FINANCIAL ECONOMICS OF CLIMATE AND SUSTAINABILITY
GLOBAL DOCTORAL COURSE 2024
Draft dated: 19 December 2023

Note: Required readings are either labeled or identified by asterisks; they are available through linked URLs. Books on this reading list are optional and must be accessed locally. In some instances, we provide multiple links, as students may have differential access to various sites. This preliminary syllabus is subject to change on a weekly basis. Please see the course Dropbox for the final readings.

CLASS 1: Introduction to climate change
Professor Peter Tufano, Harvard University

In this session, we will attempt to level-set the class with respect to basic climate science and introduce the elements of climate science that would be useful to financial economics researchers. For some of you, this material may be very basic, for others it will be quite new. The required readings are given below, but on the course Dropbox, I will provide a considerably larger number of references for people with less background on the topic. You may want to refer to these materials over the course of the semester and beyond.

Required readings (3)

1. Gasparini, Matteo, and Peter Tufano. "The evolving academic field of climate finance." https://ssrn.com/abstract=4354507

2. Please carefully read this IPCC Report: https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf

The Intergovernmental Panel on Climate Change's (IPCC) reports compile the existing climate science and are the most referred to documents in this space. The March 2023 Synthesis Report (the 6th Assessment Cycle) "Summary for Policymakers" is a dense and high-level summary of the key scientific results. In class we will discuss and explain some of the relevant results. Note reference to the major greenhouse gases, human based contributions to Greenhouse Gas (GHG) concentrations, carbon budgets, net zero, scenarios, and probability assessments.

3. To get a sense of the challenges of getting to a 1.5° scenario, please create your own pathway using the MIT-developed simulator, En-Roads, which is available at https://www.climateinteractive.org/en-roads/ (click on "Explore the En-Roads Simulation"). This is a simplified version of a very complicated systems model. To use it, either watch the video below (or read the instructions) and then put together your model using the control panel.

- Watch the En-ROADs Introductory Walkthrough
- En-ROADS Simulator Control Panel

The class Dropbox for Session 1 will contain a selected bibliography of general books on climate finance, review pieces, and a walk-through of some the material that we will cover in this class.

CLASSES 2 & 3: The Economics and Finance of Climate Change
Professors Patrick Bolton, Imperial College London and Geoffrey Heal, Columbia University

Class 2: Required Readings (5)

Heal, Geoffrey. "Climate Economics: A Meta-Review and Some Suggestions for Further Research." *Review of Environmental Economics and Policy* 1, no. 3 (2009): 4-21. https://doi.org/10.1093/reep/ren014

Heal, Geoffrey. "The Economics of the Climate." *Journal of Economic Literature* 55, no. 3 (2017): 1046-1063. https://doi.org/10.1257/jel.20151335

Heal, Geoffrey, and Antony Millner. "Uncertainty and Decision-Making in Climate Change Economics." *Review of Environmental Economics and Policy* 1, no. 8 (2014): 120-137. https://doi.org/10.1093/reep/ret023

Millner, Antony, and Geoffrey Heal. "Choosing the Future: Markets, Ethics and Rapprochement in Social Discounting." *Journal of Economic Literature* 61, no. 3 (September 2023): 1037-1087. https://doi.org/10.1257/jel.20211675

Millner, Antony, Simon Dietz, and Geoffrey Heal. "Scientific Ambiguity and Climate Policy." *Environmental and Resource Economics* 55 (2013): 21-46. https://doi.org/10.1007/s10640-012-9612-0

Class 3: Required readings (5)

Coase, Ronald H. "The Problem of Social Cost." *The Journal of Law and Economics* 56, no. 4 (1960): 837–877. https://www.jstor.org/stable/724810

Gollier, Christian. *Pricing the Planet's Future: The Economics of Discounting in an Uncertain World*. Princeton University Press (2012) – Note: this is a book, and you will have to get access to it locally.

Daniel, Kent, Robert Litterman, and Gernot Wagner. "Declining CO2 Paths." *Proceedings of the National Academy of Sciences* (2019). https://doi.org/10.1073/pnas.1817444116

Pindyck, Robert S. "The Social Cost of Carbon Revisited." *Journal of Environmental Economics and Management* 94 (2019): 140–160. https://doi.org/10.1016/j.jeem.2019.02.003

Adrian, Tobias, Patrick Bolton, and Anouk Kleinnijenhuis. "The Great Carbon Arbitrage." *IMF Working Paper* No. 2022/107 (2022). https://ssrn.com/abstract=4129572

Optional readings (Note: some of these are books and are not available online.)

