CENTER OF PLANNING AND ECONOMIC RESEARCH

LECTURE SERIES

18.

STATISTICAL REQUIREMENTS FOR GREEK ECONOMIC PLANNING

By

KENNETH J. ARROW

Stanford University, and
Center of Planning and Economic Research

ATHENS 1965

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Opinions or value judgements expressed in this book are those of the author and do not necessarily represent those of the Center of Planning and Economic Research

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THE CENTER OF PLANNING AND ECONOMIC RESEARCH

The Center of Planning and Economic Research was originally established in 1961 as the Center of Economic Research in Greece, 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 Greek Government, the United States Mission in Greece and the Ford and Rockefeller Foundations. The University of California at Berkeley participates in the process of selection of foreign 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 fellows for a period during which they assist the senior fellows in their research and programming work and participate in seminars given by them.

The Center's main task, naturally, is the carrying out 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 out by teams under the direction of senior fellows. The results are published in a Research Monograph Series.

The lectures and seminars included in the Center's program are not only for the benefit of those working for the Center. Economists, scholars and students of economics are also invited to attend and participate in this scientific exchange which has been carried out in cooperation with institutions of higher learning here and abroad. A Lecture Series and a Training Seminar Series round off the publications program of the Center.

On the basis of this satisfactory experience, the Center was reorganized in August 1964, under its new name, with the purpose of carrying out on account of the Greek Government, its scientific programming functions, in a more systematic way, at the national and regional levels.

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 cooperation, a pooling of human talent, funds and efforts, designed to promote the training of economists and to 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.

GEORGE COUTSOUMARIS
Director

I. INTRODUCTION[1]

Decision making, economic or other, always involves predictions of the future. The purpose of adopting a new policy is to cause the future to be different, and presumably better, than it otherwise would have been; to make an intelligent choice, then, it is essential to predict, within the smallest possible margins of uncertainty, the difference which the policy will make to the future evolution of the economic system.

But knowledge of the future is only derivable from that of the past and present. Further, the knowledge we need for prediction is not merely of isolated facts, important as these are, but even more of regularities and relations among economic magnitudes. In economic analysis, these have typically been derived either from cross section or

1. I wish to express my gratitude for the invaluable work of my research assistant, T. Velissaropoulos, and for the penetrating criticisms of Pan A Yotopoulos. I also wish to acknowledge benefit from reading the excellent and stimulating memorandum prepared by T. Balogh for the National Statistical Service, "Suggestions on a Closer Linkage of Statistics-Economics Research and Planning for an Integration of Greece with EEC", dated September 1962. Balogh's memorandum was primarily concerned with recommendations for research, and only to a limited extent with statistics in the strict sense.

from time series analyses. The former requires detailed knowledge of individual units in the present, the latter more aggregated knowledge not only of the present, but also of a period in the past sufficiently long that stable relations may have a chance to be revealed and tested. Both forms of analysis are useful, but there are some important questions, such as the rate of technological advance, which can only be settled by time series analysis. Now the attempt to estimate series of economic magnitudes for the past, while not necessarily impossible, is difficult, costly and likely to lead to estimates with high and frequently unknown limits of uncertainty. On the other hand, a series now begun will, in ten years time, be a series of adequate length for sophisticated time series analysis. It is not now possible to have an adequately measured past; but by now enlarging the scope of collection of statistical data, such a past will become available in the not too distant future.

