

MISQ Archivist

Stability of Transaction Fees in Bitcoin: A Supply and Demand Perspective

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Abstract

Cryptocurrencies such as bitcoin are breakthrough financial technologies that promise to revolutionize the digital economy. Unfortunately, their long-term adoption in the business world is imperiled by the lack of stability that manifests as dramatic swings in transaction fees and severe participant dissatisfaction. To date, there has been little academic effort on studying how system participants react to volatility in fee movements. Our study addresses this research gap by conceptualizing the bitcoin platform as a data space market and studying how market equilibrium forms between users who demand data space while trying to avoid transaction delays and miners who supply data space while trying to maximize fee revenues. Our empirical analysis based on past bitcoin transactions reveals the existence of a relatively flat downward-sloping demand curve and a much steeper upward-sloping supply curve. Regarding users, the inelastic nature of demand signals the utility of bitcoin as a niche platform for transactions that are otherwise difficult to conduct. This result challenges the belief that users may easily abandon the bitcoin technology upon rising transaction costs. We also find that the use of bitcoins as a trading asset is associated with higher levels of tolerance to fees. Regarding miners, the comparatively elastic nature of supply indicates that higher fees stimulate mining by a larger magnitude than suppressing demand. This finding implies that, *ceteris paribus*, the bitcoin system turns to self-regulate transaction fees in an efficient manner. Our work has implications for the management of congestion in blockchain-based systems and more broadly for the stability of cryptocurrency markets.

Keywords: Fintech, blockchain, cryptocurrency, transaction fee, supply and demand, bitcoin