

# Spatial Development in Indonesia

Review and prospects

*Edited by*

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# Chapter 2

## Spatial Implications of Export Promotion Strategies

Edison Hulu, Geoffrey J.D. Hewings and Iwan J. Azis

### 2.1 Introduction

The Anglo-Saxon bias in economics, so carefully articulated by Isard (1956) in the development of the early foundations of location in the space economy, has persisted in the field of development economics.<sup>1</sup> Without wishing to move to a position of defense of what Warntz (1967) referred to as the "tyranny of space," in which space assumes the role of the *primus inter pares* factor in conditioning growth and development paths, it would be fair to state that we have managed to accumulate a significant body of evidence to suggest that attention to space does matter in the promulgation of development strategy - in both developed and developing countries.

<sup>1</sup>Support for this project, undertaken at the Inter-University Center in Economics, University of Indonesia, Jakarta, was made possible with funds provided through the MU-CIA/World Bank XVII Second Indonesian University Development Project.

In this chapter, the authors provide some initial reports in an attempt to use a set of interregional input-output tables for Indonesia to measure the effects of export growth targets by sector and by region. The development of the interregional system is but the first stage in the construction of a set of interregional social accounts that, it is hoped will, in turn, form the basis for the development of an interregional computable general equilibrium model for Indonesia. Once constructed, it will then be possible to trace the impacts of macro policy, not only in the usual terms (i.e., effects on income, balance of trade, Gross National Product), but also in terms of the many important dimensions of welfare within the various regions of the Indonesian economy. This chapter recognizes that an interregional input-output system is a partial equilibrium view of the economy, but it advances the position that a partial or not, the system does provide some capabilities for examining spatial and sectoral interdependencies that are not available in the national models.

The chapter proceeds through a brief discussion of some of the issues associated with the growth and development strategies of the Indonesian economy. The third section reviews some of the structural changes that have been found at the national level and their implications for the regional system. The following section reviews the construction of the Indonesian interregional tables. Thereafter, an examination is made of the projected sectoral and spatial impact of export growth over the period 1980-1990. Finally, some conclusions and future directions are offered.

## 2.2 Indonesian Growth and Development Issues

There have been a number of comprehensive reviews of the performance of the Indonesian economy over the last two decades (see Chapter 1 by Azis, 1989a). In this section, only those issues relevant to the discussion in the remaining sections will be highlighted.

The Indonesian economy has shown a number of characteristics that are common to resource-based developing economies, namely its sensitivity to world market price fluctuations in the commodities that it exports. The decade of the 1970s witnessed the effects of oil price shocks on the economy in a most dramatic fashion.

In the 1980s, a concerted effort was undertaken to diversify the national economy's export portfolio away from the dominating position exercised by the oil and natural gas sector. During the period of 1983-1986, non-oil and gas exports increased from U.S.\$5 billion to \$11.6 billion and their share of total exports in value terms increased from 27 to 60 percent. However, of these non-oil and natural gas exports, 45 percent comprise wood, rubber and textiles, commodities that tend to face income elasticities of demand that are generally lower than or close to unity. In addition, technological change in the production and consumption of these commodities threatens to undermine any growth and development strategy that would place them in a significant position. On the other hand, it is important for the export promotion strategy to recognize the backward linkage effects that it has on an economy, especially in terms of employment creation. Furthermore, diversification into areas in which Indonesia does not enjoy comparative advantage may further undermine export potential.

One of the major concerns in dealing with a large country is the degree to which the development strategy is concentrated spatially. By concentration, we are thinking not only of the direct effects, but also of the total impacts (direct, indirect and induced, if one were to use input-output terminology), since substantial concentration of direct effects may not be important if the indirect and induced effects are widely scattered.

Higgins (1973), in particular, has been a strong advocate of a spatially-based development strategy, arguing at one time that attention to spatial concerns should be considered explicitly as part of the overall, national development strategy, rather than as something to be considered after a certain level of development has been achieved. However, there are few examples of countries that have adopted such a strategy, and thus it is difficult to argue forcefully in the face of little or no empirical evidence. Recent work undertaken in Bangladesh (Jahan and Hewings, 1989) with a four-region social accounting matrix, and in Korea (Ko and Hewings, 1986), with a five-region computable general equilibrium model, has suggested that the nature of many developing country economies is such that concentration is likely to continue no matter where the development projects are located and no matter where the development strategy is targeted. Bell, Hazell and Slade's (1986) work in the Muda region of Malaysia revealed a similar problem on a much smaller spatial scale (i.e., urban versus rural).

At this stage, arguments will not be presented in favor of a spatially-based development strategy; but some comments will be made to the effect that concentration is likely to lead to significant problems in the regions (which are usually urban-based) in which the impacts accumulate, while creating countervailing problems in regions that receive few of the benefits. In the Indonesian case, the particular redistributive policy that has been articulated by the government, the *Inpres* transfer policy, has really not addressed the issue since funds are allocated to the twenty-seven provinces in equal amounts, regardless of size, need or capacity.

The debate over the merits of export-led development versus import substitution has generated a great deal of literature. In this chapter, we have only been able to examine the export-led side of the discussion, although the analytical framework does provide an opportunity to consider import-substitution scenarios. In the final analysis, however, one of the major indicators of concern is employment, including its level, creation, and maintenance. A fully articulated interregional CGE model would enable a complete examination of employment effects. At the present time, however, we have restricted our attention to the distribution of impacts by sector and region.

