begin at the completion of construction they cannot address construction period issues. However, elements of timing and performance contingency may be appropriate, for example a contingency might be built into the revenue forecast to deal with a limited delay in construction completion.

***Contractual allocation*:** Construction risk is typically fully allocated to a single party, often a construction joint venture, under a fixed price, lump sum, turnkey construction contract. In the event that construction is not completed to timetable, the construction contractor will be liable to pay damages equal to the revenues lost as a result of the delay. Liabilities under the construction contract are typically capped at levels equal to the likely worst case outcome in terms of cost overrun and/or delay.

***Debt structuring*:** Debt is typically structured to provide a grace period (in which there are no principal repayments and interest payments are rolled up) during the construction period.

Revenue risk

***Description*:** Revenue risk encompasses all the risks that could lead to the actual project revenues (or net revenues) being lower than the forecast base case revenues.
***Risk assessment*:** The underlying reasons for revenue shortfalls can vary significantly depending on the type of project in question. If a project income depends on the production of a commodity with a market value (e.g. an LNG plant) the underlying revenues will depend, inter alia, on that market value and the underlying net revenues will depend on the difference between the market value of the output commodity and the input commodity (e.g. oil or natural gas). If project income depends on traffic or throughput (e.g. a toll road or airport) underlying revenues will depend on the levels of traffic attracted to use the asset and their willingness to pay the requested tolls/fees. For projects with revenues which depend on simple availability (e.g. accommodation PPPs) underlying revenues will depend on the quality of service delivery and the actual resulting level of penalties imposed under the concession agreement. Analysis will vary greatly depending on the type of project but often involves detailed market and/or traffic forecasts prepared by independent market/traffic consultants.
Contingency assessment: Cashflow contingency in the form of cover ratio is typically the primary means to address revenue risks within a project structure. As cover ratios are closely linked to debt quantum there is a direct relationship between contingency assessment and debt structuring.
***Contractual allocation*:** In certain cases, elements of revenue risk can be contractually allocated through means such as offtake contracts (which guarantee a market at a floor price) and tolling agreements, which guarantee both to supply raw materials and to offtake final product, traffic guarantees (which guarantee a traffic floor) or operating contracts which pass through revenue deductions to an operator. Cashflow reserving can be used to address risks that could lead to a short term interruption to revenue flow.
***Debt structuring*:** In projects with significant revenue risk it is often the level of revenue risk that is the primary constraint on debt quantum, which will be carefully matched against revenue downsides. Additional grace periods may be provided to match against the risk of slower initial revenue ramp-up than expected.

Operating and lifecycle risk

***Description*:** Operating and lifecycle risks encompass the risks that could lead to the actual project operating and lifecycle costs and performance being higher/poorer than the base case.
Risk assessment: The potential reasons for operating and lifecycle cost overruns can vary significantly depending on the type of project in question, but are often a function of the mis-estimation of input volume requirements or costs, e.g. for a toll road this might mean an underestimate of the number of toll operators necessary and/or the salaries required to attract them. Lifecycle costs can overrun because assets wear out more quickly than expected and need to be replaced more often. Analysis can be undertaking by benchmarking the forecast costs against those experienced by other operators of similar assets.

Contingency assessment: Cashflow contingency in the form of cover ratio is typically the primary means of addressing operating risks within a project structure. Cashflow contingency in the form of both reserving and cover ratios are typically used to address lifecycle cost risk.
***Contractual allocation*:** The approach to allocation varies from sector to sector. In the energy, power and brownfield infrastructure sectors projects typically are self-operated, and do not seek to allocate operating or lifecycle risks to a third party. In the PPP sector it is more common to allocate operating and (sometimes) lifecycle risks to an operator under an operating subcontract.
***Debt structuring*:** Operating risks are often addressed through cover ratios (and hence debt quantum) and are therefore a debt structuring matter, and the requirement for lifecycle (and other) reserving will be covenanted in the loan agreement