Mas-Colell, Andreu, Michael Dennis Whinston, and Jerry R. Green. Microeconomic Theory. New York: Oxford University Press, 1995. Chapters 10.D & 11.

Dasgupta, Partha S., and Geoffrey M. Heal. *Economic Theory and Exhaustible Resources*. Cambridge University Press, 1979. Chapter on Hotelling's Rule.

Hardin, Garrett. "The Tragedy of the Commons." *Science* 162, no. 3859 (1968): 1243-1248. https://www.jstor.org/stable/1724745

Ostrom, Elinor. (1990) *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press, 1990. (out of print)

Stern, Nicholas Herbert. *The Economics of Climate Change: The Stern Review*. Cambridge University press, 2007. http://mudancasclimaticas.cptec.inpe.br/~rmclima/pdfs/destaques/sternreview_report_complete.pdf

Weitzman, Martin L. "A review of the Stern Review on the economics of climate change." *Journal of Economic Literature* 45, no. 3 (2007): 703-724. https://doi.org/10.1257/jel.45.3.703

Nordhaus, William. *The climate casino: Risk, uncertainty, and economics for a warming world*. Yale University Press, 2013.

Llavador, Humberto, John E. Roemer, and Joaquim Silvestre. *Sustainability for a warming planet*. Harvard University Press, 2015. https://www.jstor.org/stable/j.ctvjk2xrr

Auffhammer, Maximilian. "Quantifying economic damages from climate change." *Journal of Economic Perspectives* 32, no. 4 (2018): 33-52. https://doi.org/10.1257/jep.32.4.33

CLASS 4: Climate and Asset Pricing - Theory
Professors Stefano Giglio, Yale School of Management and Marcin Kacperczyk, Imperial College Business School

Introductory reading

Giglio, Stefano, Bryan Kelly, and Johannes Stroebel. "Climate finance." *Annual Review of Financial Economics* 13 (2021): 15-36. https://doi.org/10.1146/annurev-financial-102620-103311

Climate Risk and Asset Prices: Theory

This part of the class will introduce a variety of ways climate risks have been modeled in finance. The class will cover both structural and reduced-form equilibrium models of climate risks and their effects on asset prices.

Required readings (3)

Bansal, Ravi, Dana Kiku, and Marcelo Ochoa. "Climate change risk." *Federal Reserve Bank of San Francisco Working Paper* (2019). https://www.frbsf.org/economic-research/events/2019/november/economics-of-climate-change/files/Paper-5-2019-11-8-Kiku-1PM-1st-paper.pdf

Pástor, Ľuboš, Robert F. Stambaugh, and Lucian A. Taylor. "Sustainable investing in equilibrium." *Journal of Financial Economics* 142, no. 2 (2021): 550-571. https://doi.org/10.1016/j.jfineco.2020.12.011

Giglio, Stefano, Matteo Maggiori, Krishna Rao, Johannes Stroebel, and Andreas Weber. "Climate change and long-run discount rates: Evidence from real estate." *The Review of Financial Studies* 34, no. 8 (2021): 3527-3571. https://doi.org/10.1093/rfs/hhab032

Bolton, Patrick, and Marcin Kacperczyk. "Global Pricing of Carbon-Transition Risk." *Journal of Finance* 78, no 6: 3677-3754. https://doi.org/10.1111/jofi.13272

Cenedese, Gino, Shangqi Han, and Marcin T. Kacperczyk. "Carbon-transition risk and net-zero portfolios." *Imperial College Working Paper* (2023). https://ssrn.com/abstract=4565220

Pástor, Ľuboš, Robert F. Stambaugh, and Lucian A. Taylor. "Dissecting green returns." *Journal of Financial Economics* 146, no. 2 (2022): 403-424. https://doi.org/10.1016/j.jfineco.2022.07.007

Optional readings

Barnett, Michael, William Brock, and Lars Peter Hansen. “Pricing uncertainty induced by climate change.” *The Review of Financial Studies* 33, no. 3 (2020): 1024-1066. https://doi.org/10.1093/rfs/hhz144

