Annals of Economic and Social Measurement, 2/3, 1973

RIMLOC: A COMPUTER ALGORITHM FOR REGIONAL INPUT-OUTPUT ANALYSES*

BY LONNIE L. JONES AND GHOLAM MUSTAFA

INTRODUCTION

The use of a regional input-output model for development planning often is prevented by the extensive data gathering process required in developing a model from primary data. The development of an input-output transaction table from primary sources is expensive and time consuming. Consequently, some leading authors have developed procedures for estimating a regional transaction table from national or state technical coefficients [3, 7]. The location quotient approach is one of these procedures [7].

The regional input-output model presented in this article is an inversion routine designed for use in regional planning and industrial location evaluation. The unique feature of the RIMLOC (Regional Input-Output Model Using Location Quotients) algorithm is that only information from a national or state transaction table and total output estimates for each sector are required to estimate all conventional input-output information including, the regional transaction table, technical coefficients, interdependence coefficients and sector output multipliers. Further, income, employment and other resource multipliers may be estimated by inclusion of appropriate data. Estimation of leakage coefficients and other options also are incorporated in the algorithm.

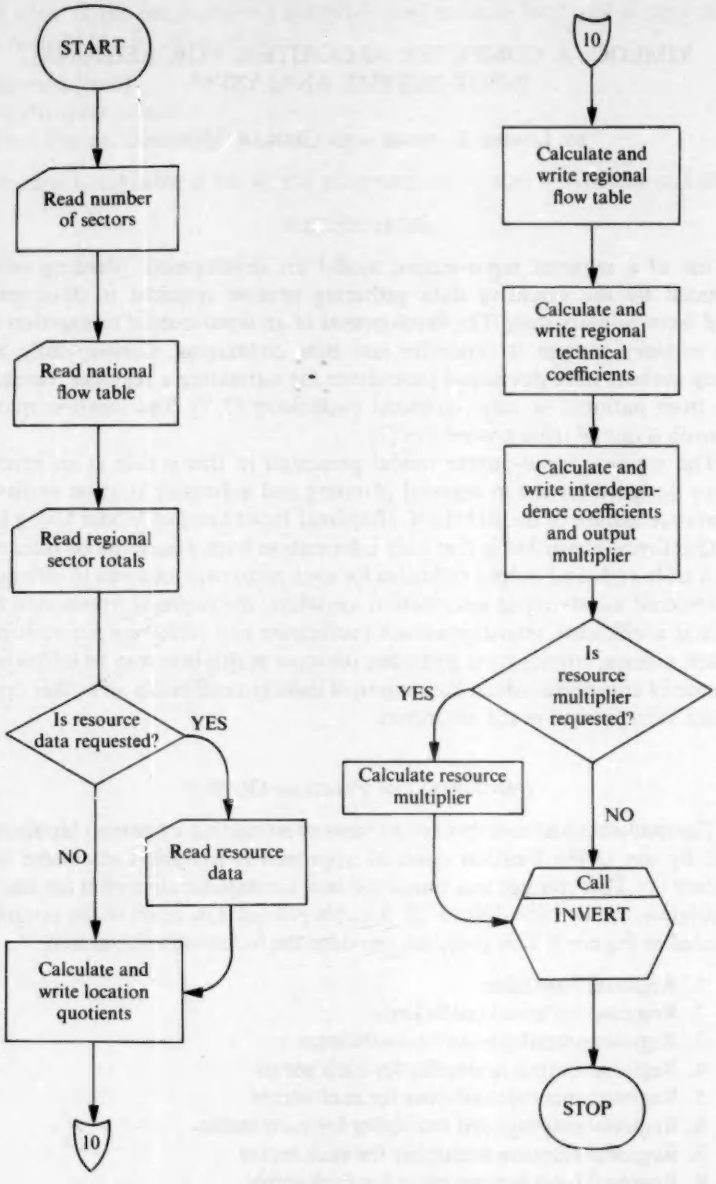
DESCRIPTION OF PROGRAM OUTPUT

The mathematical and theoretical basis of estimating a regional input-output model by use of the location quotient approach is presented elsewhere in the literature [7]. This concept was translated into a computer algorithm for handling and solution on the IBM 360/65 [5]. An abbreviated flow chart of the program is presented in Figure 1. This program provides the following information:

