Currency Stability Using Blockchain Technology

Bryan R. Routledge*
Ariel Zetlin-Jones†

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Abstract

Arbitrary speculative attacks on currencies can arise from self-fulfilling expectations. This is a well-studied source of currency crises. In this paper, we show that blockchain distributed ledger technologies, such as those which support Bitcoin and Ethereum, can be adapted to eliminate self-fulfilling speculative attacks on a currency. We show how to develop a stable currency peg, such as Pesos to Dollars, using a cryptocurrency. We show the peg is immune to speculative attacks arising from self-fulfilling prophecies and estimate the size of reserves and transaction costs needed to support the peg.

Our blockchain mechanism builds on the work of Green and Lin (2003) where bank runs in a Diamond and Dybvig (1983) setting are credibly prevented with contracts that depend on the order at which individuals arrive at the bank. We show that a similar idea can be used to credibly support a fixed exchange rate in the canonical setting of Obstfeld (1996). As in Green and Lin, the key to the credible policy is that the policy depends in a rich way on the order in which people demand to exchange domestic currency for foreign denominated assets. Through this mechanism, the policy maker can provide exchange for those requiring foreign denominated assets and discourage exchange with those seeking purely speculative profit.

The difficulty with implementing a Green and Lin mechanism to defend a currency peg is that it is complicated. Specifying, communicating, and implementing such policies in practice is difficult. Here, we use the technology of "smart contracts" to implement the peg. "Smart contracts" are rich state-contingent contracts that are credible since they are verified and enforced credibly by an irreversible technology.

The Ethereum Network is the largest (measured by market capitalization) of smart contracting environments. We use the Ethereum protocol to develop a quantitative exercise to measure the size of reserves and transaction costs needed to support a fixed exchange peg.

*Tepper School of Business, Carnegie Mellon University; routledge@cmu.edu.
†Tepper School of Business, Carnegie Mellon University; azj@cmu.edu.

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