

Global Value Chain Disruptions: The Role of Firm Heterogeneity

Topic: Input-Output Modelling: Trade and Global Value Chains Policies - I

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How do global value chain disruptions in the form of external shocks transmit to the local economy through input-output linkages? Do firms balance efficiency and resilience in their usage of external inputs? To answer these questions, I propose a tractable multisector model that matches the economy's input-output structure and trade flows. The production process embeds complementarity-substitutability between locally and externally produced inputs at a granular disaggregated level. Guided by two empirical regularities, (1) a small set of firms import intermediate inputs and (2) the propensity of importing increases with firm productivity, I introduce heterogeneous producers under monopolistic competition in each sector. Firms optimally decide which foreign inputs they adopt in the production process. Under the firm-heterogeneity framework, only firms using externally produced intermediate inputs are directly exposed to external shocks. They impose an externality by propagating the external shock to the local economy through inter-sector linkages. I also show that the elasticities of output with respect to foreign inputs are downward biased in a representative agent framework, which leads to a lower response in the aftermath of a foreign shock. I validate the internal mechanisms of the model by showing indirect empirical evidence on the relative importance of the impact of the trade shock on directly exposed firms against the local ones. Finally, an optimal policy is proposed to correct the uncovered externality by balancing efficiency and resiliency.

I use data from several sources to calibrate and validate the mechanisms of the model:

- >> Business structure from Eurostat for the firm heterogeneity
- >> Input-Output linkages from Figaro for the production function/technology
- >> Firm trade data for the relation between firm and input adoption decision
- >> Historical aggregate trade data flows for the size of the external shock
- >> Firm-level data from Orbis to validate the mechanisms of the model

The novelty of the research:

- >> First-of-class model that introduces firm heterogeneity in an otherwise general Input-Output set-up
- >> Endogenous trade network formation and flows with micro-foundation at the firm level
- >> Shows why a representative framework set-up yields biased results
- >> Novel transmission mechanism that uncovers an unexplored externality