The social cost of waste

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Abstract

We develop a growth model to estimate the social cost of waste. We integrate material flows into a Brock-Mirman economic growth framework and derive a formula for the social cost of waste. Our calibration for plastic use suggests that the social cost of plastic waste could become significantly higher than its market price, indicating a pressing need for policy intervention. The model shows an increasing historical and future plastic dependency in the economy and substantial GDP losses due to plastic waste if not addressed.

1 Introduction and literature

Integrated assessment models (IAMs) already play a central role in the economic analysis of climate change. Since the seminal contribution of Nordhaus (1993), IAMs have been widely used to estimate the social cost of greenhouse gas (GHG) emissions and to study the interaction between economic growth and the climate system. By contrast, the application of growth theoretical frameworks to other environmental pressures has remained limited. In particular, there is no commonly accepted measure of the social cost of material use and the associated accumulation of waste, despite the growing prominence of material use as an environmental concern. As economies expand, so do the associated challenges: increasing volumes of waste requiring management, rising social and environmental costs of resource extraction, and heightened

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