SOE 21: Financial Markets and Risk Management I

Time: Friday 9:30–10:00 Location: ZEU 260

Invited Talk SOE 21.1 Fri 9:30 ZEU 260

Marginal Stability and Excess volatility in firm networks — •Jean-Philippe Bouchaud — CFM — Academie des Sciences

Will a large economy be stable? Building on Robert May's original argument for large ecosystems, we conjecture that evolutionary and behavioural forces conspire to drive the economy towards marginal stability. We study networks of firms in which inputs for production are not easily substitutable, as in several real-world supply chains. We argue that such networks generically become dysfunctional when their size increases, when the heterogeneity between firms becomes too strong, or when substitutability of their production inputs is reduced. At marginal stability and for large heterogeneities, we find that the distribution of firm sizes develops a power-law tail, as observed empirically. Crises can be triggered by small idiosyncratic shocks, which lead to avalanches of defaults characterized by a power-law distribution of total output losses. This scenario would naturally explain the well-known small shocks, large business cycles puzzle, as anticipated long ago by Bak, Chen, Scheinkman, and Woodford.