CENTER OF ECONOMIC RESEARCH

LECTURE SERIES

1.

PLANNING RESOURCE ALLOCATION FOR ECONOMIC DEVELOPMENT

By

ANDREAS G. PAPANDREOU

ATHENS, GREECE

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THE CENTER OF ECONOMIC RESEARCH

The Center of Economic Research in Greece was established in 1961 in the expectation that it would fulfill three functions: (1) *Basic research on the structure and behavior of the Greek economy,* (2) *Scientific programming of resource allocation for economic development, and* (3) *Technical-economic training of personnel for key positions in government and industry. Its financial resources have been contributed by the Ford and Rockefeller Foundations, the Greek Government and the United States Mission in Greece. The University of California at Berkeley participates in the process of selection of scholars who join the Center's staff on an annual basis. It also participates in a fellowship program which supports research in Greece by American graduate students, as well as studies for an advanced degree in economics of Greek students in American Universities.*

Fellowships are also provided to young men who have graduated from a Greek University. They join the Center as junior research fellows for a three-year period during which they assist the senior fellows in their research and participate in seminars given by them.

The Center's main task, naturally, is the carrying on of research on key aspects of the Greek economy and on

the fundamental policy problems facing the country in its effort to develop rapidly in the framework of the European Common Market. This research is carried on by teams under the direction of senior fellows. The results will be published in a Research Monograph Series.

The lectures and seminars included in the Center's program are not for the benefit only of those working for the Center. Economists, scholars and students of economics are also invited to attend and participate in this cultural exchange which, it is hoped, will be carried out in co-operation with institutions of higher learning here and abroad. A Lecture Series and a Training Seminar Series will round off the publications program of the Center.

Another need which the Center has set out to meet is the establishment of a library and a bibliographical service in the economic sciences. Besides its usefulness for the education of the trainees of the Center, this service will be of particular interest to Greek economists in general.

It is contemplated that the Center will exchange information and results with similar Centers in other countries and will participate in joint research efforts with Greek or foreign public and private organizations.

Finally, one should emphasize that this is one more example of Greek-American co-operation, a pooling of human talent, funds and efforts, designed to promote the training of economists and help in meeting Greece's needs in the field of economic development.

The final aim is eminently practical: to help in creating a better life for the Greek people.

I. ECONOMIC DEVELOPMENT: A DECISION PROBLEM FOR THE PUBLIC POLICY AUTHORITY

Not too long ago economists and social scientists engaged in heated debate concerning the advantages of the planned economy over the decentralized, market economy, and vice versa. Despite the fact that some solid scientific work went hand in hand with this debate, its tone was value-laden and the alternatives considered were, almost invariably, extreme versions of the planned and the market economy. The choice seemed to be: Freedom or Serfdom.

The debate is still going on, but its character has undergone radical change. The tone has become pragmatic. The question is not whether to design a monolithic society or to remove all the obstacles to individual action, but rather how to design an economic organization which permits attainment of acceptable material goals while preserving moral values.

As is typical, events have anticipated the change in intellectual climate. In the two decades since the last world war the underdeveloped nations of the world, one by one, resolved that they would

marshal their resources in order to achieve a rapid rate of economic growth. Once this decision was taken, the die had been cast. Somehow, it seems, rapid economic growth of underdeveloped economies is not feasible without conscious design. Thus, the question is *not*, To Plan or Not to Plan; it is, How to Plan.

This universally recognized need for intervention by the public authority in the overall allocation of resources for the purpose of speeding up development may be attributed to two sets of reasons.

First, there are demonstrable imperfections of the market economy in the less developed countries. They include the following :

1. Scarcity of entrepreneurship (of the right kind).
2. Lack of reliance on the stability of the institutions.
3. Inadequate infra-structure.
4. Technological backwardness and inefficiency.
5. Scarcity of market information.
6. Widespread monopoly.
7. Extreme inequality in the distribution of wealth.

Removal of these imperfections is a staggering task calling for planning. Furthermore, it can only take place *pari passu* with economic development.

Second, there exist certain universal imperfections of the market economy which are especially relevant to economies aspiring to experience a *rapid* rate of growth. These include the following:

1. Even a perfectly competitive economy would fail to lead to a correct (efficient) allocation of resources in the presence of external economies. This is especially critical for underdeveloped countries —where the margins for exploitation of external economies are very substantial.

