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Robustness and Contagion in the International Financial Network

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The recent financial crisis of 2008 and the 2011 indebtedness of Greece highlight the importance of understanding the structure of the global financial network. In this paper we set out to analyze and characterize this network, as captured by the IMF Coordinated Portfolio Investment Survey (CPIS), in two ways. First, through an adaptation of the "error and attack" methodology [1], we show that the network is of the "robust-yet-fragile" type, a topology found in a wide variety of evolved networks. We compare these results against four common null-models, generated only from first-order statistics of the empirical data. In addition, we suggest a fifth, log-normal model, which generates networks that seem to match the empirical one more closely. Still, this model does not account for several higher order network statistics, which reenforces the added value of the higher-order analysis. Second, using loss-given-default dynamics [2], we model financial interdependence and potential cascading of financial distress through the network. Preliminary simulations indicate that default by a single relatively small country like Greece can be absorbed by the network, but that default in combination with defaults of other PIGS countries (Portugal, Ireland, and Spain) could lead to a massive extinction cascade in the global economy.

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