

Finance 746 – Risk Management  
Spring 2019  
Professor Niehaus

Overview of the Course:

This course focuses on business risk management. Students will learn the concepts and tools that businesses use when managing risk and will apply these concepts and tools to cases. We adopt an enterprise risk management perspective, which implies that ideally all of the major risk exposures of an enterprise are identified and decisions are made regarding how they are managed (including retained). As a consequence, we will consider a variety of risk exposures, including price risk, property and liability risks, supply chain risks, and human resource risks. In addition, we will consider a variety of methods for managing these risks, including holding capital, mitigation, insurance, hedging, as well as what is sometimes called alternative risk transfer, such as catastrophe bonds and captive insurers.

The main objective of the course is to provide a decision making framework that can be applied to many different situations involving risk. An important component of the course, which will be used throughout the course, is that students will conduct Monte Carlo simulations to assess risk and to evaluate risk management alternatives. The course requires students to use an “add-on” to excel, called @Risk, which allows one to easily incorporate probability distributions into spreadsheet analysis. @Risk will be available to download to a student’s computer that uses Microsoft Windows or an Apple machine with a Windows emulator. It will also be available in the computer labs in the Moore School.

The course has been approved by the Analytics Committee as an approved elective for the Analytics Certificate.

The Derivatives course that is listed as a prerequisite is not required to take this course.

**Specific Learning Outcomes**

By the end of the course, successful students will be able to:

1. Identify, explain, and measure various interpretations of risk
2. Explain and model via excel the methods that businesses use to manage risk, including derivatives, insurance, and alternative risk transfer (e.g., cat bonds, captives) contracts
3. Explain how risk is incorporated in financial valuation models
4. Evaluate circumstances under which risk reduction will likely increase firm value
5. Conduct and interpret Monte Carlo simulations models using @RISK
6. Appreciate the importance of leadership, culture, and governance in risk management
7. Understand the benefits and costs of using an enterprise risk management approach
8. Apply the tools and concepts learned in the course to cases and new situations

## **Teaching Method**

Class meetings will consist of live lectures combined with discussions of cases and examples and video lectures. You are encouraged to ask questions and raise issues during class.

### **Face to Face Office Hours (room 457H):**

I will almost always be in my office willing to talk with you at the following times:

Monday and Wednesday: 12:30-2:00

You may also stop by other days and times or make an appointment.

Phone number: 777-7254

e-mail: [gregn@moore.sc.edu](mailto:gregn@moore.sc.edu)

### **On-line Office Hours**

TBA

### **Required Reading Material:**

A custom e-book containing selected textbook chapters, cases, and other readings will be available sometime during the first week of class.

1. Go to <https://create.mheducation.com/shop/>
2. Search for and select book by Title, ISBN, Author, or State/School.

**ISBN: 9781307416879**

**Title: Corporate Risk Management**

3. Add the book to your cart and pay using a credit card or access code.

For detailed instruction handouts for your students use the links below.

- [Purchasing a book using a credit card - PDF](#)

## Required Software

You will be required to become familiar with the software @RISK which performs Monte Carlo simulation using excel. The software is available on blackboard. Unfortunately, you must have a windows operating system to run @Risk. To download the software, you need to download the program file and the license file and they must be in the same folder. Also note that you cannot rename the license file.

### Lecture Notes:

Copies of the powerpoint slides used in class will be available on Blackboard usually the night before class.

## Grades

Final grades will be calculated using the following weights:

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<u>Description</u>	<u>Type</u>	<u>% of final grade</u>
Estimating Expected Cash Flows	Individual	10
Calculating Value at Risk	Group	15
Hedging Jet fuel prices	Group	15
Choosing an Insurance Contract	Group	15
Pension insolvency	Group	15
In-Class Cases	Group	10
Final Exam	Individual	15
Contribution to class	Individual	5

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### **Contribution to class:**

Everyone starts the semester with a grade of 50 percent for contribution to class. The final contribution to class grade will depend on your contributions to class.

### **Assignments**

Most of the assignments are to be done in groups of two or three people. You choose your groups. You will be given the opportunity to assess the contribution of your group members.

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Tentative Outline

V# = video # listed in Videos for the week, BB = blackboard

## **Week 1: (what we did)**

### Prior to 1st Class:

Videos: V1-V8 (about 3 hours)

BB: Analyzing linear combinations of random variables  
Analyzing linear combination of random variables: Solutions to Concept Checks

### **1. *Introduction to Risk Management***

- What is risk?, RM objectives, the RM process, Using models (V1)
- Enterprise risk management (V2)

### **2. *Tools for Assessing Risk***

- Background on Probability Theory (V3)
- Random variables & Probability distributions (V4)
- Characteristics of Probability distributions (V5)
- The normal distribution (V6)
- Correlation (V7)
- Linear combinations of random variables (V8)
  
- Introduction, Review, and Practice problems from V8 (in class)
- Scenario Analysis & @Risk Demo (in class)

### **3. *Why Firms Manage Risk***

- How risk enters the Discounted Cash flow valuation model – part 1 (in class)

## Week 2: (what we did)

### Prior to 2nd Class:

#### Reinforce Material from week 1:

- BB: Damodaran: Using Probabilistic Approaches in Valuation, pp. 1- 12, 21-50.  
Ebook: Analyzing Uncertainty: Probability Distributions and Simulation  
Assgn 1: Use @Risk to replicate the simulation model in “Analyzing Uncertainty:.”

