Course overview

Businesses and governments now face a growing and immediate array of nonfinancial risks, including climate-related, cyber and operational, and geopolitical risks. Precisely because these critical risks are hard to measure and analyze, firms are putting both new and old resources – AI, data, people and money – to work to anticipate, manage and mitigate them. To address cybersecurity risks, for example, JP Morgan alone has 3000 employees and spends $600 million annually. Firms are only starting to grapple with existential climate-related and other risks. And startups are mushrooming to provide assessments to businesses.

This course will study these risks alongside financial risks. It will outline frameworks for measuring, assessing and analyzing them, and for actions needed to meet them. We will examine case studies of climate, cyber and geopolitical risks, including from current events. Finally, we will study whether and how the information in financial markets can both inform the assessment of these risks and potentially provide tools to transfer, insure against or hedge them.

Starting with an overview of enterprise risk management, the course will present an assessment framework. We will then examine each of the four pillars of risk discussed above -- cyber, climate-related, geopolitical and financial – in four modules. One class in each of those modules will include an expert practitioner such as risk managers or policymakers. Student presentations or exercises will be stressed. Finally, we will study the interplay among these risks, the data and new tools needed to assess them, and policy implications.

Learning outcomes

The goal of this course is to equip students with an understanding of the 21st century risk management practices firms now demand. Students will learn the strengths and weaknesses of risk management tools -- VaR, Expected Shortfall, Moody’s KMV/Distance to default, SRISK, stress testing, “table-top” (war games) exercises and operational and financial resilience planning. Students will also learn the interdisciplinary nature of these activities, as teamwork across firms is important in business. Reflecting that approach, the course is designed to be accessible for undergraduates, full-time, part-time and executive MBAs, and to students in law, public policy and other schools at NYU.
**Schedule.** FINC-UB.75.001 meets on Mondays and Wednesdays beginning XXX, 2020 from 11:00 to 12:15; location TBA. Office hours are on Mondays and Wednesday between 9:30 and 10:30 AM, or by appointment arranged by email.

**Materials.** There is no textbook required for the course. Some required readings will be found in *Risk Management and Financial Institutions* available in electronic format on Amazon here; in *Money, Banking and Financial Markets*; and in *The Law of Governance, Risk Management and Compliance* (all on reserve at Bobst Library).

*Prior to the course*, students unfamiliar with the goals, functions, and tools of central banks and other policymakers should read or at least browse the policy chapters of *Money, Banking and Financial Markets*: 15-18 and 21-23./

Required readings appear below and (aside from the readings noted above, and those found on [https://www.garp.org/#!/home](https://www.garp.org/#!/home)) will be included in the reading packet distributed at the first class. **Required readings should be completed before class.** Recommended readings are found in the appendix to this syllabus. They are *not* included in the reading packet; these provide additional background for interested students and may be useful for final essay assignments.

Students are expected to keep abreast of major risk management, financial and policy developments, using resources like various websites from regulators and GARP, *The Economist*, the *FT*, and the *WSJ*. At the beginning of each class, I will ask you to tell the class what you noticed in the news that is relevant to our learning. We will use the forums feature in NYU classes to promote discussion outside the classroom. Questions for class discussions and written assignments will be announced in advance on NYU Classes.

**Requirements and grades.** Students should have completed a basic course (or demonstrate some proficiency) in each of macroeconomics, finance and statistics.

Every student should expect and be prepared to participate and contribute in class. Class attendance, participation and thinking on one’s feet are required. Student assessment will be based on four elements: A final essay, two short memos, day-to-day class participation, and involvement in in-class exercises.

**Honor Code.** The Stern Honor Code applies in this course. In addition, we hold ourselves to a high standard of professional behavior. Lateness, using cellphones, private conversations, browsing the internet, checking your email, and any other behavior that disrupts the class will be considered inappropriate. Repeated violations of this standard will affect your grade.
Tentative Course Schedule – Topics, Readings and Assignments

