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Abstract

Systemic risk is a key concern for central banks charged with safeguarding overall financial stability. In this paper we investigate how systemic risk is affected by the structure of the financial system. We construct banking systems that are composed of a number of banks that are connected by interbank linkages. We then vary the key parameters that define the structure of the financial system — including its level of capitalisation, the degree to which banks are connected, the size of interbank exposures and the degree of concentration of the system — and analyse the influence of these parameters on the likelihood of contagious (knock-on) defaults. First, we find that the better capitalised banks are, the more resilient is the banking system against contagious defaults and this effect is non-linear. Second, the effect of the degree of connectivity is non-monotonic, that is, initially a small increase in connectivity increases the contagion effect; but after a certain threshold value, connectivity improves the ability of a banking system to absorb shocks. Third, the size of interbank liabilities tends to increase the risk of knock-on default, even if banks hold capital against such exposures. Fourth, more concentrated banking systems are shown to be prone to larger systemic risk, all else equal. In an extension to the main analysis we study how liquidity effects interact with banking structure to produce a greater chance of systemic breakdown. We finally consider how the risk of contagion might depend on the degree of asymmetry (tiering) inherent in the structure of the banking system. A number of our results have important implications for public policy, which this paper also draws out.

Key words: Networks, financial stability, contagion, liquidity risk.

JEL classification: C63, C90, G28.

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