Bridging socioeconomic pathways of carbon emission and credit risk

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Abstract

We investigate the impact of transition risk on a firm's low-carbon production. As the world is facing global climate changes, the Intergovernmental Panel on Climate Change (IPCC) has set the idealized carbon-neutral scenario around 2050. In the meantime, many carbon reduction scenarios, known as Shared Socioeconomic Pathways (SSPs) have been proposed in the literature for different production sectors in more comprehensive socio-economic context. In this talk, we consider a firm that aims to optimize its emission level under the double objectives of maximizing its production profit and respecting the emission mitigation scenarios. Solving the penalized optimization problem provides the optimal emission according to a given SSP benchmark. Such transitions affect the firm's credit risk. We then model the default time by using the structural default approach and are particularly concerned with how the adopted strategies by following different SSPs scenarios may influence the firm's default probability.

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