

Managing Climate, Cyber, Geopolitical, Pandemic and Financial Risks: An Integrated Approach
FINC-GB.2375/UB.75 Fall 2021 Professor Richard Berner

Course overview

Businesses and governments now face a growing and immediate array of nonfinancial risks, including climate-related, cyber and operational, geopolitical, and pandemic 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, geopolitical and pandemic risks, including from current events. We will assess the spillovers among these risks, and why an integrated (e.g. enterprise-wide or system-wide) approach helps to manage them. 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 five pillars of risk discussed above -- cyber, climate-related, geopolitical, pandemic and financial – in five 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, 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-GB.2375/UB.75 meets on Mondays and Wednesdays beginning September 13, 2021 from 11:00 AM to 12:15 PM in KMC UC04 and online. Classes will not meet on designated holidays.

NB: *The understanding of, management of, literature about, and policy actions being taken to address these risks are all evolving quickly. Consequently the materials and approaches in what follows will change, and class visitors are TBD. This is exciting -- Stay tuned!*

Materials.

There is no textbook required for the course, but a few are recommended, and some readings will be found in the following texts:

James Lam, [Enterprise Risk Management: From Incentives to Controls](#) (Wiley Finance) 2nd Edition, 2014. Amazon [rents](#) the book for around \$43; an e-book is available.

John Hull, [Risk Management and Financial Institutions \(5th Edition\)](#). Amazon rents the book [here](#) for \$42; an e-book is available.

Richard Apostolik and Christopher Donohue, [Foundations of Financial Risk: An Overview of Financial Risk and Risk-based Financial Regulation](#), 2nd Edition, (Wiley Finance). Amazon [rents](#) the book here for \$36. It's on Kindle and we will investigate other cheaper sources.

Geoffrey Miller, [The Law of Governance, Risk Management and Compliance](#), for [rent](#) on Amazon for \$45. There is an eBook; we will investigate other cheaper sources.

Stephen G. Cecchetti and Kermit L. Schoenholtz, [Money, Banking and Financial Markets \(5th Edition; ISBN 978-1259746741\)](#), McGraw-Hill Irwin, 2017. Amazon currently rents the book ([here](#)) for about \$30 per semester or in electronic format on Amazon.

You should obtain Joseph Romm, [Climate Change: What Everyone Needs to Know](#), Oxford, 2nd Ed, 2018. The bookstore lists it as required.

Other readings will be found in other books, as noted below.

All texts and other books are on reserve at Bobst Library, digitally, and the NYU bookstore should have availability as well.

You should have completed a basic course (or demonstrate some proficiency) in each of macroeconomics, finance and statistics. *In addition, prior to the course*, if you are unfamiliar with or want a review of financial Instruments, financial Markets, and financial Institutions, you should read or at least browse chapters 1-3 of Cecchetti and Schoenholtz.

Required readings appear below (aside from the readings noted above and those found on [GARP](#) and [Risk.Net](#); the latter is available through NYU library (bobcat) access). Required readings should be completed before class. Recommended/optional readings are found below those required. These provide additional background for interested students.

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*. Access to these publications is available to students at heavily discounted rates.

Course Requirements: Exams, Assignments and Grades.

There will be a multiple-choice quiz, an in-class midterm, and a final exam during the exam period. The quiz will be graded *redemptively*: if your midterm exam grade is higher, the quiz weight will be lowered (as specified below).

There will be five problem sets (*Assignments* tab). These assignments will be graded such that a “good faith effort” will earn full credit (1% each toward the course grade). You may complete these assignments individually or in a group of up to four students. (While this is a new course, I believe that students working in study groups learn more and perform better.) Before the start of class on the due date, submit one answer for each group electronically via NYU Classes (including the names of all group members).

Finally, choose five of the non-textbook readings listed in the Lessons tab on NYU Classes (preferably no more than one reading for each Lesson), and briefly summarize (in fewer than 100 words) the key takeaway(s) from the reading. These write-ups are individual (rather than group) assignments: a “good faith effort” will earn full credit (1% each toward the course grade). Each write-up is due before the first class for which the reading is listed in Lessons. You should submit an electronic version of your write-up via NYU Classes.