In the next section, an overview is provided of some of the changes that have characterized the national economy. Specific effects on the regional economies would be difficult to estimate at the present time, but information is provided which suggests that significant change at the sub-national level should be considered to be extremely likely.

### 2.3 Structural Changes at the National Level, 1975-1985

Susanti and Hewings (1980) provided a description of the key sectors and coefficients in the Indonesian economy for the period 1975-1985 using a set of consistently developed input-output tables with nineteen intermediate sectors. It was shown that the traditional methods of key sector analysis, drawing on the work of Hirschman (1958), Rasmussen (1956), and Hewings (1982), did not provide significant insights into the changes in the economy. In place of key sector analysis, this chapter focuses on key coefficients, defined using the concept of a "field of influence," recently advanced by Sonis

and Hewings (1989).

While the major contribution provided by input-output analysis is in the provision of a complete picture of interactions in an economy at one point in time, recent research suggests that the degree of importance that can be ascribed to any single interaction will vary. Importance here is considered to imply a relationship between changes in an element and associated changes in an output, income, employment or multiplier vector derived from the input-output model. Hence, importance in this context cannot be a universally accepted criterion, but one that must be determined in light of the specific uses to which the analysis will be applied.

Sonis and Hewings (1989) provided a formal statement and set of procedures for defining analytical importance. Drawing upon the earlier work of Sherman and Morrison (1950) and Bullard and Sebold (1977), and the structural path analysis work of Defourny and Thorbecke (1984), the notion of a Field of Influence  $F(e)$  is introduced. Let  $B$  and  $B(e)$  represent, respectively, the Leontief inverse matrices with no elements and one element perturbed by an amount  $0 < e < 1$ , then a summary measure of the Field of Influence may be shown to be:

$$F(e) = [B(e) - B]/e$$

A similar formulation can be developed when two or more elements, whole rows or columns or the whole matrix is to be perturbed. For any given change,  $e$ , the fields can be calculated for a change  $a_{ij}(e)$  in each element in turn ranked by size. The larger the value of the field, the more important the coefficient is in the matrix.

In Figures 2-1 through 2-4, the top twenty coefficients with the largest fields of influence are shown for each year. Figures 2-5 through 2-8 show the corresponding pairs of coefficients which had the largest synergistic change. The interpretation of these patterns is provided in Susanti and Hewings (1989), and the only observations to be made here are that the evidence would seem to suggest an economy undergoing a period of significant change. Over this period, 1975-1985, the degree of intermediation increased from 32 to 37 percent, and most of those changes were captured by the service part of the economy. Figures 2-9 and 2-10 show the changes in the rankings for



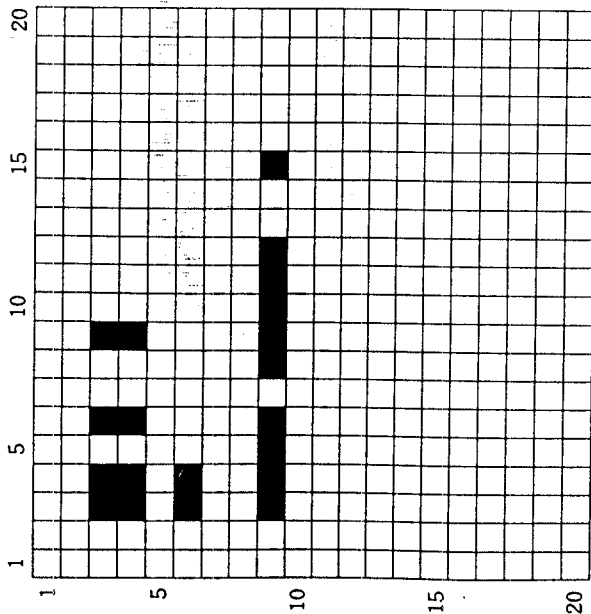


Figure 2.1: Single Element 1975 Top 20

the most important coefficients over this period. The most striking feature shown is the decline in importance of Sectors 3 (Other Agricultural Crops) and 6 (Fishing), and the increase in importance for Sector 4 (Livestock).

It is our intention to use these changes to estimate their likely impacts on the regional economies of Indonesia. Since these are the coefficients whose change is creating the most attention at the national level, the issue that needs to be resolved is the degree to which there is a concomitant change in spatial relationships. In the next section, we introduce the Indonesian inter-regional input-output system in preparation for a discussion of the spatial effects of export activity.

