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Object : Abstract

Obtaining good data on transport flows within a country is a difficult task. This is especially true for a geographically large and heterogeneous country like Canada. Surveying sections of roads to calculate transport flows suffers from sample bias and is an expensive practice. For this reason, we develop an alternative approach using existing data to estimate the trade flows between Québec, Canada and United States. We present two methods that show promise in addressing the problems associated with the collection and interpretation of transport flow data. We then compare the results of the models with the actual data produced by the Institut de la Statistique du Québec (ISQ), the provincial statistical agency, to check the validity of the approaches.

Our first method, MIMIC, is based on an econometric technique called the instrumental variable approach. The core of this method is the idea that the underlying economic flows do not need to be derived directly from transport flows. Rather, economic flows can be inferred from estimates using data having a causal or indicator relationship with the underlying quantity of study. Our model uses readily available economic indicators such as manufacturing output, demographics and income growth to estimate economic flows for a given region. Using the MIMIC model, we have estimated economic flows for the province of Quebec from 1992 to 2001 and compared these estimates with international trade data. We were able to find a robust specification that provides a good fit with historical export data but our model requires further refinement to achieve the same success for import flows.

The second method, MinXEnt, is based on an allocation model. Here, we use transport flows from a road side survey (MTQ [1999]) to extrapolate the economic value that is transported by trucks and other forms of ground-transport. We imposed formal restrictions on the optimization algorithm to ensure that the flows resulting from the method remained coherent with the economic data (production, consumption, etc.). The results show that using transport flow data to extrapolate real economic flows is a perilous exercise – real economic flows for close regions are overstated lead to bias (understated) estimations for some other regions. One explanation as to what may be



happening here is that certain regions are “transport hubs” where product arrives, is unloaded and then is redirected to other area of the country. These “transport hubs” create the illusion that there was more economic activity in the region than there actually was. A correction method is developed but relies on ad-hoc choices instead of objective criteria. Our study finds that while the optimization algorithm may still be appropriate for certain types of analysis, it requires more detailed constraints or specifications than are available for the purposes of deriving real economic flows from transport flows. For some regions, the errors computed by the method are more than 100 % when we don’t adjust the original algorithm.

References

- J. Dubé et M. Dupéré (2006). Un modèle économétrique pour estimer les flux d’échanges économiques, *Bulletin économique du transport au Québec*, no. 37, juillet, ministère des Transports du Québec, 20-23.
- J. Dubé et M. Dupéré (2006). Une méthode de répartition pour déduire les flux d’échanges économiques", *Bulletin économique du transport au Québec*, no.37, juillet, ministère des Transports du Québec, 24-28.