Attendance in class or on line is required. Both attendance and class participation will influence the course grade in the case of (good or bad) outliers and will serve as tie-breakers.

No problem sets or write-ups will be accepted after they are due. There will be no make-ups for the quiz or the midterm exam, which are required of all students. Any absence from a test without prior written approval from the professor constitutes a failure (a grade of zero) of the quiz or exam. If the professor excuses a student from the quiz, the weight on the midterm exam will be increased accordingly. If the professor excuses a student from the midterm exam, the weight on the final exam will be increased accordingly. The only valid reason for seeking to be excused is a serious (documented) illness or the equivalent.

Course grade weights for each component are:

Practice Exams	Ungraded, for your benefit
Quiz (in-class)	5% (2% if quiz grade is less than first exam grade)
Problem sets (5)	Total of 5% (1% each for “good faith effort”)
Write-ups of class readings (5)	Total of 5% (1% each for “good faith effort”)
Exam 1 (in class)	40% (43% if first exam grade exceeds quiz grade)
Exam 2 (in class)*	45%
Attendance & class participation:	Influences tie-breaks and outliers (good and bad)

*Material covered won't be cumulative; the second exam will draw on tools learned in first half but will not test that material. There will be two ungraded practice exams for your benefit: Each will be a 75 minute, take home exercise.

Please note the following key (but still tentative) dates in your calendars:

Practice Exam 1	Sept xx
Quiz	Sept xx
Exam 1	Oct xx
Exam 2	Dec xx

Problem Set Due Dates (before class)

PS#1	Sept xx
PS#2	Oct xx
PS#3	Nov xx
PS#4	Dec xx
PS#5	Dec xx

NYU Classes

Aside from the selections from the textbooks, and the links below, everything you need for this course will be posted to NYU Classes: readings, assignments, slides, and links to information sources.

Teaching Fellow

XX is our TF. She will help grade and help you with any questions. **XX** is a second-year masters in economics student in the Faculty of Arts and Sciences. She can be reached by email at XX@nyu.edu.

Communication

The key to any successful relationship is good communication. I plan to use the announcements section of NYU Classes extensively. In return, I expect you to share your comments and observations with me and/or **XX**. You may email me (rberner@stern.nyu.edu), or catch me before or after class. Your ideas and feedback can make a big contribution to the course.

Online office hours are on Mondays and Wednesday between 9:30 and 10:30 AM, but appointments are preferred (and can be arranged by email).

Help

If you need help, please contact me or **XX**. I usually reply to email quickly (if you don't hear from me within 24 hours, please try again).

Professional behavior

In the interest of providing everyone with the best classroom – virtual or actual -- experience, I ask that you:

- Join at least five minutes before class
- Display your name in every class/Please use video in Zoom
- Put smartphones away before class (their use in class is not permitted)
- Be engaged

Academic Integrity

Our undergraduate [Academics Pillar](#) states that ***we take pride in our well-rounded education and approach our academics with honesty and integrity***. Indeed, integrity is critical to all that we do here at NYU Stern. As members of our community, all students agree to abide by the NYU Stern Student Code of Conduct, which includes a commitment to:

- Exercise integrity in all aspects of one's academic work including, but not limited to, the preparation and completion of exams, papers and all other course requirements by not engaging in any method or means that provides an unfair advantage.
- Clearly acknowledge the work and efforts of others when submitting written work as one's own. Ideas, data, direct quotations (which should be designated with quotation marks), paraphrasing, creative expression, or any other incorporation of the work of others should be fully referenced.
- Refrain from behaving in ways that knowingly support, assist, or in any way attempt to enable another person to engage in any violation of the Code of Conduct. Our support also includes reporting any observed violations of this Code of Conduct or other School and University policies that are deemed to adversely affect the NYU Stern community.

