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Article abstract

It is fashionable these days to talk about "productivity", all the more so since the word may be used in several meanings. Only some of them are accepted by economists. To the Groupe des Statisticiens du Commissariat Général au Plan we owe a series of definitions which, in spite of the provisory character assigned to them by their authors, will assure a certain precision and stability to the senses in which this term is accepted.

DOCUMENTATION

DEFINITIONS OF PRODUCTIVITY¹

It is fashionable these days to talk about "productivity", all the more so since the word may be used in several meanings. Only some of them are accepted by economists. To the Groupe des Statisticiens du Commissariat Général au Plan we owe a series of definitions which, in spite of the provisory character assigned to them by their authors, will assure a certain precision and stability to the senses in which this term is accepted.

In general we speak of productivity as the quotient of production divided by one of the factors of production. The productivity of labour is the quotient of production divided by the length of the time of work. Sometimes labour productivity is reckoned "by the head", i.e. by the number of workers, and by the year (or month), etc., but the most precise calculations are obviously those based on the working hours.

$$\text{Productivity (of labour)} = \frac{\text{Production}}{\text{Number of hours of labour}}$$

This ratio assumes scientific significance to the degree that its components are precisely measured: the nature and technical conditions of production which make up the numerator, and the elements employed in calculating the denominator.

A.—ESTIMATING THE NUMBER OF WORKING HOURS

We can distinguish four measurements of labour productivity :

- 1.—Productivity of manual labour;
- 2.—Productivity of exploitation;
- 3.—Gross total productivity, or productivity of the plant;
- 4.—Net total productivity, or aggregate productivity.

I.—PRODUCTIVITY OF MANUAL LABOUR

In the phrase "productivity of manual labour" the word "manual labour" has a restricted sense: it refers to the personnel carrying out the material operations, as opposed to the rest of the personnel.

The basis of the distinction between "manual labour" and the rest of the personnel is not absolutely sharp; we can find it in the manner of wage payment (in general, manual labour is not paid monthly); or we can find it in the hierarchical level (manual labour is the level equal to or below that of foreman). The best criterion seems to be that of the initiative required by the work assigned. It enables us to distinguish "manual labour", which has only momentary decisions to make, from the rest of the personnel, whose decisions involve time for maturing and engage a greater or lesser number of other workers.

are directly involved in the work of the shop. Generally speaking, these other ranks are not included in manual labour, and when a calculation of manual labour productivity includes a reckoning of their working hours, it can only be in very particular cases and care must be taken to avoid the confusion which is an ultimate risk of such a procedure.

a) Direct manual labour productivity

The working hours included in a direct productivity calculation comprise all the working hours directly expended on a particular work of fabrication, handling, or maintenance.

The problems posed by the distinction between direct manual labour and total manual labour are of the same order as the classic ones of the distinction between "trade expenses" and cost price. It is difficult to establish a criterion for the agricultural and industrial spheres together, but criteria must be found for each branch of industry, in order to obtain — for this level at least — rigorously comparable results.

b) Total manual labour productivity

To calculate total manual labour productivity we must add to the hours of direct manual labour the hours of manual labour spent in more general operations indirectly attributable to the manufacturing process itself :

- general upkeep of the factory;
- internal transportation;
- sales management;
- storage;
- production control.

The method of assessment of these indirect elements varies according to the branch of industry. Generally they are related to the methods of figuring charges and repairs into the cost price.

II.—PRODUCTIVITY OF THE WORK OF EXPLOITATION

The reckoning of exploitation productivity comprises all the hours of work executed in the plant with the exception of those employed in capital administration and in sales and publicity.

It is obvious, however, that in a *commercial* enterprise, sales are part of the exploitation. So for commercial enterprises only publicity and capital administration are excluded.

For example, work hours reckoned in the productivity of exploitation are those expended in :

- research departments;
- personnel departments;
- accounting departments;
- administrative departments (excluding administration of capital and loans and investments).

This stage involves the hours of engineers, technicians, department heads, managers and plant directors. These hours are compared with the hours of manual labour.