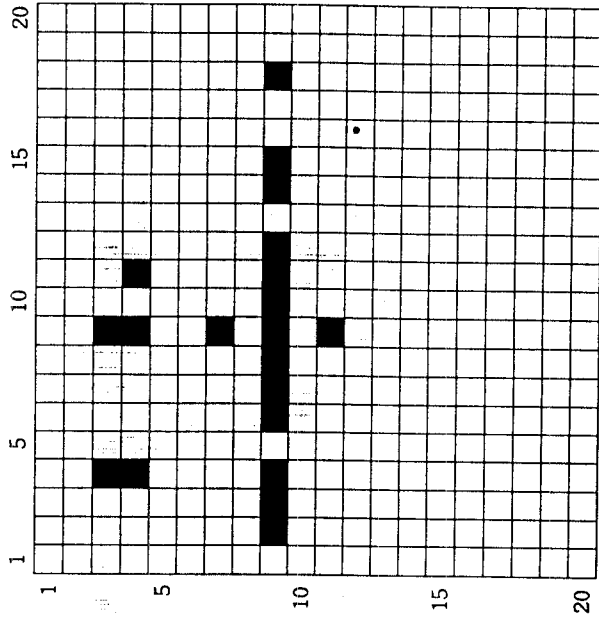


Figure 2.2: Single Element 1980 Top 20

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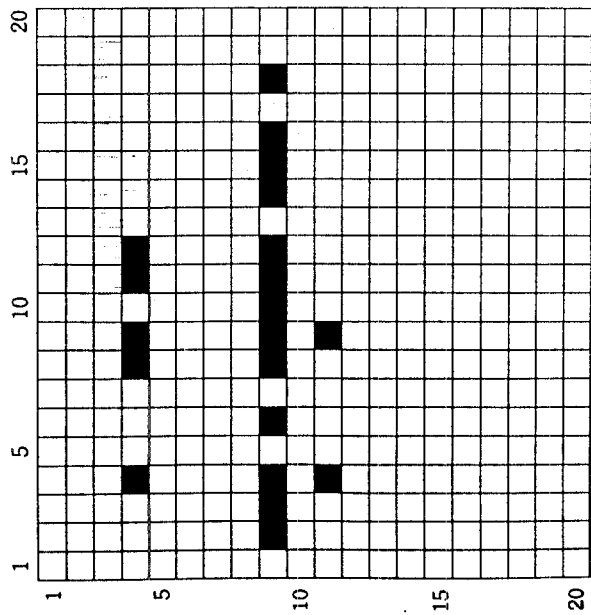


Figure 2.3: Single Element 1983 Top 20

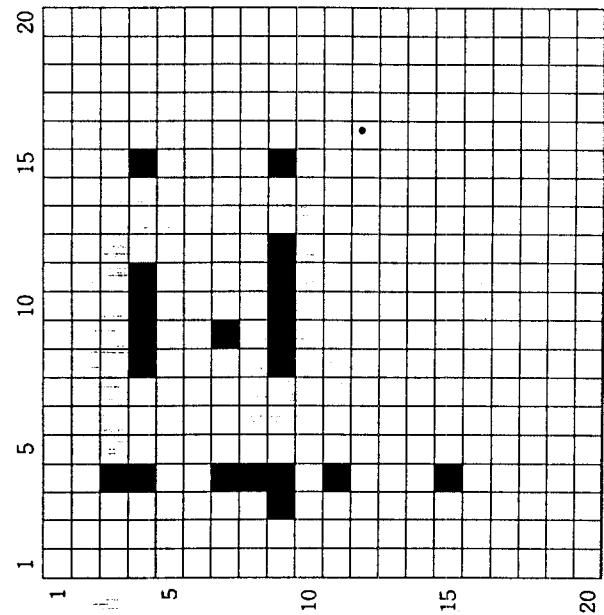
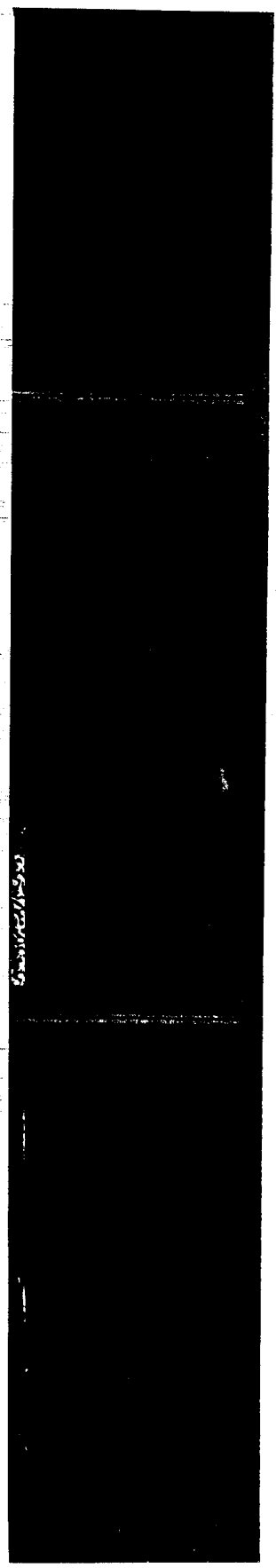