The entire Stern Student Code of Conduct applies to all students enrolled in Stern courses and can be found here: www.stern.nyu.edu/uc/codeofconduct

To help ensure the integrity of our learning community, prose assignments you submit to NYU Classes will be submitted to Turnitin. Turnitin will compare your submission to a database of prior submissions to Turnitin, current and archived Web pages, periodicals, journals, and publications. Additionally, your document will become part of the Turnitin database.

General Conduct & Behavior

Students are also expected to maintain and abide by the highest standards of professional conduct and behavior. Please familiarize yourself with Stern's Policy in Regard to In-Class

Behavior & Expectations (<http://www.stern.nyu.edu/portal-partners/current-students/undergraduate/resources-policies/academic-policies/index.htm>) and the NYU Student Conduct Policy (<https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/university-student-conduct-policy.html>).

Note: Evidence of cheating on quizzes, exams or graded assignments will result in a course grade of F without appeal.

Grading Guidelines

Grading Information for Stern **Core Courses**

At NYU Stern, we strive to create courses that challenge students intellectually and that meet the Stern standards of academic excellence. To ensure fairness and clarity of grading, the Stern faculty have adopted a grading guideline for core courses with enrollments of more than 25 students in which approximately 35% of students will receive an “A” or “A-” grade. In core classes of less than 25 students, the instructor is at liberty to give whatever grades they think the students deserve, while maintaining rigorous academic standards.

Grading Information for Stern **Elective Courses**

At NYU Stern, we strive to create courses that challenge students intellectually and that meet the Stern standards of academic excellence. To ensure fairness and clarity of grading, the Stern faculty have agreed that for elective courses the individual instructor or department is responsible for determining reasonable grading guidelines.

STUDENT ACCESSIBILITY

If you will require academic accommodation of any kind during this course, you must notify me at the beginning of the course and provide a letter from the Moses Center for Student Accessibility (212-998-4980, mosescsa@nyu.edu) verifying your registration and outlining the accommodations they recommend. If you will need to take an exam at the Moses Center for Student Accessibility, you must submit a completed Exam Accommodations Form to them at least one week prior to the scheduled exam time to be guaranteed accommodation. For more information, visit the CSA website: <https://www.nyu.edu/students/communities-and-groups/student-accessibility.html>

Tentative Class Schedule

Topics, Readings and Assignments

Week 1 Introduction to Risk Management (September 13 and 15)

- Risk Topics
- Risk assessment framework
- Enterprise Risk management and regulation
- System-wide risk assessment

Required Reading

AXA & Eurasia Group [Future Risks Report](#), October 2019, Introduction and Executive Summary, pp 7-17

James Lam, [Enterprise Risk Management: From Incentives to Controls](#) (Wiley Finance) 2nd Edition, 2014, Ch's 1, 4

Hull, [Risk Management and Financial Institutions](#), Fifth Edition, Ch 1

Stulz, [Risk Management, Governance, Culture, and Risk Taking in Banks, FRBNY Economic Policy Review / August 2016](#)

JP Morgan [2018 Annual Report](#), pp 79-83

Video: [The Big Short trailer \(and following\)](#)

Optional reading:

James Lam, [Enterprise Risk Management: From Incentives to Controls](#) (Wiley Finance) 2nd Edition, 2014, Ch's 2,3; Section Two: The Enterprise Risk Management Framework

Hull, [Risk Management and Financial Institutions](#), Fifth Edition, Ch's 27, 29

Aswath Damodaran, [Risk Management: A Corporate Governance Manual](#), SSRN 2010

Park K.F., Shapira Z. [Risk and Uncertainty](#). In: Augier M., Teece D. (eds) The Palgrave Encyclopedia of Strategic Management. Palgrave Macmillan, London.

