

Transaction Fee Mechanism Design

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Demand for blockchains such as Bitcoin and Ethereum is far larger than supply, necessitating a mechanism that selects a subset of transactions to include “on-chain” from the pool of all pending transactions. EIP-1559 is a proposal to make several tightly coupled changes to the Ethereum blockchain’s transaction fee mechanism, including the introduction of variable-size blocks and a burned base fee that rises and falls with demand. These changes are slated for deployment in Ethereum’s “London fork,” scheduled for late summer 2021, at which point it will be the biggest economic change made to a major blockchain to date.

The first goal of this paper is to formalize the problem of designing a transaction fee mechanism, taking into account the many idiosyncrasies of the blockchain setting (ranging from off-chain collusion between miners and users to the ease of money-burning). The second goal is to situate the specific mechanism proposed in EIP-1559 in this framework and rigorously interrogate its game-theoretic properties. The third goal is to suggest competing designs that offer alternative sets of trade-offs. The final goal is to highlight research opportunities for the EC community that could help shape the future of blockchain transaction fee mechanisms.

The full paper is available at <https://arxiv.org/abs/2106.01340>.

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