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Prices, Distribution and Investment in Italy, 1951-1966: an Interpretation (*)

Introduction

The first part of this paper is devoted to the theoretical hypotheses which find their place in a model of the Italian economy illustrated in the second part. The author's main concern has been to clarify certain theoretical points and, particularly, to initiate a type of analysis which considers variations in certain important aggregates and in certain categories of prices and wages simultaneously; which helps, in a word, to throw a bridge between macro- and micro-economics.

I. Theoretical Aspects

1. *Price determination and price changes*. Traditional analysis, based as it is on the equalization of marginal cost on the one hand and price or marginal revenue on the other, is concerned with the problem of the determination of individual prices and gives us hardly any information on the problem of price changes. This latter problem is either dealt with by referring to shifts of demand and supply curves or treated by empirica1 analyses, whose theoretical foundations are usually very rudimentary and almost never in accordance with the teachings of traditional theory, even if their authors are not always aware of this fact. Here we intend to put forward some theoretical propositions which allow a highly simplified treatment of both problems — that of price determination and that of price changes. I shall almost exclusively consider short-term changes and leave aside, barring a few remarks, the long-term variations. We shall distinguish four sectors in the economy: 1) agriculture, 2) industry, 3) retail trade, 4) housing. The structure of the market and the price mechanisms are significantly different in the four sectors.

2. *Agricultural prices:* determination and short-term changes. We can assume that competitive conditions prevail in agriculture and that, therefore, price variations in the short period depend on changes in demand and supply. It must be remembered at the outset that prices supported by public authorities cannot fall below a given level. In competitive conditions changes on the cost side affect prices only in the relatively long period. If, given demand, costs rise, owing for instance to an increase in factor prices, the less efficient firms are gradually pushed out of the market and the

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ensuing fall in the level of output makes prices rise: but this final effect is achieved only by a roundabout and time-consuming process. If, instead, costs fall, owing for instance to the adoption of new productive methods by some firms, product prices remain unchanged at first, then decline gradually to the extent to which the progressive firms expand their output and new firms enter the market, attracted by the extra-ordinary profits which can be obtained there. It follows that, in competitive conditions, prices tend to equal costs only in the long run: in the short period we can expect no or little correspondence between changes in costs and changes in prices ([1]). The dependence of price changes on supply and demand in the short period can be simply expressed by a function of the type:

$$P = a + bC - cO \ .$$

where *P* is the wholesale agricultural price level, *C* total consumption and *O* the supply of agricuhural products.

3. *The determination of industrial prices*. As conditions of perfect competition and monopoly in the traditional sense can seldom be found in reality, we can assume that oligopoly — imperfect or homogeneous — prevails in modem industry. Let us first consider the problem of price determination, seeking to postulate it so as to ease the transition to that of price variation. We may assume that the firm seeks to maximize its total profits in the long, flot the short, period and distinguish three hypotheses:

I) the market for the firm's products is stationary in the sense that, once the equilibrium price has been reached, demand has no tendency to rise or fall; the market for the factors used by the firm is also stationary and factor prices do not change;

II) changes in productive methods or in factor prices cause changes in costs but demand remains constant;

III) product demand varies and tends to increase. Let us begin with the first hypothesis. We have elsewhere tried to work out a theoretical model of price determination ([2]); here we shall simply recall its basic assumptions and, hence, the elements determining the equilibrium price. These are six basic assumptions.

1) Short period marginal cost (plant given) is constant and therefore equal to average direct cost. This assumption seems justified by an increasing number of empirical studies; even though these studies cannot be considered conclusive, the opposite assumption of a U-shaped curve must be discarded, since the arguments brought forward to justify it are open to insuperable objections ([3]).

([1]) This, in substance, is the view expressed by Ricardo in Chapter 30 of the Principles: It is the cost of production which must ultimately regulate the price of commodities, and not, as has often been said, the proportion between the supply and demand: the proportion between supply and demand may, indeed, for a time, affect the market value of a commodity, until it is supplied in greater or lesser abundance, according as the demand may have increased or diminished; but this effect will be only of temporary duration ".

([2]) *Oligopoly and Technical Progress*, Harvard University Press, 1962; " Prices and Wages: A Theoretical and Statistical Interpretation of Italian experience ", *Journal of Industrial Econornics*, 1967, No. I.