Heinkel, Robert, Alan Kraus, and Josef Zechner. “The effect of green investment on corporate behavior.” *Journal of Financial and Quantitative Analysis* 36, no. 4 (2001): 431-449. https://doi.org/10.2307/2676219

Pedersen, Lasse Heje, Shaun Fitzgibbons, and Lukasz Pomorski. “Responsible investing: The ESG-efficient frontier.” *Journal of Financial Economics* 142, no. 2 (2021): 572-597. https://doi.org/10.1016/j.jfineco.2020.11.001

Weitzman, Martin L. “Fat tails and the social cost of carbon.” *American Economic Review* 104, no. 5 (2014): 544-546. https://doi.org/10.1257/aer.104.5.544

CLASS 5: Corporate Carbon Accounting and Disclosures
Professor Stefan Reichelstein, Stanford University and Mannheim University

Required readings (4)

Downar, Benedikt, Jürgen Ernstberger, Stefan Reichelstein, Sebastian Schwenen, and Aleksandar Zaklan. "The impact of carbon disclosure mandates on emissions and financial operating performance." *Review of Accounting Studies* 26 (2021): 1137-1175. https://doi.org/10.1007/s11142-021-09611-x

Tollefson, Jeff. "Climate pledges from top companies crumble under scrutiny." *Nature* (2022). https://doi.org/10.1038/d41586-022-00366-2

Reichelstein, Stefan. "Carbon Emission Statements: Balance Sheets and Flow Statements". Working Paper. Mannheim Institute for Sustainable Energy Studies (2023). https://www.uni-mannheim.de/media/Einrichtungen/mises/Dokumente/CES_RAST.pdf/flipbook

Greenstone, Michael, Christian Leuz, and Patricia Breuer. "Mandatory disclosure would reveal corporate carbon damages." Science 381, no. 6660 (2023): 837-840. https://www.science.org/doi/10.1126/science.add6815

Optional readings

Christensen, H.B., Floyd, E. L.Y. Liu, and M.G. Maffett. (2017). "The Real Effects of Mandated Information on Social Responsibility in Financial Reports: Evidence from Mine-safety Records". *Journal of Accounting and Economics.* 64: 284–304. https://doi.org/10.1016/j.jacceco.2017.08.001.

Cohen, S., Kadach, I., Ormazabal, G. and S. Reichelstein (2023). "Executive Compensation Tied to ESG Performance: International Evidence." *Journal of Accounting Research* https://onlinelibrary.wiley.com/doi/full/10.1111/1475-679X.12481

Griffin, P. and E. Sun (2023) "The Conundrum of Scope 3 Emissions for Corporate Reporting" *Accountability in a Sustainable World Quarterly,* Issue 2. 61-72. https://online.fliphtml5.com/jdbmp/ptht/

Hale, T. et al. (2021) "Assessing the Rapidly Emerging Landscape of Net Zero Targets." *Climate Policy*, *22(1)*, 18-29. https://doi.org/10.1080/14693062.2021.2013155

Class 6: Sustainable Finance – Investing in Equity
Professors Caroline Flammer, Columbia University and Laura Starks, University of Texas Austin

Required readings (4)

Flammer, Caroline. "Does Corporate Social Responsibility Lead to Superior Financial Performance? A Regression Discontinuity Approach." *Management Science* 41 (2015): 2549-2824. https://doi.org/10.1287/mnsc.2014.2038

Flammer, Caroline, Michael W. Toffel, and Kala Viswananthan. "Shareholder Activism and Firms' Voluntary Disclosure of Climate Change Risks." *Strategic Management Journal* 42 (2021): 1850-1879. SSRN Paper. https://doi.org/10.1002/smj.3313

Ilhan, Emir, Philipp Krueger, Zacharias Sautner, and Laura T. Starks. "Climate Risk Disclosure and Institutional Investors." *Review of Financial Studies* 36 (2022): 2617-2650. https://doi.org/10.1093/rfs/hhad002

Sautner, Zacharias, Laurence van Lent, Grigory Vilkov, and Ruishen Zhang. "Firm-Level Climate Change Exposure." *Journal of Finance* 78 (2021): 1449-1498. https://doi.org/10.1111/jofi.13219

Optional readings

Alok, Shashwat, Nitin Kumar, and Russ Wermers. "Do Fund Managers Misestimate Climatic Disaster Risk?" *Review of Financial Studies* 33 (2020): 1146-1183. https://doi.org/10.1093/rfs/hhz143

