

Macroeconomic analysis of market prices for Collateralized Debt Obligations

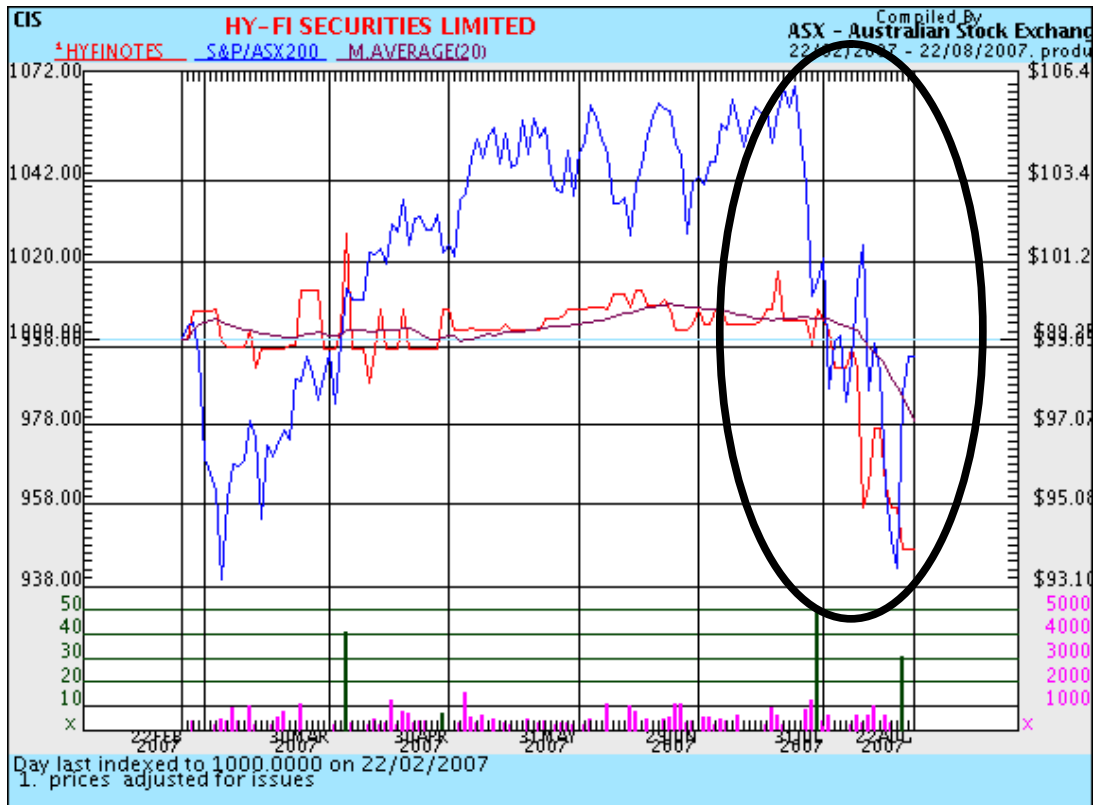
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The recent crisis in the US subprime mortgage market has led to an unforeseen decrease of prices for Collateralized Debt Obligations (CDOs) in Australia and other markets in the world. CDOs are innovative financial securities which enable financial institutions to repackage the credit risk of loan portfolios into tranches of different seniorities and transfer these to investors. Business cycles and correlations between credit loss events of individual loans are key drivers of the losses to these investors and therefore market prices.

The study will derive sensitivities of systematic risk drivers and empirical correlations from CDO market prices which will assist investors in making informed investment decisions. This is particularly important to the Australian market where CDOs may be traded by uninformed retail (ASX) and wholesale investors. The governor of the Reserve Bank of Australia, Glenn Stevens, recently warned that Australian councils investing into CDOs may not understand the risks involved.

Financial institutions often have an appetite for credit risk that is different from their current exposure and wish to change their level of risk by changing either their borrowing behaviour or trading loans in a secondary market. A very popular approach to accomplish the later involves the securitization of whole credit portfolios or tranches thereof with different seniorities. These financial vehicles are known as collateralized debt obligations (CDOs) where the securitized debt consists of a portfolio of loans, bonds or mortgages. Credit risk securitization has its tradition in the US and Europe and is increasingly becoming popular in Australia. Securitized debt in the Australian market totalled US\$74bn in 2004 (US\$ 35bn in 2000), exceeded only by the US and UK. An overview on modelling CDO prices is provided by Duffie/Gârleanu (2001), Gibson (2004), Ashcraft (2005) and Elizalde (2005). CDO prices may depend on two related issues – the business cycle and correlations.

The following chart compares the market prices for the synthetic CDO HI FY, Series 4 with the ASX 200 index and shows that CDOs as part of the fixed income family may experience price devaluations similar to the ones of equities in economic downturns. As an example, the circle highlights that the recent increase in the delinquency rates of the US subprime mortgage market led to an increase of credit spreads and therefore a decrease in CDO prices.



In addition, the accurate modelling of the correlations between the risks of the underlying assets is essential. The following table shows the losses to investors with different seniorities based on a credit portfolio (100 obligors, maturity of 10 years, default rate of 1%, recovery rate of 50%, exposure per loan of \$10,000, equity exposure of \$30,000, junior exposure of \$40,000 and senior exposure of \$930,000) with two distinct correlation assumptions of 10% and 30%. Note that in this example, it is assumed that the correlation measure relates to the asset returns of all combinations of obligor pairs.

Tranche	Correlation = 10%		Correlation = 30%	
	Attachment Probability	Expected Loss	Attachment Probability	Expected Loss
Equity	0.995	27,307	0.988	25,778
Junior	0.685	20,799	0.610	21,891
Senior	0.004	88	0.015	468
Total		48,194		48,137

The probabilities that losses attach to the senior tranche as well as the expected losses (bold numbers) increase with the correlation. Generally speaking, the senior tranches are transferred to investors. As a consequence, the misspecification of correlations leads to

the misspecification of losses with severe implications to investors (buyers of credit risk) and financial institutions (sellers of credit risk).

So far, market participants have little knowledge on the levels and drivers of CDO prices. Reasons for this limitation are the

- Lack of empirical research – while market data on CDO prices has become available in recent years, little research has been produced and published to date.
- Complexity of CDOs - most investors base their investment decision on the output of industry models such as CDOROM (Moody's Investors Service), CDO Vector (Fitch) and CDO Evaluator (Standard and Poor's) which model correlations based on a single-factor Gaussian copula (compare Li, 2000). The accuracy of these models is questionable. Currently, there exists a vibrant theoretical literature to developing more flexible and accurate models of synthetic CDOs, but no paper has empirically studied the effects of the business cycle through key macroeconomic variables and the implied correlations.

The study will identify macroeconomic drivers of credit portfolio risk and model correlations between default events given these drivers. The analysis will be based on historical spreads for iTraxx and CDX synthetic CDOs. It is believed that the empirical analysis will result in more accurate and granular assumptions with regard to risk segments such as regions, industries, as well as loan categories.

References

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