

A Network approach to Financial Stability

Giulia Iori*

Department of Economics, City University London, Northampton Square, London EC1V 0HB, UK. e-mail address: g.iori@city.ac.uk

The 2007-2008 Financial and Economic Crisis highlighted the importance of interconnectedness among financial institutions and markets and the inadequacy of pre-crisis supervisory regimes that focused on micro-prudential regulation, i.e. monitoring financial stability at the level of individual financial institutions, and neglected macro-prudential regulation, which would directly target systemic instability by focusing on the interconnectedness of the system. A strict objective of maximizing stability at the level of individual institutions can indeed have the unexpected effect of decreasing systemic stability. During the Crisis, the tightening of regulatory capital constraints and the implementation of value at risk management strategies, lead to hoarding of liquidity and panic-sales of troubled assets, which further eroded financial institutions capital and thus amplified the fragility of the system of the whole. In this talk I will present an overview of my research addressing the role of the interbank markets in both promoting and undermining systemic stability of the banking system. Our approach is based on a combination of empirical analysis of interbank networks data and the development of Agent Based models. Unlike conventional macroeconomic models which stress forward looking behaviour by far-sighted and rational, often representative, agents at the expense of the plumbing (i.e. the inter-connections) of an actual economy, ABMs have the advantage of simplifying behavior at the individual level by assuming that agents follow given but evolving rules-of-thumb, and this allows them to explore the multiplicity of agent types and their set of inter-connections in far greater detail. In particular ABMs can follow the behaviour of agents in rapidly evolving dynamic settings and see how this both determines and is determined by the emergence of crises and collapses. Because banks operate by issuing liquid liabilities, such as chequing accounts and investing the funds in illiquid assets, such as mortgages and business loans, individual banks may not always be able to meet all their liquidity needs from their own reserves and the interbank market is a source from which banks facing liquidity shortages can borrow funds from other, liquid banks. We showed in [1] that when banks are homogenous in size and risk characteristics, the interbank market acts as an effective shock absorber for individual fluctuations in liquidity needs. But when banks are heterogeneous, contagion effects may arise, particularly following the default of highly interconnected banks– the so called too connected to fail syndrome. Direct knock-on contagion driven by creditor defaults, while increasing with connectivity, only explains a small percentage of the overall failures. Rather simultaneous defaults arise spontaneously as the system reaches a critical state by its own intrinsic dynamics. Instability builds up as liquidity is depleted from the system, leading to funding contagion, in a fashion that resembles self-organized criticality in physical systems. In a more recent paper [2] we have analyzed the implication of the new regulatory proposals of the Basel III agreement. One of the impacts of these proposals is to push banks to either increase their capital or reduce their intermediation activity. Using again an ABM model which builds on the previous one we find that the effects of tightening leverage constraints on the banking sectors performance can vary in a complex way with the state of the economy, the degree of connectivity of the interbank market and the amount of information available to market participants on bank risks. In particular, our findings suggest that counter-cyclical leverage ratios, as proposed under the new regulatory framework, will increase systemic stability; at the same time, the average level of lending to firms will fall over the business cycle. In a different paper [3] we show that banks who establish long lasting relationships with other banks have better access to liquidity, both in normal times and during the crisis. Private information, acquired through frequent transactions, improves the ability of banks to assess the creditworthiness of their counter parties, and as such plays a positive role for financial stability. The default, or exit from the market, of banks that are important relationship lenders or borrowers may lead to a deterioration of the interbank credit market. Thus, when identifying the systemically important financial institutions (SIFIs) regulators should not only look at how connected a bank is, but also at how preferentially connected it is to other institutions. Given the implications of relationship lending for financial stability, it is important, when performing stress test exercises, to generate scenarios that allow for the formation of stable

relationships. We do propose a simple ABM model that can achieve so in a recent paper [4].

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