Berg, Florian, Julian F. Kolbel, and Roberto Rigobon. "Aggregate Confusion: The Divergence of ESG Ratings." *Review of Finance* 26 (2022): 1315-1344. https://doi.org/10.1093/rof/rfac033

Bolton, Patrick, Zachery Halem, and Marcin T. Kacperczyk. "The Financial Cost of Carbon." *Journal of Applied Corporate Finance* 34 (2022): 17-29. https://doi.org/10.1111/jacf.12502

De Angelis, Tiziano, Peter Tankov, and Olivier David Zerbib. "Climate Impact Investing." *Management Science* (2022). https://doi.org/10.1287/mnsc.2022.4472

Dimson, Elroy, Oğuzhan Karakaş, and Xi Li. "Active ownership." *The Review of Financial Studies* 28, no. 12 (2015): 3225-3268. https://doi.org/10.1093/rfs/hhv044

Dyck, Alexander, Karl V. Lins, Lukas Roth, and Hannes F. Wagner. "Do Institutional Investors Drive Corporate Social Responsibility? International Evidence." *Journal of Financial Economics* 131 (2019): 693-714. https://doi.org/10.1016/j.jfineco.2018.08.013

Flammer, Caroline and Giroux, Thomas and Heal, Geoffrey M., Biodiversity Finance. *European Corporate Governance Institute – Finance Working Paper* (2023). https://ssrn.com/abstract=4379451

Gantchev, Nickolay, Mariassunta Giannetti, and Rachel Li. "Does Money Talk? Divestitures and Corporate Environmental and Social Policies." *Review of Finance* 26 (2022): 1469-1508. https://doi.org/10.1093/rof/rfac029

Garel, Alexandre, Arthur Romec, Zacharias Sautner, and Alexander F. Wagner. "Do Investors Care About Biodiversity?." *Swiss Finance Institute Research Paper* 23-24 (2023). https://ssrn.com/abstract=4398110

Krueger, Philipp, Zacharias Sautner, and Laura T Starks. "The Importance of Climate Risks for Institutional Investors." *Review of Financial Studies* 33 (2020): 1067-1111. https://doi.org/10.1093/rfs/hhz137

Starks, Laura T. "Presidential Address: Sustainable Finance and ESG Issues – Value Versus Values." *Journal of Finance* 78 (2023): 1837-1872. https://doi.org/10.1111/jofi.13255

CLASS 7: Climate and Asset Pricing - Empirics

Professors Stefano Giglio, Yale School of Management and Marcin Kacperczyk, Imperial College Business School

This lecture will expose you to the ideas underlying physical and transition risk in financial markets. We will discuss the basic empirical framework in which these problems can be studied and discuss empirical findings consistent with this framework. Focus will be on equity markets, but we will also discuss auxiliary predictions from other markets.

Required readings – Part 1

Acharya, Viral V., Tim Johnson, Suresh Sundaresan, and Tuomas Tomunen. "Is physical climate risk priced? Evidence from regional variation in exposure to heat stress." No. w30445. *National Bureau of Economic Research*, 2022. https://www.nber.org/papers/w30445

Hong, Harrison, Frank Weikai Li, and Jiangmin Xu. "Climate risks and market efficiency." *Journal of Econometrics* 208, no. 1 (2019): 265-281. https://doi.org/10.1016/j.jeconom.2018.09.015

Optional readings

Baker, Malcolm, Daniel Bergstresser, George Serafeim, and Jeffrey Wurgler. "The pricing and ownership of US green bonds." *Annual Review of Financial Economics* 14 (2022): 415-437. https://doi.org/10.1146/annurev-financial-111620-014802

Baldauf, Markus, Lorenzo Garlappi, and Constantine Yannelis. "Does climate change affect real estate prices? Only if you believe in it." *The Review of Financial Studies* 33, no. 3 (2020): 1256-1295. https://doi.org/10.1093/rfs/hhz073

Bernstein, Asaf, Matthew T. Gustafson, and Ryan Lewis. "Disaster on the Horizon: The Price Effect of Sea Level Rise." *Journal of Financial Economics* 134, no. 2 (2019): 253-272. https://doi.org/10.1016/j.jfineco.2019.03.013

Bolton, Patrick, Zhongchen Halem, and Marcin Kacperczyk. "The Financial Cost of Carbon." *Journal of Applied Corporate Finance* 34, no. 2 (2022): 17-29. https://doi.org/10.1111/jacf.12502

