

A Comparative Assessment of Nowcasting Approaches For MRIO Databases

Topic: Methodological and Statistical Challenges for Analyses of Integration of Developing Countries in Regional and Global Value Chains - I

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The lack of timeliness of Environmentally Extended Multi-Regional Input Output (EEMRIO) tables due to data limitations and lengthy compilation processes constitutes a major constraint to enabling policy-orientated research, as well as any other real-time application. Whilst this is acknowledged by analysts and MRIO compilers, there is little in the literature that provides a comparative assessment of the methodologies capable of adopting an alternative ‘nowcasting’ approach to create carbon multipliers.

The need for a nowcasting approach has been further exacerbated by high inflation. EEMRIOs rely on price to act as an accurate proxy for the amount consumed, and thereby associated emissions. Periods of high inflation cause the price-quantity relationship to break down as in high inflation environments, pure monetary values over-inflate the physical quantities they represent. There is a clear need to investigate the potential methods to resolve this problem, and without a robust understanding of the effects of price changes on estimates of environmental impacts, the drawbacks of using lagged data will continue to loom over the real-time deployment of EEMRIO produced carbon multipliers. Given the considerable economic, technical, and human resources required to create MRIO databases, it is apparent that utilizing more frequent, external datasets is required to nowcast MRIOs towards the present day. The use of projections and nowcasting is not alien to this context, with projections occasionally required in the compilation, balancing and revisions of MRIOs and the inclusion of nowcasted years in major databases such as EXIOBASE and FIGARO.

By grounding outputs in known official datasets, nowcasting avoids the unbounded uncertainties associated with forecasting, creating a credible justification for its deployment in contexts where the infrequency of data threatens usability. However, as MRIO databases aim to illustrate the complex and interrelated structure of the global economy, questions must be asked as to how granular exogenous data must be to produce accurate results, particularly as dynamic changes in structure are caused by various moving parts.

Focusing on price, this paper conducts an empirical comparative assessment on the methodologies aimed at adjusting annual carbon multipliers against benchmark counterparts, created by the UKMRIO. These methodologies will be assessed by a set of measurements of goodness of fit, selected from the existing literature, to provide rankings of accuracy, allowing for comparison across both year and industry of reference. The empirical analysis will shed new light on the necessary parameters for effective nowcasting, testing across the years 2001 and 2020 to explore the potential difficulties with nowcasting in changing economic conditions. Following this multiplier-level assessment, nowcasted multipliers are assigned to transaction data generated by a sample of commercial clients (n=275) of a large retail bank in the United Kingdom. This provides opportunity to draw comparisons against objective sources of emission data, such as the Streamlined Energy and Carbon Reports (SECR) declared in company annual accounts.

The outcome of this assessment is intended to illustrate the relationship between differences in the complexities of approaches and the accuracy of yielded results, considering the intrinsic uncertainties associated with any form of projection. The outputs of this study can then form a basis for closing the gap between EEMRIO’s reference year and year of application, providing a

meaningful solution to a substantial barrier for EEMRIO application.

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