EDITORIAL

IT IS ALL ABOUT CREDIT

Insurance companies invest heavily in credit sensitive assets such as corporate bonds and other securitized instruments. Life and health insurance companies in the United States and Canada on average have more than 60 percent of their investments in corporate bonds. According to the latest survey by Fitch, the insurance and financial guarantor industries are large net sellers of default protection at $556 billion. One company alone, AIG Financial Products Corp., has a net sold position in default protection of $268 billion. How to manage credit risk in these investments plays an important role in the insurance company financial performance.

The credit market in North America has been revolutionized due to the introduction of the credit derivative market over the last decade. Credit, as a fundamental driving factor of the economy, has become a trading factor similar to interest rates or stocks. Investors can now take a long or a short position on the credit market as a whole or on specific credits using credit derivatives on indices or on single names. Traditionally, an investor can take the credit risk of a company by investing in the bonds issued by the company if the investor has a positive view on the company's credit quality. However, there isn't very much that the investor can do if he has a negative view of the company. Using credit default swaps, an investor can simply buy default protection against the credit. This synthesizes a short position in the bonds with none of the potential problems of maintaining a short position, such as borrowing bonds to deliver against the short. By selling default protection using CDS and buying high-quality, labor-yielding bonds, an investor can synthetically create a security similar to the corporate bonds issued by the credit. As most actuaries are aware, this process is well-understood by insurance regulators and is known on statutory financial statements as an RSAT (Replication Synthetic Asset Transaction). However, the amount of corporate bonds an investor can create synthetically is much larger than the amount of bonds issued by the company.

The innovation of credit derivative instruments does not stop at single name credit default swaps. Collateralized Debt Obligations (CDOs) alone, where a pool of credits such as bonds or loans are created and pieces of the pool are sold to different investors based on their risk/return appetite, is another trillion-dollar market. The CDO market started with cash CDOs where the underlying pool contains actual bonds or loans. The life insurer is the largest investor's group of the cash CDO securities. Then synthetic CDOs, which have a collateral pool consisting of a portfolio of single name default swaps, quickly followed suit. This innovation overcame the constraint that only limited actual assets could be taken as collateral in the cash CDO markets. In spite of attractive yields, many insurance companies have been reluctant to invest in these synthetic CDOs because of GAAP accounting rules that require the embedded credit derivatives to be bifurcated and marked to market through earnings. Proposed changes in GAAP accounting for beneficial interests, due to be implemented in the first quarter of 2006, will eliminate this bifurcation requirement, making synthetic CDO structures far more attractive for life insurers.

Over the last two years the market has developed investment-grade CDS indices in North America, Europe and Asia. Emerging market and high-yield CDS indices followed shortly thereafter. Then standard CDO tranches based on these indices were developed. Bespoke CDO tranche transactions can now be arranged between investors and brokers/dealers and executed very quickly. More dynamic structures, such as managed mezzanine tranches in which investors can choose their own portfolio, the attachment (similar to deductible) and detachment (similar to liability ceiling), and substitute credits after the portfolio transaction is executed, allow investors to achieve any desired risk/return profile. Credit volatility products such as single name and index CDS options and Constant Maturity Default Swap (CMDS) have become more and more popular. These volatility products offer insurers relatively simple ways to enhance income, such as covered call writing against corporate bonds, as well as tools to more precisely manage credit spread risk.

More credit hybrid products, which combine credit with inflation, interest rates and equity, are emerging. There is almost daily innovation in the credit derivative market. Efficient use of these credit derivative products could substantially enhance the credit portfolio investment management at insurance companies, leading to higher income and total return for a given level of portfolio risk.

How to model default and how to price various new credit derivative products have been interesting and challenging tasks on Wall Street. Actuaries with strong quantitative training should play an important role in the development of this market and help insurance companies make better use of credit derivative products in daily investment portfolio management. Actually, much of the current credit modelling techniques used on Wall Street and elsewhere can be traced back to some sort of original actuarial work.

The modelling of default events using survival time distribution is very similar to the modelling of the death of a human life. A credit curve, which describes the term structures of default probabilities for an obligor, is very much like a mortality table. Pricing a default swap is not much different from pricing a life insurance contract. Some delicate issues, such as premium accrual or refund, have been well studied in basic actuarial textbooks, while some popular models like the one in Bloomberg are still based on some simple assumptions on the timing of default. The current popular credit portfolio model using copula functions (Li 2000) was borrowed from the actuarial work of pricing joint-life annuity by considering the phenomenon of ''broken heart'' (Frees, Carriere, and Valdez 1996). All efficient computational methods of a credit portfolio loss distribution under the framework of copula functions, such as the Fourier transformation, recursion or conditional normal approximation, have all been ''reinvented'' by credit derivative practitioners while they had been extensively studied by actuaries much earlier. Duffie and Singleton's approach (1999) to risky bond pricing can be traced back to the recursive formulas for insurance reserving by the Hattendorf theorem (1868). In fact, the whole reserve issue for illiquid products, and various products involving extreme events or ''gap risk'' in credit derivatives, lacks fundamental thinking and rigor compared to what has been achieved in the actuarial science area for similar risks. One of the most popular credit portfolio models, CreditRisk+ (Wilde 1997), was all based on actuarial work of the compound Poisson distribution approach to loss modelling, and most of the formulas in CreditRisk+ are taken directly from the actuarial book by Panjer and Willmot (1992).

Actuaries have been studying the default or ruin problem of a company for about a century, and a lot of substantial progress has been made in the ruin study area. It is a bit unfortunate that little effort has been made so far to expand the scope of study on the ruin problem to a realistic company, to incorporate more economic factors into the framework, and to assess the model based on its effective prediction and assessment of default instead of on its mathematical beauty.

In summary, credit derivatives are becoming the ''bread and butter'' of the credit market. Actuaries with a long tradition and experience in modelling similar events should be able to make more of a contribution to the area, and life insurers, as large investors in the credit space, should be more active users of the technology. We are looking forward to more research papers that cover credit modelling in the future in NAAJ.

References

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