Chapter 5

A SUMMARY VIEW AND SOME RESEARCH DIRECTIONS

In almost all discussions and documents on economic development and planning in India, the regional aspect has been mentioned as crucial. However, the lack of introduction of space explicitly in national planning exercises in India is striking. The state plans too have remained schematic in nature in the absence of specialised efforts to aid the planning process at the state level. This has resulted into a room for adhocism and inefficient spatial allocation of resources. A necessary stop to both regional and inter-regional analysis would be that the detailed mapping exercises of the economic structures at the regional level are undertaken which could provide a framework for policy decisions. One extremely useful way of doing it is to organise available information at the regional level into a Leontief type of inter-industry model. Such a framework, apart from serving as a device for 'displaying', sorting out, or storing the information, provides a powerful analytical device for structural analysis and projection purposes.

The inter-industry model for Gujarat has been estimated in two stages; the initial formulation for 1964-65 and its subsequent updating to 1969-70. The updating procedures adopted attach high premium to information as compared to the importance given to mechanical methods. Thus, for the 1969-70 model data base for inter-industry flows generated
for non-industrial activities (agriculture, construction and mining) is comparable to the 1965-66 model; whereas the incorporation of survey based inter-industry and inter-scale (registered and unregistered industrial activities) transactions for urban small scale industries and endogenous treatment of petroleum and petroleum products constitute important improvements over the earlier effort. Estimates for final demand components for 1969-70 model are also based on fresh information. Here again the inclusion of expenditure pattern of rural and urban local bodies constitutes an advance over the earlier model. The Census Sector is the only part of the updated model whose information constraint has been a handicap. Input flows into registered industrial activities imbibe a uniform "fabrication effect," using separately the totals of the fuel inputs and non-fuel inputs for 1969-70 as marginal constraints.

The 1969-70 input-output model has two variants. Inter-industry transactions in one variant are shown by thirty sectoral divisions. The main feature of this variant is that it depicts inter-industry flows between registered and unregistered industrial sub-sectors of the regional economy. The 30x30 input-output model, however, because of data limitations, is not able to capture the sectoral flows to final demand components. The other variant
has 16x16 dimensions. This is a complete model; but in the process of completing the model with respect to final demand requirements, the inter-scale flows are sacrificed. Both the variants of the 1969-70 model for Gujarat have been used for studying the nature of the inter-sectoral relations. However, for projection analysis only the complete model could be used.

**Nature of Inter-Sectoral Relations:**

Our probing into the nature of inter-sectoral relations proceeds in stages. From an initial understanding of direct interdependence, we proceed to an examination of direct and indirect interdependence as captured by the Leontief Inverse matrix. The inter-scale linkages and decomposability of the regional economy are initially gauged through first order effects. The analysis is then extended on the basis of Leontief multiplier matrix and its different variants, as the output multiplier matrix is weighed by wage income, employment, and value added coefficients. Rasmussen's linkage methodology is used to study various inducement effects (output, income, wage income, and employment) of different economic activities on the regional economy.

The pattern of inter-scale flows on current flow accounts shows directional imbalances; flows of commodities from registered sub-sector being much larger than the flows in the opposite direction. This feature suggests that unregistered small scale sub-sector is well integrated into the regional economy on backward linkage count. However,
such lauded phenomenon of sub-contracting is not seen for urban small-scale enterprises.

Pattern of inter-sectoral relations of Gujarat's economy depicts block-diagonality. Almost akin to the national economy, Gujarat economy decomposes into food-fibre and mining-metal blocks. This result is of interest because Gujarat's exercise, unlike the exercise at the national level where sectors were "expressly designed" to highlight a particular dependence relation, relies on objective criteria of isolating the interrelated sub-sets of industries. Block-diagonality, however, gets a sharper focus once universal intermediates are withdrawn from each block and are given a separate treatment as an independent block. Similar activities in registered and unregistered sub-sectors appear together in 'blocks' as well.

Direct and indirect inducement effects have been studied by using linkage indices. Our analysis of linkage indices casts doubts on linkage indices as cardinal numbers. Linkages, however, are useful in highlighting the qualitative features of the economy, which show considerable stability over different variants of the regional economy (30x30, and 16x16 with and without import leakages). Thus, agriculture and allied activities, mining, and electric light and power sectors generally show high forward linkages on different counts (output, income, wage income, employment) over different variants of Gujarat's inter-industry model. Textiles and construction sectors show high backward linkages
and spread of these linkages is also even. If one were to use Rasmussen's definition of "key industry", textiles from food-fibre block and construction from mining-metal block emerge as sectors of crucial importance in the regional economy. Agriculture and allied activities and farm output processing activities also emerge as high backward linkage sectors in their income and employment inducement effects. However, backward linkages pattern for these sectors shows concentration in linkage dispersal.

