EXPORT BASE THEORY AND MULTIPLIER ESTIMATION:
A CRITIQUE

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Abstract

In recent years export-base related models have come under increasing criticism by regional economists. At the same time, the framework is being used implicitly in the great many studies including most socioeconomic environmental impact studies. The paper shows that the various alternatives commonly used at each step in the process of an export-base analysis (i.e., that is to specify one or more equations and estimate an indirect-direct employment multiplier) generates widely varying estimates of that multiplier. A recommendation is made that regional scientists turn their attention to other types of models including input-output frameworks and case studies for determining appropriate multiplier values.

I. Introduction

Although the use of export-base and related models to explain long-run regional growth have been almost written off as worthless by some economists (for example, See Richardson [13]1), this framework has experienced something of a renaissance as evidenced by its growing use in the socioeconomic part of many environmental impact statements prepared for a variety of government actions. Various kinds of nonbasic/basic employment multipliers are estimated in order to project the indirect impact of the increased employment associated with the proposed action. Indeed, there is considerable debate among those preparing these statements as to the correct multiplier and the lag between the increases in basic or direct employment and the resulting change in indirect employment.2 The latter, incidentally, is an important question about which regional economists have had little to say.

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1In his treatise on regional growth, H. W. Richardson states: "Despite their long ancestry, export base models would not be worth attention were it not for the fact that export base notions still crop up repeatedly in other, particularly econometric models." [13-p. 16]

2This paper is concerned only with problems associated with applications of the export base concept; it will not address any of the more fundamental problems that arise from the "theory" itself. The rationale for this approach is that: (1) the base multiplier concept is once again being widely used and misused in various kinds of impact studies; (2) it is clear that there are multiple effects on
Basically, there are four stages in the development of an export base model:

1) Identify the appropriate regional unit;
2) Specify the equation system (this may consist simply of one equation relating nonbasic to basic employment);
3) Measure the export base (i.e., statistically measure the level of employment or income generated by export activity); and
4) Estimate the parameters of the model—specifically the nonbasic/basic employment or income multiplier

Of course, the analyst has several well documented alternatives available to him at each step. For example:

1) Identification of the appropriate regional unit: The areal unit selection process is usually constrained by the problem being considered; cities, counties, various types of multi-county units, and states are often used.
2) Specification of the equation system: The key and sometimes the only equation in a base model is that relating nonbasic activity, \( E_n \) (which could represent either employment or income) to basic activity, \( E_b \). In the literature are found numerous functional forms of which the linear equation
\[
E_n = \alpha + \beta E_b,
\]
the log-linear specification
\[
E_n = e^{\beta E_b},
\]
or variants thereof are the most common.

3) Measuring the export-base: Ideally, the researcher would like to have detailed interregional flow data on which to base an estimate of the volume of export activity. Generally, such data is unavailable and the cost of collecting it through a survey or census of area establishments is prohibitive. Because of this, indirect estimation methods such as the minimum requirements and location quotients techniques have been widely used, although there are serious questions about their ability to accurately measure export activity. An ad hoc approach regional income and employment following the introduction of some type of investment; and (3) there is a need for better information on the range of values that the multiplier or multipliers might take although those estimates might best be made using something other than an export base model.

3 This subsumes that there is a theoretical basis to the division of activity into export and non-export components, i.e., that the dichotomy is not an artificial one.