Macroeconomic risk

***Description*:** Macroeconomic risks encompass the risk that macroeconomic factors such as interest rates, inflation and foreign exchange rates vary over time.
***Risk assessment*:** As macroeconomic factors can vary widely over the likely lifetime of an infrastructure asset risk, assessment is typically restricted to the stress testing of the project cashflows against changes in macroeconomic factors.
***Contingency assessment*:** Typically assessed by ensuring debt service can be maintained under stress tests. Whilst some macroeconomic variables can be assumed to vary within bounds (e.g. inflation and interest rates) and so can be addressed through contingencies, it is difficult to address more volatile variables such as foreign exchange rates through this method.
***Contractual allocation*:** Macroeconomic risks are not risks that are typically amendable to contractual allocation. In limited situations, it is possible that foreign currency, local interest rate and inflation risks can be shared with a governmental counterparty through the index-linking of contractually guaranteed revenues.
***Debt structuring*:** Debt is typically structured to minimise macroeconomic exposure as far as possible, e.g. debt will be hedged using interest rate swaps so as to minimise exposure to interest rate changes, debt will be raised in the currency of the infrastructure asset's revenues so as to minimise exposure to foreign exchange rates, and debt may be index-linked to minimise exposure to changes in inflation levels.

Force majeure risk

***Description*:** Force majeure risks encompass those risks which are outside the control of the project parties such as 'Acts of God' and which are typically insurable.
***Risk assessment*:** Force majeure events are typically occur with low probability, but have a very significant impact if they occur, e.g. a major fire at a power plant might interrupt operations for a long period leading to an extended period of revenue loss. Analysis can assess the likely maximum period of interruption for different types of force majeure event informing the required level of insurance protection.
Contingency assessment: Reserving may be able to address certain limited Force majeure type events.
***Contractual allocation*:** Force majeure events are typically allocated to insurance companies. In some cases, government counterparties are able to act as the insurer of last resort in the event that commercial insurance becomes unavailable.

***Debt structuring*:** Debt structuring is often restricted to the covenanting of insurance requirements.

Uncertainty and complexity

It will be obvious from the above that we largely treat risk and uncertainty as the same thing – or rather that uncertainties of outcome for each key element of the life of a greenfield project case are among the main aspects of risk analysed and addressed in such transactions. Though a large number of project finance deals have been closed in each industry sector around the world, there is insufficient volume of cases to provide statistically valid data and anyway each new case is significantly different from any previous case. While the list of generic types of risk in project finance areas which cover most of the categories of risk are well known, there are unknown unknowns as well as known unknowns and there are few if any project finance cases where we could state with a high level of confidence ex ante a precise percentage probability for the most likely outcome for each element of the case and precise probabilities for other possible results.

As stated above, for each transaction we contemplate supporting we model and analyse results for a variety of downside scenarios and consider worse case outcomes, including combining downside outcomes for each element of each case we consider. We address uncertainty by attempting to allocate risks to parties best able to undertake them, who are appropriately incentivised to control and minimise them. And we set levels of gearing and build contingencies into case structures which are intended to minimise losses of loans advanced while being pitched to accommodate tolerable variations in planned outcomes without triggering unnecessary defaults in finance agreements.

Of their nature large greenfield infrastructure investments typically involve high levels of complexity in contractual arrangements and demanding practical interfaces between multiple parties. This creates significant risks to be analysed, understood and appropriately controlled especially when a major investment is to be financed on a limited recourse basis at a high level of gearing. The generic approach is again to allocate the risks that arise as a result of complex interfaces to counterparties which have the financial strength to undertake them and the skill and track record to best control and minimise them.

From risk assessment to measurement of required capital allocation and deciding appropriate pricing

Notwithstanding the above issues of uncertainty and complexity, detailed due diligence performed on the above listed categories of risk for each transaction (and on any additional material aspect of risk specific to a particular case) provides a clear understanding of the quality of all key aspects of a project finance transaction. This, combined with the strength of the structural mitigants which we propose and with some reliance on the judgement and instincts of experienced project finance credit experts performing objective reviews on the cases proposed by others, enables us to gauge probabilities for each key risk aspect of a transaction within bands of quality which are fairly narrowly set.

