Optimal temporal distribution of supply multipliers for final demand forecasting: Argentina 2004-2023.

Topic: Input-Output Theory and Methodology
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The aim of this paper is to explore the possibility of bringing a temporal dimension to input-output multipliers. In particular, we are interested in forecasting quarterly final demand components from a set of mothly series of sectoral value added. The Monthly Estimator of Economic Activity (EMAE) is one of the most important economic situation indicators provided by the National Institute of Statistics and Censuses (INDEC) of Argentina. It provides a leading forecast for economic activity, disaggregated into fifteen (15) sectors, and advances the evolution of quarterly national accounts.

The supply driven version of the input-output model has been a subject of debate. First presented by Ghosh (1958), it was deemed implausible by Oosterhaven (1988), and later vindicated as a price model by Dierzenbacher (1997). In our view, Ghoshâ€™s allocation model has a nice interpretation within the framework of the Labor Theory of Value (LTV). Value added can be understood as the amount of labor unfolded by the labor force in the production process (Marx 2015). This value product (in Marxâ€™s words) reappears later in the gross output of other industries, as an intermediate input. Then, given an input-output matrix, total output can be reconstructed from a vector of sectoral value added. And final demand can also be estimated from the former.

An input-output matrix was constructed using the Supply and Use Tables (SUT) for the year 2018, and latter aggregated to match the series of the EMAE. With this two elements, it is possible to forecast the evolution of final demand components (private consumption, public consumption, exports and investment) in a quarterly series ranging from the year 2004 to 2023, using Goshâ€™s supply multipliers. In addition, these estimations are improved by constructing a time dimension, a quarterly distribution for the effects of the multipliers. Two alternatives are presented for doing so. First, we explore a Distributed Lag Model (DLM) with no restrictions over the coefficients. In second term, we demand that the supply multipliers are not to be modified by the coefficients of the regression, so all betas from the lags must sum to unity and be non negative. This transform the DLM model into a quadratic optimization problem. Both alternatives are implemented in levels (currency at constant prices) and in percentage variations, and compared.

The results shows that final demand forecast can be greatly improved by considering the temporal distribution. Specially in the case of Argentinaâ€™s (mostly agricultural) exports, when the creation of value added tends to be lagged from its commercialization. Moreover, this approach can be extended to other kinds of multipliers, like the demand driven input-output model.

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