Tail Risk in Production Networks

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This paper describes the response of the economy to large shocks in a nonlinear production network. While arbitrary combinations of shocks can be studied, it focuses on a sector's tail centrality, which quantifies the effect of a large negative shock to the sector – a measure of the systemic risk of each sector. Tail centrality is theoretically and empirically very different from local centrality measures such as sales share – in a benchmark case, it is measured as a sector's average downstream closeness to final production. The paper then uses the results to analyze the determinants of total tail risk in the economy. Increases in interconnectedness in the presence of complementarity can simultaneously reduce the sensitivity of the economy to small shocks while increasing the sensitivity to large shocks. Tail risk is strongest in economies that display conditional granularity, where some sectors become highly influential following negative shocks.