It is then true that a major part of the value of increased data collection will not accrue for some period of time. But of course the same can be said of many capital-intensive projects, such as irrigation, and yet they may well be excellent investments. In the case of data collection it should be observed first that there will clearly be an immediate value to the data for the derivation of predictable relations by cross section analysis, and

second, that the value of relations derived from time series, when there is sufficient accumulation of data, is incomparably greater than any conceivable cost.[1]

Facts and regular relations perceived from them do not of themselves determine policy. But in their presence many conceivable alternatives become obviously infeasible or non-optimal, and argument necessarily takes place in a more relevant and fruitful context. This has been most conspicuously shown by current discussions of contracyclical policy in the United States and Western Europe. The development of highly reliable and ramified national income and unemployment statistics has made it impossible to question the reality even of recessions that would have been completely disregarded thirty or forty years ago. Further, the presence of continued series has made it possible to meet, by simple reference to historical experience, such arguments as: tax cuts are useless for achieving full employment since individuals will save the entire amount of the cut. The

1. It should be noted that the data requirements for cross section analyses which are to be repeated regularly are the same as those for time series analyses. Thus the individual input and output entries in a Census of Manufactures can be used for estimating production functions on a cross section basis, at least if certain conditions are fulfilled; the aggregate inputs and outputs obtained by summarizing successive censuses (and the intervening sample surveys) can be used for time series estimates of production functions. But the data actually collected is the same.

value to the economy, measured in terms of national income, of such economic intelligence must be many thousands of times the cost.

In brief then, I am arguing that increased knowledge of economic facts is likely to be as productive an investment as any economy is likely to have available. I would hold that this proposition is true even for the United States, which already has a rich and highly sophisticated and reliable statistical system. The proposition is *a fortiori* true for developing countries; on the one hand, their economies are undergoing radical structural alterations and therefore require for their understanding more thorough observation; on the other hand, such countries are very apt to be underdeveloped statistically as well.

Greece, indeed, appears (to this very casual observer's eye) to be unusually capable of handling an increased collection of data. The Statistical Service appears, from its product, to have adequate statistically trained personnel to move further in the direction of thorough coverage of economic intelligence.

In the next section, I will discuss briefly some general principles which should guide decisions on the range of economic data to be collected. Following that, a set of assumptions will be made about the general nature of Greek economic policy. As will be brought out, the statistical require-

ments for economic decision making, depend on the range of economic instruments the government allows itself. Section IV will present some general recommendations about the collection of economic statistics. The last three sections will present recommendations for the collection of specific economic magnitudes, in the fields of investment and capital, labor, and foreign trade, respectively.

II. PRINCIPLES FOR THE SELECTION OF ECONOMIC DATA

It is useful, and conformable to a growing usage, to differentiate between *planning* and economic *decision making*. Planning is the drawing up of long-term plans covering the economy as a whole. It tends to be general and aggregative; it does not imply specific economic decisions but only strategies and broad lines of policy. Plans, of which the French is probably the most developed example, really tend to be projections over a period of four to five years, alternative projections being made for different sets of assumptions about broad economic magnitudes, such as the savings ratio, the proportions of gross national product originating in manufacturing and other equally broad sectors, or the desired rate of growth.

Specific economic decisions are, or should be, taken in the context of the plan. A specific decision might be an investment, a change in tariff structure, or the establishment of new sources of credit; in any case, it is an action, not merely a general intention to perform a class of actions. Economic decisions may be made in various places; they may be public (governmental) or private (household or firm). It is worth noting here

that information is needed for both kinds of decisions and, what may be less obvious, publicly collected and distributed information can be highly useful for private decision making. (The converse, of course, is also true; after all, government statistics are to a large extent a summarization of private information.) Indeed, the plan itself serves as information to private firms, since it gives a broad picture of the evolution of the economy in the near future. The individual firm can therefore economize on the use of its resources for forecasting by accepting the government's projections and concentrating on the variables more individual to the firm.

For planning or for predicting the consequences of an individual decision, it is necessary to have a system of relations for projecting into the future. The relations used may be simply assumptions of constant ratios (e.g., capital-output, savings-income) or they may be more complex production and consumption functions, but in any case they have to be given some numerical content based on past observations. Thus the *estimation* of economic relations is in any case a prime use for economic data.

In any realistic projection some, at least, of the relations must be dynamic, that is, involving economic variables of different date. If nothing else, we find that capital, the accumulated stock of

productive equipment, necessarily enters into any growth model in some form or other, and the definitional relation that capital this year equals capital last year, plus net investment, is certainly dynamic. It is now being realized that perhaps equally important are relations involving the accumulation of human capital through education, industrial experience, and migration.

