Systemic Risk Macrodynamics in a Multiplex Financial Network

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July 14, 2022

Extended abstract

The financial system is becoming more and more interconnected. Although this has led to a considerable development of international financial markets, it also has a dark side. Higher connectedness means that shocks to one agent can propagate to others generating widespread crises (Demirer et al., 2018; Mendoza and Quadrini, 2010). Quantitative models have to account for this intrinsic characteristic of modern financial systems; however, as indicated by Blanchard (2014), the body of theory feeding contemporaneous macroeconomic models capture reasonably well periods of stable business cycles (1987-2007) but cannot yet explain or predict periods of crises and instability (2007-2009). Thus, another class of models are needed to solve this limitation, as it is not yet possible to include both stability and instability scenarios in the same framework.

Advancing in this research line, we build a multiplex international financial network model based on the complexity theory in order to analyze the dynamics of propagation of financial shocks in some of the largest economic systems of the world. Our objective is to measure the resilience of the financial system to a crisis depending on its capital levels. We separate the network in four layers and analyze the dynamics of a shock with the propagation algorithm of Bardoscia et al. (2015). This approach allows us to get a deeper understanding of how shocks affect different kind of institutions, rather than focusing exclusively on banks. Moreover, we are able to analyze for which capitalization levels Monetary and Financial Institutions (MFIs) are able to resist shocks. These parameters are crucial to measure the true health of the financial system. Finally, our work distinguishes from previous literature in that we analyze the multiplex macrodynamics of the international financial system instead of restricting to a set of banks or MFIs.

Key-words: Systemic risk, macrodynamics, multiplex financial network, shock, financial stability.

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