Week 1 Overview

- Enterprise Risk management
  - Core activities: Defining risk appetite, risk identification and firmwide risk governance
  - Guidelines on financial and nonfinancial risks
  - Regulation and risk management
- Risk Topics
  - Financial: Market, credit, liquidity
  - Cybersecurity and other operational risks
  - Climate-related
  - Geopolitical
  - Other
- System-wide risk assessments
  - Vulnerabilities and shocks
  - Crises and crisis fighting
  - Resilience
- Simple risk assessment framework that we will apply to understand each risk topic
  - Definition
  - Measurement
  - Assessment – incl stress tests, table tops
  - Monitoring
  - Building resilience
  - Mitigation
  - Portfolio construction, hedging, risk transfer

Required Reading

Hull, Risk Management and Financial Institutions, Fifth Edition, Ch’s 1,27, 29
JP Morgan 2018 Annual Report, pp 79-83

Optional reading:

James Lam, Enterprise Risk Management: From Incentives to Controls (Wiley Finance) 2nd Edition, 2014, Ch’s TBA
Peter L. Bernstein, Against the Gods: The Remarkable Story of Risk, Ch 17

Week 2 and 3 Financial risks

- Types of Financial Risk: Market, Credit, Liquidity, Contagion
Volatility and risk
Venues: Firms, Markets and instruments, System, Cross border
Risk management tools:
  - Strengths and weaknesses
  - How to pick the right tool for the job
  - VaR, Expected Shortfall, Moody’s KMV/Distance to default, SRISK, stress testing, “table-top” (war games) exercises and resilience planning
Low inflation and low interest rates: Reach for yield; Asset-Liability mismatch, zombie finance
Case studies
Portfolio construction, hedging, risk transfer

Class visitor: e.g., Keishi Hotsuki, Morgan Stanley CRO

Required Reading:
Cecchetti and Schoenholtz, Chapter 3
Jorion 2009, Risk Management Lessons from the Credit Crisis, p. 1-10
Hull, Risk Management and Financial Institutions, Fifth Edition, Ch 24
Kodres, “What is shadow banking?” OFR 2012 Annual Report, Chapter 2, pp. 10 – 12, and Box B
Video: The Big Short trailer
A reading on low inflation and rates

Optional reading:
Obstfeld and Taylor, “International Monetary Relations: Taking Finance Seriously,” JEP, Summer 2017
BCBS Stress Testing Principles https://www.bis.org/bcbs/publ/d450.htm
Bell, Sarah and Henry Holden, “Two defaults at CCPs, 10 years apart,” BIS Quarterly Review, December 2018.

Assignment 1 will be distributed; due in one week

Week 4 and 5 Cyber/operational risks
- Cyber on firms
- Cyber on governments
- Other op risks: Financial crime, supply chain
- Case studies
- Portfolio construction, hedging, risk transfer

Class visitor: e.g., Phil Venables, Goldman

Required Reading
James Lam, Enterprise Risk Management: From Incentives to Controls (Wiley Finance) 2nd Edition, 2014, Ch’s TBA
Kai-Lung Hui, Wendy Wan-Yee Hui, Wei Thoo, Cyber Insurance and Risk Management: A Normative Analysis, November 2019
Case studies https://www.cshub.com/case-studies

Optional reading:
Federal Reserve, Information Technology Guidance
Global Association of Risk Professionals (GARP), Financial Risk and Regulation Series: Operational Risk Management
Anil Kashyap, Anne Wetherilt, Some Principles for Regulating Cyber Risk, November 2018
RiskNet, Top 10 Operational Risks for 2019

Week 6 and 7 Climate-related risks
- Physical risk
- Transition risk
• ESG
• Case studies
• Portfolio construction, hedging, risk transfer

Class visitor: e.g. Bob Litterman, Kepos Capital

Required Reading
Four Twenty Seven, Using Climate Data, April 2018
McKinsey Global Institute, Climate risk and response: Physical hazards and socioeconomic impacts, January 2020
George Metcalf, On the Economics of a Carbon Tax, Brookings Papers on Economic Activity, Spring 2019
Robert Engle, Stefano Giglio, Heebum Lee, Bryan Kelly, Johannes Stroebel, Hedging Climate Change News Review of Financial Studies, Forthcoming
UN Sustainable Development Goals – click on each goal to read the background behind it.