Notwithstanding the stability of broad qualitative picture of the regional economy over different variants, the linkage analysis throws up certain interesting aspects of the regional economy. Sectoral linkages, given the existing structure, vary in their inducement effects as measured by different multiplier matrices - output, wage income, employment and income. Linkages based on output multiplier matrices generally show poor correspondence with other multiplier matrices. This implies that a vigorous industrialisation strategy basing itself on output inducements alone can impair other objectives of development. This suggests that it may be difficult to identify a set of sectors which would serve a broad based strategy of regional development. The choice of sectors would perhaps depend upon other development objectives.

*Projection Analysis:*

An extension of understanding of the roles that
different sectors are likely to play in the regional
economy is sought through projection analysis. It is not
denied that the projection exercise with a regional input-
output model can be hazardous. Yet, the "variational
analysis," where consumption sector is altered to capture
income equalization effect and technological changes are
introduced in the economy, gives some insight into the
functioning of the regional economy. It is seen that over
time certain sectors depict a tendency to gain in growth
rates to meet the projected levels of final demand require-
ments. Agricultural and allied, food industries (milk
food, edible oil, other food and agro-based, and salt) arid
basic metal products belong to this set.

Textiles sector belongs to the set of sectors where
the growth rate shows tendency to decline over time. Redis-
tribution of consumption is likely to further dampen the
growth rate of this sector. Seemingly parallel pattern of
sectoral responsiveness to redistribution at the regional
and at the national level masks some important deviations.
It is seen that some of the crucial sectors in Gujarat,
textile and edible oil, contrary to the pattern witnessed
at the national level, respond adversely to redistribution.

Sectoral output levels also show considerable sensi-
tivity to changes in the intermediate resource use technology.
The dramatic increases in the sectoral growth rates occur in
chemicals, electric light and power, and sectors related
to the chemicals complex such as mining and non-metallic
mineral products. This seems mainly due to the fact that incremental technology in the farm sector has a higher chemicals and energy intensity as compared to the base year technology.

The total employment generation potential in the regional economy is almost neutral to reduction in inequalities. Pattern of employment, however, is sensitive to redistribution. It is seen that redistribution, unless accompanied by product-mix alterations that enhance direct and indirect labour intensity, might dampen the employment opportunities in the non-farm sector. It is highly probable that such a qualitative change in the pattern of employment would be accompanied by disquieting tendencies.

Research Directions:

We may now draw from the above account some research directions in the inter-industry framework at the regional level. It appears that the farm sector would call for dominant attention from the regional planners. This conclusion holds good whether viewed from the growth rates of farm products and food processing industries required to meet growing food requirements over time, or to fulfill the redistributive objective, or the demands that from sector is likely to place on the related sectors so that the technological changes already observed in the farm sector become widespread over time. Our understanding of this phenomenon may be considerably enhanced by disaggregated
incorporation of farm sector in the regional models. Ihalla's studies on Punjab and Haryana economies may well prove to be the trend-setter in this direction.\(^1\)

The other extension of regional analysis could be such that trade-offs between growth and equity are better appreciated. Take the case of dampening of industrial employment opportunities consequent to reduction in inequalities. To the extent that reduction in the rate of urban job opportunities affects the job prospects of people from depressed areas, the redistributive policies can be self-defeating. Appropriate product-mix strategy or space specific compensation devices might alleviate some of the costs of redistribution policies. In the informal sector, at least in the case of Ahmedabad city, a strong tendency of attachment between jobs, caste and community is noticed.\(^2\)

The point being made here is that if poverty removal is going to be the focus of the policy, the regional model builders may be called upon to incorporate some of the structural features of the economy that have been traditionally ignored.

One useful extension in this field could be the extension of Van'der Veen's work. It is of considerable

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1/ Structure of Haryana Economy; Inter-industrial Flows and Patterns of Final Demand, 1969-70, ICSSR Project, Delhi, 1974 (mimeo) and Structure of the Punjab Economy; Inter-Industrial Flows and Patterns of Final Demand 1969-70 ICSSR Project, Delhi, 1975 (mimeo).

relevance that not only linkages between different type of producers' are studied but also of interest is to know the types of final demand (by different income classes) as are satisfied by establishments varying by size. The later aspect could enable choices on the final demand side.

The questions related to information base are obviously very important. It needs to be emphasized that specialised studies which would remove the scope for adhocism in making consumption studies correspond with input-output framework and to systematically explore the implications of trade and technological change are very much required. Only in that case, would the "... second and third generation tables become invested with the elaboration and professional finish required from an effective scientific instrument." 3/

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