

## ECON 4559 - A HISTORY OF RISK MANAGEMENT, Spring 2023

- Professor Steven Peterson ([speterson@virginia.edu](mailto:speterson@virginia.edu); [speterson@varetire.org](mailto:speterson@varetire.org))
- Jan 19 – May 2; Mar 4-12 spring break
- Tuesday, Thursday 9:30 – 10:45 am, Dell 2 – 101
- Office hours: Zoom by appointment

This course examines the meaning of risk and the history of risk management from the Bronze Age through the Digital Age. From pure risks to speculative risks, systematic and systemic risks, risks that arise through individual choice as well as endogenous risks that arise through social networks, this course links together our natural aversion to loss and our attempts throughout history to mitigate loss and hedge risk. We focus on market developments designed to diversify risks such as futures, forwards, and insurance along with the co-evolution of probability theory as a tool to both understand and price risks. We evaluate the effectiveness of those tools through time and the challenges posed to their application in the rapidly developing complexity of the digital age.

**Class readings**, so far, are given in *Assigned Readings – Econ 4559*. I will edit and manage these readings as required over the course of the semester.

### Course Outline

- Part I: Hammurabi to the Age of Enlightenment (Jan 24 – Feb 9, six class periods)
  - Pure Risks vs. Speculative Risks
  - Futures and Forwards in Babylon and Greece
  - Insurance and Annuities (17<sup>th</sup> Century)
  - Tulip Mania (Derivatives and speculative risk)
  - The South Sea Bubble and Newton
  - The Dawn of Probability and the Casting of Lots
  - Cardano, Pascal, Fermat, and Bernoulli (and friends)
  - Knowns and Unknowns and the Doors of Perception
- From Analog to the Dawn of the Digital Age (Feb 14 – Mar 2, six class periods)
  - Samuelson discovers Louis Bachelier
  - Frank Knight on risk versus uncertainty
  - Arrow-Debreu securities and state contingent claims
  - Complete markets and risk
  - Diversification and systematic risks
  - von Neuman and Morgenstern utility
  - Factor models
  - Unsystematic risks
  - Systemic risks
- Individual Behavior (Mar 14 – Apr 4, seven class periods)
  - The Search for homo-economicus and REH
  - Four paradoxes (St. Petersburg, Allais, Bertrand, and Ellsberg)
  - Departures from REH and Behavioral Economics
    - Violations of Expected Utility (List?)
  - The “Anatomy of Risk”
    - Controlled v. Automatic Responses (Thinking Fast and Slow)
    - Neuroeconomics

- Social Behavior in the Digital World (Apr 6 – May 2, eight class periods)
  - Millennium Bridge (Endogenous risk and feedback)
  - Portfolio Insurance (crash of October 1987)
  - Securitization (the Great Fin Crisis of 2008)
  - Credit Risk (Independence violation)
  - Retirement Savings (Hyperbolic discounting and Present Bias)
  - Information Cascades (and Herding)
  - Self-Directed Investing (Robin Hood, GameStop,...)
    - Social Networks
  - Measurement, Ergodicity, and self-absorbing states
  - Reinforcement Learning (concept only)

**Grading:** This is a writing-intensive class. We will have no exams. Instead, we will write a series of approximately 5-6 short critiques (selected topics) and a single research paper (please read *Risk Research Project Outline* for details). Please note that we will be starting work on the research paper by week 3. I will be working with you individually and as a class throughout the semester on your projects providing feedback, advice, and encouragement. The critiques will be worth ~ 25% and the research paper the remainder. As such, your grade will be almost entirely dependent on the quality of your research and writing.

**Attendance:** More than two unexcused absences will each count 2% against your final grade. Class participation is key. All assignments are to be pledged unless otherwise noted by me.

**Office hours:** By appointment over Zoom. I also welcome email.