Bolton, Patrick, and Marcin Kacperczyk. "Do Investors Care About Carbon Risk?" *Journal of Financial Economics* 142, no. 2 (2021): 517-549. https://doi.org/10.1016/j.jfineco.2021.05.008

Bolton, Patrick, Marcin Kacperczyk, and Frederic Samama. "Net-Zero Carbon Portfolio Alignment." *Financial Analysts Journal* 78, no. 2 (2022): 19-33. https://doi.org/10.1080/0015198X.2022.2033105

Goldsmith-Pinkham, Paul, Matthew T. Gustafson, Ryan C. Lewis, and Michael Schwert. "Sea-level rise exposure and municipal bond yields." *The Review of Financial Studies* 36, no. 11 (2023): 4588-4635. https://doi.org/10.1093/rfs/hhad041

Murfin, Justin, and Mark Spiegel. "Is the Risk of Sea Level Rise Capitalized in Residential Real Estate?" *The Review of Financial Studies* 33, no. 3 (2020): 1217-1255. https://doi.org/10.1093/rfs/hhz134

Painter, Marcus. "An Inconvenient Cost: The Effects of Climate Change on Municipal Bonds." *Journal of Financial Economics* 135, no. 2 (2020): 468-482. https://doi.org/10.1016/j.jfineco.2019.06.006

ESG Hedging Portfolios

This part of the class will review different approaches to building hedging portfolios for climate risks.

Required readings – Part 2

Alekseev, Georgy, Stefano Giglio, Quentin Maingi, Johannes Selgrad, and Johannes Stroebel. "A Quantity-Based Approach to Constructing Climate Risk Hedge Portfolios." *NBER Working Paper* (2021). https://www.nber.org/papers/w30703

Giglio, Stefano, Theresa Kuchler, Johannes Stroebel, and Xuran Zeng. "Biodiversity Risk." No. w31137. *NBER Working Paper* (2023). https://www.nber.org/papers/w31137

Optional readings

Engle, Robert F., Stefano Giglio, Bryan Kelly, Heebum Lee, and Johannes Stroebel. "Hedging Climate Change News." *The Review of Financial Studies* 33, no. 3 (2020): 1184-1216. https://doi.org/10.1093/rfs/hhz072

Long Term Discounting, SCC

Crost, Benjamin, and Christian P. Traeger. "Optimal CO2 Mitigation under Damage Risk Valuation." *Nature Climate Change* 4, no. 7 (2014): 631-636. https://doi.org/10.1038/nclimate2249

Daniel, Kent D., Robert B. Litterman, and Gernot Wagner. "Declining CO2 Price Paths." *Proceedings of the National Academy of Sciences* 116, no. 42 (2019): 20886-20891. https://doi.org/10.1073/pnas.1817444116

Giglio, Stefano, Matteo Maggiori, Krishna Rao, Johannes Stroebel, and Andreas Weber. “Climate Change and Long-Run Discount Rates: Evidence from Real Estate.” *The Review of Financial Studies* 34, no. 8 (2021): 3527-3571. https://doi.org/10.1093/rfs/hhab032

Lemoine, Derek. “The Climate Risk Premium: How Uncertainty Affects the Social Cost of Carbon.” *Journal of the Association of Environmental and Resource Economists* 8, no. 1 (2021): 27-57. https://doi.org/10.1086/710667

Nordhaus, William D. “To Slow or Not to Slow: The Economics of the Greenhouse Effect.” *The Economic Journal* 101, no. 407 (1991): 920-937. https://doi.org/10.2307/2233864

Class 8: Sustainable Finance – Investing in Debt
Professors Caroline Flammer, Columbia University and Laura Starks, University of Texas Austin

Required readings (4)

Flammer, Caroline. "Corporate Green Bonds." *Journal of Financial Economics* 142 (2021): 499-516. https://doi.org/10.1016/j.jfineco.2021.01.010

Goldsmith-Pinkham, Paul, Matthew T. Gustafson, Ryan C. Lewis, and Michael Schwert. "Sea-level rise exposure and municipal bond yields." *The Review of Financial Studies* 36, no. 11 (2023): 4588-4635. https://doi.org/10.1093/rfs/hhad041

