ACTIVITY ANALYSIS MODELS IN REGIONAL DEVELOPMENT PLANNING

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Planning is essentially the establishment of goals, or objectives, and the determination of means to achieve these goals. Although usually prepared to accept less, the planner strives for optimization; that is the maximum return from investment of physical and human resources. This paper will consider activity analysis as a model which would hopefully provide the information base for optimization in economic development planning.

THE MARKET ECONOMY AND SOCIAL GOALS

In the competitive economy, individuals maximize their welfare, and producers maximize their profits. In equilibrium, the system “solves” for the prices of various goods so that scarce goods are priced positively, and free goods have zero prices. Market prices reflect the true social scarcity of resources.

The literature has pointed out, however, that there are many behavioral and technological reasons why the competitive model may fail to describe the real world—principally monopoly, economies of scale, external economies, imperfection in the capital market, immobility of resources, and irrationalities of the consumer. The problem becomes deeper if we note that there is a possible divergence between private goals and social goals. Each individual may be concerned with his own welfare, but as a member of a community, he may share joint objectives which are outside his private preference function; e.g., defense, education.

The arguments above lead to the conclusion that a community may have objectives that are not met by the market mechanism, and moreover, the

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community may decide to take joint action to achieve its objectives. On the regional level, imperfections and immobilities in the market economy can account for inefficient differential regional growth rates and provide justification for joint community action to overcome these difficulties. Even if the market mechanism functions correctly and economic efficiency dictates that a community should decline in population, the community may prevent this decline by subsidizing industry and accepting a lower per capita income.

For joint regional planning, the following must be specified: (1) an objective to be minimized or maximized; (2) the collection of alternative courses of action, i.e., the production and trading activities that could be undertaken in the region; and (3) the restraints on the uses of resources and the specific targets that must be met (these targets are essentially other objectives of the program). Once the community targets are set, the selection problem becomes that of choosing, among all alternative courses of action, the one which maximizes (or minimizes) the objective function. For example, with given consumption targets, the task may be to choose, among alternative investment programs which meet the targets, the least expensive program.

An optimum program for regional growth must include specification of the public instruments available for the implementation of the program. It may be that the absence of suitable instruments will make infeasible an otherwise optimum program. Among all the programs that could be attained with the existing instruments, we seek the best one. Thus, one task of regional analysis, not to be discussed further in this paper, is the search for methods to strengthen public instruments of program implementation.

THE PRICING MECHANISM IN THE ACTIVITY ANALYSIS MODEL

Activity analysis in the form of linear programming is applicable to the general economic problem of resource allocation. If the objective is to maximize output or minimize costs, and the demand functions, constraints, and technological possibilities are correctly specified, then there is a dual solution which results in "scarcity" prices that are the competitive prices. The scarcity price of each resource is its marginal contribution to the objective function. Resources that are fully used will receive positive prices, whereas resources not fully used will be priced at zero. In either case, the price reflects the improvement in the value of the objective function that would result from an increase of one unit in the availability of the resource. The linear programming model provides "scarcity prices" that are the competitive prices because it achieves a solution by meeting the three conditions necessary for competitive equilibrium: (1) output is produced with minimum cost, (2) resources are paid (priced) according to the value of their marginal product, and (3) output is exhausted in the sense that if every scarce resource is priced according to its marginal product all output is being distributed without positive or negative residual.

Under the objective of income maximization, we have the following: maximize