([3]) There are two main arguments. The flrst, based on the principle of decreasing returns, supposes that plant and machinery must be used as an indivisible whole. The second is based on considerations of demand: unusually high demand causes costs to rise for one (or more) of the following resasons: (1) workers are paid overtime rates; (2) Iess efficient machines are brought into use; (3) additional and usually less efficient labour has to be paid at the existing wage rate. Now, the hypothesis of plant and machinery lo be used as an indivisible whole very seldom corresponds to reality: the concept of the " degree of unused capacity " implies the use of some or all of numerous similar machines or of machines whose production varies according lo their running time. The hypotheses behind the second argument may justify two — or three — levels of marginal cost but not a gradually and continuously rising curve; unusually high levels of demand, moreover, cannot help identify an equilibrium position. The third hypothesis is only valid if equal wages are paid to unequally efficient workers. It should be noticed that Keynes thought this factor of pre-eminent irnportance in causing costa to rise after a certain point (*General Theory*, pp. 41 and 299), though he considered rising costs as usual, but not necessary. For a discussion of the whole question see also P. GAREGNANI, " Note su consumi, investimenti e domanda effettiva ", *Economia Internazionale*, 1964, n. 4 and 1965, n. 4, note 1, p. 72 of the reprint.

2) The long period marginal cost curve tends to be L-shaped: with given technology the curve flattens out owing to the decreasing effect of economies of scale, whereas the "diseconomies of scale" cannot be conceived as a force gradually pushing up long period costs. The number of techniques available at a given moment is however limited and the long period cost-quantity relationship should be represented by a limited number of points rather than a curve.
3) When new firms enter the market those already established go on producing as much as before, not only to discourage the entry of new firms but also because otherwise average total costs would rise (it follows from the first assumption that average total costs fall up to the limit of capacity)
4) Not all firms have the same power to influence prices; we assume that only big firms can affect prices directly, whereas small firms can influence them indirectly (and involuntarily) by varying their total production.
5) A new firm, using a given technique, only enters a certain market if it expects to sell at a price allowing a rate of profit at least a little higher than the market rate of interest; any price lower than this can be considered an "exclusion price ". In the long period the exclusion price for a certain type of new firm becomes the " elimination price " for existing firms of the same category, since they will abandon the market if they consistently fail to obtain the minimum rate of profit.
6) An existing firm, using a given technique, is forced to suspend activity or to leave the market if the price falls below the level of direct cost; a price lower than direct cost is an "elimination price" even in the short period, because the firm cannot go on making losses on its direct costs.
Now, available technologies, factor prices and the positions and shape of the demand curve being given, it can be shown that there are various possible equilibrium prices. But only if the initial conditions are neglected is the solution not unique. The final equilibrium price depends on the assumptions made as to the origin of the changes in price or quantity; practically, it will depend on which firms started the change. In every case, the initial structure of the industry will affect the final equilibrium situation and the variations are irreversible since, *inter alia*, they involve changes in the number of plants. Once the changes have been made there is no going back. Once a certain equilibrium situation has been reached, other equilibrium situations are precluded. In this way "past history" formally enters into the model. But though there is no unique equilibrium solution in a static sense, something can be said as to how prices will be fixed; the equilibrium price tends to settle at a level immediately above the exclusion price of the least efficient firms which major firms do not find it expedient to eliminate or absorb by a price war. At the same time, the equilibrium price, given the demand curve for the industry as a whole, will be such as to prevent the entry of new firms whatever their size. In short, prices are determined by: 1) technologies; 2) factor prices; 3) the absolute size of the market; 4) overall demand elasticity. The first three of these factors are fundamental. In the case of concentrated (and homogeneous) oligopoly, demand elasticity is relevant only for the industry as a whole and not for the individual firm. In the case of imperfect (or differentiated) oligopoly, demand elasticity seems to have a certain relevance for the individual firm as well. If however we assume that in this latter case firms usually differentiate their products not for the sake of higher prices but in order to win the greatest possible number of buyers *at the given price which is the same for every firm*, demand elasticity becomes irrelevant for the individual firm even in imperfect oligopoly conditions. In other words, apart from the case in which the products are radically different (when it is perhaps more appropriate to speak of so many monopolies rather than of an oligopoly), firms usually consider price differentiation too expensive, because of the probable reactions of rival enterprises, and prefer to differentiate their products rather than their prices. We cannot, in this case, think in terms of individual demand curves. Therefore, for differentiated oligopoly as well the relevant demand curve is that for the industry as a whole: the equilibrium price is fixed in the way outlined above and cannot be determined from marginal revenue and marginal cost curves.
4. *Changes in industrial prices.* We have so far taken the factors determining the equilibrium price as given: techniques and factor prices (which together determine costs), the size, of the market and the demand elasticity for the market as a whole. Let us now suppose (hypothesis 2) that costs vary.