Figure 2.4: Single Element 1985 Top 20



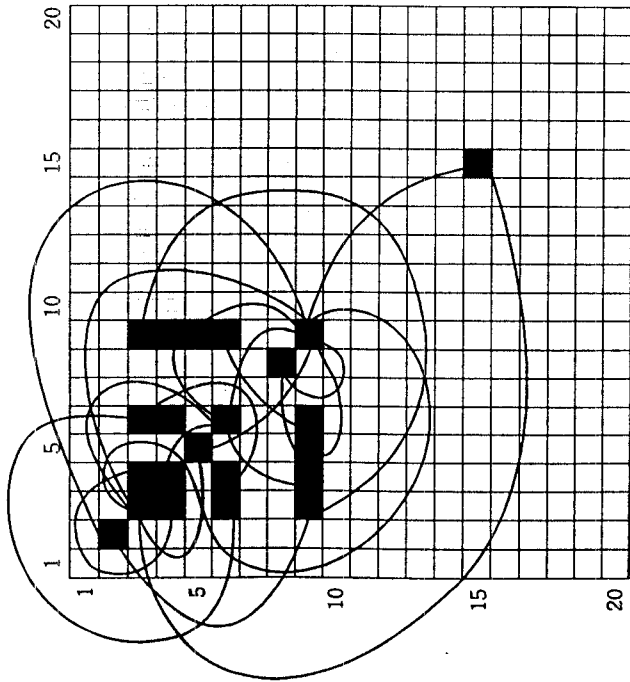


Figure 2.5: Two-Element Changes 1975 Top 20

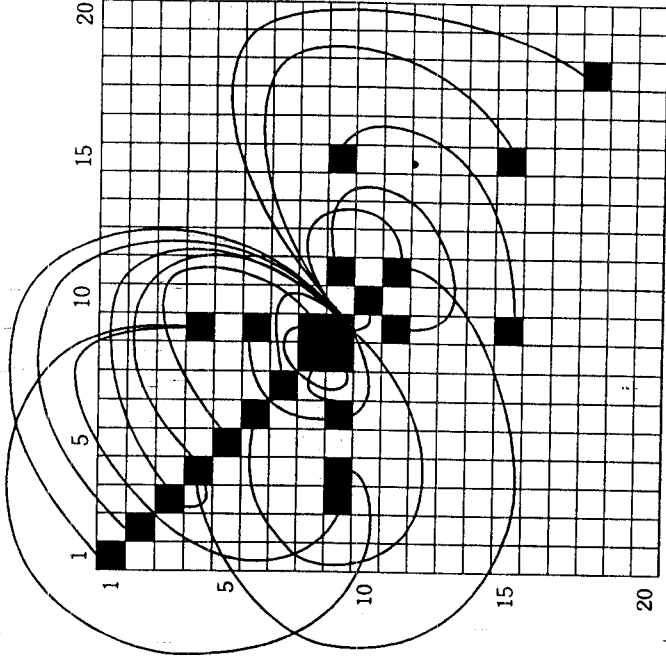
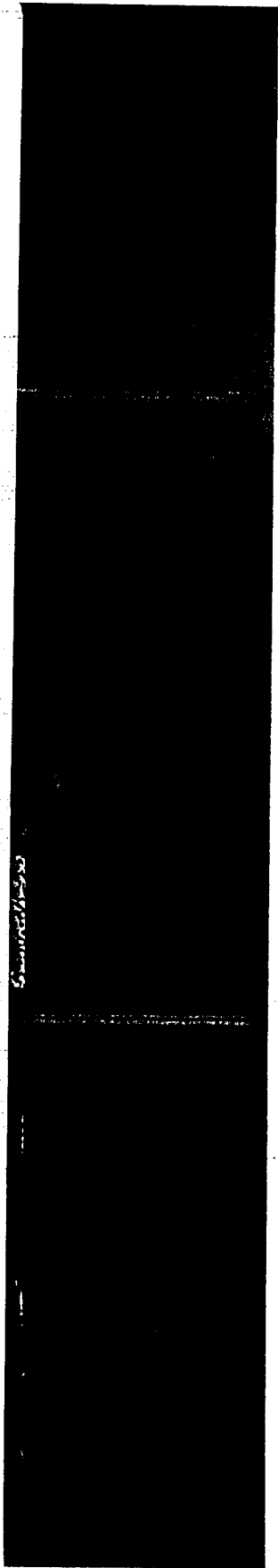


