

Measuring Supply-Side Inefficiency Spillovers in Global Value Chains

Topic: 809B Innovation and Technological Transfer

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Research question / Preliminary and Tentative Outline

The paper explores new ways of looking at the supply side growth models when Global Value Chains (GVCs), with an emphasis on the differences that the global value chain perspective brings when looking at GVC-specific export-led growth strategies (joining GVC then up-grading by incorporating more domestic value-added). The paper uses the TiVA data to offer new perspectives for analysing the international competitiveness of domestic industries. Applying benchmarking techniques to international input-output data offers a way of identifying industrial inefficiencies.

â€¢ Sectoral efficiency: basic indicators

There are many definitions of productivity and efficiency. The most intuitive is approximated by the sectoral Value-Added per unit of Output. Comparing sectoral ratio with other foreign producers, nevertheless, does not reflect only differences in gross return per unit due to technology as reflected by the (IO matrix) technical coefficients, but also the difference in the purchase price of inputs and output. Even under the assumption of a unique international price for tradable goods, domestic prices are affected by trade costs, while the price of non-tradable inputs (services and primary inputs) is affected â€“inter aliaâ€“ by the Balassa-Samuelson effect (Feenstra, Inklaar and Timmer, 2015).

These adjustments are expected to affect the basic efficiency indicator, especially in developing countries, which usually have a more protectionist policy and benefit from lower costs of living than â€“for example-- the US. The size of the gap provides some indication of the productive shift that the sector would require to maintain its profitability if domestic prices were to align on international ones.

â€¢ Benchmarking inefficiencies

The paper intends to apply frontier analysis using a series of alternative options.

The first one is data envelopment analysis (DEA), which has been used extensively in the last 30 years in the estimation of production frontiers for private and public entities. DEA has evolved considerably since its early days of Operational Research and now allows to include stochastic and random effects, allowing more flexibility. An advanced DEA analysis is also expected to deliver additional information on how the actual performance of sub-optimal industries could be improved, by comparing them to their peers located at the frontier. Such an analysis would, nevertheless, differ from standard DEA and consider that those industries are located in different countries, facing different external constraints. Assessing the performance of industries in a collection of different countries would require separating sub-frontiers (or meta-frontiers), something which falls outside the objectives of the present essay.

The DEA results (resulting from a non-parametric approach) will be compared with alternative parametric methods. The parametric methods require the ex-ante specification of a production model, whose parameters are subsequently estimated using econometric methods (usually based on Maximum Likelihood Estimators

Combining parametric and non-parametric approaches will lead to a clearer identification of the institutional variables that affect efficiency. As some (most) of these variables are the object of economic policy (trade policy; structural reforms; ease of doing business), the results should help identifying, (i) within the groups of countries constituting the various meta-frontiers, what are the key variables that require attention to reduce efficiency compared to direct peers, and (ii) across groups of countries, what are the priorities for a policy aiming at closing the efficiency gap with best performers, a necessary condition for up-grading the mode of insertion in global value chains.

Data used: OECD-WTO Trade in Value Added (TiVA) and underlying International Input-Output Tables

Novelty of the research:

Most research on efficiency frontiers involves firms that share similar (national) environments. Applying non-parametric/parametric/stochastic benchmarking analysis to industries facing different institutional and pricing environment raises a series of issues which will be identified, analysed and -hopefully- solved by the paper.

This will be a contribution to an important policy issue in a trade in value-added analytical framework: what is the relationship between comparative advantages (a macro perspective) and competitiveness (a micro perspective).