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Modelling the effects of climate policy risk on power investment

Abstract

Carbon markets bring an additional risk element into the financing of power projects. Whilst the motivation of carbon trading has partly been to help policy makers as well as industry discover the market prices of carbon abatement, this learning by doing induces even more uncertainty upon investors. This paper discusses empirical and model-based evidence on the drivers of carbon prices in the short and medium term, and then extends this into a stochastic optimisation formulation of the financial planning models of real investment in new power facilities. We show that detailed consideration of financial constraints, the optionality to delay, risk aversion and the existing resource base can affect the propensity to invest, as well as various institutional policies. Further, as policy risk affects the propensities to invest by different types of company and different technologies, it may induce the evolution of different market structures.