Figure 2.6: Two-Element Changes 1980 Top 20



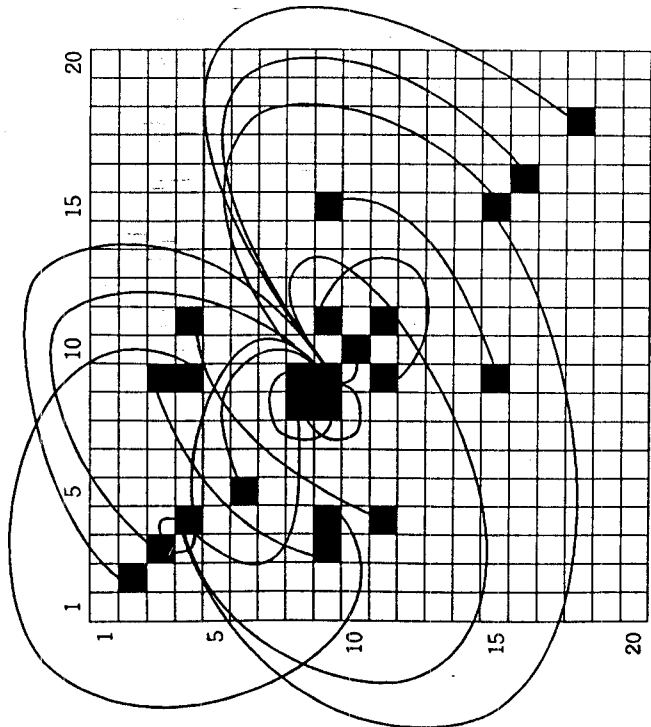


Figure 2.7: Two-Element Changes 1983 Top 20

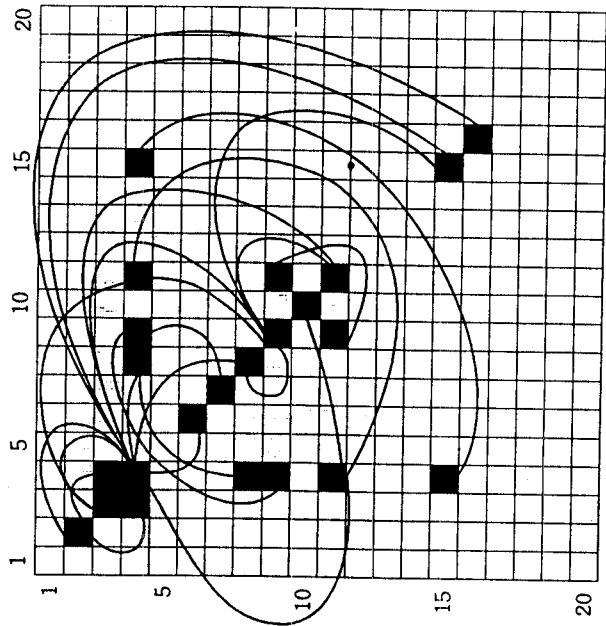
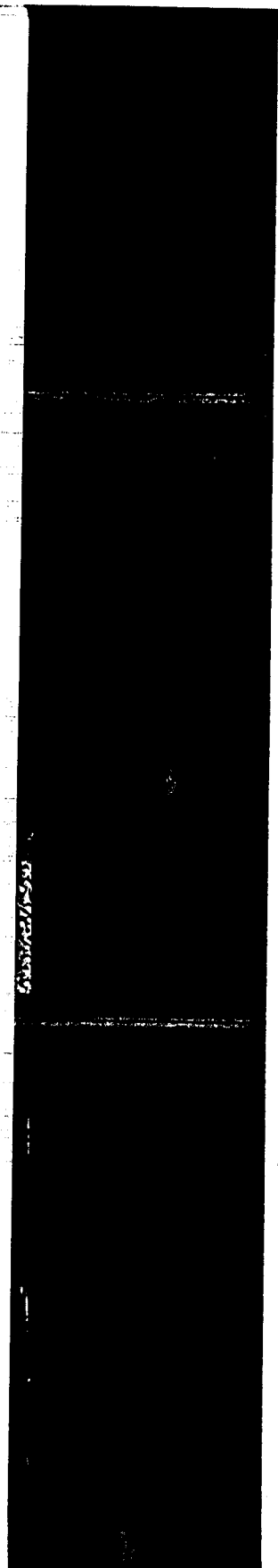


