B40.3312: RISK MANAGEMENT IN FINANCIAL INSTITUTIONS

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Office hours: immediately after each class, or by appointment.

GOAL OF THE CLASS

The course focuses on modern, quantitative and qualitative methods to measure and manage the risks faced by financial institutions. It covers market risk related to foreign exchange, interest rates and commodities (value at risk, expected shortfall, market volatility, stress testing, scenario analysis, back testing), credit risk (single name, portfolio, ratings & market based models, credit derivatives and liquidity risk), operational risk, policies and procedures, data management, information security, fraud, vendor management, new product assessment and approvals, enterprise risk (reputational risk, sovereign, regulatory, culture and process and investment risk (alpha relative vs. absolute return, portfolio attribution, concentration risk and valuation issues).

In light of the recent crisis, the course will also focus on systemic risk, in interconnected networks, bailouts, new regulations, and macroeconomic risks.

CLASS MEETING DATES AND TIMES

The class meets on Tuesday from 6 to 9 pm in KMEC-590. The first class is on October 5th. The last class is on December 14. The final exam period is on December 21.

PREREQUISITES

The material covered Foundations of Finance is a prerequisite for this class. In particular, you should be familiar with:

- Definition, pricing and marking to market of forward contracts, futures, swaps, and options.
• Fixed income concepts, such as duration, convexity, and immunization.

• Statistics concepts such as expected value, conditional expected value, standard deviation (volatility), variance. You should know their definitions, their properties, and how to compute them in a spreadsheet.

• Black-Scholes model and implied volatility. Delta hedging.

• Objective and risk-neutral probabilities and how to use them to price derivatives.

All these topics are covered in Foundations. If you do not remember, take a look at your notes and textbook to refresh your memory.

**RECOMMENDED BOOKS**

Before buying new books, you should make sure that you have fully exploited the ones you already own. To refresh your memory before each class, read the relevant chapters in the textbook used in Foundations of Finance:

• **Investments** by Zvi Bodie, Alex Kane, and Alan J. Marcus, 7e or 8e. *The basics, well explained.*

Regarding Risk Management, no single textbook covers all the relevant material. In designing the class, I have used the books listed below. These textbooks are not required, just recommended, and you can also use earlier editions. Each has its strengths and weaknesses, none is perfect. You should buy the one that corresponds to the area where you need or want to learn more. Here are some excellent references:

• **Financial Institutions Management: a Risk Management Approach** by Anthony Saunders and Marcia Cornett, Irwin-McGraw Hill, 5e, 2005. *Good overview of risk management. Not very technical. (Referred to in the class outline as FIM.)*

• **Options, Futures and Other Derivatives** by John C. Hull, Pearson Prentice Hall, 6e, 2006. *Best reference for derivatives. But not a complete risk management book, and too light on credit risk. (OFO)*

• **Value at Risk** by Philippe Jorion, McGraw Hill, 3e, 2007. *Everything you always wanted to know about VaR, and more. But too focused on VaR, and too light on credit risk. (VAR)*

• **Managing Credit Risk** by Caouette, Altman, Narayanan and Nimno, Wiley Finance, 2e, 2008. *Good book on credit risk, but that's it. (MCR)*

Finally, you can find some interesting specific information in these two books:


GRADING

At NYU Stern we seek to teach challenging courses that allow students to demonstrate differential mastery of the subject matter. Assigning grades that reward excellence and reflect differences in performance is important to ensuring the integrity of our curriculum.

No more than 35% of students will receive grades of A or A-. Your grade will be based on a series of home works, one midterm and one final exam. The breakdown is approximately:

- Homework: 20%
- Midterm: 25%
- Final: 40%
- Participation in class: 15%

All homework assignments are submitted in class. The exams are open-book, open notes.

ACADEMIC INTEGRITY

Integrity is critical to the learning process and to all that we do here at NYU Stern. All students are expected to abide by the Graduate Programs Honor Code. A student’s responsibilities include, but are not limited to:

COURSE POLICIES

Attendance

Class attendance is required and part of a student’s grade. Absences are excused in the case of documented serious illness, family emergency, religious observance, or civic obligation. If you will miss class for religious observance or civic obligation, you must inform me no later than the first week of class. Recruiting activities are not acceptable reasons for class absence. If you will miss a class because of a business trip, you must inform me a week in advance.

Homework

Homework and other assignments are expected to be completed on time. Late Assignments will not be accepted unless due to documented serious illness or family emergency.

All electronic devices must be turned off prior to the start of each class meeting.
Laptops, cell phones, smartphones and other electronic devices are a disturbance to both students and professors.