Peter L. Bernstein, [Against the Gods: The Remarkable Story of Risk](#), Ch's 12, 13

Week 2 and 3 Financial risks (September XX)

- Types of Financial Risk: Market, Credit, Liquidity, Contagion
- Volatility and risk
- Venues: Firms, Markets and Instruments, System, Cross border
- Risk management tools
- Portfolio construction, hedging, risk transfer

Class visitor: XX, Chief Risk Officer, September XX

Practice exam 1 September XX

In Class Quiz Sept XX

Required Reading:

Week 2

James Lam, [Enterprise Risk Management: From Incentives to Controls](#) (Wiley Finance) 2nd Edition, 2014, Ch 13, p 209-224; 12, p 175-185
Cecchetti and Schoenholtz, Ch 7 (Interest rate risk)
Bookstaber, [The Volatility Paradox](#)

Week 3

[OFR 2012 Annual Report](#), Chapter 2, pp. 10 – 12, and Box B
Jorion 2009, [Risk Management Lessons from the Credit Crisis](#), p. 1-10
Bao, J., David, J., and Han, S. [“The Runnables,” FEDS Notes, September 3, 2015](#)
Kodres, [“What is shadow banking?”](#)

Optional reading:

Week 2

Hull, 10 (Volatility-213-220), 11 (Correlations-243-248), 12 (VaR and ES-269-283), 19 (Credit-431-439)
Hull, 10 (Volatility 222-228)Hull, Ch 8 (hedging; p 161-174); Ch 22 (Stress tests – 497-511); Ch 24 (Liquidity – 537-562)
[Covid-19 and the credit cycle](#), Edward Altman, Journal of Credit Risk, 16(2), 1–28
[A fifty-year retrospective on credit risk models, the Altman Z-score family of models and their applications to financial markets and managerial strategies](#), Edward Altman, Journal of Credit Risk 14(4), 1–34

Week 3

Brownlees, Christian T. and Robert F. Engle, [“SRISK: A Conditional Capital Shortfall Measure of Systemic Risk,”](#) *The Review of Financial Studies*, vol. 30, no. 1, p. 48-79, January 2017.
Obstfeld and Taylor, [“International Monetary Relations: Taking Finance Seriously,”](#) *Journal of Economic Perspectives*, Summer 2017
BCBS Stress Testing Principles <https://www.bis.org/bcbs/publ/d450.htm>
Glasserman, Paul and H. Peyton Young, [“Contagion in Financial Networks,”](#) *Journal of Economic Literature*, American Economic Association, vol. 54, no 3, September 2016, pages 779-831.
Paddrik, Mark, Sriram Rajan and H. Peyton Young, [“Contagion in the CDS Market,”](#) Office of Financial Research Working Paper 16-12, December 2016.
Bell, Sarah and Henry Holden, [“Two defaults at CCPs, 10 years apart,”](#) *BIS Quarterly Review*, December 2018.
Berner, Cecchetti and Schoenholtz, “Stress Testing Networks: The Case of Central Counterparties,” [NBER Working Paper No. 25686](#), Issued in March 2019; [SSRN](#)
Eugene Fama and Kenneth French [The Cross-Section of Expected Stock Returns](#), Journal of Finance 1992

Richard Roll and Akshay Srivastava, [Mimicking Portfolios](#), The Journal of Portfolio Management Spring 2018, 44 (5) 21-35; DOI: <https://doi.org/10.3905/jpm.2018.44.5.021>
Cochrane Fishing https://www.youtube.com/watch?v=3J_uV1TLoQo
Cochrane Factor Mimicking Portfolios and Fishing
https://www.youtube.com/watch?v=2Od0cpN5_vo

Week 4 and 5 Cyber/operational risks (September XX, October XX)

- Cyber on firms
- Cyber on governments
- Other op risks: Financial crime, supply chain
- Case studies
- Portfolio construction, hedging, risk transfer

Class visitor: XX

Required Reading

[RiskNet, Top 10 Operational Risks for 2020](#)

James Lam, [Enterprise Risk Management: From Incentives to Controls](#) (Wiley Finance) 2nd Edition, 2014, Ch 14

FS ISAC, "[Best Practices for US Financial Institutions](#)

ESRB, [Systemic cyber risk](#), February 2020, pp7-10,17-23

[Sasha Romanosky, Lillian Ablon, Andreas Kuehn, Therese Jones, Content analysis of cyber insurance policies: how do carriers price cyber risk?](#) *Journal of Cybersecurity*, Volume 5, Issue 1, 2019, tyz002, p. 21-31