Larcker, David F., and Edward M. Watts. "Where's the greenium?." *Journal of Accounting and Economics* 69, no. 2-3 (2020): 101312. https://doi.org/10.1016/j.jacceco.2020.101312

Seltzer, Lee H., Laura Starks, and Qifei Zhu. "Climate regulatory risk and corporate bonds." *Nanyang Business School Research Paper* No. 20-05*, FRB of New York Staff Report* No. 1014 (2023). https://ssrn.com/abstract=3563271

Optional readings

Baker, Malcolm, Daniel Bergstresser, George Serafeim, and Jeffrey Wurgler. "The Pricing and Ownership of US Green Bonds." *Annual Review of Financial Economics* 14 (2022): 415-437. https://doi.org/10.1146/annurev-financial-111620-014802

D'Amico, Stefania, Johannes Klausmann, and N. Aaron Pancost. "The benchmark greenium." Working Paper (2023). https://ssrn.com/abstract=4128109

Flammer, Caroline. "Green Bonds: Effectiveness and Implications for Public Policy." *Environmental and Energy Policy and the Economy* 1 (2020): 95–128. https://doi.org/10.1086/706794

Heinkel, Robert, Alan Kraus, and Josef Zechner. "The Effect of Green Investment on Corporate Behavior." *The Journal of Financial and Quantitative Analysis* 36 (2001): 431-449. https://doi.org/10.2307/2676219

Kölbel, Julian F., and Adrien-Paul Lambillon. "Who pays for sustainability? An analysis of sustainability-linked bonds." *Swiss Finance Institute Research Paper* 23-07 (2023). https://ssrn.com/abstract=4007629

Pastor, Lubos, Robert Stambaugh, and Lucian Taylor. "Dissecting Green Returns." *Journal of Financial Economics* (2022). https://doi.org/10.1016/j.jfineco.2022.07.007

Zerbib, Olivier David. “The Effect of Pro-Environmental Preferences on Bond Prices: Evidence from Green Bonds.” *Journal of Banking & Finance* 98 (2019): 39–60. https://doi.org/10.1016/j.jbankfin.2018.10.012

Class 9: Climate and Corporate Finance
Professor Peter Tufano, Harvard University

Required readings (5) noted with asterisks in sections below (*)

Corporate Climate Exposures (1)

*Sautner, Zacharias, Laurence Van Lent, Grigory Vilkov, and Ruishen Zhang. "Firm-level climate change exposure." *The Journal of Finance* 78, no. 3 (2023): 1449-1498. https://doi.org/10.1111/jofi.13219

Addoum, Jawad M., David T. Ng, and Ariel Ortiz-Bobea. "Temperature shocks and establishment sales." *The Review of Financial Studies* 33, no. 3 (2020): 1331-1366. https://doi.org/10.1093/rfs/hhz126

Li, Xia. "Physical climate risk and firms' adaptation strategy." Working Paper (2023). https://ssrn.com/abstract=4143981

Li, Qing and Shan, Hongyu and Tang, Yuehua and Yao, Vincent. "Corporate Climate Risk: Measurements and Responses." *Review of Financial Studies*, Forthcoming (2023). https://ssrn.com/abstract=3508497

Corporate Carbon Impacts, Pledges and Actions (1)

Aldy, Joseph E., Bolton, Patrick, Kacperczyk, Marcin, Halem, Zachery M.. 2023. "Behind Schedule: The Corporate Effort to Fulfill Climate Obligations." *Journal of Applied Corporate Finance* 35: 26–34. https://doi.org/10.1111/jacf.12560

*Bolton, Patrick, and Marcin Kacperczyk. "Firm commitments." *Columbia Business School Research Paper* (2023). https://ssrn.com/abstract=3840813

Shive, Sophie A., and Margaret M. Forster. "Corporate governance and pollution externalities of public and private firms." *The Review of Financial Studies* 33, no. 3 (2020): 1296-1330. https://doi.org/10.1093/rfs/hhz079

Acharya, Viral V., Robert F. Engle, and Olivier Wang. "Incentives to decarbonize and innovate: the role of net zero commitments." Work. Pap., NYU Stern Sch. Bus., New York (2023). https://afajof.org/management/viewp.php?n=27552

Carbon Taxes and other (Dis)Incentives (1)

*Martinsson, Gustav and Stromberg, Per and Sajtos, Laszlo and Thomann, Christian J. "Carbon Pricing and Firm-Level CO2 Abatement: Evidence from a Quarter of a Century-Long Panel."