Figure 2.8: Two-Element Changes 1985 Top 20



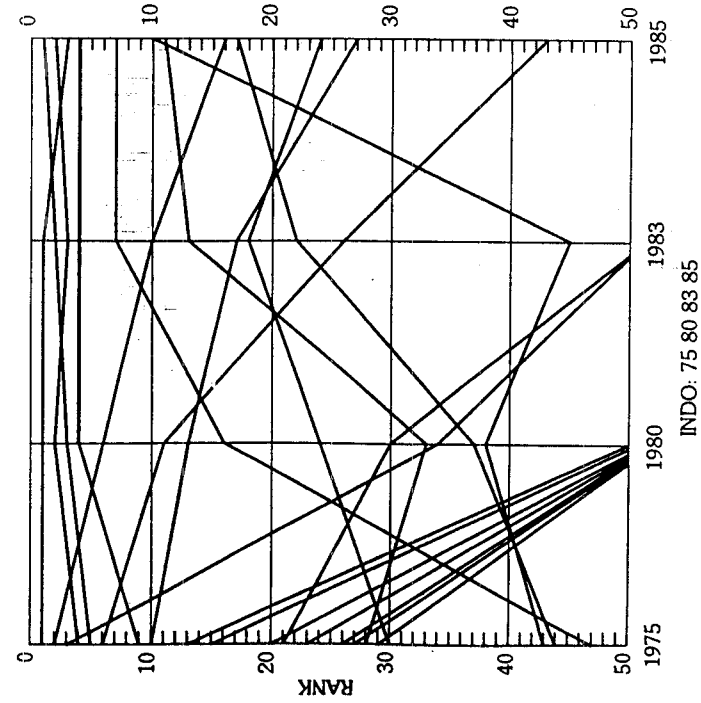


Figure 2.9: Changes in Rank for Selected Fields of Influence

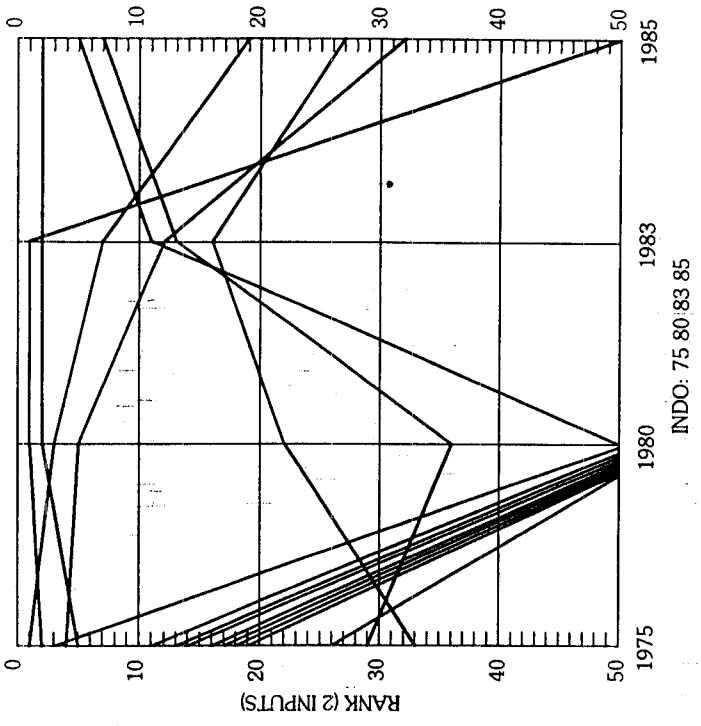


Figure 2.10: Changes in Rank for Selected Synergetic Fields of Influence

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## 2.4 Construction of Indonesian Interregional Input-Output Tables for 1980

A complete description of the construction of the Indonesian interregional input-output tables is provided in Hulu and Hewings (1990). As mentioned earlier, these tables have been constructed to form the basis of a set of interregional social accounting matrices and, eventually, a computable general equilibrium model. While the initial hope was that the set of regions would be able to comprise the twenty-seven provinces, it became clear that data limitations precluded this development. In the end, it was decided to focus attention on five regions: Sumatra, Java, Kalimantan, Sulawesi, and the "Rest of Indonesia".

The basis for the tables was the sixty-six-sector National Input-Output Table for 1980; which was aggregated to eleven sectors.<sup>2</sup> The tables were estimated in a two-stage process. In the first stage, a location quotient adjustment procedure was used to estimate the regional and interregional requirement coefficients for each region and a second, "Rest of Indonesia" region. The associated estimated flows between each region and the Rest of Indonesia were then distributed over the complete five-region system using a modified bi-proportional algorithm.<sup>3</sup>

Some summary, interpretive measures of the structure of the interregional economy are shown in Table 2.1. Although both sales and purchases direct coefficient matrices were constructed (as well as their associated inverses), the analysis will proceed with the column coefficient matrix version. Miller (1964) and others have long pointed out the importance of interregional feedback effects in the analysis of change within regional systems. In Table 2.1, some attempt has been made to summarize these feedbacks by sector within each region. A more complete interpretation, utilizing some recent developments in matrix decomposition analysis may be found in Hewings,

<sup>2</sup>These sectors are: (1) Agriculture; (2) Mining; (3) Industries; (4) Electric, Gas and Water Supply; (5) Construction; (6) Trade, Restaurants, and Hotels; (7) Transportation and Communications; (8) Finance; (9) Business Services; (10) Government; and (11) Other Services.

<sup>3</sup>As Bon (1984) and others have recently demonstrated, the convergence properties in interregional and multiregional systems cannot be guaranteed in cases where the matrices are sparse. Bon has suggested using a linear programming routine to bring the matrix as close as possible to the margin constraints after the iterative adjustment yields no further significant improvements.

Hulu, Sonis and Lee (1990).

The entries in Table 2.1 show the distribution of the "flow-on" effects calculated from the Leontief Inverse net of the initial injection. Hence, in Sumatra, the total multiplier is 1.3838 and the flow-on portion (0.3838) has been calculated by sector and region. The regional summary entries in Table 2.1 should be interpreted as follows: of the 0.3838 flow-on effects for Sector 1 in Sumatra, 66.6 percent occur within Sumatra, 14.0 percent in Java, 5.4 percent in Kalimantan, and so forth.

*A priori*, one would suspect that Java, Sumatra, Kalimantan, Sulawesi and the "Rest of Indonesia" would form the ranking according to the size of intra-regional effects. For the most part, this is the case. In addition, one would anticipate that Java would also be an important source of direct and indirect effects from expansions occurring elsewhere in the country. Again, the evidence suggests that this is, indeed, the case. However, there are some surprising results. For Kalimantan and Sulawesi, Sumatra almost equals Java in terms of the accumulation of direct and indirect effects from changes in sectoral outputs in the first-named regions. The degree of intra-regional dependence in some sectors (e.g., Sector 2 in Sulawesi) is often less than the cumulative interregional effects from several of the other regions. The degree to which sectors are or are not dependent on sectors in other regions provides important information for policy formation. The focus of the next section is directed towards export promotion strategies.

