



General Information

Instructor: Prof. Harrison Hong, Columbia University, Department of Economics

Course Objectives

This graduate mini-course will develop both models and empirical methods that are necessary to assess the role of the financial system in addressing the risks of global warming. The course will feature financial markets that provide crucial information on expectations and plans of economic agents regarding climate change. We will cover a number of topics including: mitigation of weather disaster risks that are becoming more frequent with global warming, regional adaptation strategies to heatwaves, integrating learning and adaptation into integrated assessment models, and sustainable finance mandates in fostering the transition of the industrial sector to net-zero emissions.

Course Dates and Location

Wednesday, October 5, 2022:	1300 h – 1700 h	KOL-E-13 (Senatszimmer, main building)
Thursday, October 6, 2022:	1400 h – 1800 h	PLM-F-103/104 (Plattenstrasse)
Friday, October 7, 2022:	1400 h – 1800 h	SOE-E-01 (Schönberggasse)

Location: University of Zurich

Participants are expected to attend all sessions

Course Assessment

3 ECTS

Students who require credit are expected to hand in a written report, as detailed by the instructor during the course.

UZH students for credit must register for this course in the module booking.

1. Weather disasters, the economy and asset markets

Hsiang, S.M. and Jina, A.S., 2014. The causal effect of environmental catastrophe on long-run economic growth: Evidence from 6,700 cyclones (No. w20352). National Bureau of Economic Research.

Knutson, T., Camargo, S.J., Chan, J.C., Emanuel, K., Ho, C.H., Kossin, J., Mohapatra, M., Satoh, M., Sugi, M., Walsh, K. and Wu, L., 2020. Tropical cyclones and climate change assessment: Part II: Projected response to anthropogenic warming. *Bulletin of the American Meteorological Society*, 101(3), pp.E303-E322.



National Academy of Sciences (2016), Attribution of extreme weather events in the context of climate change. Washington, D.C.: The National Academies Press.

Hong, H., Karolyi, G.A. and Scheinkman, J.A., 2020. Climate finance. *Review of Financial Studies*, 33(3), pp.1011-1023.

2. Optimal learning and regional adaptation to mitigate disaster risks to capital

Hong, H., Wang, N., and Yang, J., 2021. Mitigating disaster risks in the age of climate change, NBER Working Paper.

Pindyck, R.S. and Wang, N., 2013. The economic and policy consequences of catastrophes. *American Economic Journal: Economic Policy*, 5(4), pp.306-339.

3. Regional adaptation to productivity damage from heatwaves

Hong, Wang, Xu and Yang, 2021 Welfare implications of heatwaves. Columbia University Working Paper.

Dell, M., Jones, B.F. and Olken, B.A., 2012. Temperature shocks and economic growth: Evidence from the last half century. *American Economic Journal: Macroeconomics*, 4(3), pp.66-95.

Burke, M., Hsiang, S.M. and Miguel, E., 2015. Global non-linear effect of temperature on economic production. *Nature*, 527(7577), pp.235-239.

4. How learning and adaptation change the social cost of carbon

Nordhaus, W.D., 2017. Revisiting the social cost of carbon. *Proceedings of the National Academy of Sciences*, 114(7), pp.1518-1523.

Cai, Yongyang, and Thomas S. Lontzek. "The social cost of carbon with economic and climate risks." *Journal of Political Economy* 127, no. 6 (2019): 2684-2734.

Barnett, M., Brock, W. and Hansen, L.P., 2020. Pricing uncertainty induced by climate change. *Review of Financial Studies*, 33(3), pp.1024-1066.

Hong, H., Wang, N., and Yang, J., 2021. Mitigating disaster risks in the age of climate change, NBER Working Paper.

5. Climate tipping points and decarbonization pathways

de Pee, A., Pinner, D., Roelofsen, O., Somers, K., Speelman, E., and Witteveen, M., 2018. Decarbonization of industrial sectors: the next frontier. McKinsey Sustainability Report, McKinsey and Company.



Gates, B., 2021. How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need. Knopf.

Rogelj, J., Shindell, D., Jiang, K., Fifita, S., Forster, P., Ginzburg, V., Handa, C., Kheshgi, H., Kobayashi, S., Kriegler, E. and Mundaca, L., 2018. Mitigation pathways compatible with 1.5C in the context of sustainable development. In *Global warming of 1.5C* (pp. 93-174). Intergovernmental Panel on Climate Change.

Cai, Y., Judd, K.L., Lenton, T.M., Lontzek, T.S. and Narita, D., 2015. Environmental tipping points significantly affect the cost? benefit assessment of climate policies. *Proceedings of the National Academy of Sciences*, 112(15), pp.4606-4611.

Lenton, T.M., Rockstrom, J., Gaffney, O., Rahmstorf, S., Richardson, K., Steffen, W. and Schellnhuber, H.J., 2019. Climate tipping points--too risky to bet against. *Nature* 575, 592-595.

Lenton, T.M., Held, H., Kriegler, E., Hall, J.W., Lucht, W., Rahmstorf, S. and Schellnhuber, H.J., 2008. Tipping elements in the Earth's climate system. *Proceedings of the National Academy of Sciences*, 105(6), pp.1786-1793.

6. Sustainable finance mandates and the transition to net-zero

Heinkel, R., Kraus, A. and Zechner, J., 2001. The effect of green investment on corporate behavior. *Journal of Financial and Quantitative Analysis*, pp.431-449.

Hong, H., Wang, N., and Yang, J., 2021. Welfare consequences of sustainable finance. NBER Working Paper.

Bolton, Patrick, Harrison Hong, Marcin Kacperczyk, and Xavier Vives (2021). "Resilience of the Financial System to Natural Disasters." *CEPR, Future of Banking Report 3* (2021).