

UNIVERSITY OF PENNSYLVANIA
 Professors Doherty, Mitchell, and Nini
 The Wharton School
Fall 2015 – (Draft) Syllabus

BEPP 305/805: Risk Management

The recent financial crisis and subsequent recession provide ample evidence that failure to properly manage risk can result in disaster. Individuals and firms confront risk in nearly all decisions they make. Individuals face uncertainty in their choice of career, their spending and saving decisions, family choices, and many other facets of life. Similarly, the value that firms create by designing and marketing good products is at risk from a variety of sources. The bankruptcy of a key supplier, a sharp rise in the cost of financing, the destruction of an important asset, or a liability suit can quickly squander the value created by a firm. In extreme cases, risky outcomes can bankrupt a firm, as has happened recently to manufacturers of automobile parts and a variety of financial service firms. The events since 2007 provide stark evidence that risk can impose significant costs on individuals, firms, governments, and society as a whole.

BEPP 305/805 explores how individuals and firms assess and evaluate risk, the tools available to successfully manage risk, and real-world frictions that limit the amount of risk-sharing. Our focus is primarily on explaining the products and institutions that we see in the world, which will serve you in making decisions in your future careers and lives.

Course Structure and Requirements. The course is organized around three modular sections. The first module introduces the concept of risk, explores different measures of risk, and presents the theory of optimal decision-making under uncertainty. The second module illustrates how asymmetric information and psychological considerations affect risk management. Then, the third module examines when firms do and do not have a motivation to manage risk and investigates the role of the legal system in corporate risk management.

At the end of each module, there will be a midterm exam covering the material from that module. There is no final exam. Final grades are determined by the three midterm exams (90%) and exercises (10%); see below for additional information.

Contact information and office hours*

| <i>Faculty</i> | <i>Email</i> | <i>Phone</i> | <i>Office</i> | <i>Office Hours*</i> |
|----------------|----------------------------|--------------|---------------|----------------------|
| Prof. Nini | greg30@wharton.upenn.edu | 215-898-7726 | SH-DH 3006 | Tuesday: 9:30-11am |
| Prof. Doherty | doherty@wharton.upenn.edu | 215-746-2594 | SH-DH 3010 | TBD |
| Prof. Mitchell | mitchelo@wharton.upenn.edu | 215-746-5706 | SH-DH 3303 | Wednesday: 8:30-10am |

*Please schedule these with each professor via email if you are planning to attend Office Hours.

| <i>Module</i> | <i>TA</i> | <i>Office Hours</i> |
|---------------|------------------|---|
| Module I | Elliott Oblander | Thursdays, 4:00-5:30 p.m., SHDH 213 (8/27;9/3;9/10;9/17 and 9/24) |
| Module II | Matthew Herling | Tuesdays, 4:30-6:00 p.m., SHDH 213 (10/6; 10/13; 10/20) |
| Module III | Matthew Lesser | Thursdays, 3:30-4:30 pm, SHDH 213 (11/5; 11/12; 11/19 and 12/3) |

BEPP 305/805: Risk Management

Prerequisites. There are no formal prerequisites for the class but students are assumed to have an introductory knowledge of *statistics, microeconomics, and finance*, at the level of the Wharton undergraduate classes STAT 101, BEPP 250, and FNCE 100.

Course grades. Final grades for the course are determined by midterm exams and exercises. The *equally-weighted* average of the **three midterm exams** is worth 90% of the final grade. The remaining 10% is determined by the grades on **homework exercises and survey responses** turned in by the appropriate deadline. Problems may be worked with other class members but each student must submit his/her own homework to the professor. We will drop one homework with the lowest score.

Add/Drop Deadline. As per Wharton policy, you may drop a course until October 3, 2014. After the drop deadline, you need written permission from an instructor to drop the course. It is the policy of the course instructors that we do not sign petitions to drop the course after the official drop date. Please refer to the following link for more information:

http://spike.wharton.upenn.edu/ugrprogram/policies_forms/acad/withdrawing.cfm

Withdrawal Deadline. As per Wharton policy, the formal withdrawal deadline is October 31, 2014. According to official policy, after the tenth week of the semester, withdrawals are not normally permitted.

Exam Regrades. To submit a regrade request for an exam, you student must submit your original test paper, a signed regrade affidavit (see the course Canvas for the template), and a written memorandum explaining why you think that the exam should be regraded. This request must be submitted within 5 business days after the graded examination papers have been made available for pickup. Your entire exam will then be reviewed, and your grade may go down, go up, or remain unchanged at the prerogative of the professor for the module. Students must not mark, make notes on, or alter the exam papers for which they seek a regrade; any such alteration will be seen as a violation of the Code of Academic Integrity and students will receive an automatic failing grade for the course.

Missing an Exam. Students may miss scheduled examinations only with a University-approved excuse; such valid excuses include direct conflicts with another course offered at Penn that cannot be rescheduled as well as a varsity (but not club) sport competition (but not training). In particular, job interviews are *not* a legitimate reason to miss an exam. Missing an exam without a University-approved excuse will result in a zero for the exam. Arriving late to an exam will be treated as missing an exam.

