

# Collateral Unchained: Rehypothecation networks, complexity and systemic effects.

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## Abstract

This paper investigates how the structure of rehypothecation networks affects the dynamics of endogenous total liquidity and the emergence of systemic risk within the financial system. Rehypothecation consists in the right of reusing the collateral of a transaction many times over. Rehypothecation increases the liquidity of market players, as those players can use the collateral received to honor another obligation. At the same time, rehypothecation lowers parties actual coverage against counterparty risk, because the same collateral secures more than one transaction, and it can therefore be a source of systemic risk. To study the above issues, we build a model where banks are linked by chains of repo contracts and use or re-use a fixed amount of initial collateral. In the model each bank sets the amount of collateral to hoard using a VaR criterion, and the fraction of collateral hoarded is a function of the fraction of collateral hoarded by the banks neighbors. In this framework, we show that, first, the additional amount of collateral endogenously created in the system is positively related to the density of the network, revealing an important effect of market integration and diversification processes on collateral and liquidity creation. In addition, as such processes expand, the emergence of long chains and especially cyclic structures can create a level of collateral that may far exceed the initial level of proprietary collateral of banks in the network. Furthermore, we study the amount of liquidity hoarding and of total collateral losses following uncertainty shocks hitting a small fraction banks in the system under different network structures. We show that on the one hand, core-periphery networks even with a much more smaller size of a densely connected core can create the same maximum amount of the aggregated collateral as in other network structures. On the other hand, these are also networks exposed to larger cascades of liquidity hoarding and to larger losses in collateral. This indicates that rehypothecation networks involving an unequal distribution of collateral in the system are also characterized by a trade-off between liquidity and systemic risk.

Keywords: Rehypothecation, Collateral, Repo Contracts, Networks, Liquidity, Liquidity-Hoarding Effects, Systemic Risk.

JEL: G01, G11, G32, G33.