Credit Risk, Bankruptcy and Distressed Securities

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Contact information:

Viral Acharya
Professor of Finance
NYU-Stern
Room: Suite 9-84
Phone: 212-998-0354
e-mail: vacharya@stern.nyu.edu

(two classes to be taught by Ed Altman, NYU Stern
one class by Marti Murray, Murray Capital)

*Assistant: Norma Rodriguez
Room: Finance department, 9th Floor
(walk straight from elevators, turn right)
Phone: 212-998-0363
e-mail: nrodrigu@stern.nyu.edu
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 risk (defaults, bankruptcies) and assets such as distressed securities that are most exposed to this risk. 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 first two lectures to be taught by Ed Altman and the last one by Marti Murray of Murray Capital will focus on bankruptcies and distressed debt, in particular, on historical trends in default risk and loss given default on corporate bonds, the current conditions and outlook for the future, and the early models of corporate default risk prediction such as the Z-score. The remaining part of the course will focus more on the role played by newer credit instruments in the financial crisis and understanding how these instruments work.

As you know, the credit derivatives market was at the heart of the ongoing sub-prime 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, its underlying rationale in terms of risk transfer from banking sector to rest of the economy remains robust. 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.

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 and their direct or indirect impact on credit derivatives, and credit markets in general, going forward.

Topics Covered

The topics covered in the course will include:

- Historical default experience and current conditions and outlook for credit markets
- Corporate credit risk models such as Z-score
- 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
- Liquidity risk of corporate bond returns
• Historical recovery experience
• Introduction to single-name credit derivatives
• Brief overview of reduced-form models
• Basket default products: index tranches and CDOs
• Brief overview of correlation modelling and applications
• Credit Crisis 2007-09 and the role played by credit derivatives in the crisis
• Distressed debt markets

Format and Teaching Methods

The classes will include discussions around empirical facts about credit, guest speakers on market developments, lectures on models and their applications, and also some cases.

The class will be held on Fridays and Saturdays from 9:00 to 12:30 with a break from 10:30-11.

Books

The required books for the course are the following. One of these is the NYU-Stern contribution on the financial crisis which makes an excellent reading for facts relating to the financial crisis, that anyone aspiring to learn about credit markets must know:


Additional recommended materials (for a brief summary of credit markets and modelling):

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

Binder

The final paper of this outline contains a list of the items that are included in the binder. Any remaining handouts, exercises, cases etc. will be either distributed in class or put on the Blackboard (or both).

Assignments and Assessment

The grade for the course will be based on an in-class mid-term exam (40%) and a take-home final exam at the end of the course (40%) and class participation (20%) awarded by the instructors (Viral Acharya, Ed Altman and Marti Murray).
## Summary Outline

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Session 1 (Acharya) Overview of the course  
5 February (Altman) Current conditions and outlook in credit markets  
Preparation  
Topics  
1. AH: Chapter 1.  
A Tale of Three Periods: What caused the Meltdown in credit markets, What happened since the meltdown and during the recovery, What is the outlook for the economy and credit markets; Historical and Current Default and Recovery Rates; Correlation between default and recovery rates; Risk and Return in the high yield and distressed debt markets; Size and Scope of the Distressed Debt Markets; Outlook for Defaults and Recoveries

Session 2 (Altman) Predicting Financial Distress of Companies in the US and Foreign Environments  
6 February Preparation  
Topics  
1. AH: Chapters 11-14.  
Historical Evolution of credit scoring models; Predicting Financial Distress of Manufacturing Firms - the Z-Score model; Non-manufacturing industrials; In Emerging Markets - The Z" score model; Assessing the probability of default and loss of corporations; Applications of distress prediction models; Managing a financial turnaround

Session 3 (Acharya) Credit Derivatives and the Crisis of 2007-09 – I  
19 February Structural models I  
Preparation  
Topics  
1. AR: Prologue: A Bird’s Eye View, Chapters 1-3, 5, 10.  
2. Chacko, Sjoman, Motohashi and Dessain (2006): Credit Derivatives – A Primer on Credit Risk, Modeling, and Instruments (Chapter 2)  
The role played by credit derivatives in the crisis of 2007-09 – I  
Equity as call; risky debt as riskless debt minus put; Merton model

Session 4 (Acharya) Structural Models II  
20 February Liquidity risk or credit risk?  
Preparation  
Topics  
Discussion of limitations of Merton. Measuring asset volatilities; KMV model and its implementation.  
Liquidity risk of corporate bonds returns and credit spreads
### Session 5
**26 February**

**Acharya** *In-class Mid-term exam (based on material until and including 20th February)*

- **Introduction to single-name credit derivatives**
- **Introduction to reduced-form models**

**Preparation**
1. Chacko, Sjoman, Motohashi and Dessain (2006): (Chapter 2)

**Topics**
- Relationship between spreads and expected loss
- Litterman and Iben’s reduced-form model

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### Session 6
**27 February**

**Acharya** *Reduced-form models (continued)*

**Overview of Correlation Products**

**Preparation**

**Topics**
- Introduction to Basket and index credit derivatives.

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### Session 7
**12 March**

**Acharya** *Default Correlation Modeling*

**Preparation**

**Topics**
- Vasicek’s model to estimate loan loss portfolio distribution (based on Merton’s structural model of credit risk)

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### Session 8
**13 March**

**Acharya** *Credit Derivatives and the Crisis of 2007-09 - II*

**Preparation**
1. AR: Chapter 11.

**Topics**
- The role played by counterparty risk and opacity of credit derivatives in the financial crisis of 2007-09.
- “Big-bang” protocol and its impact on credit derivatives
- Impact of financial sector reforms on credit derivatives going forward
Session 9
26 March
Preparation TO BE CONFIRMED
Topics A case-study based on opportunities in high-yield and distressed corporate debt