SUMATERA						
Sector	Sumat	Java	Kaliman	Sulawesi	Rest of Indonesia	Inter-Regional Sum
1	66.6	14.0	5.4	6.8	6.1	32.4
2	66.7	17.4	6.9	3.5	3.5	31.4
3	72.8	11.7	4.9	5.2	4.7	14.7
4	65.6	18.5	6.2	4.7	4.4	33.9
5	72.7	12.4	5.3	4.8	4.2	26.6
6	64.1	17.4	6.4	5.7	5.3	34.9
7	59.5	21.8	6.9	5.5	5.7	40.1
8	56.5	23.9	7.6	5.8	5.8	42.3
9	55.0	22.5	8.6	5.9	6.4	43.5
10	100.0					
11	67.9	16.1	6.0	4.8	4.4	31.4
JAVA						
1	6.4	93.2	2.7	3.6	3.3	17.8
2	17.2	72.4	7.2	1.0	1.9	27.6
3	14.0	74.5	5.9	2.4	2.9	25.5
4	6.1	89.0	2.6	1.0	1.1	11.0
5	8.9	83.99	3.8	1.4	1.7	16.1
6	5.0	89.0	2.1	1.6	1.6	11.0
7	4.1	92.2	1.7	1.0	1.0	7.8
8	3.0	94.2	1.3	0.5	0.6	5.8
9	4.2	92.3	1.8	0.7	0.7	7.7
10		100.0				
11	5.4	89.6	2.3	1.1	1.3	10.4

Note: Entries show the percentage distribution of the flow-on effects from a unit change on each region in the sector at the left (to be continued to next page).

Table 2.1: Direct and Indirect Effects of a Unit Change in Final Demand in All Sectors Net of the Initial Injection

KALIMANTAN						
Sector	Sumat	Java	Kaliman	Sulawesi	Rest of Indonesia	Inter-Regional Sum
1	16.9	17.8	57.3	4.1	3.6	42.7
2	27.2	29.2	30.7	6.5	5.5	59.3
3	21.4	21.5	47.7	5.1	4.0	52.3
4	29.6	31.4	25.8	6.9	6.0	74.2
5	24.6	24.4	39.9	5.9	4.7	60.1
6	24.4	26.0	37.8	6.1	5.3	62.2
7	27.8	30.8	27.4	6.7	6.8	72.6
8	27.4	30.1	28.1	7.2	6.8	71.9
9	33.5	31.7	17.1	8.3	8.9	82.9
10			100.0			
11	27.5	28.4	31.6	6.5	5.7	68.4
SULAWESI						
1	19.4	19.9	8.2	48.6	3.4	51.4
2	33.4	35.2	14.3	11.8	5.0	88.2
3	29.9	29.6	13.2	22.4	4.6	77.6
4	33.5	33.4	14.6	12.6	5.8	87.4
5	32.5	31.9	14.4	15.5	5.4	84.5
6	27.0	28.2	11.7	28.0	4.7	72.0
7	31.4	33.6	13.0	16.6	6.0	83.4
8	26.4	29.3	10.5	28.3	5.0	71.6
9	24.7	27.3	10.2	32.8	4.2	67.2
10				100.0		
11	32.8	32.8	14.3	14.1	5.8	85.9
REST OF INDONESIA						
1	20.7	21.0	9.2	4.7	43.9	56.1
2	32.8	33.3	14.5	7.5	10.8	89.2
3	29.4	28.9	13.0	6.7	21.8	78.2
4	34.1	34.4	14.7	7.7	8.9	91.1
5	33.5	32.8	14.9	7.9	10.7	89.3
6	28.9	29.6	12.7	6.9	21.3	78.7
7	31.0	30.9	13.8	7.0	16.8	83.2
8	29.0	30.1	12.5	7.5	20.5	79.5
9	25.0	26.3	10.8	6.1	31.3	68.7
10					100.0	
11	33.7	33.3	15.0	7.9	9.9	80.1

## 2.5 Spatial and Sectoral Impacts of Export Growth, 1980-1990

In addition to the analysis presented here, a parallel form of experimentation will be conducted to that undertaken at the national level, namely the identification of spatially and sectorally important parameters. Their identification will be of great value in any policy analysis of alternative targets for export growth and will provide some insights into the possible synergistic effects of diversion of activities from one region to another or from one sector in one region to another sector in another region. At present, we shall rely on some preliminary work which is divided into two parts: (1) an examination of the potential impacts of forecasted national export growth on the regional economies, and (2) a simple examination of the effects of an increase in exports on each sector and on the regional system.

Table 2.2 shows the spatial distribution from a change of Rp 10 million in each sector in turn (but all sectors in the same industry changed by the same amount in each region). Two major points should be noted. First, there are substantial variations in the total impacts on the economy, ranging from a low of Rp 61.6 in Sector 10 to a high of Rp 115.6 in Sector 5. Second, the domination of Sumatra and Java is further reinforced: between 44 and 58 percent of the total impacts are concentrated in these two regions. It should be borne in mind that the initial expenditures were evenly distributed across all five regions.

The data in Table 2.3 summarize the results by comparing the distributions to a distribution that reflects the equality of the initial changes (i.e., deviations from 20 percent in each region).

As expected, Sumatra and Java are net "gainers" in this sense, while the other three regions experience less than their initial share of the total effect. The need for decomposition should be apparent - we need to know the degree to which the changes in any one region reflect demands placed on industries in those regions and on industries in other parts of Indonesia.