#### New Material

- Videos: V9, V10, V11  
BB: ~~American Electric Power (AEP) Case~~  
Ebook: “Value at Risk at Morgan Stanley”  
“ERM at Hydro One,” focus on Phase 1

### 3. *Why Firms Manage Risk*

- How risk enters the Discounted Cash flow valuation model – part 2 (V11)
- Incorporating Market Imperfections into the DCF Model (in class)
  - Financial distress costs & costs of raising external capital
  - Taxes

### 4. *Additional Tools for Assessing Risk*

- Non-linear combinations of random variables (V9)
- Value at Risk (V10). We will also discuss next assignment on VaR in class.
- @RISK tools needed for next assignment (in class)

### 5. *Behavioral Biases and Decision Making* (in class)

- Common Behavioral Biases & Mitigating Biases

### ~~6. *Risk Identification* (in class)~~

- ~~• Risk classification approaches~~
- ~~• Hydro One’s approach~~

## Week 3: (What is planned)

Prior to 3rd Class:

Reinforce Material from week 2:

- Podcast: Listen to “Getting Better by Being Wrong,” an Interview with Annie Duke (<https://fs.blog/annie-duke/>) – about 2 hours. Annie Duke is a professional poker player. The interview covers a wide range of topics, including behavioral biases and how to mitigate them, probabilistic thinking, and decision making under uncertainty
- Ebook: Before you Make that Big Decision, HBR
- Assgn 2: Calculating Value at Risk for a Portfolio

New Material

- Videos: V12 – How Taxes affect Risk Management Decisions  
V13 - Hydro One’s Approach to Risk Identification and Assessment
- BB: American Electric Power (AEP) Case  
Dupont Case
- Ebook: Leadership and Risk Culture

Review Material in Videos

### 6. *Responding to unexpected events* (in class)

- American Electric Power (AEP) Case

### 7. *Miscellaneous Topics* (in class)

- Discussion of Assignment 2 – Calculating Value at Risk (in class)
- Role of Leadership and Culture (in class)
- Risk Management Objectives & the Dupont Case (in class)

## **Week 4 (tentative plan)**

Prior to 4<sup>th</sup> Class:

Reinforce Prior Material:

### New Material

Videos: V14-V20  
BB: Boeing Case  
Ebook: Risk Exposure and Hedging  
Supply Chain Management Risk Models

### **9. Risk Mitigation**

- Risk Management Metrics - Boeing Case (in class)

### **9. Hedging Market Risk with Derivatives**

- Derivative Contracts
  - Derivative Payoffs & Hedging
    - Call Options (V12)
    - Put Options, Settlement, Basis Risk (V13)
    - Forward Contracts (V14)
    - Swaps (V15)
    - OTC vs Exchange Traded Contracts (V16)
  - Basic pricing relations
    - Option pricing (V17)
    - Forward prices (V18)
  - Variance minimizing hedge ratio (in class)
  - Taking into account a “view” of prices (in class)
  - Hedging assignment

### **10. Measuring Supply Chain Risk**

- Sourcing inputs



## **Week 5 (tentative plan)**

Prior to 5th Class:

Reinforce Prior Material:

Assgn 3: Hedging Jet fuel prices

New Material:

Videos: V21 (Shiller) – 1<sup>st</sup> 50 & last 10 minutes

<https://www.youtube.com/watch?v=qfK9rCDCicE>

V22 – V?

### ***10. Overview of Insurance Contracts & Markets***

- Pooling & Development of Insurers (V22-V23)
- Insurance Pricing (V24-V26)
- Risk management of Insurers (V27)
- Commercial Insurance Contracts, Layering of Coverage (in class)
- Role of Brokers (in class)
- Similarities and Differences between insurance and derivative contracts (in class)
- Modeling coverage (in class)

## **Week 6: (tentative plan)**

Prior to 6th Class:

Reinforce Prior Material

Assgn 4: Choosing among alternative insurance contracts

New Material:

Videos:

### ***11. Government Sponsored Pension Plans***

- Background on Pension Plans (V)
- Current state of some state operated pension plans (in class)

### ***12. Alternative Risk Transfer***

- General description and some examples (V)
- Captives (V and in class)
- Cat bonds (V and in class)

## **Week 7: (tentative plan)**

Prior to 7<sup>th</sup> Class:

Reinforce Prior Material

Assgn 5: Managing the Probability of Insolvency of a Government Sponsored Pension Plan

New Material:

Ebook: The Six Mistakes Executives Make in Risk Management, Taleb et al.  
Six Ways Companies Mismanage Risks, Stulz

### ***13. Enterprise Risk Management and Overview of the Course***

- United Grain Growers Case
- Costs and benefits of ERM
- Risk Management Mistakes
- Course Overview