Course Outline

Credit Risk

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Aims and Objectives

Fuelled in part by burgeoning growth in the credit derivatives market in late 90's, the market in credit expanded dramatically for 10 years till 2Q 2007. These increased activity levels led to a much greater research focus on credit and one of the features of this work has been the high degree of complementarity between the research carried out by academics and by practitioners, for example, the investment banks and rating agencies.

The credit derivatives market was at the heart of the ongoing global financial and economic crisis, having contributed substantially to it by affecting lender incentives once loans were securitized, allowing banks to "game" regulatory capital requirements, and creating opacity due to their over-the-counter (rather than centralized or exchange-based) trading infrastructure. While the market for credit derivatives suffers at the current moment, a part of its underlying rationale in terms of risk transfer from banking sector to the rest of the economy remains robust. Securitization markets are nevertheless somewhat moribund. This market will perhaps never be as large as it was in 2Q 2007, but it will certainly continue to play a major role in the financial intermediation sector going forward, once the crisis abates. In the meanwhile, however, we have a sovereign debt crisis in the Western Europe to deal with… And the securitization markets appear to be coming back in some fashion, and regulators are in fact looking to "soften" the rules to hasten this comeback!

The objective of the course is to provide an introduction as well as an in-depth understanding of issues in credit risk, its modelling and analysis of credit related instruments such as default-prone debt of credit derivatives. The objective is also to provide an understanding of how and why these products played such a critical role in the ongoing crisis. As with any derivatives model, the idea is to learn it well so that one knows when *not to use it!* Hence, the objective is to provide a balance between developing, on one hand, a sound conceptual framework and, on the other, market understanding and insight, especially with respect to liquidity effects that are often so important in markets from a practitioner's standpoint. We regard both as essential to the informed practitioner and academic.

Given the important role played by credit derivatives in the crisis, the course will also devote substantial amount of time understanding this role. We will also understand the new financial sector reforms – most notably the Dodd-Frank Act – and their direct or indirect impact on credit derivatives, and credit markets in general, going forward. Finally, given the current risks in sovereign credit risk area, especially in the Eurozone, we will cover sovereign credit risk and derivatives as well.

Topics Covered

The topics covered in the course will include:

- Historical default experience
- Structural models of credit risk

- Applications of structural models of credit risk to default prediction and hedging; the KMV model
- The success of structural models in explaining credit spreads and corporate bond returns
- Historical recovery experience
- Introduction to single-name credit derivatives (corporate, sovereign, …)
- Default-intensity or reduced-form models
- Application of default intensity models to Credit default swaps (single-name corporate and sovereign)
- Basket default products: index tranches and CDOs
- Correlation modelling and applications
- Credit Crisis 2007-09 and the role played by credit derivatives in the crisis
- Sovereign Credit Crisis in the Eurozone
- Implications of the proposed financial sector reforms for the credit derivatives market
- Shadow banking: Money markets, Repo Markets, Government-Sponsored Enterprises

Format and Teaching Methods

The classes will include discussions around empirical facts about credit, guest speakers on market developments, and lectures on models and their applications. Primary reading material will be my slides/handouts. Anything else that is relevant will be circulated over email to the class mailing list.

Reading Materials

In addition, the *required* books for the course are as follows: The first book (ACRW) has content on the proposed reforms of the financial sector and (ANRW) on the housing finance debacle in the United States and its possible reform.

Acharya, Viral V., Thomas Cooley, Matthew Richardson and Ingo Walter, editors *Regulating Wall Street: The Dodd-Frank Act and the New Architecture of Global Finance,* New York University Stern School of Business and John Wiley & Sons, November 2010 [ACRW].

Acharya, Viral, Stijn van Nieuwerburgh, Matthew Richardson and Larry White (2011): *Guaranteed to Fail: Fannie Mae, Freddie Mac and the Debacle of Mortgage Finance,* Princeton University Press. [ANRW]

Additional recommended materials (especially, Prologue of AR, and early chapters of Chacko et al. for a primer on credit derivatives – I will distribute relevant material in hard copies)**:**

Acharya, Viral V., and Matthew Richardson, editors, *Restoring Financial Stability: How to Repair a Failed System,* NYU-Stern and John Wiley & Sons, March 2009. [AR]

Chacko, Sjoman, Motohashi and Dessain (2006): *Credit Derivatives – A Primer on Credit Risk, Modeling, and Instruments*. [Chacko et. Al]

There are two good books that deal with the technical analysis of credit risk. However, neither of them covers all the material we plan to discuss in the class:

Lando, David, *Credit Risk Modelling: Theory and Applications*, Princeton: Princeton University Press, 2004. [Lando]

Duffie, Darrell and Kenneth Singleton, *Credit Risk*, Princeton: Princeton University Press, 2003. [DS]

Assessment

The grade for the course will be based on a take-home mid-term and final exam. The mid-term will require you to conduct credit analysis of an individual corporation based on methods learnt in the course. The final will require you to conduct credit analysis of an individual sovereign based on methods learnt in the course. Both the mid-term and the final exams must be done in groups of four each. The groups do not have to be the same between mid-term and final (Again, I will leave that to you). These will determine 40% of your grade each. There will also be 20% credit for class participation and bringing to the classroom discussion relevant themes from on-going credit risk issues at time of the course.

PLEASE REVIEW THE RULES GOVERNING ACADEMIC INTEGRITY AND THE STERN CODE OF CONDUCT.

Week	**Topic**
1 (5 January)	The role played by credit derivatives in the crisis of 2007-09 The Dodd-Frank Act and proposed reforms to the financial sector
	Overview of credit market and trends: Historical default experience Statistical models of default probability
2 (7 January)	Structural models: Merton's model and Moody's KMV Approach
3 (9 January)	Moody's KMV Approach Empirical performance of structural models
4 (12 January)	Introduction to single-name credit derivatives and historical recovery or loss-given-default experience
	Intensity modelling : Litterman and Iben's reduced-form model
5 (14 January)	**Mid-term exam: Project assessing the credit risk of a <u>corporation</u> due**
	Intensity modelling : Continued <u>Guest Lecture on the changing nature/regulation of credit derivatives</u>
6 (16 January)	Sovereign Credit Risk
7 (19 January)	Correlation: Products and modelling
8 (21 January)	<u>Guest Lecture on the recent trends in Structured Finance market</u> Measuring systemic risk
9 (23 January)	Shadow banking and its reform: Government-sponsored enterprises (Fannie Mae, Freddie Mac), Repo Markets and Money-market funds
(30 January)	**Final exam: Project assessing the credit risk of a <u>sovereign</u> due**