We have to distinguish between fixed and direct costs. Direct costs consist of wages, raw material and power costs

$$V^i = L^i + M$$

where L^i is given by the ratio between hourly wage rates and output per man hour

$$L^i = \frac{S^i}{\pi^i} .$$

Fixed costs include salaries and depreciation of plant and machines. Total average cost is thus

$$C^T = \frac{S^i}{\pi^i} + M + \frac{k'}{X} + \frac{k''}{X} .$$

where *k'* and *k"* are the two types of fixed costs and *X* is the quantity produced. Only changes in costs affecting *all* firms will modify general supply conditions and therefore cause a price change; when cost changes affect a few firms their supply conditions only will be affected and there is hence no need for a price change. Changes in supply conditions occur when the prices of variable factors change and when labour productivity improves as a result of either new methods or organisational improvements. Some improvements, however, require large scale operation and can therefore only be exploited by the larger firms; these firms need not pass on their lower costs but may instead reap higher profits. Staff and technicians'salaries are a fraction of total cost, varying from firm to firm; staff composition, moreover, differs very widely: salary changes will therefore affect all firms but to a much more varied extent than will changes in direct costs. Changes in machine prices will not necessarily influence supply conditions: first, the type of machine used varies widely with the size of firm; secondly, in a progressive economy machines are written off according to their estimated economic, not physical life, so that there is a big conventional element in depreciation estimates. Changes in costs which change the equilibrium of the whole market and hence force price changes are thus essentially of two sorts, both regarding direct costs: changes in the productivity of labour, for whatever cause as long as they affect all firms, and changes in the price of variable factors. Such changes are frequent even in the short period: productivity increases almost continuously, though at varying rates, owing both to small technical or organisational changes and to the effects of important innovation which may be spread over time; wages and raw material prices also change frequently. If businessmen did not have quick rules to find the new equilibrium price corresponding to a new level of direct costs, industries would almost always be struggling in chaos: in oligopolistic conditions unlike in free competition — firms are *not* very small and can directly or indirectly influence prices. One such method is full cost pricing, which is meaningless in a static context but acquires significance when dealing with dynamic conditions and, in particular, when direct costs change. When such cost changes affect all firms, the price must change and the change is brought about by means of a mark-up, calculated on the basis of the former equilibrium price. Thus, the new price tends to reproduce the previous equilibrium and be acceptable to all firms. In other words, the elernents mentioned above fix the equilibrium price; full cost pricing allows the price to be rapidly adapted to change in costs, and particularly in direct costs. In its simplest terms, the full cost criterion can be expressed as follows:

$$P^i = V^i + qV^i$$

where P^i is the price, V^i is direct or variable cost $\left(V^i = \frac{S^i}{\pi^i} + M\right)$ and *q* is the mark-up, which serves to cover the average fixed cost and ensure the profit per unit $\left(qV^i = \frac{k'}{X} + \frac{k''}{X} + g\right)$.

The hypothesis that price varies as a function of direct cost can be verified using a function of the type