To solve a dynamic system, it is necessary to have *initial values* for at least some of the variables. We will need to have as a datum this year's capital in order to use our system of relations to determine simultaneously next year's capital and investment. Next year's capital, once projected, serves in turn as an initial value for projections to the year after that, and so forth. Thus, once the current year initial values are known, the dynamic relations can be used to project as far into the future desired.

This account might give the misleading impression that once we have estimated the relations and measured the initial values the future is determined, and no more data need be collected. Of course, this is false because the relations do not hold exactly, but only with error (and also because the variables are measured only with error). This has the following interesting implications for the use of data in forecasting: (1) Since the projected initial values for the second year are bound

to be incorrect, a new projection for the entire relevant future (say five years) should be made each year with the initial values actually observed used instead of those projected the year previous; (2) The relations themselves, having been estimated with error, should be re-estimated on the basis of the additional data each year, or at any rate, frequently; (3) The actual values each year should be compared with the projections from previous years, to serve as a check on the accuracy of the relations used and to identify as precisely as possible the sources of errors.

We have so far stressed the collection of data for variables used in projections. In a growth context these variables tend to be real magnitudes—investment, capital, labor force. But economic theory has historically stressed the rôle of prices (in this context, relative prices) as *signals* for the allocation of resources. Speaking in the crudest way, if the same commodity has two different prices in two parts of the market, there is evidence of resource misallocation. In this context, the term "prices" must be interpreted to include wages and rates of return on capital in different industries.

Prices have many limitations as indicators of resource allocation, especially in the field of economic growth. But these well advertised deficiencies should not blind us to their great value when used with appropriate caution. The recording of these

signals can be most valuable in calling the attention of the government to blockages in resource allocation and to appropriate policies for their removal. Thus, wide discrepancies in the rate of return between industries suggest, at the very minimum, study to find the cause and possibly indicate the desirability for improved credit facilities, better information to potential investors, the breaking up of a monopoly situation, or even direct government investment. Similarly, wide discrepancies in wages for comparable skills in different sectors suggest imperfections in the labor market, and wide wage discrepancies between occupations for which the training costs differ only slightly may suggest the high social return to investment in training facilities or the breaking up of a monopoly situation.

The public diffusion of information about prices, wages, and especially rates of return will also improve the quality of private decision making. Realization of profit opportunities previously unnoticed will cause capital to flow into more profitable, and therefore more productive, channels. Similarly, labor may gravitate more quickly to high wage sectors or occupations if the wage differences become sufficiently publicized.

But, as already indicated, prices are far from infallible as a guide to resource allocation. Modern welfare economics suggests that *shadow* or account-

ing *prices* be calculated and that decisions be based on them. Productive activities should then be chosen so as to maximize shadow profits, which are profits computed according to shadow prices. The differences between shadow and actual prices represent corrections for imperfections in the market mechanism. The calculation of shadow profits is identical with what is usually termed *benefit-cost analysis.*

The computation of shadow prices cannot, at least at this time, be regarded as data collection in the ordinary sense of the term; it is rather part of the research activities which must be associated with government economic decision making. But at least some of the data needed for determination of shadow prices should be collected regularly as part of the general statistical program of the government. Doubtless, some part of the data will have to be collected *ad hoc* for each particular benefit-cost analysis.

To sum up then, data are required for: (1) the estimation of economic relations, (2) initial values and continued series for revision and verification of projections, (3) price signals, including wages and rates of return, to indicate inefficiencies in the economic system, and (4) raw material for the computation of shadow prices.

