Credit Risk

ECTS : 3

Description du contenu de l'enseignement :

Part 1 : O. Toutain (18h) The objectives of this cours is the following:

- Understanding credit risk
- Mastering the financial mechanisms of CDS and other credit derivatives
- Mastering pricing

Part 2 : F. Astic (12h) This course provides a theoretical and practical analysis of the asset-backed security market. Topics include: Duration And Convexity of Bond Yields, Price Dynamics of Mortgages and Cash Flows, Default Risk, Interest Rate Volatility, Financial Risk Management of Bond Portfolios, Securitization, Corporate Debt And The Securitization Markets, Asset-Backed Commercial Paper, Collateralized Loan Obligations, Structuring Synthetic Collateralized Loan Obligations, Securitization of Revolving Credit, Financial Derivatives And Their Use As Hedging Tools. The course is in the computer lab, where theoretical models are illustrated and solved using Excel. Students will have computer application of topics covered in class using Excel. Students will be assigned a field project, instead of a final exam, that involves financial decision making and real data analysis. Course outline: Part 1 1 Credit Risk

- Default risk
- Downgrade risk
- Issuer risk
- Counterparty risk
- Sources of risk
- Characterizing credit risk

2 Measuring Credit Risk

- Ratings: advantages and disadvantages
- Market measures: bond spreads, asset swap spread, CDS spreads

3 Credit Derivatives Markets

- Main products : CDS, Total Return Swaps, Credit Linked Notes, Spread options
- Market size
- Market organization
- Market participants

4 CDS on one entity

- CDS mechanism
- Cash flow diagram
- Buying or selling a protection
- Credit events
- Settlement risks
- Cash settlement / Physical settlement
- Conditions of exercise
- ISDA contract

5 Basket CDS

- Principles : premium of a basket CDS, default correlations, example
- ITraxx : indices, contracts on the iTraxx index
- Les CDOs : generic structure of a CDO, tranching, correlations, Cash CDO and synthetic CDO

6 Pricing of CDS

- Simplified approach for a zero-coupon bond
- Principles of structural models
- products based on a structural model: KMV and CreditGrades
- Principle of intensity models (reduced form models) : extracting default probabilities from CDS spreads

Part 2 Key Structures and Cash Flow Dynamics I. Price Dynamics of Mortgages and Cash Flows

- Bond and Mortgage Basics
- Bond Valuation
- Price/Yield Relationship

- Fixed-Rate Mortgages
- Prepayment Option
- Macauley and Modified Duration
- Convexity
- Risk Exposures

II. Sub-Prime Mortgages, Securitization, The Liquidity problems of August 2007 III. Mortgage-Backed Securities: Origins of the Market

- From the Primary to the Secondary Mortgage Market (The Agency Market,The Private-Label Market)
- Agency and Nonagency Market Segments Compared (Credit Risk Considerations, Mortgage and Funds Flow in the Secondary Market, Industry Illustration)
- Pricing of Newly Originated Mortgages (Freddie Mac Sample Purchase Pricing, Mortgage Pricing from the Bank's Perspective)
- Valuation of Mortgage- and Asset-Backed Securities
- Modeling Cash Flows of Pass-Through, PO, and IO Securities (Information Set, Model, Cash Flow over Time)
- Effective Duration
- Effective Convexity
- Case Study: A Pass-Through Security Issued by FNMA (Prepayment Standard, Assumption Levels, S-Curve Prepayment Function, Weighted Average Life and Different Spreads Measurements, Spread I, Static Spread (Spread Z), and Spread S, Option-Adjusted Spread, Negative Option Cost)
- Case Study: Principal-Only and Interest-Only Sec

Compétence à acquérir :

Master the mecanisms behind the credit risk products and their pricing models

Mode de contrôle des connaissances :

100% Final exam

Bibliographie, lectures recommandées :

Textbooks Options, Futures and Other Derivatives (6th Edition), Prentice Hall, 2005 By John C. Hull Credit Risk : Modeling, Valuation and Hedging, Springer Finance, 2002 By Tomasz R. Bielecki, Marek Rutkowski Articles Altman, Edward, Andrea Resti, and Andrea Sironi, "Default Recovery Rates in Credit Risk Modeling: A Review of the Literature and Empirical Evidence", Economic Notes, Vol. 33, No. 2, (July 2004), pp. 183-208. Jarrow, Robert A. and Stuart M. Turnbull. "Pricing Derivatives on Financial Securities Subject to Credit Risk", Journal of Finance, Vol. L, No. 1, Cornell University, and Queen's University (Canada) (Mar-1995), pp. 53-85. Hull, John and Alan White, "The Impact of Default Risk on the Prices of Options and Other Derivative Securities", Journal of Banking & Finance, Vol. 19, No. 2, (May 1995), pp. 299-322. Duffie, Darrel, Lasse Hefe Pedersen and Kenneth J. Singleton, "Modeling Sovereign Yield Spreads: A Case Study of Russian Debt", Journal of Finance, (February 2003), Vol. LVIII, No. 1, pp. 119-159. Elliott, Robert J., Monique Jeanblanc, and Marc Yor, "On Models of Default Risk", Mathematical Finance, Vol. 10, No. 2, (April 2000), pp. 179-196. Schönbucher, Philipp J., "Term Structure Modelling of Defaultable Bonds", The Review of Derivatives Research, Vol. 2, No. 2/3 (Fall-1998), pp. 161-192. Heath, David, Robert Jarrow, "Bond pricing and the Term Structure of Interest Rates: A Discrete Time Approximation", Journal of Financial and Quantitative Analysis, Vol. 25, No. 4, Cornell University, University of Illinois at Chicago, (December-1990), pp 419-440. Jarrow, Robert A., and Stuart M. Turnbull. "Pricing Derivatives on Financial Securities Subject to Credit Risk", Journal of Finance, Vol. L, No. 1, Cornell University, and Queen's University (Canada) (Mar-1995), pp. 53-85.