Cascades in World Input-Output Network: Illusion of Stability

ANDREY LEONIDOV, P.N. Lebedev Physical Institute, Moscow, Russia,
STANISLAV RADIONOV, P.N. Lebedev Physical Institute, Moscow, Russia,
EKATERINA VASILYEVA, P.N. Lebedev Physical Institute, Moscow, Russia.

In this study we address an issue of stability of global production network by constructing a scheme combining classical Leontieff input-output analysis and modelling of contagion in financial networks. We propose a model of disruptive cascades in global economy with non-linear effects similar to those in the financial contagion model proposed by Elliott, Golub and Jackson (2014). We apply the model to the analysis of stability of the global input-output sectoral network using the data from the World Input-Output Database (WIOD). We show that this sectoral network appears to be very stable with respect to sectoral shocks. However, by introducing synthetic substructure of economic sectors in the WIOD data we show that this stability is to a significant extent an artefact of working with aggregated data. Namely, we show that the impact of economic shocks may be much more pronounced if an underlying disaggregated network is sufficiently sparse.