Measuring the impact of tourism on the economy through regional input-output modelling: The case of Campania

Luigi Guadalupi[1] and Salvatore Capasso[2]

Detailed Abstract

Tourism may provide very significant contribution to the economy overall (Wagner 1997; Zhou, Yanagida, Chakravorty, & Leung 1997). This is particularly true for underdeveloped regions for which tourism can represent a lever of growth and development (Holzner 2011; Rosentraub & Joo 2009). Hence, determining the channels through which changes in the tourism sector affects all other industries, and measuring the effects of these changes, is extremely important in order to design and implement the best growth enhancing policies. The literature has already provided some evidence of the effects of the changes in the tourism industry on the economy. The effects of changes in the tax system, in the transport provision, in the promotion and marketing of entire areas, among many others, have been extensively studied in different settings and frameworks. Yet, the debate on how to uncover and measure the multiple effects in the short and in the long run of tourism on the economy is still open (Dwyer, Forsyth, & Spurr 2004). The reason is twofold. Firstly, by its own nature tourism is a multifaceted and articulated industry whose boundaries are very often difficult to set, secondly, changes in the sector and the consequent direct and indirect effects on the overall economy are difficult to measure. These difficulties are amplified when one wants to focus on local and regional effects. Indeed, the lack of data and specific aspects of the economy at this level makes it cumbersome to obtain reliable measures.

Traditionally, empirical investigations have employed input-output (I-O) analyses to study the effects of tourism on the economy. While, more recently, many investigations have started operating through richer models such as Computable General Equilibrium models (CGE). These studies are supported by the idea that CGE have the advantage of providing a richer picture of the interconnections between economic sectors by taking into account income feedback effects, resource limitations and price adjustments. Despite these empirical and theoretical developments many empirical works continue to employ input-output analyses (Haddad, Porsse, & Rabahy 2013; Orens & Seidl 2009; Tian, Mak, & Leung 2013). The reason is the simplicity of the I-O model and the immediate interpretation of the multipliers. This is particularly true at regional or local levels because of the lack of data. The recent efforts of part of the literature in providing more reliable and significant methods to regionalize I-O tables can be read in this direction. By no chance many recent theoretical studies have deeply refined the techniques to reduce the scale of global I-O tables (Bonfiglio & Chelli 2008; Flegg & Tohmo 2013; Kronenberg 2009; Lehtonen & Tykkyläinen 2012; Nakano & Nishimura 2013).

[1] Luigi Guadalupi (contact author), Researcher, Institute for Service Industry Research (IRAT), National Research Council (CNR), Via Gugliemo Sanfelice, 8, 80134, Naples, Italy. Email: l.guadalupi@irat.cnr.it.
[2] Salvatore Capasso, Professor of Economics, Department of Economics, University of Naples, "Parthenope", Via G. Parisi 13 80132 Naples, Italy. Email: s.capasso@uniparthenope.it.

By departing from this literature, we discuss the most recent developments in the methodologies to regionalize national input-output table. The final objective is to test whether different regional rescaling procedures deliver significant differences in the multipliers and, specifically, whether these lead to significant different results in the interpretation of how changes in the tourism industry impact on a local economy. To this extent we build multiple regional models using different techniques of regionalization (*non-survey methods*) using Italian input-output tables provided by Eurostat (Tourist Satellite Account) for the year 2010. We then use these tables to to investigate the effects of different shocks in the demand from tourists in a specific Italian region, Campania.. This region provide indeed a good framework to understand whether differences in multipliers due to different methodologies in regionalization lead to significant differences in the propagation of shocks.

Depicting the working of regional economies is quite different from depicting the working of national economies. For example, imports and exports from one region towards another are not registered as such at a national level. Hence, interregional trade flow represent the most relevant obstacle in reducing national tables. Another problem concerns the structure of the economy. The production structure at national level may well be, and often is, very different from the production structure at regional level. And the efforts of the literature on the subject have indeed been directed to solve these problems.

In this paper we use nonsurvey methods of regionalization which have been classified in three different approaches: a) the quotient approach; b) the commodity-balance approach; c) the iterative approach (Hewings & Jensen, 1986).

The most simple process for regionalizing a national input–output table is to apply production-based location quotients (LQ). In its simpler form the *Simple location Quotient* (SLQ) is obtained by dividing the proportion of regional production in each supplying sector *i* by the corresponding proportion of national production in that sector. Hence, if the SQL of a sector *i* is greater than unity this implies that the sector is overrepresented at regional level and it does not need any transfer of resources from other regions. The opposite occurs if SQL<1. In the first case one applies the national coefficient, in the second the national coefficient on the sector is scaled down. Evidently this asymmetric adjustment represents the first limit to the process of reduction through location quotients which has been further modified in different directions.

The first modification comes by the *purchase-only location quotients*. This process applies adjustment and rescaling factors in each sector but only to those sectors which actually use as input the production of sector *i*. The objective is to reduce the amplified effect arising from the straightforward application of SQL (size effect). A further modification to SQL has been introduced by the cross-industry quotients (CIQ). This takes into account the ratio between the selling sector *i* and the buying sector *j* at national and regional level. More recently, Flegg and Tohmo (2013) modify the CIQ by adjusting the ratio between the selling sector and the buying sector by the proportion of the regional output on national output (*Flegg Location Quotient*, FLQ).

Regionalization techniques through commodity-balance approach are based on Isard (1953). Using national production coefficients and local output estimates, it is possible derive regional input requirement tables. "This procedure allocates local production, where adequate, to meet local needs. Where the local output is inadequate, however, the procedure allocates to each purchasing industry *j* its share of regional output *i*, based on the needs of the purchasing industry itself relative to total needs for output *i*" (Schaffer & Chu, 1969).

The last approach used in the paper, the iterative approach, is essentially based on the *RAS method*. Adopted for the first time by Stone (961) for updating input-output tables, this method is an iterative method employing bi-proportional matrix adjustment of rows and columns. RAS is basically an iterative scaling method whereby a non-negative matrix is adjusted until its column sums and row sums equal given vectors (Schneider & Zenios, 1990). This adjustment is achieved by multiplying each row by a positive constant so that the row of totals equals the target row of totals. This operation also modifies the column of totals and for this reason the columns as well are multiplied by constants in order to make their totals correspond to the target column of totals. This sequence of row and column multiplication continues until both the column and row totals converge to the target vectors (Ahmed & Preckel, 2007).

The application of these processes of reduction lead to significantly different regional tables and multipliers. We verify the significance of these differences simulating specific shocks to the tourism sectors in the Campania region. The exercise allows us to draw some policy implications for the Region.

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