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Title: Transition to Green Technology along the Supply Chain (joint with Lint Barrage, David Hémous, Ernest Liu)

Abstract

We analyze a model of green technological transition along a supply chain. In each layer, a good is produced with a dirty technology, or, if the required “electri_cation” innovation has occurred, with a clean technology which uses the immediate upstream good. We show that the economy is characterized by a single equilibrium but multiple steady-states, and that even in the presence of Pigouvian environmental taxation, a targeted industrial policy is generally necessary to implement the social optimum. We also show that: (i) small, targeted, industrial policy may bring large welfare gains; (ii) a government which is constrained to focus its subsidies to electri_cation on one particular sector, should primarily target downstream sectors; (iii) when extending the model so as to allow for supply chains also for the dirty technology, overinvesting in electri_cation in the wrong upstream branch may derail the overall transition towards electri_cation downstream. Finally, we illustrate our model with a calibration to decarbonization of global iron and steel production via hydrogen direct reduction, and show that, absent industrial policy, the economy can get stuck in a “wrong” steady-state with CO2 emissions vastly above the social optimum even with a carbon price in place.