Liquidity in Credit Networks

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Abstract

Credit networks model the trust between agents and a way to facilitate transactions between them based on the level of trust. It is similar to a social network where each node prints its own currency and can transact with other nodes that trust it. The system is represented as a directed graph with edge capacities denoting credit extended by the node. Any arbitrary transaction can go through if there exists a feasible path of nonzero capacity between payer and payee nodes. In this setting, the ability of an initial network to sustain liquidity requirement is modelled given that the nodes transact repeatedly.

The model exhibits several useful properties such as the following. The transaction failure probability does not depend on the path through which the transaction is routed and, under few assumptions for certain family of graphs, the failure probability tends to zero as the size, density and capacity of the network increase. Finally, the model is compared with an equivalent centralized currency system in terms of liquidity performance and scope for further work is presented.