We use the above to estimate the probability that a case may default (PD) and the percentage of loan advanced which it is expected might be lost if the case did default (Loss Given Default – LGD).

Each bank which lends in this business sector has its own methodology and models for calculating the amount of capital it needs to allocate for each project finance case it undertakes. At one extreme a small regional bank with limited resources and modest

exposure to project finance might use the Standardised method set out by the Bank of International Settlement in its guidance manual for adoption of Basel 2 regulatory capital requirements. A major international bank group with a large global project finance business will have developed its own complex methodology for calculating PD and LGDs and, based on these, will compute levels of capital required by the project finance lending it undertakes both for regulatory capital reporting purposes and for determining the economic capital required for each project transaction. In the case of the latter type of institution the methodology adopted may well involve stochastic modelling (using Monte Carlo simulation), scorecard evaluation and reference to values and conclusions drawn from the bank's own extensive case data compared with data on the overwhelming majority of all project financing concluded in global markets which has been gathered by one of the major credit rating agencies. The most advanced banks will have had their methodologies considered and approved by financial regulators in the key national markets in which they do business.

Applying the PD and LGD of a case to the amount of debt finance to be committed for that case, together with the planned profile of the drawdown and repayment of that finance, we are able to estimate the amount of the bank's capital required for a given transaction. Set a given hurdle rate for return on capital we can select pricing to meet or exceed this hurdle rate.

If competitive conditions or relationship factors put pressure on a bank to reduce the pricing for a given case below that which will meet the minimum hurdle requirement, using the above methodology it will at least have a measure of the extent to which it would be falling short of the target return rate it has been set if it were to agree to reduce pricing – which shortfall will need to be recovered elsewhere in the project finance business portfolio, whether by providing higher return products to the same transaction or charging prices on other project finance loans which produce a return on capital employed which is above their required target return levels.

When project finance risk is assessed

Prior to lending to a project finance transaction, a bank will conduct a thorough risk assessment exercise including performing detailed due diligence along lines outlined above. As explained the results of this exercise helps determine at the outset the structure for the financing to be committed and helps set the price for the debt offered to the client. Thereafter once commitment has been made and conditions precedent to advancing monies have been fulfilled, even if subsequently the risks which the bank faces in lending to a transaction are perceived to be much worse than previously believed the bank will not be able to change the price it agreed to charge at the outset unless material default occurs under the contractual undertakings which govern the loan.

The bank will nevertheless reappraise the risks of the project finance transaction on a regular basis throughout the life of the loan. It will require to receive reports on the progress of construction, monitoring these with the assistance of its technical consultants against preset milestones and, following completion, it will receive and review regular financial reports covering the operating period of the project. Timely reporting linked to appropriately structured performance controls will enable early identification of any significant unforeseen problems or negative outcomes and engagement of sponsors and other key counterparties with a view to having them implement approved remedies to address deterioration or increased risk. Typically once completion has occurred a project finance case will then be reviewed and the risks it faces will be reassessed at least once annually thereafter.

If assessment of a project finance case by a bank later on during the life of its loan leads to the conclusion that the risks faced are materially greater than originally perceived, the amount of capital which the bank requires to support its lending to the transaction will need to materially increase – notwithstanding the limited scope to alter pricing on the loan which exists as explained above. The effect of this will be to reduce the return on capital below that originally intended, which therefore may well be significantly below the target return which the project finance business has been required to achieve. Such signals of course quickly feed back into the appraisal of new project finance cases, cause a tightening of the appraisal process and could impact the terms a bank is prepared to offer for its new lending.

The big players in global project finance lending are a smallish group of leading international banks. Typically, one or a small number of banks from this group will take the lead on a deal: devoting resources to analyse the elements of the transaction early on, structuring the loan package and bearing the brunt of the work of instructing external consultants to conduct appropriate due diligence. The lead bank will often build the financial model which all lenders use to analyse potential case scenarios under varying economic conditions and practical pressures. Such lead bank or banks will frequently commit to underwrite the total amount of the loan proposed, with a view to subsequently selling down significant proportions or all of its underwriting to other banks which have some appetite and experience of project finance lending but less resources to devote to originating such a transaction and commit to underwrite 100% of the required lending.

