Measuring industry importance: an Australian application*

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Abstract. The focus of this paper is an empirical examination of the importance of an industry in terms of its contribution to regional employment. It uses a closed input-output model. Four alternative measures of importance are presented and explored in the framework of a 58-industry input-output model of the Australian State of Tasmania. The four measures are compared to each other, to direct employment and to a multiplier-based rule-of-thumb. Our preferred measure is one which takes into account both direct effects and the strength of backward linkages. The rule-of-thumb is found to be highly correlated to this measure.

1. Introduction

Governments frequently face decisions regarding the level of assistance (e.g. tariffs, subsidies) to be given to a particular industry. When such decisions are being made, particularly in times of high unemployment or in the case of an industry located in a region of high unemployment, industry lobbyists are tireless in pointing out that the industry contributes a substantial number of jobs to the economy and that these jobs are in jeopardy if assistance is not given or is discontinued. Yet there does not appear to be a well developed, widely-accepted method for measuring a particular industry’s importance in terms of jobs. Direct employment is one possible way of measuring importance but is generally considered unsatisfactory, especially by industry spokesmen, since it ignores the indirect employment generated in other industries by the industry concerned. To remedy this weakness by adding direct and indirect employment raises the problem of double-counting.

The main aim of this paper is to examine the measurement of industry importance (in terms of jobs) in a rigorous way within the framework of a closed input-output model. We begin by presenting four alternative procedures for measuring importance. Three of these methods have previously been analysed algebraically

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in Groenewold, Hagger and Madden (1987) and Groenewold (1986) where their relationship to the interindustry linkages literature is explored. The fourth method is based on Szyrmer (1986). There is a brief discussion of the computational problems associated with applying these four measures to actual data. This discussion leads into the central section of the paper in which each measure is applied to regional Australian data. For comparison purposes a measure of direct employment and one of employment contribution based on a multiplier-based rule-of-thumb are also presented and analysed. The data used are drawn from the 58-sector Transactions Table which was constructed for the State of Tasmania in the late 70's and early 80's and first published in 1981. \(^1\) The final section of the paper sums up the argument of the paper and presents the major conclusions.

2. Methods of measuring industry importance

The most obvious way of measuring an industry’s importance to a particular regional economy is by asking the following hypothetical question: Suppose that the industry were to be lost to the region. What job-loss would result? The answer one gets to this question varies, however, according to the meaning given to the phrase “lost to the region”. In this section we present four different procedures for measuring importance, each corresponding to a particular interpretation of “lost”. Each procedure uses the conventional closed input-output model for computational purposes.

2.1. Method 1: shut-down of industry

In the case of the first method, “loss of the industry” is interpreted to mean “shut-down of the industry”. The computational procedure for answering this question consists of the following three steps. First, use the closed input-output model to calculate the aggregate employment which would exist in a regional economy shorn of industry j. Second, subtract this figure from aggregate employment in the economy as it is, i.e. with industry j in place. Third, take the figure which results, i.e. the excess of employment in the regional economy as it is over employment in a hypothetical regional economy without industry j, as the number of jobs which would be lost to the economy if industry j were to be shut down.

2.2. Method 2: relocation of industry

In the case of our second method, “loss of the industry” is taken to mean “relocation of the industry outside the region”. It is assumed that after relocation, the industry continues to buy from the region some (possibly all) of the intermediate inputs which it bought there prior to relocation.

Taking the extreme case where all the industry’s intermediate inputs continue to be purchased from within the region, the computational procedure is identical with that presented above for the method 1, except for a difference in the truncated system which is solved in the first step. This relates to the values allotted

\(^1\) See Edwards et al. (1981).