
Optimal climate policy as if the transition matters

Emanuele Campiglio^{1,2,3}, Simon Dietz^{*†3,4}, and Frank Venmans^{3,5}

¹University of Bologna/Università di Bologna – Italy

²RFF-CMCC European Institute on Economics and the Environment (EIEE) – Italy

³Grantham Research Institute on Climate Change and the Environment – United Kingdom

⁴Department of Geography Environment - London School of Economics and Political Science – United Kingdom

⁵University of Mons [Belgium] – Belgium

Abstract

The optimal transition to a low-carbon economy must account for adjustment costs in switching from dirty to clean capital, technological progress, and economic and climatic shocks. We study the low-carbon transition using a dynamic stochastic general equilibrium model with emissions abatement costs calibrated on a large energy modelling database, solved with recursive methods. We show how capital inertia puts upward pressure on emissions and temperatures in the short run, but that nonetheless it is optimal to actively disinvest from – to ‘strand’ – a significant share of the dirty capital stock. Conversely, clean technological progress, as well as uncertainty about climatic and economic factors, lead to lower emissions and temperatures in the long run. Putting these factors together, we estimate a net premium of 33% on the optimal carbon price today relative to a ‘straw man’ model with perfect capital mobility, fixed abatement costs and no uncertainty.

Keywords: adjustment costs, carbon price, climate change, low, carbon transition, stranded assets, technological progress, uncertainty

*Speaker

†Corresponding author: s.dietz@lse.ac.uk