In spite of the preceding distinction, it sometimes happens that productivity calculations take into account the working hours of other ranks of personnel when they

(1) Reprinted from *Travail et Méthodes*, February 1950, pp. 38-39-40.

III.—GROSS TOTAL PRODUCTIVITY OR PRODUCTIVITY OF THE PLANT

Calculation of gross total productivity involves the hours of work counted in the reckoning of exploitation productivity plus the hours of work expended in administering capital and in sales and publicity.

IV.—NET TOTAL PRODUCTIVITY, OR AGGREGATE PRODUCTIVITY

In the calculation of net total productivity we consider not only all the hours of work counted in the preceding productivity calculations, but also the expenses connected with investments, with power, with amortization of machines, with materials consumed, etc. These expenses are converted into their equivalent in hours of labour.

Net total productivity is, of all the types of productivity examined above, that which is closest to being the inverse of the real cost price. (We call real cost price the ratio of the nominal cost price to the current mean hourly wage).

Net total productivity, however, is still not quite the inverse of real cost price in view of the following elements :

1) In the calculation of productivity the working hours of engineers, department heads, workers, manual laborers are counted as equivalent, without taking account of wage hierarchies.

2) Productivity calculation does not take account of interest on capital investments.

3) Productivity calculation does not generally take into account the incidence of taxes.

4) Productivity calculations are never made by accounting procedures and sometimes have a degree of error of 10%, or sometimes 20% (see below, *Errors*).

B.—ESTIMATING PRODUCTION

In estimating production it is better to consider, whenever possible, a single product. Unfortunately the case of a single product remaining homogeneous through time is rather rare and one is often obliged to refer to a type product; different methods of calculation exist and the choice of a method depends essentially on the sources of information at one's disposal and on the purpose to be followed.

1.—Case of a product remaining homogeneous in the passing of time

It is sufficient to define the initial and final states of the product (physical state, chemical state, physical characteristics, situation at time of handling, etc.).

2.—Case of a product varying in the passing of time

When one has to follow a product which varies with the passing of time, the term of comparison cannot be found in the time of production nor in the prices, these two elements being both a function of productivity. In this case we must refer to the classic criteria of :

—physical and chemical characteristics (mechanical power, capacity, output, thermal power, etc.);

—overall economic utility (for example: an automobile can transport so many persons, for a distance of, at a speed of...);
—length of use, etc.

3.—Case of several products remaining homogeneous through time

In a case of this kind we must refer to a type product with the help of a coefficient of conversion variable in time. There are three methods generally admitted for determining this coefficient, but others can be used.

—The method of the time of production seems to be the best for a calculation of productivity. The coefficient is the ratio of the time necessary for fabricating the product under consideration to the time necessary for fabricating the type product.

—The method of net values or added values also gives a rather good approximation if it is not possible to apply the time method. The coefficient is the ratio of the values (1).

—The method of economic or technical equivalence (for example: the use of agricultural units, like forage units, calory units, etc.).

Prices do not give a satisfactory basis of comparison. They who take into consideration such elements as profits and price controls risk falsifying their results.

4.—A remark

Economists and statisticians often calculate a "monetary return per person" or "per hour of work" in which production is estimated by the value added to the product in an industrial operation. By "added value" is understood the difference between the figure for the total transaction (i.e. the sales total) and the cost of the merchandise and materials consumed in the operation. It is sufficient to divide the sum thus obtained by the number of persons employed or the number of hours of work expended to obtain the monetary return per person or per hour.

It does not seem like the term "productivity" can be applied to this quotient. Monetary elements like profits and salary levels interfere in it and risk giving an entirely false idea of productivity such as defined above. (This quotient varies as much with profits or the treatment of the director as with productivity properly speaking). So it is more fitting to call this quotient "net product per person employed" (or per hour of work) and not "productivity".

The principal advantage of evaluations of "net product" is to permit comparisons of one industry to another and, with special precautions, of one country to another.

C.—ERRORS

Every productivity calculation should be accompanied by an evaluation of the exactitude of the results. Without a reckoning of the error, the results of a measuring of the productivity have no scientific value and it is difficult to take them as a basis of study.