2. We do not know much about the dynamic properties of the competitive system. Such experience as we have, however, points to the fact that it is not in a position to effectively re-allocate resources on a massive scale in a short period of time, as, for instance, in war. Underdeveloped countries are committed to a *rapid* improvement in their position and face up to the need, therefore, to depart from the strictures of the competitive system—wherever this becomes necessary.

II. PLANNING RESOURCE ALLOCATION AS AN OPTIMIZATION PROBLEM

In discussions concerning planning for development the center of the stage is occupied by debates concerning the *investment criteria* to be employed by the policy maker. Why this emphasis on investment criteria rather than on resource allocation? Strictly speaking, it is resource allocation in its general sense that must occupy the center of the stage in such discussions. Resource allocation, however, is often telescoped into investment allocation for the following reasons:

1. It is often the case that, rightly or wrongly, capital is considered as the key, if not the only, scarce resource in underdeveloped countries.

2. The investment decision may be viewed as the focal point for a host of resource allocation decisions.

3. Economic growth as conventionally measured is intimately related to the process of capital formation.

This resource allocation problem confronting the policy maker in an economy intent upon rapid growth may be viewed as an *optimization* problem.

Such a general formulation of the problem may not be operational, and may be of only limited interest to the policy maker. Nevertheless, it is instructive to consider it in some detail.

The decision problem confronting the policy maker, if cast in the framework of optimization, must contain information on the following: 1. The collection of alternatives among which he is to choose. This collection may be called the *choice set.* 2. Not all alternatives contained in the choice set are feasible. It becomes necessary, therefore, to specify a sub-collection of the alternatives which are feasible. This sub-collection is called the *feasible subset.* 3. Finally, an ordering or a valuation must be imposed on the alternatives in the choice set (and, therefore, on those of the feasible subset). This *preference ordering* of the policy maker may be represented by a numerical function (which assigns values to each alternative in such a fashion that a preferred alternative is always associated with a higher value) that goes under the name of *social welfare function.*

The choice set may be defined in a number of alternative ways. If we wish to be very elaborate we may define it as *the set of time patterns* (ad infinitum) of vectors (ordered n-tuples) *specifying the composition of consumption for every present and future member of the community.* More simply, we may de-

fine it as *the set of time patterns of per capita consumption* (ad infinitum). In both instances the time horizon is *infinite*, but in the second instance substantial simplification is achieved by abstraction both from the structure of the output available for consumption and from its distribution among the constituent members of the community.

In practice, it is customary to choose a finite horizon. This may be justified on the grounds that the policy maker is concerned with the present generation — in the sense that he wishes it to share in the gains from growth. Under these circumstances, however, the policy maker ought to take into account the *terminal capital stock* — since its magnitude will affect the course of future consumption. We assume, of course, that the policy maker is not entirely indifferent to what will happen to the next generation. Thus the choice set in the case of a finite horizon ought to consist of elements the first component of which is the time pattern of consumption per capita (or the time pattern of vectors of the form mentioned above), while the second component is the terminal capital stock. (Capital stock may be viewed either as an aggregate value or as a vector, depending on the complexity of the model proposed.) If we broaden the concept to include *human capital*, then education, health and similar expenditures over the

planning period, whose impact on the economic process will become felt after the terminal date, may be incorporated into the decision model in a fashion similar to that employed in the case of physical capital — namely, as a component of terminal capital stock.

If we wish to work with a finite horizon, while avoiding the specification of the terminal capital stock, we may define the choice set as a *set of time patterns of per capita income*, provided we require that the time patterns to be included in the set exhibit a certain uniformity with respect to growth. This actually is the popular procedure.

The policy maker is not free to choose any element of the choice set (no matter how defined). He is restricted to the feasible subset. What time patterns are feasible depends on the initial state of resource availability, the initial state of technology and the initial state of economic and social organization. Economists have made significant progress in characterizing feasibility in terms of the initial state of resource availability and technology. Much less is understood, however, about the impact of institutions and organization on the feasibility of alternatives. Often the economist talks about the *absorptive capacity* of an economy— in an attempt to summarize the force of this factor.