III. THE INSTRUMENTS OF GOVERNMENT POLICY

As has already been stressed, information is needed for decisions, whether made by the government or by private enterprises. Nevertheless, the exact nature of the data requirements does depend on the rôle the government has assigned to itself. In a highly centralized economy, where the government has made itself responsible for the bulk of production decisions, it would have to have a correspondingly vast accumulation of detailed data. On the other hand, in an economy where the government leaves the bulk of detailed decisions to private enterprise, it may also assume that the individual firms will collect the data peculiar to their specialized needs and, indeed, that they can do so much more efficiently than the government can. The informational rôle of the government is then to collect the data useful for its own decision making and those common to the needs of many individual firms. The latter are classical examples of public goods, since the use of data by one firm does not exhaust it for another.

The range of data useful for the government's own decision making depends upon the range of decision areas to which it has restricted itself or,

in Tinbergen's terms, to the *instruments* of government policy. No official list appears to be available, but the following seems to summarize the instruments available for economic growth:[1]

(1) Development corporations for lending and buying equities, to better tap the investment market;

(2) credit policy, particularly setting of priorities in bank loans;

(3) improvement of the private capital market;

(4) creation of industrial zones or estates which will provide electricity, buildings and, possibly, machinery to industrial tenants;

(5) feasibility studies for particular kinds of industrial development;

(6) tax policy to encourage fixed investment;

(7) increased education.

Taken together, they point to a relatively restrained rôle for the Greek government in economic decision making. The first three instruments are primarily devoted to overcoming imperfections in the capital market. The fourth also has this aim, but in addition permits the exploitation of certain external economies. The fifth instrument is, in fact, the creation of certain kinds of informa-

1. The list is largely derived from the article by A. G. Papandreou, "New Government Vows Sustained Growth Drive", in *Journal of Commerce*, International Edition, 3 August 1964, Section 3, pp. 1A, 21A, with some additions based on interviews.

tion, specifically benefit-cost analyses. The sixth, if it is to serve the desired purpose, again must be based on the idea of overcoming market imperfections, or on shadow profit computations. The seventh is based on the general hypothesis, derived from a great deal of research in various countries, that the shadow rates of return in education are apt to be very high. For detailed guidance of specific directions for the expansion of education, more specific analyses are still needed.

For this list, it is clear that the rôle of what I have called signals can be very great. In the following recommendations, I have gone somewhat beyond the implications of this list, by suggesting that signals as to misallocation of labor, particularly skilled labor, should be collected regularly as well as those indicating misallocation of capital.

Though signals have a high priority in data collection with this set of instruments, the data needed for the estimation of economic relations and for initial values cannot be neglected. The evolution of an economic plan is also one of the government's aims (I have not classified the plan itself as an instrument, but one could make a case for so doing), and the plan will supply the background information essential to private decision making and to individual benefit-cost analyses by the government. The profits, real or shadow, from any long-lived investment require for their esti-

mation a forecast of the general economic environment which affects both demand and the supply of complementary factors. So, along with the signals, priority must be given to the variables which enter into the general macroeconomic system of dynamic relations.

IV. GENERAL RECOMMENDATIONS ON THE COLLECTION OF DATA

It will be convenient to group in this section several recommendations which apply to broad categories of data rather than to the collection of specific kinds.

A. Complete sector coverage

With regard to all the data whose collection is recommended in the following section, as well as similar kinds of data now collected, it is strongly recommended that they be collected from *all* sectors of the economy. The tendency now is to collect such data primarily for manufacturing. But it is equally important to have information on agriculture, services (especially the distributive services), and construction. This is in no way a denial that manufacturing must grow more rapidly than other sectors. But its growth will depend in part on the (relative) withdrawal of resources from other sectors. Hence, data which will cast light on efficiency changes in non-manufacturing sectors are just as important for policy formation as data for manufacturing itself. In addition, of course, it is not always to be presupposed that manufacturing is the sole road to increased wealth,

and opportunities for investment in particular branches of non-manufacturing sectors should not be overlooked dogmatically.