Optional reading:

Phil Venables blog <https://www.philvenables.com/>

Steven Cecchetti and Kim Schoenholtz, [Cyber Risk, Financial Stability and the Payments System](#), July 26, 2020

Jonathan Welburn and Aaron Strong, [Systemic Cyber Risk and Aggregate Impacts](#), RAND, [Video](#)
Hilary J. Allen, "[Payments Failure](#)," SSRN, [Video](#)

Antoine Bouveret, "Losses Due to Cyber Risk and Concentration Risks Related to Cloud Providers for the Financial Sector" ([Video Paper Slides](#))

Anna Kovner, Thomas Eisenbach and Michael Lee, "[Cyber Risk and the U.S. Financial System: A Pre-Mortem Analysis](#)," Federal Reserve Bank of New York, Staff Report No. 909 January 2020; [Video](#)

Greg Ros, [The making of a cyber crash: a conceptual model for systemic risk in the financial sector](#), ESRB Occasional Paper Series No 16 / May 2020

Kai-Lung Hui, Wendy Wan-Yee Hui, Wei Thoo, [Cyber Insurance and Risk Management: A Normative Analysis](#), November 2019

Federal Reserve, [Information Technology Guidance](#)

Noted above: Global Association of Risk Professionals (GARP), Financial Risk and Regulation Series: Operational Risk Management

[René M. Stulz](#), [Shinichi Kamiya](#), [Jun-Koo Kang](#) and [Jungmin Kim](#), “Risk Management, Firm Reputation, and the Impact of Successful Cyberattacks on Target Firms,” [Fisher College of Business Working Paper No. 2018-03-004](#), [Charles A. Dice Working Paper No. 2018-03-04](#), [Journal of Financial Economics \(JFE\)](#), *Forthcoming*

Anil Kashyap, Anne Wetherilt, [Some Principles for Regulating Cyber Risk](#), November 2018 Bank of England, [Financial Sector Continuity](#), including CBEST

Bank of England, [Operational Resilience: Impact tolerances for important business services](#), Consultation Paper 29/19/Discussion Paper 1/18, December 2019

Week 6 and 7 Climate-related risks (October XX)

- Climate science basics
- Risk management
- Disclosure and ESG
- Case studies
- Portfolio construction, hedging, risk transfer

Class visitor: XX, October XX

XX, October XX

Required Reading

Joseph Romm, [Climate Change: What Everyone Needs to Know](#), Ch’s 1, 3.

CFTC, [Managing Climate Risk in the U.S. Financial System: Report of the Climate-Related Market Risk Subcommittee, Market Risk Advisory Committee of the U.S. Commodity Futures Trading Commission](#), Executive Summary, i-ix

Four Twenty Seven, [Using Climate Data](#), April 2018

IPCC, [Managing the Risks of Extreme Events, and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change](#), 2012, Summary for Policymakers (pp. 3-21)

Center for Sustainable Business [ROSI™ Methodology](#)

[GARP’s climate website](#) provides useful information; see [Climate Survey](#)

Optional reading:

Joseph Romm, [Climate Change: What Everyone Needs to Know](#), Ch’s 2, 4.

McKinsey Global Institute, [Climate risk and response: Physical hazards and socioeconomic impacts](#), January 2020, Executive Summary

George Metcalf, [On the Economics of a Carbon Tax](#), Brookings Papers on Economic Activity, Spring 2019

[UN Sustainable Development Goals](#) – click on each goal to read the background behind it.