Sector	Sumatera	Java	Kalimantan	Sulawesi	Rest of Indonesia	Inter-Regional Sum
1	15.6 (21.6)	16.3 (25.0)	14.8 (18.4)	12.6 (17.1)	12.6 (17.5)	71.9
2	16.2 (23.4)	17.3 (25.0)	12.7 (18.4)	11.8 (17.1)	11.0 (15.9)	69.0
3	31.6 (27.4)	30.9 (26.9)	21.7 (18.9)	15.4 (13.4)	15.2 (13.2)	114.8
4	29.6 (27.5)	33.7 (31.4)	17.4 (16.2)	13.6 (12.6)	13.0 (12.1)	107.3
5	31.0 (27.8)	33.2 (29.7)	19.6 (17.5)	14.4 (12.9)	13.3 (11.9)	115.6
6	16.1 (22.5)	17.7 (24.7)	13.0 (18.2)	13.0 (18.2)	11.6 (16.2)	71.4
7	22.4 (24.9)	27.5 (30.6)	14.9 (16.6)	11.8 (13.1)	18.1 (14.6)	89.7
8	14.7 (21.9)	16.9 (25.2)	12.7 (18.9)	11.4 (17.0)	11.3 (16.8)	67.0
9	13.5 (21.9)	15.6 (25.3)	11.3 (18.3)	10.0 (16.2)	11.2 (18.8)	61.6
10	Not evaluated					
11	23.7 (26.2)	25.6 (28.3)	16.1 (17.8)	12.9 (14.2)	12.1 (13.3)	90.4

Note: Number in Parentheses are the Percentages of the Totals.

Table 2.2: Effect of a 10 million Rp Increase in Exports by the Industrial Sector at the Left in All Regions on Total Output by Region



Sector	Sumatera	Java	Kalimantan	Sulawesi	Rest of Indonesia
1	+1.6	+2.6	+0.5	-2.5	-2.5
2	+3.6	+5.0	-1.6	-2.9	-4.1
3	+2.6	+6.9	-1.1	-6.6	-6.8
4	+7.5	+10.4	+3.8	-7.4	-7.9
5	+7.8	+9.7	-2.5	-7.1	-8.1
6	+2.5	+4.7	-1.8	-1.8	-3.8
7	+4.9	+10.6	-3.4	-6.9	-5.4
8	+1.9	+5.2	-1.1	-6.9	-5.4
9	+1.9	+5.3	-1.7	-3.8	-1.2
10	Not Evaluated				
11	+6.2	+8.3	-2.2	-5.8	-6.7

Table 2.3: Deviation in Each Region's Expected Share of Export Generated Output from an Equal Distribution

## 2.6 Conclusions

One of the advantages of the existence of a set of interregional tables is the ability to answer questions about the spillover effects from development strategy in two dimensions: space and sector. The data presented in Table 2.4 suggest that the Indonesian economy is connected in complicated ways, but the dominance of Sumatra and Java and the important interaction between these two islands, independently of the rest of the system, should also be noted. Even without the benefit of an interregional social accounting matrix (SAM), it will be possible to construct Lorenz curves to examine the degree to which certain types of export policy do or do not shift the distribution of resources in the desired direction. It should be clear that the nature of the interregional feedbacks are such that policies that only examine the location of direct impacts would seriously underestimate or overestimate the degree to which these targets can contribute significantly to the improvement of welfare (in a distributional sense) within the country.

However, as many other studies have revealed, it is the income receipt and expenditure flows that are often the most important at the regional level; for this reason alone, the development of interregional SAMs would appear to be a high priority. Consumption-induced effects will almost cer-

tainly enhance the dominant positions of Java and Sumatra since these are prime locations for consumer-oriented final goods and services.

Plans are underway to update the tables in this study to 1985 when the full survey-based national tables are released. This venture will then provide a way of measuring the degree to which the location of important parameters in the system has changed, reflecting the gradual deepening of the structural interdependencies (see Jackson, Hewings and Sonis, 1990). With interregional tables, the process may not appear "monotonic" across all sectors and regions, with the possibility of differential "hollowing-out" occurring (see Okazaki, 1989).

The input-output system provides important insights into the spatial impacts of change; however, it provides little information about the time-phasing of impacts. The present system would need to be linked with either an econometric model (see Azis, 1989b; and Azis and Ekawati, 1990) or nested within a computable general equilibrium framework. Some preliminary work has already been completed along the latter path (see Hulu, Hewings and Saptia, 1991). However, until the system is complete, the input-output framework provides the only available insights into the spatial distribution of these impacts.

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## Chapter 3

# Spatial Development: Future Prospects

Sugijanto Soegjoko

### 3.1 Introduction

This chapter explores the future prospects for spatial development in Indonesia. As a first step, it is helpful to simplify the nation's space by categorizing it in terms of the larger islands and groups of islands. This involves grouping the provinces located in any given island as an entity. Admittedly, this categorization results in the sacrifice of some specificity or special characteristics for certain provinces, but it does help to describe the value of averages for certain indices. This simplified categorization is helpful for discussion of the indications of Indonesia's future spatial development.

The development pattern for the configuration of Indonesia's space described above has resulted from the implementation of the nation's prevailing development strategy and program. Specifically, the present situation is the product of the sectoral programs and investments made throughout the