B. Publicity of methodology

One procedural matter should be given a good deal of stress. It is very important for the proper working of a statistical system that the maximum publicity be given to its methods of procedure and calculation. Thus, the consumer of the statistics will be properly apprised of its value to him, and the producer will be subject to more scrutiny. This should not be thought of as a disadvantage to the latter; it enables him to benefit from the comments of others and, where deficiencies exist which are the result of inadequate resources, it enables him to make a better case for more funds.

In particular, it does not appear that there exists, for general circulation, an adequate statement of the procedure and sources used in deriving the national income accounts and, specifically, of the price deflators used in arriving at real national income figures. Since these numbers are of crucial importance, both in estimating economic relations and, perhaps more important, in checking *ex post* on the performance of the economy, they deserve the most complete explanation of methodology and sources possible.

C. Presentation of comparative experience

One major source of information about economic relations appropriate to Greece is the experience of other more or less comparable countries. Such comparisons are in fact made all the time, implicitly or explicitly, in current studies of economic development. It would be useful and probably not too expensive to keep routinely comparable series on key indicators of economic growth and accompanying structural changes. These might include real national income and its components, distribution of employment and domestic product originating by sectors (on a two-digit basis if possible), rates of return, capital- and labor-output ratios by sector (two- or even three-digit if possible), real wages (preferably differentiated by occupation and sector), savings ratios, consumption patterns, and exports and imports (on a sector basis if possible). Of course, a number of the items mentioned will not be currently available, but the list does express comparative data which would be useful to have.

Thought would have to be given to the choice of countries, and much would depend on the availability of statistics as well as the comparability of the countries. They should not all be similar to the Greek economy in level and structure; it would be well to include, for comparative purposes, some economies with considerably different per capita

income levels, both higher and lower. Suitable countries which come immediately to mind might be Belgium, France or West Germany, Italy, Spain, Turkey, Israel, Japan, Egypt, Mexico, and Ghana.

There would be some work involved in making the series comparable, and a fairly good knowledge of the statistical systems of the individual countries would have to be acquired. (The figures obtained should therefore have a higher degree of comparability than those compiled in the United Nations.) Possibly some cooperative statistical arrangements among several countries could reduce the burden, but it is better to start the collection of comparative series now than wait for the negotiation of agreements.

It would be best to publish the comparative statistics separately rather than introduce them into the *National Accounts of Greece* or the *Statistical Yearbook*. The status of the data is different, since they are drawn from foreign sources, and the format will necessarily be affected by the availability of foreign data, which should not affect the complete presentation of domestic data in the usual statistical compilations.

D. Coordination between statistical and planning agencies

In view of the increasing development of the planning and research activities in the Center of

Planning and Economic Research and in the Ministry of Coordination, the using agencies should have a stronger say in the determination of the data to be collected and the methodology of its collection. A Coordinating Committee for Economic Statistics should be created, with representatives of the Center and the Ministry, as well as the National Statistical Service, the National Accounts Division, the new Industrial Development Bank, the Bank of Greece, the Agricultural Bank and, probably, one or two more ministries which produce or consume statistics. This should provide a channel for communicating need and feasibility in the statistical field. In this way, the statistical services will find it easier to provide the data of greatest use.

V. SPECIFIC RECOMMENDATIONS: INVESTMENT, CAPITAL, AND RATES OF RETURN

A. Investment

It will be desirable to have an annual table showing for each sector of the economy its purchases from each capital goods sector. Both purchasing and selling sectors should be at the two-digit level.[1] Imported capital goods should be classified with the sector that would have produced them if they had been produced domestically, but the published figures should retain the distinction between imported and domestically produced goods. Since most machinery is currently imported, these data should be relatively easy to collect.

For a time series it is most important to have the quantity flows from capital goods sectors to purchasing sectors. Hence, it will be necessary to form price indices for each flow (or at least for every producing sector) to deflate the value series.

It is important to include in the flow table the purchases of capital goods by the government and by para-governmental organizations, such as

1. Such a table now exists but on a more highly aggregated level than that recommended; see, Statistical Service, *1961 Industrial Survey and Survey on Gross Investments* for 1958-60, pp. 25-30 and 54-58. Publication of the results seems to be unduly delayed, since the 1961 results are not yet in print.

municipalities, public enterprises, and the church.