Webinar: [Climate Scenario Analysis: Guidance from the NGFS and CFRE](#), GARP and the Bank of England

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

Congressional Research Service, [Attaching a Price to Greenhouse Gas Emissions with a Carbon Tax or Emissions Fee: Considerations and Potential Impacts](#) March 22, 2019

Kent D. Daniel, Robert B. Litterman and Gernot Wagner, [Applying Asset Pricing Theory to Calibrate the Price of Climate Risk](#), NBER Working Paper 22795

Tensie Whelan, [How to Quantify Sustainability's Impact on Your Bottom Line](#), HBR, 2017

Kevin Eckerle, Tensie Whelan, Bryan DeNeve, Sameer Bhojani, John Platko, Rebecca Wisniewski, [Using the Return on Sustainability Investment \(ROSI\) Framework to Value Accelerated Decarbonization](#), Journal of Applied Corporate Finance, June 2020

Robert Engle, Stefano Giglio, Heebum Lee, Bryan Kelly, Johannes Stroebel, [Hedging Climate Change News](#) Review of Financial Studies, Forthcoming

Signe Krogstrup and William Oman [Macroeconomic and Financial Policies for Climate Change Mitigation: A Review of the Literature](#), IMF Working Paper, September 4, 2019

Task Force on Climate-Related Financial Disclosures, [Status Report](#), 2019

Prudential Regulatory Authority, [Enhancing banks' and insurers' approaches to managing the financial risks from climate change](#) April 2019 Supervisory Statement | SS3/19

Bank of England, Discussion Paper, [The 2021 biennial exploratory scenario on the financial risks from climate change](#), December 2019

Financial Conduct Authority and Prudential Regulatory Authority, Climate Financial Risk Forum, [Guide: Summary](#), June 2020

STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE, Climate-Related Security Risks <https://www.sipri.org/sites/default/files/Climate-related-security-risks.pdf>

Week 8 and 9 Geopolitical risks (October XX)

- Many facets to geopolitical risk
- Geopolitical vs. Political vs. Sovereign Risk
- Combatting the Financing of Terrorism (CFT)
- Case studies
- Portfolio construction, hedging, risk transfer

In-class Exam 1 October XX

Class Visitors, XX

Required Reading

BlackRock [Geopolitical Risk Dashboard](#)

IMF, [Anti-Money Laundering/Combating the Financing of Terrorism \(AML/CFT\)](#)

[Scott R. Baker](#), [Nicholas Bloom](#), [Steven J. Davis](#) Measuring Economic Policy Uncertainty, *The Quarterly Journal of Economics*, Volume 131, Issue 4, November 2016, Pages 1593–1636, <https://doi.org/10.1093/qje/qjw024>
[Economic Policy Uncertainty Index](#)
[Brunswick Geopolitical](#)
[Sigma Ratings](#)

Optional reading:

Dario Caldara, Matteo Iacoviello, Patrick Molligo, Andrea Prestipino, and Andrea Raffo, [Does Trade Policy Uncertainty Affect Global Economic Activity?](#) Feds Notes, 2019

Bryan Kelly, Leland Bybee, Asaf Manela, Dacheng Xiu, [“The Structure of Economic News”](#), September 2019

Robert F Engle and Susana Martins “Hedging Geopolitical Risk based on a Multiplicative Volatility Factor Model”

Geoffrey Miller, *The Law of Governance, Risk Management and Compliance*, Second Ed. Wolters Kluwer, Chapters 4 and 14 (at Bobst)

Week 10: Pandemic Risks (November XX)

- History: Evolution, Public Health and Resilience, Health Economics
- Detecting, Testing and Tracing the Pandemic
- Macroeconomic and Financial Impact and Policy Responses
- Planning for Future – Improving Public Health, Vaccination, Pandemic Stress Tests

Class Visitor XX

Required Reading

WHO, Coronavirus, https://www.who.int/health-topics/coronavirus#tab=tab_1

Johns Hopkins, Coronavirus Research Center, <https://coronavirus.jhu.edu/>

Sergio Correia, Stephan Luck, and Emil Verner, [“Fight the Pandemic, Save the Economy: Lessons from the 1918 Flu,”](#) Federal Reserve Bank of New York *Liberty Street Economics*, March 27, 2020.

Warwick McKibbin & Roshen Fernando, Global Macroeconomic Scenarios of the COVID-19 Pandemic, [Covid Economics](#) 39.