European Corporate Governance Institute – Finance Working Paper No. 842/2022 (2022). https://ssrn.com/abstract=4206508

Allen, Franklin, Adelina Barbalau, and Federica Zeni. "Reducing Carbon using Regulatory and Financial Market Tools." Working Paper (2023). https://ssrn.com/abstract=4357160

Iovino, Luigi, Thorsten Martin, and Julien Sauvagnat. "Corporate taxation and carbon emissions." Working Paper (2021). https://ssrn.com/abstract=3880057

Fan, Grace, and Xi Wu. "Going Green: The Governance Role of Environmental Regulations on Firm Innovation and Value." *Singapore Management University School of Accountancy Research Pape*r 2023-163 (2022). https://ssrn.com/abstract=4098403

Emissions Reduction, Offshoring and Greenwashing (1)

*Duchin, Ran, Janet Gao, and Qiping Xu. "Sustainability or greenwashing: Evidence from the asset market for industrial pollution." Working Paper (2022). https://ssrn.com/abstract=4095885

Dai, Rui, Rui Duan, Hao Liang, and Lilian Ng. "Outsourcing climate change." *European Corporate Governance Institute–Finance Working Paper* 723 (2021). https://ssrn.com/abstract=3765485

Bingler, Julia Anna, Mathias Kraus, Markus Leippold, and Nicolas Webersinke. "How cheap talk in climate disclosures relates to climate initiatives, corporate emissions, and reputation risk." *Swiss Finance Institute Research Paper* (22-01) (2023). https://ssrn.com/abstract=4000708

Aldy, Joseph E., Patrick Bolton, Zachery Halem, Marcin T. Kacperczyk, and Peter R. Orszag. "Show and Tell: An Analysis of Corporate Climate Messaging and its Financial Impacts." Working Paper (2023). https://ssrn.com/abstract=4418347

Green Innovation (1)

Bolton, Patrick, Marcin T. Kacperczyk, and Moritz Wiedemann. "The co2 question: Technical progress and the climate crisis." Working Paper (2023). https://ssrn.com/abstract=4212567

*Lanteri, Andrea, and Adriano A. Rampini. "Financing the Adoption of Clean Technology." (2023). https://people.duke.edu/~rampini/papers/cleantechnology.pdf

Class 10: Climate and Household Finance
Professor Johannes Stroebel, New York University

Required readings (5) noted with asterisks in sections below (*)

Overview

Canals-Cerda, José J., and Raluca Roman. "Climate Change and Consumer Finance: A Very Brief Literature Review." *FRB of Philadelphia Payment Cards Center Discussion Paper* 21-4 (2021). https://ssrn.com/abstract=3937770

Climate Risk and Household Investment Decisions

*Bauer, Rob, Tobias Ruof, and Paul Smeets. "Get Real! Individuals Prefer More Sustainable Investments." *The Review of Financial Studies* 34, no. 8 (2021): 3976-4043. https://doi.org/10.1093/rfs/hhab037

*Giglio, Stefano, Matteo Maggiori, Johannes Stroebel, Stephen Utkus, Zixuan Tan, and Nancy Xu. "Four Facts about ESG Beliefs and Investor Portfolios." *NBER Working Paper* No. w31114 (2023). https://ssrn.com/abstract=4415012

Engle, Robert F., Stefano Giglio, Bryan Kelly, Heebum Lee, and Johannes Stroebel. "Hedging Climate Change News." *The Review of Financial Studies* 33, no. 3 (2020): 1184-1216. https://doi.org/10.1093/rfs/hhz072

Pástor, Ľuboš, Robert F. Stambaugh, and Lucian A. Taylor. "Dissecting Green Returns." *Journal of Financial Economics* 146, no. 2 (2022): 403-424. https://doi.org/10.1016/j.jfineco.2022.07.007

Climate Risk and Housing Markets

Baldauf, Markus, Lorenzo Garlappi, and Constantine Yannelis. "Does Climate Change Affect Real Estate Prices? Only If You Believe in It." *The Review of Financial Studies* 33, no. 3 (2020): 1256-1295. https://doi.org/10.1093/rfs/hhz073

Bernstein, Asaf, Matthew T. Gustafson, and Ryan Lewis. "Disaster on the Horizon: The Price Effect of Sea Level Rise." *Journal of Financial Economics* 134, no. 2 (2019): 253-272. https://doi.org/10.1016/j.jfineco.2019.03.013