In addition to fixed investment, figures on inventory accumulation are needed. It would be desirable to have figures on the inventory accumulation of the products of each two-digit sector and of its raw materials classified by sector of origin.

B. Capital stock

There is no need to enlarge on the importance of the capital stock and its distribution by sectors on economic growth. Unfortunately, it is also true that the measurement of capital is far more difficult, both conceptually and practically, than the measurement of flows. Nevertheless, experience abroad suggests ever more plainly that the task is not beyond the bounds of practicality, and its value in analysis and policy guidance cannot be overestimated. A set of interrelated recommendations are presented here.

(1) Quantity. The simplest requirement is for the book value of the assets, brought to a real basis. It should be presented two ways, both depreciated and undepreciated. The former measures the productive capacity of the country in a relatively long-run sense, allowing for future replacement needs. The depreciation figures should probably, as in other countries, be taken from standards set by the Statistical Service, not from those used by individual firms which reflect

various pressures from tax laws and from the marketplace. The undepreciated stock of capital goods in existence probably better reflects immediate productive capacity. The capital figures should be presented on a two-digit sector basis, if not on an even more refined basis.[1]

Several sources will probably have to be used conjointly to get a reliable capital stock series. The balance sheets of corporations are the main starting point, but in view of probable wide variations in meaning and interpretation, they need to be supplemented. The Census of Manufactures and the annual Industrial Surveys could be used, by suitable questionnaires, to have the firms themselves adjust their balance sheets to common definitions.

An alternative method, which should be used at any rate as a check, is the perpetual inventory method, used by Goldsmith in developing his time series of United States wealth,[2] and in current studies by the Office of Business Economics of the United States Department of Commerce. This is based essentially on applying a table of assumed lifetimes of different types of capital goods to historical records of their domestic output and im-

1. A table such as that recommended here appears in Statistical Service, *Results of the Industrial Survey of the Year 1958*, pp. 20-21, but with too limited sectoral coverage and apparently without any revaluation of reported assets or depreciation.

2. R. W. Goldsmith, *A Study of Saving in the United States*, Princeton, New Jersey: Princeton University Press, 1956.

ports. It avoids the vagaries of financial considerations in the construction of balance sheets but may suffer from considerable arbitrariness in the assumption of fixed lifetimes for capital goods.

The best method of all is a true inventory of the stock of capital goods. This is not impractical, especially if done on a sample basis. It has in fact already been carried out by Japan, for the year 1955 (and also by the Soviet Union in 1959). Such a project is under active discussion in the United States, and very detailed proposals have been prepared by a private study group.[1]

As a final remark, it may be worth noting that land is part of the capital stock and should be given explicit treatment. This will require, in effect, a classification of land according to category of use. (A cadaster is not necessary for this purpose, though it may well be desirable on other grounds; a sample survey is sufficient.)

(2) A g e. It would be valuable, in an analysis of production functions, to have the age distribution of capital goods separately by some detailed classification, or at least by machines and buildings. At a minimum the mean age (weighted by undepreciated value) should be found. This should be carried out for each two-digit sector.

1. Wealth Inventory Planning Study, George Washington University (Washington, D. C.), Professor John W. Kendrick, Director. A mimeographed report is now appearing.

(3) Power. The present series on power installed should be continued with broader sectoral coverage. A number of studies suggest that power is a useful surrogate variable for capital plus technological progress, and power per worker or per unit output may be a very useful indicator of technological level.

(4) Multiple shift use. This is frequently regarded as an easy way of increasing productivity in a capital-poor country. Good data on its prevalence would be a first step towards consideration of policy.

