Estimating Option-Implied Correlation between iTraxx Europe Financial and Corporate Sub-Indexes

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Summary

In 2011, the European debt crisis intensified the negative feedback loop between the troubled sovereigns and the banking sector such that the crisis could spread into a banking crisis. A sudden negative shock to the banking system will have a disproportionately contractionary impact on the corporate sector whose growth depends on the funding provided by banks. Therefore, such spillover of default risk between the two sectors may trigger systemic defaults within Europe.

This paper proposes a model to estimate option-implied correlation embedded in options on the European CDS indexes as a measure of the spillover effect of default risk between the financial and corporate sectors in Europe. We consider the option on the iTraxx Europe Main Index as a basket option with two correlated underlyings, namely the Financials and Non-Financials sub-indexes. While the implied volatilities of options on the Main and Financials Indexes can be directly quoted from the market, the implied volatilities of options on the Non-Financials Index and the implied correlation between the Financials and Non-Financials Indexes are missing. Closed-form formulae based on a simple stochastic model are proposed to estimate those two missing quantities.

The option-implied correlation is used to study the information transmission between the iTraxx CDS indexes and their corresponding options. Statistical results show that the option-implied correlation moves with a four-week leading time compared with the actual movements of the indexes. It suggests that the option-implied correlation is a useful forward-looking indicator to gauge the contagion risk between the financial and corporate sectors in Europe.

Four macro-financial variables are then examined as major determinants of the option-implied correlation based on a regression analysis. The sovereign default risk, funding liquidity risk, level of risk aversion, and equity market performance were found to be significant determinants, implying that the option-implied correlation incorporates information about various markets during the European debt crisis.