Calculations of productivity often reveal errors of 10 to 20 percent. In simple and well defined cases results can be obtained within one or two units of 100% exactness, but when the measurements become larger in extent or are spread out in time, such exactitude often becomes impossible. Moreover, an approximation of the order of 10 to 20%, of which there would be no question in a calculation of cost price, has only relative importance in a calculation of productivity.

Actually, the most frequent variations in productivity itself are of sufficient extent to make an error of 20% negligible. (Productivities are frequently registered which vary from 1 to 5 or even more). Finally, the purpose of

the measurements is often more to obtain indices of comparison than to obtain absolute values; consequently an approximation, even one that is 20% off, is enlightening enough when it brings to view a major tendency or much larger disparities. It must be remembered, moreover, that the use of precise and generally adopted methods of calculation should reduce the extent of these errors to 10% at the most.

Calculations of errors in productivity are conducted according to classic rules of arithmetic. It is sufficient to reckon the error of each term entering into the calculation, and from there the error of the result will be a simple mathematical deduction.

BOOKS

LABOR COURTS

DENYS DION

The Extension Department of Laval University has just published a pamphlet full of interest. It is the first of a series concerning labor relations, and is entitled, "Labor Courts". The author is Mr. Benoit Yaccarini, master of social science and specialist in industrial relations. It is a condensation of the thesis which Mr. Yaccarini presented to the Department of Social Science of Laval University at Quebec to obtain his Master's degree. This study had appeared at an earlier date in the *Revue du Barreau* for October-November 1949.

In his introduction the author sketches the evolution of social legislation and emphasizes the ever-increasing contrast which exists between the traditional legislation of the civil Code, individualist and liberal, and the development of a social legislation, larger and more comprehensive.

From this point, the author, in the first part of his essay, tries to show "the necessity which exists today of instituting labor courts in general and by what means they function". In the second part, he attempts to apply the general principles of Labor Courts to the Province of Quebec.

The author divides the first part of his work into five chapters. In the first chapter he explains the aim of the Labor Courts which consists, above all, in arriving at an appropriate procedure for resolving industrial conflicts, that is a less expensive, less formalistic, and more expedient procedure. These courts are also to nominate judges who are well acquainted with habits developed in working-class sections, as well as questions of fact which only a professional man is capable of fully understanding, finally, judges who are penetrated with the spirit and meaning of labor legislation.

In the second chapter the author sketches the history of Labor Courts. Special labor jurisdiction exists, according to the author, in at least thirty countries. These courts, almost all alike in spirit, differ appreciably in their techni-

ques. The character of the courts depends upon the social and economic evolution of the country which has instituted them. At their outset, these courts knew only individual conflicts; then, little by little, they become acquainted with conflicts of a collective nature. The author treats next the semi-administrative and semi-judiciary bodies which are found in the United States, in Canada and in various provinces of ours, established to resolve certain labor disturbances. The author points out that "labor courts, whose role is to pronounce rights (individual or collective), must not be confused with services or councils of conciliation and arbitration whose function is to create new rights".

The author consecrates the following chapter to the jurisdiction of labor courts. In other words, in what field can such a court function? There are courts whose judgments are binding and there are those whose judgments are non-executive. Then the allocation of jurisdiction would be determined by the distinction between individual conflicts and collective conflicts, conflicts of right (individual and collective) and conflicts of interest.

The author is intent on delineating clearly these different concepts which are at the base of the jurisdiction of labor courts. However, he insists, and righteously so, it would seem, on the fact that the allocation of jurisdiction should be based especially on the distinction between conflicts of right and conflicts of interest. The solution of conflicts of right should be confined to the labor courts, while the conciliation and arbitration boards would take care of conflicts of interest.

In the fourth chapter, the author explains labor court procedure. According to his definition, "this procedure should be simple, apart from all formalism, rapid and not expensive". In general, he continues, the parties appear in person in such courts. But, in the case of a corporate body, it must necessarily be represented by an authorized agent. Must this authorized agent necessarily be a legal practitioner, a lawyer? According to Mr. Yaccarini, in most countries where labor courts have been established,