C. Rate of return

This is the ratio of profits to net worth. If book value can be obtained, net worth should not be too hard to estimate. The estimation of profits will be difficult for several reasons, one being the prevalence of small firms where salaries and payout of profits may be difficult to distinguish, and another, the difficulties with depreciation. Nevertheless, this figure is of such key importance, as has been stressed in the earlier sections, that strong efforts should be devoted to its estimation.

D. The relation between savings and investment

Since it is commonly agreed that the imperfection of the capital market is one of the chief problems of the Greek economy, it is important to have

a fairly precise picture of the channels by which savings become investment. For this purpose what is needed is a complete flow-of-funds analysis for savings. We would like to have the volume of business savings and how it is allocated among reinvestment in the business, lending for use elsewhere, and accumulation of bank deposits and currency; the allocation of personal savings among currency, deposits, other financial intermediaries, bonds, equities, and direct investment; the distribution of types of lending by banks and financial intermediaries; and the disposition of savings through the government and the foreign sector.

VI. SPECIFIC RECOMMENDATIONS: LABOR

The literature on economic development has tended to stress problems in the allocation of capital and to neglect those in that of labor. This may have some justification in dealing with countries of massive unemployment, but Greece is soon likely to be reaching a state where labor scarcity is real. In any case, it is increasingly recognized that the skill levels of the working force may be of critical importance for growth: undifferentiated numbers of workers are not adequate data for planning.

A. Wages

Annual wages for manufacturing workers are now gathered. The coverage should be extended to other sectors of the economy. Further, the wage levels should be differentiated by occupation (taken as some indication of skill level) within each sector. In other words, there should be a two-way classification of wage rates, by sector and occupation. If at all possible (or as a substitute for the occupational classification), wages should also be differentiated by educational level. The latter data will arise more naturally from a population census than from an industrial survey.

B. Skills

The employees in each sector should be classified by occupation and education level, giving a three-way classification. The distribution of skills in the population as a whole and its annual change as a result of education and training (on or off the job) should also be presented.

C. Employment and unemployment

The present employment coverage should be extended to all sectors of the economy.

A glaring gap is the omission of data on unemployment to be derived from a survey of the labor force. If possible, such a survey should also try to get some further characteristics of the unemployed, particularly their skills and educational attainments. In rural areas, the labor force survey should measure seasonal unemployment, so as to cast some light on the possibilities for complementary seasonal industries and on the true labor return to farmers.

VII. SPECIFIC RECOMMENDATIONS: FOREIGN TRADE

A. Price and quantity indices

Export and import price indices seem to be weak in all countries. For some reason of convenience, they are not constructed according to usual price index methods, but according to unit value. That is, volume is measured by weight, then prices obtained by dividing value by volume. Obviously, a procedure which equates a ton of sand to a ton of silk is not very reliable. A study by R. G. Lipsey for the National Bureau of Economic Research has shown that there are considerable differences between the movements of unit value indices and price indices constructed according to more standard rules (i.e., Laspeyres indices) for the United States. I recommend, therefore, the appropriate change both for imports and for exports.

B. Exports to specific countries

Since export markets will play an increasingly important rôle in Greek economic growth with its participation in the European Economic Community, it is important to collect data which will best measure the competitive position of Greece in its foreign markets. Currently, exports to specific

countries are reported in a very satisfactory degree of sector detail. However, they need to be put on a real basis (deflated by appropriate price indices, as suggested above) to form a useful time series, in conjunction with an index of price movements (which may have to be different for different importing countries). To gauge the Greek competitive position more accurately, there should also be given for each importing country and each sector that part of the total import market and of the total market, import and domestic, which Greek exports represent.

There is no implication that the list of recommended items for collection is in any way complete. In the first place, the emphasis has been placed on real resource allocation problems; monetary questions have been almost completely neglected, although I do not claim that monetary policy may not have a significant effect on economic growth. In the second place, regional problems have been omitted, especially since regional statistics are already under study elsewhere. Finally, even within these limitations there are many more types of data which would be of the greatest use to the planner. But it will be time enough to consider the collection of additional statistics when the considerable program suggested here has been carried out.

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