Any serious attempt to characterize the feasible

subset requires substantial disaggregation with respect to the composition of output over time. Activity analysis, input-output techniques and similar devices now under development have gone a long way toward providing an operational framework along these lines. The definition of the feasible subset reflects the definition of the choice set. If the choice set is defined in terms of time patterns of per capita consumption, the *time pattern of the distribution of consumption* is relevant to the feasibility question by reason of the fact that it affects the time pattern of population growth. If the choice set is defined in terms of time patterns of per capita income, then an additional problem relating to feasibility arises. To each time pattern of per capita income corresponds *a set of time patterns of distribution of income* — namely, the set of all such time patterns of income distribution which yield aggregate saving (over time) equal to that required to finance the corresponding capital formation (over time). Naturally, for some patterns of income per capita, this set may be empty — namely, there may be no income distribution which will yield the requisite saving, and the corresponding time patterns of per capita income will be judged as being not feasible.

Not much can be said on a priori grounds about

the preference ordering of the policy maker (the social welfare function). Certain things emerge, however, from the fact that, ceteris paribus, more income (or consumption) per capita is preferred to less. The feasible subset contains a subset of *undominated* time patterns. A pattern of income (or consumption) per capita, say Y, will be called undominated if there exists no other pattern which contains at least one value which is larger than the corresponding (in time) value of Y and no value which is smaller than the corresponding (in time) value of Y. Given our assumptions, optimization calls for the selection of a pattern from the undominated subset.

Strictly speaking, the economist's role is restricted to characterizing the undominated subset—leaving it to the policy maker to proceed with the choice of an element belonging to that subset. As a matter of fact, however, the task of the economist usually includes the formulation of alternative preference orderings for the use of the public policy authority. He may and often does exert significant influence over the choice through the manner in which these alternatives are presented.

III. GROWTH, INCOME DISTRIBUTION AND EMPLOYMENT

It would be an unusual policy maker that would concern himself only with the time pattern of per capita income. Typically, additional aspects of the state of the world are relevant to his decisions. Among them the most characteristic are employment and the distribution of income. Incorporation of such additional elements into the decision-making process may take the following form. To each feasible time pattern of income per capita is associated a set of time patterns of income distribution and employment, namely, those which are consistent with the time pattern of income per capita in question, given the technological (and social) environment and resource availabilities. The social welfare function may still be defined in terms only of time patterns of income per capita, but the policy maker may be thought of as maximizing it, subject to the constraint that unemployment (over time) be not larger than some given level and that the income distribution (over time) possess certain characteristics.

We have already observed *(Section II)* that to

each (feasible) pattern of income per capita corresponds a set of patterns of income distribution. Thus, setting the characteristics of income distribution may be expected to restrict the area of choice of the policy maker with respect to the growth pattern of income per capita. It is often argued that a reduction in the degree of inequality of income distribution will lead to a reduction in aggregate capital formation and, therefore, to a reduction of the rate of growth of per capita income. This may well be true, but the argument overlooks the possibility that maintenance of a high degree of income inequality may make higher rates of growth of per capita income non-feasible, as a result of the loss of interest on the part of a large component of the population in growth itself. Also, it is not clear that inequality of income distribution in underdeveloped countries tends to foster economic growth. Conspicuous consumption and orientation toward luxury imports — which characterize the spending pattern of the «lucky few» in underdeveloped countries —also places limits on growth. Above all, it ought to be kept in mind that an ingenuous fiscal policy combined with special measures to develop a capital market with wide participation on the part of the large numbers of the community may enlarge the set of income distribution patterns

which are consistent with a given rate of growth. In other words, the overall propensity of the community to save is itself a variable which ought to be taken account of in the formulation of the feasible set.

Similar questions may be raised with respect to unemployment. To be precise: Is a high rate of growth of income per capita consistent with the early elimination of involuntary unemployment? (It may be assumed that no such inconsistency arises in the long run.)