1. Regional flow table
2. Regional technical coefficients
3. Regional interdependence coefficients
4. Regional output multiplier for each sector
5. Regional income multiplier for each sector
6. Regional employment multiplier for each sector
7. Regional resource multiplier for each sector
8. Regional total income effect for each sector
9. Regional total employment effect for each sector
10. Regional total resource effect for each sector

* Technical Article No. *9805* of the Texas Agricultural Experimental Station.

Figure 1 Abbreviated Flow Chart



Also, with a slight modification of the program (one statement) all the above information may be obtained with a no import assumption which ultimately will provide leakage coefficients as developed by Little and Doeksen [2].

Operational Use

Data Requirements

The program requires the following data inputs which may be developed from secondary sources (see Figure 1):

(1) The national or state transaction table on the basis of the desired sector classification for the base year [6].
(2) The regional total output of each sector for the base year.
(3) The regional total output of each sector for the current or estimation year.

Options

The user may develop employment or any other resource multipliers by entering the appropriate resource data. Income, employment, environmental factors and other resource effects may be obtained simply by providing appropriate data in the resource technical coefficients matrix. This resource matrix, whose elements are units of resource per dollar of output by sector, contains the same number of columns as the interdependence coefficients matrix and any number of rows—one for each resource. Following the estimation procedure developed by Martin and Carter [3], the functional relationship between sector resource requirements and output is specified such that total resource requirements may be estimated for a specified final demand.

Input Specifications

The program must be modified before each use to specify the size of the input-output model desired and the number of endogenous and exogenous sectors in the model. In addition, the program may be modified to conform to the format of the input data of the user. Details of these changes are published in the program and model documentation [5].

Conclusion

The regional input-output model announced in this article is an inversion routine designed for use in regional planning and industrial location evaluation. Specifically, the model and algorithm provide a method for estimating regional interindustry transactions, technical and interdependence coefficients and sector multipliers from the national input-output model and other secondary data. This algorithm was developed for estimating the interdependencies among 31 sectors of the Texas economy. It may be adapted for use in estimating other regional input-output models for any region, number of sectors, or base year. The base year need not be the same as that of the national input-output table.

The program is written in FORTRAN IV and runs on the IBM 360/65. A publication containing a sample run showing input and output data may be obtained by contacting the authors [5].

Texas A & M University
Bangladesh Agricultural University

References

[1] Jones, Lonnie and Gholam Mustafa, *Structure of the Texas Economy: Emphasis on Agriculture*, Bull. 1121, Texas Agricultural Experiment Station, College Station, Texas, May, 1972.
[2] Little, Charles H. and Gerald A. Doeksen, "Measurement of Leakage by the Use of an Input-Output Model," *American Journal of Agricultural Economics*, 50:921–934, November, 1968.
[3] Martin, William E., and Harold O. Carter, *A California Interindustry Analysis Emphasisizing Agriculture (Part I and II)*, Giannini Foundation Res, Rept. 278, February 1968.
[4] Miernyk, W. H., *The Elements of Input-Output Analysis*, New York, Random House, 1965.
[5] Mustafa, Gholam and Lonnie L. Jones, *Regional Input-Output Model Using Location Quotients*, Program and Model Documentation 71–4, Texas Agricultural Experiment Station, June, 1971.
[6] Office of Business Economics, U.S. Department of Commerce, *Input-Output Structure of the U.S. Economy*, Vols. I, II and III, U.S. Government Printing Office, 1963.
[7] Schaffer, William A., and Kong Chu, "Non-survey Techniques for Constructing Regional Interindustry Models," *The Regional Science Association Papers*, 23:83–101, November, 1968.

received: July 19, 1972
revised: January 20, 1973