Christos A. Makridis and Jonathan T. Rothwell, The Real Cost of Political Polarization: Evidence from the COVID-19 Pandemic, [Covid Economics](#) 34.

Edward Holmes, [The Coronavirus Is Mutating, and That’s Fine \(So Far\)](#), NYT, September 11, 2020

Optional Reading

Luboš Pástor and M. Blair Vortatz, Mutual fund performance and flows during the COVID-19 crisis, *Covid Economics* 38. <https://cepr.org/content/covid-economics-vetted-and-real-time-papers-0>

Michael Gapen, Jonathan Millar, Blerina Uruçi and Pooja Sriram, Assessing the effectiveness of alternative measures to slow the spread of COVID-19 in the United States Covid Economics 38. <https://cepr.org/content/covid-economics-vetted-and-real-time-papers-0>

Correia, Sergio and Luck, Stephan and Verner, Emil, Pandemics Depress the Economy, Public Health Interventions Do Not: Evidence from the 1918 Flu (June 5, 2020). Available at SSRN: <https://ssrn.com/abstract=3561560> or <http://dx.doi.org/10.2139/ssrn.3561560>

Week 11: Interplay (November)

- Interconnectedness, contagion and spillovers
- Interplay among the five pillars of risk
- Case studies

Required Reading

Yellen, Janet L., "[Interconnectedness and Systemic Risk: Lessons from the Financial Crisis and Policy Implications](#)," speech at the American Economic Association/American Finance Association Joint Luncheon, San Diego, California, January 4, 2013.

Kara, Gazi, Mary Tian and Margaret Yellen, "[Taxonomy of Studies on Interconnectedness](#)," FEDS Notes, July 31, 2015.

Darrell Duffie and Josh Younger, "[Cyber Runs](#)," Hutchins Center Working Paper #51, June 2019

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

Schwebel, Michael, [Is There a Link Between Climate Change and Global Pandemics?](#), GARP, August 18, 2020

Optional reading:

Bernanke, Ben, "[Clearinghouses, Financial Stability, and Financial Reform](#)," At the 2011 Financial Markets Conference, Stone Mountain, Georgia, April 4, 2011

Allen, Franklin and Douglas Gale, "[Financial Contagion](#)," *Journal of Political Economy*, vol. 108, no. 1, p. 1-33, February 2000.

Elliott, Matthew, Benjamin Golub and Matthew O. Jackson, 2014, "[Financial Networks and Contagion](#)," *American Economic Review*, vol. 104, no. 10, October 2014, p. 3115-3153.

Kovner, Thomas M. Eisenbach and Michael Junho Lee, [Cyber Risk and the U.S. Financial System: A Pre-Mortem Analysis](#) Number 909 January 2020

Patrick Bolton, Morgan Despres, Luiz Awazu Pereira Da Silva, Frédéric Samama, Romain Anna Svartzman, [The green swan: Central banking and financial stability in the age of climate change](#), Banque de France, January 2020

Week 12 New Tools: Business Analytics and Big Data (Nov 23 and 30)

- Applications of AI, Machine Learning, NLP, and other RegTech tools
- Use cases and tools

- Data: Big and otherwise
- Fintech and Digital Assets

Visitor: XX

Required Reading

Maini and Sabri, [Machine Learning for Humans](#), Introduction, pp 3-15, 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:

Dhar, [When Should we Trust Machines?](#), 2018

Brainard, [What Are We Learning about Artificial Intelligence in Financial Services?](#), November 2018

FinRegLab, [FAQs: AI in Financial Services](#), 2020

FINRA, [Technology Based Innovations for Regulatory Compliance \(“RegTech”\) in the Securities Industry](#), September 2018

Alliance for Innovative Regulation, [Regtech Manifesto](#), July 2020

McKinsey, [Why Data Culture Matters](#), Sept 2018

Benck, Darin, Michael Descy and Emma Bebee, [Big Data and the Insurance Industry](#), Society of Financial Examiners, Fall, 2016

Weeks 12 and 13: Policy Implications (November XX)