We look to the capital-labor ratio as an indicator of the impact of investment (growth) on employment. (We are making no distinction here between average and marginal capital-labor ratios.) The capital-labor ratio may be affected either by substitution of labor for capital (and vice versa) in the production of a particular product (*change of process*), or by a change in the structure of output (*change of product mix*). The extent to which we must sacrifice growth of income per capita in order to obtain a given reduction in the volume of involuntary unemployment depends on (a) the shape of the production function for each product and (b) the extent to which a shift from products for which the capital-labor ratio is relatively high to products for which it is relatively low can be carried out without reduc-

ing the social valuation of the resulting output.

Many assumptions can be made with respect to the production function. The following seems reasonable. For each *scale* of output the cost-minimizing composition of labor and capital inputs will not show much sensitivity to moderate changes in the prices of the inputs. Furthermore, in terms of the capital-labor ratio, it is likely that it is positively related to scale and standardization. Thus, with expanding markets in a developing economy, it may be expected to rise for cost-minimizing combinations. On this score, therefore, it looks as if the adoption of labor intensive processes will be carried out at the expense of growth. It may be counterargued, of course, that the market wage rates in underdeveloped countries depart significantly from the correct «shadow» rates — and that labor-intensive processes would have been consistent with growth if the correct valuation were placed on labor. Such shadow prices, however, must be inferred from the plan itself — that is to say, they must take account of the impact on the labor market of the unfolding of the development program. This may tend to limit seriously the force of the counterargument.

If the income and price elasticity of the international demand for products in which the under-

developed country has a comparative advantage is high (it being kept in mind that labor is in relatively abundant supply), then a shift from products for which the capital-labor ratio is relatively high to products for which it is relatively low could be carried out without substantial sacrifice in growth. It is quite likely, however, that this is not the case and that, in order to maintain a rate of growth of exports consistent with the growth of their national income, underdeveloped countries will be forced to maintain a structure of output which may not readily absorb their relatively abundant resources.

It goes without saying that, in the presence of persistent unemployment, every effort should be made to explore the possibilities for introducing labor-intensive techniques without decreasing the rate of growth of the economy. The sector of construction (building, public works) and small industry, in general, may offer some opportunities. Effort should be exerted also to discover changes in the product-mix which reduce the overall capital-labor ratio without interfering with growth. In view of the argument above, however, it is likely that, despite all such efforts, the policy maker will be faced with a choice between higher rates of growth and higher early levels of involuntary unemployment, on the one

hand, and lower rates of growth and lower early levels of involuntary unemployment, on the other hand. Under these circumstances it makes sense to attack the unemployment problem as a distributive problem and as an opportunity for worker-education. Public investment in skill-developing training programs makes good sense. For it ought to be kept in mind that in underdeveloped countries some types of labor are in extremely short supply, at the same time that other types are in excess supply. Raising the minimum age for entrance in the labor force, lowering the retirement age and distributing employment more equitably (by eliminating or restricting over time arrangements) also makes good sense. Finally, if all these measures prove inadequate, the policy maker may consider undertaking some special, labor-absorbing projects. All these measures probably imply some reduction in the immediate prospects for growth. The policy maker would be well advised, therefore, to investigate in detail the relationship between growth and unemployment in its specific historic context, formulate explicitly his preferences and then proceed to make his decision. At the beginning of this section it was suggested that the social welfare function (representing, as it does, the preference ordering of the policy maker) could be defined in

terms of income per capita, and be maximized subject to the constraint that unemployment (over time) does not exceed some given level. It is also possible, if the unemployment problem occupies the center of the stage, for the social welfare function to be defined in terms of employment, and to be maximized subject to the constraint that the annual rate of growth of the economy be not lower than some specified rate.

IV. SUB-OPTIMIZATION IN A MIXED ECONOMY

The preceding discussion represents the process of resource allocation for development as a process of optimization by the policy maker. Optimization, however, is a very exacting type of behavior. It requires (a) knowledge of the consequences of every alternative decision or choice, and (b) the ability to place a valuation on all such consequences. Policy makers are unlikely to possess this kind of knowledge concerning the consequences of alternative decisions and the capacity to place a valuation on all of them. Thus, the process of choice or decision by the policy maker is probably one to which we can at best ascribe *limited rationality*. Instead of speaking of optima we should rather speak of *acceptable* states of the world, in contrast to unacceptable states. Instead of speaking of complete knowledge of the consequences of each alternative decision we should rather speak of limited knowledge of the consequences of decisions which are within the experience of the policy maker. Thus, the process is one of *search for improvements* in a step

by step trial and error fashion which may or may not lead to an optimum, depending on its dynamic properties.

