The Macroeconomic Impact of Microeconomic Shocks: Beyond Hulten's Theorem

CFM-DP2017-34

David Rezza Baqaee[1,3] and Emmanuel Farhi[2]

[1]Centre for Macroeconomics, [2]Harvard University, [3]London School of Economics and Political Science

We provide a nonlinear characterization of the macroeconomic impact of microeconomic productivity shocks in terms of macro-elasticities of substitution. We also show how structural parameters are mapped to these reduced-form macro-elasticities. In this sense, we extend the foundational theorem of Hulten (1978) beyond first-order terms. Key features ignored by first-order approximations that play a crucial role are: structural elasticities of substitution, network linkages, structural returns to scale, and the extent of factor reallocation. Higher-order terms magnify negative shocks and attenuate positive shocks, resulting in an output distribution that is asymmetric, fat-tailed, and has a lower mean even when shocks are symmetric and thin-tailed.

Second-order terms also show how shocks to critical sectors can have large macroeconomic impacts. For example, relative to a loglinear approximation, a non-parametric second-order approximation more than triples the impact of the oil price shocks of the 1970s on output. When we calibrate a parametric version of our model, we find that output losses due to business-cycle fluctuations are an order of magnitude larger than the cost calculated by Lucas (1987).