Repaying the climate debt with carbon dioxide removal (CDR): Lessons from monetary economics for CDR.

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Overview

Reaching Net-Zero emissions necessitates the implementation of Carbon Dioxide Removal (CDR) methods, which extract CO_2 from the atmosphere and store it permanently (IPCC, 2022). However, creating effective economic incentives for CDR deployment is challenging due to its unique properties. Firstly, CDR is partially fungible with CO_2 emissions, enabling it to counterbalance residual emissions, but with varying levels of storage durability depending on the method used (Chiquier et al., 2022). Secondly, CDR can be characterized as a public service, as few actors bear the costs, and the benefits are globally shared (Honegger et al., 2021). Thirdly, CDR methods involve both negative and positive externalities (Prütz et al., 2024).

To address these complexities, we propose a novel approach by analogizing CDR to a currency that repays the climate debt incurred by anthropogenic CO_2 emissions. This framework distinguishes between virtual CDR, a unitary volume fully fungible with CO_2 emissions, and actual CDR processes. By recognizing CDR as a climate currency, we can design policies and regulations that facilitate its deployment. This paradigm shift allows for a more nuanced understanding of CDR's role in achieving Net-Zero emissions.

Methods

Our approach leverages the insights of monetary economics to inform the development of CDR markets. We begin by identifying the key properties of monetary assets and draw parallels with CDR. We then extend this analogy by likening different CDR processes to currencies with varying levels of quality and stability, highlighting the need for an anchor currency to standardize their value. Building on this framework, we explore how to establish high-quality CDR as the reference unit, ensuring consistency and trust across carbon markets. Finally, we examine the optimal level of centralization (e.g., a Central Bank), versus decentralization (e.g., Blockchain), required to govern and facilitate the circulation of CDR units, ultimately supporting the emergence of a robust and efficient CDR market.

Results

Our analysis reveals that traditional market-based approaches may not be sufficient, and instead, innovative policy instruments are required to incentivize CDR adoption. We provide recommendations for market design and regulations that account for CDR's distinctive properties, ensuring the effective deployment of these critical technologies.

Conclusions

By acknowledging the fungibility of CDR with CO_2 emissions, policymakers can create a functional net-zero economy, where CDR is valued and traded as a means to counterbalance emissions. By characterizing CDR in monetary terms, our framework provides a more nuanced and detailed understanding of such a net-zero economy, building on well-established economic theory.

References

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