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FACTOR PROPORTIONS IN THE ITALIAN ECONOMY

Economics 1, 3 and 5 rightly consider the technological unemployment -- described as "the factor proportions issue," or as "structural disequilibrium at the factor level" -- as the central problem of the Italian Economy. "The theoretical remedy for factor disequilibrium is...: a change in factor endowments to accord with the factor prices, or a change in factor prices to accord with factor endowment. A change in factor proportions can be substituted for a change in factor endowments."[1] The diagnosis of technological unemployment in Italy is undoubtedly correct, but the therapy proposed is based on the assumption of variable coefficients of production. This assumption is almost certainly unrealistic for any short-period analysis and may prove of limited applicability even for the longer-run analysis. The "factor proportions issue" should therefore be analyzed under the assumption of fixed coefficients. The "theoretical remedy" may still be indicated under such more realistic assumptions, but its modus operandi, its range and its dosage may have to be substantially qualified and restricted.

I. Equilibrium under fixed coefficients.

Assuming two factors of production (labor and capital) in given amounts and several products, "equilibrium" may have two different meanings -- (a) maximum value of output (b) full employment of factors. These two meanings coincide under the assumption of variable coefficients of production but do not coincide in the case of fixed coefficients.

Full employment of both factors may be technically impossible. Even if it were possible the full employment combination of products may represent

1) C. P. Kindleberger "Structural Disequilibrium" page 766.

a lower value of output as a whole. Under normal competitive conditions, market forces will tend rather towards a position of maximum value of output as a whole than towards a full employment position.

The larger the number of goods the less likely (or smaller) will be the unavoidable unemployment of one factor and the smaller the divergence between the maximum value of output and the value of full employment output. Owing to demand conditions, however, this divergence may persist. It will be the smaller, the lower is the degree of convexity of indifference lines of consumption. It will also be considerably reduced by international trade.

The marginal productivity of the unemployed factor is zero but in the case of labor some arbitrary positive price is nonetheless payed. If this "arbitrary" price were lowered, a different combination of goods would be produced depending on the income and price elasticity of demand. The following questions arise in that connection:

1. Will the total wages bill be higher, lower, or equal?
2. By how much will the fall in the price of labor lower real wages?
3. What determines the deviation between the value of the full employment output and the maximum value output?
4. What are the elasticity of demand conditions for a higher volume of employment without a fall in the value of output as a whole?

II <u>Limited discontinuous variability of coefficients of production.</u>

The assumption of rigidly fixed coefficients will probably be realistic only for some industries in the same way in which continuous variability of coefficients is probably the exception rather than the rule. A limited and discontinuous variability of coefficients seems to be the most realistic assumption for the largest part of industry. Let us assume, therefore, that in many industries factors can be combined in three alternative proportions

giving us three distant points on isoquants:

a. High capital intensity (example: automatic looms), very high productivity of labor.
b. "Normal" capital intensity (example: ordinary looms), normally high productivity of labor.
c. Very low capital intensity in handicrafts (example: hand looms), very low productivity of labor.

In the short run (with given equipment), some additional production may be secured by employing factor proportion b ("normal" capital intensity) in an industry using preponderantly the factor proportion a. In the same way the factor proportion c may coexist with the factor proportion b. An optimum output cannot be secured,[1] however, by a combination of all the three factor proportions. On the assumption of a given wage rate only combination ab or bc are possible, while the coexistence of a,b and c is impossible.

If the distance on the isoquant between the points a, b, and c is very great, a lower wage rate need not necessarily lead to full employment of labor without a fall in the value of output as a whole. Income-elasticity of demand effects may be such that workers receiving lower wages may not demand the goods produced in more labor-intensive ways.

The existence of three possible factor proportions for the production of one good, introduces the same type of problems on the supply side as in the case of several goods under the assumption of rigidly fixed coefficients. The discussion of the theory of production may therefore proceed as if there were no difference between the different processes producing one good and the different factor proportions for producing different goods. The possibility of producing many goods in three different degrees of capital-intensity makes it easier however to come nearer to a full-employment output irrespective of demand conditions; it should, in other words, at least reduce the divergence between the maximum value of output and the value of full employment output.

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1) Short of a most improbable case in which all the three points a,b,c, lie on the same price-line.

In an open economy, it may be assumed that products of more labor intensive industries will be produced for export, while products of more capital intensive industries will be imported. It is not clear, however, to what extent these international trade factors could alleviate the Italian situation. Fuller employment in Italy means higher demand for imports. Demand for foodstuffs by the formerly unemployed will be quantitatively more important than the import content of additional output. Since even at the present level of unemployment Italy is a net importer of foodstuffs, its marginal propensity to import will certainly be very high, i.e. the price-elasticity of demand for Italian imports will be very low. International trade would only help to solve the Italian full employment problem if Italy's "marginal propensity to export" were even higher than its high propensity to import: i. e. if the price-elasticity of demand for Italian exports were higher than the low price-elasticity of demand[1] for Italian imports. This implies successfull competition with other exporters like U.K., Germany and Japan: prospects here cannot be said to be very good. International trade will undoubtedly help but it is not a perfect substitute for fully variable coefficients of production.

III Coexistence of two different methods of production in the same industry.

