

Optimal Financial Contagion

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Gideon du Rand and Co-Pierre Georg

Abstract

We extend the results of Allen and Gale (2000) on financial contagion between competitive banks connected in an interbank market as an equilibrium phenomenon. The basic setup is standard in a large literature that follow Diamond and Dybvig (1983) where bank runs occur due to coordination failure between privately informed depositors: if a run does not occur, bank deposit contracts are welfare improving as they offer insurance for agents that face uncertain liquidity demand, but the nature of the optimal deposit contract allows for multiple equilibria, one of which is a run on the bank that is welfare inferior to autarky. Allen and Gale study a situation where multiple banks of this type are subject to idiosyncratic liquidity demand risk and linked by interbank deposit holding. They assume that banks offer a deposit contract and invest in an asset portfolio that is first best in the absence of an aggregate liquidity demand shock and impose interbank positions that are not derived from an optimization problem. They show that an unanticipated aggregate liquidity shock can lead to contagion where a run on one bank induces a chain of failures of connected banks. Our contribution lies in considering asset portfolios, deposit contracts and interbank holdings that are fully optimal (in the Nash equilibrium sense) given an ex ante positive probability of an aggregate liquidity shock. We characterize the conditions under which

contagion occurs and compare the differences in welfare induced by autarky, the strategic interbank market, perfect co-operation and the first best risk-sharing contract. As the pay-offs are discontinuous across situations where contagion does and does not occur, we use computational methods to solve for the symmetric Nash equilibrium decisions of banks for a large parameter set. The Allen and Gale results obtain as a limiting case of ours.