*Bernstein, Asaf, Stephen B. Billings, Matthew T. Gustafson, and Ryan Lewis. "Partisan Residential Sorting on Climate Change Risk." *Journal of Financial Economics* 146, no. 3 (2022): 989-1015. https://doi.org/10.1016/j.jfineco.2022.03.004

*Giglio, Stefano, Matteo Maggiori, Krishna Rao, Johannes Stroebel, and Andreas Weber. "Climate Change and Long-Run Discount Rates: Evidence from Real Estate." *The Review of Financial Studies* 34, no. 8 (2021): 3527-3571. https://doi.org/10.1093/rfs/hhab032

Climate Risk and Mortgage Markets

Ouazad, Amine, and Matthew E. Kahn. "Mortgage Finance in the Face of Rising Climate Risk." *NBER Working Paper* (2021). https://www.nber.org/papers/w26322

Issler, Pedro, Richard Stanton, César Vergara, and Nancy Wallace. "Mortgage Markets with Climate-Change Risk: Evidence from Wildfires in California." Working Paper (2020). https://ssrn.com/abstract=3511843

Climate Risk and Insurance Markets

Ge, Sumudu, Amanda Lam, and Ryan Lewis. "The Costs of Hedging Disaster Risk and Home Prices in the Face of Climate Change." Working Paper (2023). https://ssrn.com/abstract=4192699

*Mulder, Peter. "Mismeasuring Risk: The Welfare Effects of Flood Risk Information." Working Paper (2022). https://www.dropbox.com/s/nwg5j1vt0u9k26w/Mulder2022_RiskRatingWelfare.pdf?dl=0

Sastry, Pravin. "Who Bears Flood Risk? Evidence from Mortgage Markets in Florida." Working Paper (2022). https://ssrn.com/abstract=4306291

Class 11: Climate and Financial Institutions
Professor Ben Caldecott, Oxford University

Required readings (including choices)

Central Banks and Climate Change (1)

Campiglio, Emanuele, Yannis Dafermos, Pierre Monnin, Josh Ryan-Collins, Guido Schotten, and Misa Tanaka. "Climate change challenges for central banks and financial regulators." *Nature Climate Change* 8, no. 6 (2018): 462-468. https://doi.org/10.1038/s41558-018-0175-0

or

Dikau, Simon, and Ulrich Volz. "Central bank mandates, sustainability objectives and the promotion of green finance." *Ecological Economics* 184 (2021): 107022. https://doi.org/10.1016/j.ecolecon.2021.107022

Financial Regulation and Climate Change (1)

D'Orazio, Paola, and Lilit Popoyan. "Fostering green investments and tackling climate-related financial risks: Which role for macroprudential policies?." *Ecological Economics* 160 (2019): 25-37. https://doi.org/10.1016/j.ecolecon.2019.01.029

Stranded Assets (1)

Caldecott, Ben, Alex Clark, Krister Koskelo, Ellie Mulholland, and Conor Hickey. "Stranded assets: Environmental drivers, societal challenges, and supervisory responses." *Annual Review of Environment and Resources* 46 (2021): 417-447. https://doi.org/10.1146/annurev-environ-012220-101430

Climate Change and Pricing of Bank Credit (1)

Degryse, Hans, Roman Goncharenko, Carola Theunisz, and Tamas Vadasz. "When green meets green." *Journal of Corporate Finance* 78 (2023): 102355. https://doi.org/10.1016/j.jcorpfin.2023.102355

or

Fard, Amirhossein, Siamak Javadi, and Incheol Kim. "Environmental regulation and the cost of bank loans: International evidence." *Journal of Financial Stability* 51 (2020): 100797. https://doi.org/10.1016/j.jfs.2020.100797

Climate Change and Bank Lending Behaviour (1)

Aslan, Caglayan, Erdem Bulut, Oguzhan Cepni, and Muhammed Hasan Yilmaz. “Does climate change affect bank lending behavior?.” *Economics Letters* 220 (2022): 110859. https://doi.org/10.1016/j.econlet.2022.110859

Class 11: Climate Finance wrap-up

In this class, all the FECS professors will join to discuss their new work, new and exciting topics in climate finance, applications of climate finance in practice, and more. In addition, we will try to find a way that students can share their work with the class.