

Time: 10 Dec., 2024, 4:00 pm - 5:30 pm

Venue: Seminar Room 8B, Chiyoda Campus, Hitotsubashi University

Speaker: Andrea Macrina (University College London)

Title: The Financial Impact of Carbon Emissions on Power Utilities Under Climate Scenarios

Abstract:

Power utilities, especially those that generate electricity by burning fossil fuels, produce significant amounts of carbon emissions. Mitigation of CO₂e emissions can be achieved by replacing power plants with renewable power installations and by adopting carbon-sequestration technologies. Physical upgrades are expensive, but carbon taxes, or the purchase of certificates and allowances on a voluntary carbon market, can be costly, too. Carbon costs may increasingly become a threatening liability for power utilities, eating into profits and undermining the financial viability of emission-intensive electricity generation. Thus, we consider an asset-and-liability, structural firm model to investigate the creditworthiness of a generic power utility. The utility's assets dynamics are driven by the financial returns generated from the sold electricity for a set tariff which is modelled by a simple stochastic process. The liabilities not only depend on fuel, running, and depreciation costs, but also on the costs of CO₂e emissions. As a case study, we consider the evolution of the default probability of a power utility firm under various fuel mix plans and technologies, and under the Network for Greening the Financial System (NGFS) carbon price scenarios. The obtained results and insights present significant headwind ahead.