Expectations. All students must become familiar with and adhere to the Penn Code of Academic Integrity (http://www.upenn.edu/academicintegrity/ai_codeofacademicintegrity.html). Class attendance and punctuality are expected. Students are asked **to use laptop computers exclusively for taking notes; other electronic devices during class.**

Classrooms :

| | | |
|------------------|----------------|----------|
| BEPP 305/805-401 | MW 10:30-12:00 | JMHH F55 |
| BEPP 305/805-402 | MW 1:30-3:00 | JMHH F55 |
| BEPP 305/805-403 | MW 3:00-4:30 | JMHH F55 |

Course Material

- Lecture notes, readings, case studies, problem sets, and surveys will be posted on the course Canvas. Students are responsible for checking this site regularly for updates. Go to <https://wharton.instructure.com>

Module 1. The Theory of Risk (Nini)

The first module is an introduction to risk and its measurement. We discuss what risk means, how it is measured, and how insurance can allow offloading of risk and reducing potential insolvencies. We then analyze optimal decision-making under risk.

Module 2. Individual and Market Failures (Doherty)

The second module explores barriers to risk management. First, we study incentive problems that arise because of asymmetric information, under the themes of “moral hazard” and “adverse selection.” Then, we study typical mistakes when making decisions involving risk. We will use a variety of real world examples to illustrate the ideas.

Module 3. Corporate Risk Management (Mitchell)

The third module addresses how firms can manage their own risk. We begin by asking why risk is a problem. Though the answer may seem obvious, it is not. We show that risk not only increases the possibility of future bankruptcy costs, but it also causes conflicts between the various stakeholders which can result in dysfunctional decision-making. Additionally, risk can raise financing costs and lead to the sacrifice of otherwise profitable investment opportunities. Finally, as exemplified by recent accounting scandals, risk management decisions often are made by managers to further their own welfare, rather than that of owners. We examine the legal duties of directors and officers and liabilities toward customers and other parties.

Exam Dates - put these on your calendar now (*rooms TBA*):

Midterm 1:

Review Session: Monday, Sept. 28, 6-8 pm

Exam: Wed, Sept 30, 6-7:30 pm

Midterm 2:

Review Session: Oct. 27, 6-8 p.m.

Exam: Thu, Oct 29, 6-7:30 pm

Midterm 3:

Review Session: Wed., Dec. 2, 6-8 pm

Exam: Tue, Dec. 7, 6-7:30 pm

BEPP 305/805: Risk Management

Tentative Course Agenda

| <i>Topic</i> | <i>Day</i> | <i>Date</i> | <i>Subject</i> |
|-----------------|---------------|----------------|--|
| Module 1 | | | |
| 1 | Wednesday | Aug 26, 2015 | Overview of Probability |
| 2 | Monday | Aug. 31 | Law of Large Numbers and Risk Pooling |
| 3 | Wed | Sept 2 | Central Limit Theorem and Value at Risk |
| NC | Mon | Sept 7 | No class (Labor Day) |
| 4 | Wed | Sept 9 | Expected Utility Theory (1) |
| 5 | Mon | Sept 14 | Expected Utility Theory (2) |
| 6 | Wed | Sept 16 | Expected Utility Theory (3) |
| 7 | Mon | Sept 21 | Precautionary Saving |
| 8 | Wed | Sept 23 | Subjective Expected Utility and Ambiguity |
| 9 | Monday | Sept 28 | In-class Review |
| | Wed | Sept 30 | Midterm Exam: Module 1, 6-7:30 p.m. |
| Module 2 | | | |
| 10 | Mon | Oct 5 | In-Class Game |
| 11 | Wed | Oct 7 | Adverse Selection (Lemons Problem) |
| 12 | Mon | Oct 12 | Adverse Selection (Screening) and Reclassification Risk |
| 13 | Wed | Oct 14 | Moral Hazard In Insurance Markets |
| 14 | Mon | Oct 19 | Principal-Agent Relationships |
| 15 | Wed | Oct 21 | Insurance Markets and Healthcare Reform |
| 16 | Mon | Oct 26 | Behavioral Economics |
| - | Tue | Oct. 27 | TA Review Session, 6-8 p.m. |
| 17 | Wed | Oct 28 | In-Class Review Session |
| 18 | Thu | Oct. 29 | Midterm Exam: Module 2, 6-7:30 p.m. |

| <i>Topic</i> | <i>Day</i> | <i>Date</i> | <i>Subject</i> |
|-----------------|------------|--------------|---|
| Module 3 | | | |
| 19 | Mon | Nov 2 | Corporate risk management and firm value Assignment #1 due Nov 8 @ 5 PM |
| 20 | Wed | Nov 4 | Limited liability and real options |
| 21 | Mon | Nov 9 | Motivation for corporate risk management |
| 22 | Wed | Nov 11 | Motivation for corporate risk management (cont.) Assignment #2 due Nov 17 @ 5 PM |
| 23 | Mon | Nov 16 | Corporate legal liability |
| 24 | Wed | Nov 18 | BP Case Study |
| 25 | Mon | Nov 23 | Corporate risk management strategies |
| NC | Wed | Nov 25 | <i>Thanksgiving Break</i> |
| 26 | Mon | Nov 29 | Corporate risk management strategies (cont) |
| 27 | Wed | Dec 2 | Review Session, 6-8 p.m. |
| 28 | Mon | Dec 7 | Midterm Exam: Module 3, 6-7:30 p.m |