While project finance loans mature over very loan terms (30 years plus for some sectors under current market conditions) if the lead bank plans to sell down all its original underwriting exposure early on in the life of a transaction, concerns could arise that the risk analysis it performs will really only be focused on the early life of the case and that more of its efforts will be devoted to gauging the appetites of potential buyers of participations in its loans rather than to detailed risk assessment of the underlying project finance transaction through its whole life. If such concerns do exist they are largely unjustified. This part of the market place is not another sub-prime mortgage loans market where debts originated by brokers are sold on through a number of intermediaries to ultimate owners who are remote from and have little understanding of the borrowers. It is very rare indeed that the Lead Arrangers of bank funded project finance loans sell down 100% of the transactions they have underwritten. They sell down a proportion of their underwriting but usually hold a significant percentage of each deal through to maturity. The independent consultants employed for due diligence work on each case will be instructed to appraise all its key elements through to maturity and typically owe a duty of care to participant lenders as well as original underwriters. Finally banks who buy participations are usually staffed with competent project finance professionals, themselves highly skilled in risk analysis. They would quickly realise if a rogue lead arranging bank was underwriting a badly structured transaction on the basis of inadequate risk appraisal and would stand back from participating in such a deal, with consequential portfolio distortions, substandard returns and even ultimately business losses for the original underwriters of the case debt.

Results of risk appraisal by banks

In some sense it could be argued that limited recourse project financing, where repayment of the debt is limited to the cash flows arising directly from the infrastructure asset part financed by that debt and to any defined additional contracted support, dates back to the 19th century when the development of railways and the like was often funded from private

sector sources under structures quite similar to modern day project finance arrangements. The established project finance industry we have in today's global markets however is little more than 20 years old and whilst subject periodically to temporary decline in annual volume has grown gradually to its present annual total of US$273 billion for deals closed in 2007 from very much smaller volumes 20 years ago.

The relevant data we have for this form of financing is therefore somewhat limited and includes many cases which are at early stages of project life, i.e. either the construction phase has not yet been completed or, if completed, projects have not yet established a track record in operation nor, in cases facing market risk, achieved full demand/sales ramp up.

The data which has been collected on the performance of project finance lending however covers more than 80% of all the project finance deals closed over the last 15 years across the global market place. This shows that during that period, the probability that a case in that overall portfolio would default in any year was on average less than 2% and that the average loss which occurred in that period if a loan defaulted was less than 25%. These numbers produce a lower average annual cost of loss for project finance deals than for loans to equivalently rated corporate borrowers over the same period and suggest that project finance lending by banks over the recent past has been well structured with risks relatively well controlled. The individual portfolios of some banks with the greatest expertise in this field show markedly better PD and LGD statistics than the overall market portfolio. It is therefore fair to conclude that this is an area where some banks have made significant investment in people and systems, patiently developed businesses with due concern for the assessment and mitigation of risks and have been rewarded with reasonable returns on the capital they have employed.

Conclusion

Private sector involvement in the financing and ownership of infrastructure has been shown to bring benefits in many though of course not all cases. Through such involvement risks tend to be more clearly identified and placed with parties best able to bear and control them. Roles are more clearly defined and risks get appropriately priced.

The use of project finance structures as the vehicle for private sector involvement is now a well established model and large commercial banks undertake a significant role as financial advisors and lenders into these structures. To play this part adequately project finance bankers have clear goals, perform thorough up front assessment of risks, closely monitor performance and frequently reassess risks over the life of each transaction. Much of this is well known, so perhaps there are few new lessons here to be derived from it by others. There is value nevertheless in re-emphasising the simple principles which govern what to all appearances is an efficient, robust and growing part of the global financial sector.

References

Scott, David L. (2003) *Wall Street Words: An A to Z Guide to Investment Terms for Today's Investor*, Houghton Mifflin Company