**Calculator**

You need a calculator for this class. A scientific calculator is good enough; you do not need to buy a financial one. As a rule, you will use spreadsheets for homework assignments, and the calculator for the simple examples in class, and, most importantly, for the exams. It is a very bad idea to wait for the last week before buying a calculator. You need to become familiar with exponential, natural logs, and various other functions, and you need to practice before the exam.

**Study Groups**

It is highly recommended that you regularly review the readings and class notes in a study group. Don't wait until exam week to set up such a study group. By then it's too late. You are encouraged to work on the problem sets with your study group, but you must hand in your own answers.

**COURSE CONTENT**

- **Readings.** The required readings are in the course pack. You should read them before the class, skipping the technical parts, and after the class, once I have explained the concepts and the techniques. I will also provide you with homework assignments and additional materials in class.
Week One

Introduction

- **Definition of Risk and Risk Principles**
  - Risk Principles – Buy Side Risk Manager’s Forum
  - Risk and the Smart Investor / David X. Martin, Introduction only

- **Risk in Financial Institutions**
  - FIM, Chapter 7

- **Lessons Learned**
  - Risk Takers, John Marthinsen, Chapter 7

Week Two

Credit Risk

- **Credit Doctrine, Credit Scoring, Metrics, Migration, Market Cycle and Macro Economic Risks**
  - MCR, Chapters 1, 2, 7, 10, 12, 17 and 21
  - VAR, Chapter 8

Week Three

Counterparty Risk

- **Evaluation of Counterparties and Positions, Use of Collateral, Central Clearing Counterparties, Measurement, Monitoring and Controlling**
  - MCR, Chapters 5, 6 and 22
  - Does a Central Clearing Counterparty Reduce Counterparty Risk, Duffic and Zhu
Weeks Four & Five

Market Risk

- **Foreign Exchange**
  - FIM, Chapters 10 and 17

- **Interest Rates (Derivatives and Convexity)**
  - FIM, Chapters 8 & 9

- **Options, Caps, Floors and Collars**
  - FIM, Chapter 25

- **Swaps**
  - FIM, Chapter 26

- **VAR (Calculations and Problems)**
  - Part II, We Just Can't Predict, Black Swan, Taleb
  - VAR, Chapters 4, 5 and 21
  - VAR is from Mars, Finger

Week Six

Liquidity Risk

- When Everyone Runs for the Exits, Pedersen
- Securitization Banking and the Run on Repo, Gordon, Metrick
- VAR, Chapter 13
- FIM, Chapter 17
- Guest Speaker

Week Seven

Midterm
Week Eight

Investment Risk

- Relative vs. Absolute Return, Risk Decomposition and Portfolio Attribution
  - Risk Profile, User Guide, Barra Analytics

- Diversification
  - When Diversification Fails, Demakis

- Due Diligence, Madoff
  - Risk and the Smart Investor, David X. Martin (Chapter 4)

Valuation

- FASB 157

Hedge Fund Risk Assessment

- Presentation by David X. Martin, Risk Symposium

Week Nine

Operational Risk

- What Do Regulators Look For?
  - Financial Services Authority, Home Page, CP142

- Framework, Measurement, Tools and Systems
  - VAR, Chapter 19

- Technology
  - FIM, Chapter 14

- Information Security
  - Guest Speaker
  - Understanding the ISO 27000 Series, Corporate Executive Board
**Week Ten**

**Sovereign Risk**

- **Country Risk Models**
  - MCR, Chapter 23

- **Vulnerabilities**
  - FIM, Chapter 16

- **Impact of the Macro Environment**
  - Wisdom on Risk Materials

**Week Eleven**

**Enterprise Risk Management**

- **Reputational Risk**
  - Reputation and Its Risks, Eccles, NewQuist and Schatz
  - Guest Speaker

- **Financial Reform**
  - How Regulation and Government Action Will Shape The Capital Marked Landscape, Presentation by David X. Martin at the SIFMA Conference
  - VAR, Chapter 2

- **Risk Capital/Budgeting/Appetite**
  - VAR, Chapter 17

**Week Twelve**

**Enterprise Risk Management (cont’d)**

- **Managing Global Risk**
  - How Citibank Manages Risk, Rhodes and Martin
  - The End of Enterprise Risk Management, Powers and Martin
  - VAR, Chapter 20
• Culture and Processes
  o Talking Risk, AllianceBernstein

• Stress Testing; Scenarios, Analysis and Triggers
  o VAR, Chapter 14

• Future of Risk Management
  o VAR, Chapter 2

Week Thirteen

Final Exam