How detailed (disaggregated) should the targets set by the policy maker be? This necessarily depends on the kind of economic and social organization in which he is operating. In a fairly centralized economic organization the policy maker's targets may be characterized by a fairly detailed « bill of goods ». In contrast, in a highly decentralized competitive economy these targets may be cast in highly aggregative terms, as are exemplified by terms such as income per capita, consumption per capita, and so forth. We shall be concerned here with intermediate type or «mixed» economic organizations. The targets of the policy maker in such mixed economies may be expected to exhibit a fair amount of disaggregation. At a minimum they must include information on the role of the major sectors of the economy (such as agriculture, manufacturing, construction, services, etc.). Naturally, more detailed breakdowns may be necessary for a thorough investigation of the feasibility of the program.

The emerging picture of the policy maker's choice process in a mixed economy may be summarized as follows: First, he considers a range of

alternative targets which pass the test of acceptability in terms of his valuation scheme. Next, he examines their feasibility, one by one. Their feasibility having been assured, in principle, the policy maker must determine the instruments to be employed in achieving each of them. If the acceptable, feasible targets are two or more, additional choice criteria may be introduced which restrict the number of eligible programs to one. Such criteria may be expressed in terms of the rate of growth of per capita income, along with certain structural and distributional characteristics associated with the growth pattern. Thus, it becomes possible for the policy maker to select one among the acceptable, feasible programs. As the execution of the program proceeds, the policy maker may gain additional information which may affect even his valuation scheme. Thus, the program is in a process of continuous revision on the basis of the «feedback» of the system.

Target-setting in a mixed economy does involve the age-old problem of *comparative advantage*, albeit in a highly aggregative sense. Do we expect all sectors to grow at the same rate as the economy as whole, or do we expect some to grow faster and other more slowly than the economy? It is characteristic of the best-known formal growth models (von Neumann) that they imply

a proportionate growth of all sectors. This conclusion is reached because of the exclusion of such considerations as resource endowment, international trade, changes in the quality and quantity of factor supplies, scale economies, non-homogeneity of the consumption function, and so forth. It comes as no surprise, therefore, that sectors in growing economies tend to grow at different rates. Interestingly enough, however, this variation in sector patterns of growth exhibits strong international uniformity. Recent work (Clark, Kuznets, Hoffman, Chenery) * leads to the conclusion that we can talk in terms of a «standard» pattern of sector growth. Chenery estimates this standard pattern by expressing per capita value added for each sector as a function of per capita income and population. (Similar estimates are made for imports.) Deviation from these «predicted» values for the various countries considered are much smaller than would have been expected

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* C. Clark, *The Conditions of Economic Progress*, 3rd ed. London 1957.
S. Kuznets, «Quantitative Aspects of the Economic Growth of Nations: II. Industrial Distribution of National Product and Labor Force». *Economic Development and Cultural Change*, July 1957, 5, suppl.
W. G. Hoffman, *The Growth of Industrial Economics*. Manchester 1958.
H. B. Chenery, «Patterns of Industrial Growth», *American Economic Review*, September 1960.

on a priori grounds. The share of value added by manufacturing exhibits the highest rate of growth, while the share of value added by services exhibits the lowest (positive) rate of growth, and the share of the primary sector actually declines, with rising per capita income. These patterns reflect the changing structure of both demand and supply. That is to say, they reflect both the growth in the final use of industrial products and the substitution of domestic production for imports, which accompany the growth of per capita income. The magnitude of the impact of *universal* as against *particular* factors in the growth pattern of countries is truly impressive. This is not to be taken to mean, however, that the particular factors which incorporate a country's comparative advantage are without significance. It merely means that they explain much less than one is inclined to attribute to them on a priori grounds.