In the short run additional output may be produced by a more labor - intensive method especially if wages are lowered. Even in the long run two methods of production may coexist at a given wage-rate, but an incentive may be needed for reaching a higher employment combination of methods. Price-discrimination in the labor market in various forms may constitute such an incentive, but practical difficulties of handling it grow with time until they become unsurmountable in the long run. Subsidies for "additional"

1) While price-elasticity is low, income-elasticity of demand for imports is high.

labor employed may be appropriate in a short run. In the long run employers would simply hire less labor in order to obtain more subsidies for "additional" labor. Only rigidly institutionalized and well thought out wage-discrimination (f.i. using unemployed workers in specific industries, or some public works or public enterprises) might be compatible with a long-run equilibrium.

IV Economic policy conclusions.

The argument of I, II and III leads to the following conclusions about the long-run technological unemployment in Italy: Under variable coefficients of production even small changes in wage-rates would lead to different factor proportions and to higher employment, without a fall in Real National Income. Under rigidly fixed coefficients of production even large changes in wage-rates may not lead to an appreciable increase in employment without a fall in Real National Income. Under "discontinuously variable" coefficients of production large changes in wages may be required to increase employment; the reduction in wages may, however, affect the income- and price-elasticities of demand in such a way that the higher employment-output may represent a smaller value than the previous output-combination. Additional taxation of the "maximum-value output" may compensate the unemployed while leaving everybody else better or not worse off than before. If the proceeds of such a tax were to be used for wage-subsidies, additional production would become possible using the unemployed workers at wages lower (by the amount of the subsidy) than the current rate. If such compensatory taxation and such wage-discrimination were possible in practice, a higher National Income and a "Maximum Economic Welfare" could be realized.

The Italian Economy consists presumably of three sectors: 1) a small one with fixed coefficients, 2) a large one with "discontinuously variable" coefficients, 3) a small one with variable coefficients of production.

The last sector may be too small to eliminate technological unemployment although it helps to reduce it. International Trade has an effect similar to an extension of the "variable coefficients" sector; it reduces but does not eliminate the divergence between the maximum-value and the full-employment output.

V The problem of verification.

The above conclusions follow only if the assumptions about the spread and the type of coefficients of production correspond to the Italian reality. The assumptions under I,II and III have obviously to be tested. Several difficulties,however, stand in the way of verification.

A production function is only "given" in the case of a firm; it involves difficult problems of aggregation in the case of an industry. Firms employing different factor proportions at the same wage rate in the same industry may coexist owing to different qualities of entrepreneurship. More often, however, different factor proportions coexist in the same industry because wages for the same quality of labor, or wages per efficiency unit of labor vary between different localities. Only a thorough knowledge of an industry will enable us to differentiate between such two cases.

1. A thorough knowledge of mechanical industry in Italy should enable IRI to make such tests.

a) Let us select one industry (several firms producing the same product) and ascertain the factor proportions used, in each firm as a whole, and in each process of production within a firm. If the factor proportions differ, let us examine whether this difference is due to different wage-rates in various locations, or to differences in entrepreneurship. In either case an explanation should be attempted of why different firms using different factor proportions coexist, and why one firm or group of firms

does not expand more than it did in fact at the expense of others. A verification of the range of variability of coefficients of production may be thus obtained in several industries.

IRI would also be able to indicate which factor proportion type was expanded whenever an expansion of production in one of the industries which use different factor proportions was realized (or intended). Would a different method of production had been chosen at a wage-rate 10%, 15% or 20% lower?

While the management of any one firm may erroneously believe that it has no choice in technology, i. e. that there are fixed coefficients of production in its industry, it is more difficult to believe that all the firms in one industry would labour under the same illusion; and it is quite clear that the management of institutions like IRI, or the FINMECCANICA controlling or surveying all such firms and having the data about different methods of production would be well aware of such variability of coefficients as the existing technology provides.

b) Similar enquiries might be possible in other industries, f. i. in the field of the FINSIDER. An enquiry comparing the coefficients of production in comparable sectors of the shipbuilding industry in Italy, Great Britain and Holland might f. i. be extracted from the rich data and studies material which is already available in this field.

c) The working sheets of the Italian Input-Output Study might finally contain data referring to coefficients of production of various firms in an industry. Wherever the inputs were calculated by aggregating data firm by firm this would be possible.

2. What type of coefficients of production obtain in Italian agriculture? Would lower wages make more agricultural employment possible? Or is the fact that agricultural wages are markedly lower than the industrial wages offer

sufficient evidence that the range of variability of coefficients is restricted in agriculture to a degree comparable with industry? -- A joint enquiry by the Institute of Agrarian Science, Rome and the SVIMEZ may be suggested.

3. An estimate of the existing excess capacity in certain industries should be made. Is excess capacity confined to export-industries only?

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Such tests in large and representative sectors of Italian industry and agriculture may show to what extent our assumptions about the range and spread of fixed, discontinuously variable and variable coefficients of production correspond to reality. If they do, then Italian economic policy would seem to be confronted with a dilemma: to aim at <u>either</u> a) high productivity, higher value of output as a whole with a larger volume of unemployment, <u>or</u> b) lower productivity, lower value of output as a whole with a lower volume of unemployment.