Optional reading:
Nicholas Stern, The Stern Review, 2006
William Nordhaus, Projections and Uncertainties about Climate Change in an Era of Minimal Climate Policies, American Economic Journal: Economic Policy, August 2018
Robert Litterman, Market Risk Advisory Committee, Report, December 2019
Task Force on Climate-Related Financial Disclosures, Status Report, 2019
Dave Jones, Climate Risk and Insurance Mitigation, MRAC
Prudential Regulatory Authority, Enhancing banks’ and insurers’ approaches to managing the financial risks from climate change April 2019 Supervisory Statement | SS3/19

Assignment 2 will be distributed; due in one week

Week 8 and 9 Geopolitical risks
• Many facets to geopolitical risk
• Geopolitical vs. Political vs. Sovereign Risk
• Combatting the Financing of Terrorism (CFT)
• Case studies
• Portfolio construction, hedging, risk transfer
Class Visitor, e.g. Neal Wolin, Brunswick Group

Required Reading
BlackRock Geopolitical Risk Dashboard
IMF, Anti-Money Laundering/Combating the Financing of Terrorism (AML/CFT)
Robert F Engle and Susana Martins “Hedging Geopolitical Risk based on a Multiplicative Volatility Factor Model”

Optional reading:
Dario Caldara, Matteo Iacoviello, Patrick Molligo, Andrea Prestipino, and Andrea Raffo, Does Trade Policy Uncertainty Affect Global Economic Activity? Feds Notes, 2019
Sigma Ratings
Brunswick Geopolitical

Week 10: Interplay
• Interconnectedness, contagion and spillovers
• Interplay among the four pillars of risk
• Case studies

Required Reading
Kara, Gazi, Mary Tian and Margaret Yellen, “Taxonomy of Studies on Interconnectedness,” FEDS Notes, July 31, 2015.
Jason Healey, Patricia Mosser, Katheryn Rosen, Alexander Wortman, The Ties that Bind: A Framework to Assess the Linkage Between Cyber Risk and Financial Stability, December 2018
NGFS, Macroeconomic and financial stability Implications of climate change, July 2019

Optional reading:

Week 11 New Tools: Business Analytics and Big Data
- Applications of AI, Machine Learning, NLP, and other RegTech tools
- Use cases and tools
- Data: Big and otherwise

Required Reading
Maini and Sabri, Machine Learning for Humans, 2017
Chartis, Demystifying Artificial Intelligence in Risk and Compliance, April 2018
Thomson Reuters (2018), Fintech, Regtech and the Role of Compliance: A Regulatory Opportunity or Challenge? By Stacey English and Susannah Hammond
Haldane, Will Big Data Keep its Promise? 19 April 2018

Optional reading:
FINRA, Technology Based Innovations for Regulatory Compliance (“RegTech”) in the Securities Industry, September 2018
McKinsey, Why Data Culture Matters, Sept 2018

Final Assignment will be distributed; due in one week

Week 12: Policy Implications
- Resilience
- Crisis Fighting
- Other risks: Fintech, cryptocurrencies, Conduct and Culture

Required reading
Gruenberg and Tucker, FT op-ed (2012);
Benoît Cœuré, *The known unknowns of financial regulation*, PIIE, October 2017

*Crisis Fighting*: Geithner, “*Are We Safer? The Case for Strengthening the Bagehot Arsenal.*”


*Other risks*: Brainard, “*The Opportunities and Challenges of Fintech;*”
BIS, *Policy responses to fintech: a cross-country overview;*
Dudley, *Strengthening Culture for the Long Term*

Optional reading:
Liang, “*Higher capital is not a substitute for stress tests*;”
Adrian et al, “*Macroprudential Policy: Case Study from a Tabletop Exercise*;”
Powell, *Relationship Between Regulation and Economic Growth;*
Adrian and Liang, “*Monetary Policy, Financial Conditions and Financial Stability,*” Staff Report 690;
*GAO Financial Technology Report*; pp 3-12;
FSB, *FinTech and market structure in financial services: Market developments and potential financial stability implications*, Feb 2019
FSB, *Strengthening Governance Frameworks to Mitigate Misconduct Risk: A Toolkit for Firms and Supervisors*, April 2018;
Group of 30, *Banking Conduct and Culture: A Call for Sustained and Comprehensive Reform*, 2015
Global Foreign Exchange Committee, *FX Global Code*, July 2018
TBAC Code of Conduct

*Week 13 and 14 review and final exam*