In view of the presence of these powerful universal factors, it makes sense to take account of them in setting the targets. Thus, the policy maker may begin by considering the «standard» structure (in terms of relative shares of sectors) which corresponds to some acceptable target income per capita. Then he may «distort» this pattern in a fashion which takes account both of the historically given starting point of the econ-

omy in question and of the direction in which comparative advantage may best be sought. A country well endowed with natural resources may well afford a significantly larger share of primary output in total output. A country poorly endowed with such resources might be well advised to put emphasis on the development of human skills —and might plan, therefore, to «overdevelop» its manufacturing sector. In selecting the «deviations» from the «standard» structure, the policy maker may, initially, take as a guide the experience of economies, akin to his own, whose growth pattern he considers acceptable. Selection of the structure (in terms of relative shares of sectors), for the terminal year, and the (annual) ratio of gross fixed asset formation to total output (gross domestic product) determine the annual rate of growth of per capita income, given the sectorial output-investment ratios and the rate of growth of the population. Furthermore, it determines a complete investment program by sectors year by year.

Of course, such a program may not be feasible. The flow of domestic saving (private and public) and of external financing may be inadequate to the task. The policy maker need not accept the historically given saving propensity, but there are limits (institutional and political)

within which it may be amenable to manipulation. The same is true with respect to external fiinancing. Alternatively, the balance of payments may be the bottleneck. The imports associated with the program may be estimated in a more reliable fashion than exports, which generally are rather difficult to forecast — and it would pay to consider alternative rates of growth of exports. Finally, labor may be the bottleneck. If estimates of labor productivity by sectors are available, then the labor requirements of the program may be estimated and contrasted to labor available over the life of the program.

Since developments in the future (e.g. affecting external financing, etc.) cannot be predicted with certainty, the policy maker must develop a decision rule or a *strategy* which would specify the program to be selected (or shifted to) for each alternative situation, the situation being defined in terms of the flow of domestic saving, the structure of the balance of payments, and so forth.

Of course, a program of the type described here may not be feasible because of hidden structural inconsistencies. Only a thorough analysis of demand, side by side with sector outputs and the import-export structure, can provide reasonable assurance that the program will not run

up against structural imbalances. If the data and the computing facilities are available, such studies ought to accompany each program. If they are not, then a macro-program of the type considered may be the best the policy maker can undertake.

It is rather obvious that the process of program selection described here is not necessarily one of optimization. In setting his targets the policy maker was first guided by analogy. There is nothing in this that suggests optimization. In the second round, however, the targets were revised in a fashion that took account of the direction in which comparative advantage might best be sought or developed. This second round suggests that the procedure may not be devoid of a search for *improvements*, if not for optima. Indeed, it may be suggested that there exists an optimization process that would lead to results not too different (that is to say, not different *qualitatively*) from those obtained through the process described here. Its outline is as follows: The output-investment ratio for the economy as a whole is the weighted average of sectorial output-investment ratios. Since the rate of growth of national product may be shown to be equal to the product of some given ratio of aggregate investment to national product times the overall output-investment ratio,

maximization of the output-investment ratio is equivalent to the maximization of the rate of growth of the national product. This maximization is effected by a redistribution of investment by sectors. Naturally, such maximization of the output-investment ratio must be carried out subject to certain constraints — the constraints taking the form of minimum requirements of sectorial output for consumption. The effort to «overdevelop» the sectors or activities wherein may lie the country's comparative advantage may be viewed as being akin to the effort to «overdevelop» the sectors with the highest output-investment ratios. This comment is in the way of an aside intended to establish that there exists a possible rational interpretation for a seemingly arbitrary procedure.

The selection of a strategy of this type in a mixed economy, and therefore of a program (given relevant developments in the rate of domestic saving, etc.), has a *tentative character*. The flow of investment by sectors has been determined on the basis of fairly general, rough-and-ready criteria. Nothing has been settled concerning the micro-investment decision — the investment decision by product, location, etc. Yet, the macro-pattern of investment is determined by the multitude of micro-investment decisions — and the two, there-

fore, must be brought together into a consistent scheme. It is a characteristic of mixed economies, of the type considered here, that this may be sought after but that it cannot be assured. If the program is to have any meaning, it must be given some «teeth». The policy maker must undertake to promote and assist in the financing of an investment pattern of the general structure and order of magnitude that is incorporated into his program. Sector-oriented development corporations may be established with mixed entrepreneurial-banking responsibilities. The larger financing institutions must be urged or directed to accept the overall pattern of investment incorporated into the program. All this be as it may, there are no grounds for expecting that the private sector will conform all-the-way. All that may be hoped for is that the realized pattern of investment is in the direction, and of the order of magnitude, of the investment program.

