

BA/RIHM 773: SEMINAR IN THE THEORY OF RISK
Fall 2005
Professor Michael R. Powers

Class Meetings: Fridays, 3:40 – 6:10 p.m.; **Room TBA**

Office: Department of RIHM, 481 Ritter Annex
Office Hours: **Mon., Fri.: 1:00 – 2:30 p.m.**
Phone: 215-204-7293 (Office/Voice-Mail); 215-204-8456 (Department)

E-Mail: michael.powers@temple.edu
Web Page: <http://astro.temple.edu/~powersmr/>

Required Text:

Course Reading List (attached); all articles will be provided in .pdf.

Optional Text:

Klugman, S. A., Panjer, H. H., and Willmot, G. E., 2004, *Loss Models: From Data to Decisions* (2nd Edition), New York: John Wiley and Sons, Inc.

Learning Objectives:

Class lectures and readings will cover the basic mathematical theory of risk from an insurance regulatory perspective.

Students will be expected to understand the utility-theoretic foundations of insurance, finite-horizon individual and collective risk models, infinite-horizon risk models, relevant actuarial forecasting methods, the impact of catastrophe risk, equilibrium in insurance markets, effects of scale, and the role of reinsurance.

Students will make several presentations on areas of current research activity.

Schedule (Subject to Revision):

<u>Date</u>	<u>Topic</u>
September 2	Overview <i>Reading: 1.1</i>
9	Utility Theory <i>Reading: 1.2</i>
16	Loss Severity Distributions <i>Readings: 1.3, 1.4</i>

	23	Loss Frequency Distributions; Individual Risk Model <i>Reading: 2.1</i>
	30	Collective Risk Model, Finite Period First Written Assignment Due <i>Reading: 2.2</i>
October	7	Collective Risk Model, Infinite Horizon <i>Readings: 2.3, 2.4, 3.1 (Skim all three)</i>
	14	Collective Risk Model, Infinite Horizon (continued) <i>Readings: 3.2, 3.3</i>
	21	Extreme-Event Risk Second Written Assignment Due <i>Readings: 3.4, 3.5</i>
	28	Measuring Terrorism Risk <i>Readings: 4.1, 4.2 (Skim both), 4.3</i>
November	4	Market Structure, Reinsurance
	11	Final Presentations
	18	Final Presentations
	25	<i>No Class (Thanksgiving Recess)</i>
December	2	Final Presentations

Assignments:

Each student will complete two written assignments and make one in-class final presentation. The first written assignment will consist of an editorial-style essay on a topic of the student's choice. The second written assignment will consist of a review / critique of a research article assigned by the instructor. The topic for the final presentation, which will involve criticism of work in the research literature, will be selected by the student, subject to the instructor's approval.

Grading:	Class Participation	15%
	Two Written Assignments	25% each
	Final Presentation	35%

Reading List:

Risk and Insurance

- (1.1) Powers, M. R., 1999, "Insurance," in *Encyclopedia of Electrical and Electronics Engineering*, Volume 10 (John G. Webster, ed.), New York: John Wiley and Sons.
- (1.2) Porat, M. M. and Powers, M. R., 1999, "What Is Insurance? Lessons from the Captive Insurance Tax Controversy," *Risk Management and Insurance Review*, 2, 2.
- (1.3) Powers, M. R., 2005, "If It Ain't Brokin' (or Regulatin'), Don't Fix It," 2005, *Journal of Risk Finance*, 6, 2, 85-86.
- (1.4) Powers, M. R., 2005, "Mortality: The Alpha and the Omega of Risk," 2005, *Journal of Risk Finance*, 6, 3, 189-191.

Insurer Solvency

- (2.1) Powers, M. R., Venezian, E. C., and Jucá, I. B., 2003, "Of Happy and Hapless Regulators: The Asymptotics of Ruin," *Insurance: Mathematics and Economics*, 32, 2.
- (2.2) Powers, M. R., 1995, "A Theory of Risk, Return, and Solvency," *Insurance: Mathematics and Economics*, 17, 2.
- (2.3) Lin, W. C., 2005, "Insurance Market Equilibrium: A Multi-Period Dynamic Solution," *Journal of Risk Finance*, 6, 3, 239-250.
- (2.4) Ren, J., 2005, "Diffusion Models of Insurer Net Worth: Can One Dimension Suffice?" *Journal of Risk Finance*, 6, 2, 98-117.

Extreme-Event Risk

- (3.1) Powers, M. R. and Ren, J., 2003, "Catastrophe Risk and Insurer Solvency: A Diffusion-Jump Approach," *Assurances (Insurance and Risk Management)*, 71, 2.
- (3.2) Powers, M. R., 2003, "'Leapfrogging' the Variance: The Financial Management of Extreme-Event Risk," *Journal of Risk Finance*, 4, 4, 26-39.
- (3.3) Powers, M. R., 2005, "Salutary Skewness: Risk Financing of the Third Kind?" *Journal of Risk Finance*, 6, 5 (forthcoming).
- (3.4) Powers, M. R., 2005, "The Terror of the 'Black Box,'" 2005, *Journal of Risk Finance*, 6, 4 (forthcoming).
- (3.5) Powers, M. R. and Shen, Zhan, 2005, "Colonel Blotto in the War on Terror: Implications for Event Frequency" *Fox School Working Paper*, Temple University.

Market Structure, Reinsurance

- (4.1) Powers, M. R., Shubik, M., and Yao, S. T., 1998, "Insurance Market Games: Scale Effects and Public Policy," *Zeitschrift für Nationalökonomie (Journal of Economics)*, 67, 2.
- (4.2) Powers, M. R. and Shubik, M., 2001, "Toward a Theory of Reinsurance and Retrocession," *Insurance: Mathematics and Economics*, 29, 2.
- (4.3) Venezian, E. C., Viswanathan, K. S., and Jucá, I. B., 2005, "A 'Square-Root Rule' for Reinsurance: Evidence from Several National Markets," *Journal of Risk Finance*, 6, 4, 319-334.