

MODELING GOOD BUT COMPLEX PROJECT FINANCE DEALS

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21 February 2008

Project finance has been a field of relatively strong growth within the last decade. As a consequence banks involved in project finance have established internal methods and procedures for identifying solid, profitable deals.

However, many good, profitable deals still remain unfunded as banks fail to raise the required syndicated debt. Often this is due to the difficulties in assessing the risk in deals that go beyond the standard structures.

The problems, according to Dr Peter Andrésén at Risk Integrated, arise due to the inherent complexity of project finance deals, both within the project itself but also within the structure of the deal. In addition, deal structures are constantly evolving and there is often no historical experience on which to base the risk assessment.

By using advanced methods for risk assessment there is an opportunity for banks to achieve a greater degree of confidence in their assessment of project finance deals, thereby becoming more competitive and providing them with the tools to convince investors to invest in complex but potentially rewarding deals.

Currently two standard methods are typically used for assessing risk in project finance deals.

One is based on the creation of a very detailed and customized cashflow model for each deal. This model is used to analyze the cashflows of the project by comparing them with the expected debt service and ensuring that the deal does not default.

The deal-specific cashflow model is also stress tested in scenarios where a single

macroeconomic variable is displaced from its forecasted value. This helps to gain an insight into how the deal will perform in adverse economic situations, for example, "What happens if energy costs rise 20%?"

The second method is a scorecard approach where experts within the bank assign values to different pre-determined characteristics and features of the deal.

The scores used are based on the results of the deal-specific cashflow model as well as technical and historical experience. The final output from the scorecard is a weighted sum of the inputs which is then typically mapped to a credit rating.

Both methods provide a relatively static risk view of the deal, either based on the deal structure in the base case or based on one or more of the stressed scenarios.

The limitations that banks come up against when using the standard approaches are three-fold:

- Neither approach takes into account the complexity of true economic conditions where multiple macroeconomic variables change simultaneously, often with intricate correlations
- They only provide a very limited temporal resolution of the potential risks within the deal, obtained through the simple stress tests applied to the deal-specific cashflow model
- They do not provide a consistent and cohesive framework for assessing and comparing the risk across a portfolio of deals

Advanced simulation with standardized cashflow models is one approach that can address all of these issues. The approach is based on the concept of generating a random macroeconomic scenario with historical standard deviations and correlations which are then fed into a standardized cashflow model.

By generating a large number (e.g., 1,000) of random macroeconomic scenarios and feeding them into the cashflow model, the outputs for each scenario can be collected and analyzed within a solid statistical framework.

As each random, macroeconomic scenario represents one possible evolution of future economic conditions one is able to extensively explore and analyze the overall expected future performance of the deal through the generation of a large number of scenarios.

Comparatively, the approach goes far beyond the standard stress test, which only provides insight into one very simple variation of the expected future economic path. The correlations built into the macroeconomic scenarios allow analysis of the results of the interaction of multiple variables (e.g., what happens if oil prices fall, interest rates fall and CPI rises?). Advanced cashflow simulation produces a detailed temporal resolution of the risks as well as a deep, finely tuned insight into the sources the risk. The risk is no longer limited to being characterized by a single number representing the overall risk of the project, but can be broken down and analyzed in much greater detail.

The graphs below represent a simple illustration of this, comparing the results of a stress analysis to those of an advanced cashflow simulation.

The stress analysis depicted in Figure 1 shows the debt service coverage ratio (DSCR) drops in year 4 and also in year 12. However, the advanced cashflow simulation (Fig. 2) provides greater insight by quantifying the risk through spikes in the annual probability of default (PD) graphs, and breaking down the risk across sources.

This detailed information can then be used to potentially restructure the deal to address some of the risks identified.

dynamic. They can be updated to include new and untried deal features and structures.

The implementation of an advanced simulation framework can take several different forms. The most obvious is the fully-fledged version where the bank obtains standardized cashflow models that address its specific needs and deploys these within a computational framework built for advanced simulation.

Figure 1

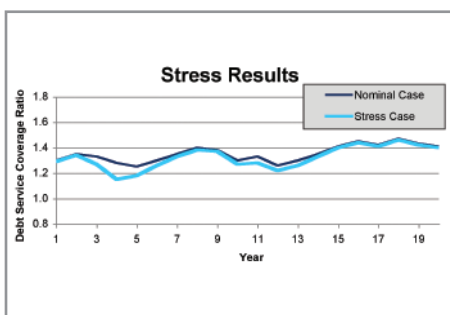


Figure 2

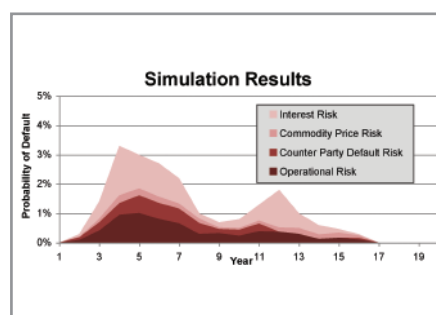
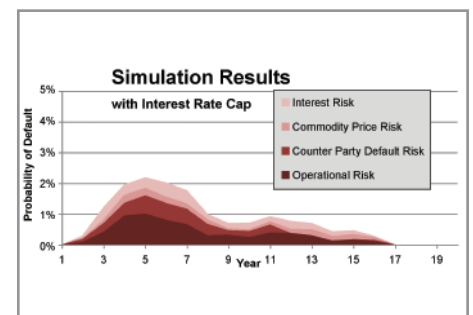


Figure 3



For example, as demonstrated in the last graph in Figure 3, by adding an interest rate cap to reduce the interest rate risk in years 4 and 12, the bank can provide a better deal to sell to potential investors.

The benefits of advanced cashflow simulation discussed above are all addressing the analysis of a single deal.

However, by using standardized cashflow models (that may be tailored to the bank's specific needs) within the simulation framework, one can achieve a consistent basis for the analysis and comparison of different deals within the portfolio.

The trade-off in using standardized cashflow models is that complexity compromises usability. The same detail cannot be attained using standardized models as can be obtained from a deal-specific cashflow model. This loss of detail can be countered with sector-specific standardized models, each incorporating most of the deal features and structures used within that sector. Standardized cashflow models are also

Less comprehensive implementations may be pursued in two ways:

- Add an advanced simulation framework to the bank's existing deal-specific cashflow models (sacrificing consistency and coherence)
- Use cashflow simulation to generate a surrogate historical deal universe from which standard regression methodologies can be used for building scorecards (sacrificing temporal resolution and causality)

Project finance deals are complex by nature. The inability or lack of confidence in assessing the inherent risk in these types of deals in a coherent, consistent and granular manner may result in good but complex deals remaining unfinanced. Advanced risk assessment methodologies can address the shortcomings of current standard risk approaches and give banks an opportunity to get ahead of the curve. ■

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