In fact, there is good reason for not wanting the realized pattern of investment to *exactly* match the programmed investment. After all, the criteria employed in setting the macro-targets are themselves of a rather tentative character. If sound criteria are employed in the allocation of investment at the micro-level, then a superior pattern than that anticipated (at the macro-level) may

well emerge. For this to be the case, however, it is essential that well thought-out and socially desirable investment criteria be adopted by the investment decision makers as well as by the financing institutions. Such criteria must take into account the total impact on the economy of the investment in question, such estimates of the impact being based on correct valuation of the benefits to be derived and the costs to be incurred. A variety of such criteria are available in the literature. The thing to keep in mind is that almost any of them is better than no criterion in the context of an underdeveloped economy. Given some list of specific projects, the application of some investment criterion produces a hierarchy, an ordering of the components of the list on the basis of their social desirability. An element of arbitrariness creeps into the procedure. The criterion orders the projects in the list. It says nothing about projects not included. Thus the selection of alternatives is crucial to the correct application of the criteria. Furthermore, the specification of the alternative projects is itself crucial to the outcome. How a project is defined, what it includes and does not include may well determine whether it is selected or not. If external economies are present (or, indeed, diseconomies, as in the case of transport), appropriate enlargement of the project leads to

their internalization, making the task of estimation of their impact easier and its selection more likely than would have been the case otherwise.

It is not enough for the private sector to adopt socially beneficial investment criteria. Investment possibilities must be *discovered.* The lists of projects must be imaginative. It is essential, therefore, to design a fairly decentralized organization with sector and regional representation which will be devoted to the *search* for investment opportunities. *Search, discovery, selection, promotion* are critical functions which must be provided for. They are the functions typically associated with the entrepreneur western-style, the kind of functionary who is in very limited supply in underdeveloped economies.

If the private sector is to function adequately to the task, it is essential that it be rewarded for success and that it be penalized for failure. Thus, competitive pressure must be fostered, privileged positions must be threatened, barriers to entry must be removed. Effective search takes place only under pressure of this kind. This is not an argument for the removal of all pegs, of all protection. Rather it is a warning. Protection is strong medicine that may well kill the patient if liberally administered.

This plea is intimately related to the task of mak-

ing the «signalling» mechanism (the market mechanism) operate in an efficient manner. Market prices, if they are to perform their role in resource allocation, must give information on relative scarcities. In some instances, given the presence of external interdependencies, this may not be feasible — and the policy maker must impose his own estimates of the «correct» accounting or shadow prices either directly or indirectly through fiscal measures. More important yet, he should explore a wide range of possibilities for promotion of private activity in the right direction by providing a range of activities and services which (given the market mechanism) would lead the private sector to make correct resource allocation decisions. This amounts to bringing about an internalization of external economies when the public and the private sector are taken together. In all instances in which the market mechanism can function efficiently it should be allowed to do so. This involves more than anti-trust policy. It involves careful design of the large variety of government regulations and measures, including especially indirect taxes of all types, so that their total impact might not lead to a reduction of the efficiency of the system. Above all, the policy maker must resist the temptation to solve distributive problems by playing with the

price mechanism, where this is institutionally and politically feasible.

It must have been noticed that in discussing the relationship between the macro-plan and the micro-decisions we have been rather vague. This is a reflection of the state of our thinking or, better yet, the state of our ignorance. The co-ordination of economic organization —in the sense of information processing, communication, decision — to resource allocation is a problem that lies at the frontier of our discipline. The need to give answers to the pressing questions of our times may force us to improve our understanding of the problem. As things stand now we have a fair understanding of the manner in which organization relates to resource allocation in the case only of two polar extremes —the case of the completely centralized and the completely decentralized economy. The organization-allocation relation for a mixed economy remains unexplored. Thus, experimentation with alternative organizational patterns is a sound prescription for the policy maker. The gains from such experimentation may be expected to outweigh the losses.