- Resilience
- Crisis Fighting
- Other risks: Fintech, cryptocurrencies, Conduct and Culture

Visitor: XX

Required reading

Resilience: Macropru, OLA, incentives: Hanson, Kashyap and Stein, “[A Macroprudential Approach to Financial Regulation](#),” 2011;

Gruenberg and Tucker, [FT op-ed](#) (2012);

David Aikman, Andrew G Haldane, Marc Hinterschweiger and Sujit Kapadia, [Rethinking financial stability](#), Staff Working Paper No. 712 February 2018

Benoît Cœuré, [The known unknowns of financial regulation](#), PIIE, October 2017

Crisis Fighting: Geithner, “[Are We Safer? The Case for Strengthening the Bagehot Arsenal.](#)”

Monetary Policy: Ben S. Bernanke, [Monetary Policy in a New Era](#), Brookings Institution October 2, 2017

Other risks:

Brainard, [Financial Stability Implications of Climate Change](#)

Brainard, [“The Opportunities and Challenges of Fintech:”](#)

Christian Barontini and Henry Holden, [Proceeding with caution – a survey on central bank digital currency](#), BIS Papers No 101, January 2019

Dudley, [Strengthening Culture for the Long Term](#)

Optional reading:

FSB, [Framework for Post-Implementation Evaluation of the Effects of the G20 Financial Regulatory Reforms](#);

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](#)h;

Adrian and Liang, [“Monetary Policy, Financial Conditions and Financial Stability,”](#) Staff Report 690;

Tobias Adrian, Federico Grinberg, Nellie Liang, Sheheryar Malik, [The Term Structure of Growth-at-Risk](#), Brookings December 2019

Jeremy Stein, [“Overheating in Credit Markets: Origins, Measurement, and Policy Responses”](#) [GAO Financial Technology Report](#); pp 3-12;

Arner, Douglas W. and Barberis, Janos Nathan and Buckley, Ross P., [FinTech, RegTech and the Reconceptualization of Financial Regulation](#) (October 1, 2016). 37 Northwestern Journal of International Law & Business, 371 (2017); University of Hong Kong Faculty of Law Research Paper No. 2016/035.

Zetsche, Dirk A., Ross P. Buckley, Janos N. Barberis, and Douglas W. Arner, [Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation](#), Fordham Journal of Corporate & Financial Law, Volume 23, Number 1 2017 Article 2

BIS, [Policy responses to fintech: a cross-country overview](#);

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

[Treasury Market Practices Group: 10 Years of Best Practices](#)

Week 14 (December XX) Office Hours

December XX final exam 12 to 1:50 PM

Tentative Class Schedule

Class	Date	Topic	Visitors	Assignments
Pre-class	<i>Before</i> Sept 2	Review		Complete online survey
1,2	Sept 2, 9	Introduction to Risk Management		
3,4	Sept 14, 16	Financial risks	Sept 16	Practice exam 9/16
5,6	Sept 21, 23	Financial risks		
5	Sept 21	In-class quiz (20 minutes)		
7,8	Sept 28, 30	Cyber/operational risks		PS#1 Due Sept 30
9,10	Oct 5,7	Cyber/operational risks		
11,12	Oct 12,14	Climate-related risks	Visitors Oct 12, 14	PS#2 Due Oct 14
13	Oct 19	Climate-related risks and Review for Exam 1		
14	Oct 21	In-class Exam 1 (75 minutes)		
15,16	Oct 26, 28	Geopolitical risks	Visitor Oct 28	
17,18	Nov 2, 4	Geopolitical risks		PS#3 Due Nov 11
19,20	Nov 9,11	Pandemic Risks	Visitor, Nov 9	
21,22	Nov 16, 18	Interplay		PS#4 Due Dec 2
23,24	Nov 23, 25	New Tools: Business Analytics and Big Data		PS#5 Due Dec 9
25, 26, 27, 28	Nov 30, Dec 2, Dec 7, Dec 9	Policy Implications		
	Dec 18	Final Exam		
29, 30	Dec 14, 16	Office Hours		

