An evolving risk perspective for policy instrument choice in sustainability transitions

We develop the concept of evolving risk to demonstrate that the optimal policy choice between price and quantity instruments may change over time. Drawing from system innovation, evolutionary concepts and modern financial and transaction cost economics, we analyze dynamic cost and welfare impacts of instrument choice under uncertainty. In early market deployment of niche technologies, economic and system-innovation arguments suggest price instruments can stabilize revenues and decrease market risks for investors. This accelerates deployment without necessarily compromising economic efficiency. Protective policies that work well for niche technologies should, however, be used cautiously during market upscaling and diffusion, due to the changing nature of risks. We use theoretic arguments and a case to demonstrate that a gradual shift towards quantity control may become preferable for welfare maximization under certain circumstances. Solar photovoltaics in Germany serves as illustrative case, where auctions (a form of quantity control) succeeded feed-in tariffs (a price instrument).