$$P^i = a + b\frac{S^i}{\pi^i} + cM$$

or, to avoid non-linearity

$$P^i = a + b\ S^i - c\pi^i + dM$$

where *M* stands for prices of raw materials produced outside the industrial sector — in agriculture or abroad. It should be noted that such a relationship is only valid if, given output per man hour, marginal cost is assumed to be constant; it would otherwise be impossible to apply the formula to an entire industry and still less to industry as a whole. Now, if we accept that industrial prices change on the basis of changes in direct costs, must we assume that the mark-up *q* is constant in every industry? If *k/X* and the total value of invested capital *K* are constant, a constant mark-up *q* would imply that P^i rises or falls in proportion to V^i and that the rate of profit rises or falls. Hence, if the rate of profit is to remain at the same level as in. the preceding equilibrium situation *q* must be reduced if V^i rises and increased if V^i falls. However, if the variable cost V^i increases because of an increase in wages not offset by an increase in productivity, salaries will also tend to rise and with them the unit fixed cost *k/X*. Further, if this increase in variable costs affects the whole of industry, machine prices will tend to increase, and, with them, depreciation costs. Thus it will often happen that if V^i increases, *k/X* and *K* will also tend to rise, though not necessarily in the same proportion. As a first approximation it can be assumed that the mark-up *q* and the rate of profit will vary in the same direction. With this premise let us consider the two opposite cases of a rise and a fall in direct costs. If direct costs rise, for example because wage increases outrun gains in productivity, producers will tend to pass the increase on to consumers; in an open economy, however, they soon run into the obstacle of foreign competition if foreign prices are steady or rising less rapidly. Moreover, in rapidly expanding markets, the bigger firms may find it expedient not to transfer the whole increase in costs onto prices so as not to put a brake on the growth of demand and to avoid the entry of new firms (see hypothesis 3). If direct costs fall — for example because productivity gains outpace wage increases while international prices do not — there is no pressure from foreign competition: either prices will not fall or they will fall only if domestic competition pushes them down in spite of market imperfections and of the power of dominant firms. If *average* productivity rises, not only as a result of generally accessib1e improvements but aiso as a result of innovations not open to all firms, prices will necessarily fall, on average, less than direct costs. On the other hand, in rapidly expanding markets the bigger firms may find it expedient to reduce prices in proportion to costs in order to encourage demand and discourage the entry of new firms (see hypothesis 3). Two important propositions emerge from this analysis: *First proposition*: The mark-up tends to fall when direct costs increase and to increase when they fall. (This proposition is however only true for industry as a whole: it may not be true for individual industries and the mark-up may remain constant). *Second proposition*: Short-term price variations depend exclusively on changes in costs and, particularly, in direct costs: changes in demand induce corresponding changes in supply without changes in price. (A sustained increase in demand may affect the extent to which prices change; such an increase — taking static and dynamic economies of scale into account — usually tends to check increases in price or to hasten their decline.) The preceding proposition is only untrue in two cases: in the case of an unexpected and large rise in demand — but in this case the hypothesis of unchanged direct costs is unrealistic; — and in the case of a considerable fall in demand — but here, even if prices of the variable factors remain unchanged, the total average cost increases because of the rise in average fixed costs, so that, instead of falling, prices may even

increase. The above proposition is similar, though not identical, to one of the basic propositions of Keynes' General Theory ([4]). It seems to hold good, in modern conditions, not only in periods of depression and unemployment — as Keynes believed — but also when the economy expands at a rate that employers consider normal. I should like finally to point out that the inflationary process cannot be attributed to one cause alone (cost push or demand pull) and that at the same time the eclectic thesis is deceptive; in general it may be said that *in industry, except in special cases, the inflationary process is started by a cost push, while for agriculture in the short period — given the supply of agricultural products — it is set off by demand*. (This implies, *inter alia*, that a fall in industrial and an increase in agricultural prices — or vice versa — may occur simultaneously). As will be seen, the mechanism governing retail prices is similar to that governing wholesale industrial prices. This difference in the mechanisms in industry and in agriculture gives rise to difficult problems, both theoretically and from the practical stand point of controlling inflationary tendencies.

5. *Demand, profit and investment*. We must now consider the third hypothesis, that demand tends to increase, more systematically: as we have seen, in this case the bigger firms may deliberately choose to raise their price by less than the increase in direct costs, or they may reduce prices by the same amount as these costs fall, in order both to discourage the entry of new firms and to favour the expansion of the market, and hence the increase of production. We have here a first link between price decisions and the growth of the firm's output, but there is a more important connection: profits depend on prices (and costs) and investment depends on profits. We must here distinguish between *current* profits and *expected* profits, the former being the source of finance for investment and the latter its motive. The maximisation of long-term profits is therefore a condition for the maximisation of the rate of increase of the firms'output. It is a necessary but not sufficient condition since, to attain its second end, the firm must plough back in investment a part of its profits while another part must be distributed in the form of dividends (if it is a public company) to support the course of shares. The amount of external finance (debentures, bank loans), on which the firm may draw, also depends on current profits. We can talk however of maximisation of the rate of growth only if this rate depends on the firm. This is usually only true within narrow limits. The firm may influence price not only to prevent or discourage the entry of new firms (which is here considered to be the overriding preoccupation of oligopolists) but also, as we have seen, to stimulate the demand for its products. The firm may also devote part of its profits to advertising campaigns or to diversifying its products in order to expand demand or to speed up the "spontaneous" increase in demand. The first case is only relevant within certain limits and in certain conditions. The second case regards only those firms operating in new fields which are particularly suitable for expansion. Normally it is difficult to force the expansion of demand and progress mainly depends on the trend of total demand, that is, on exogenous variations originating not only from the actions of all the firms taken as a whole, but also from foreign demand and from the action of the public sector. Here the real problem is no longer one of maximising the rate of development: unless it embarks upon a price war, the firm will attempt to keep pace with the exogenously given rate of increase (possibly with the help of formal advertising), so as to maintain its share of the market. The relevant connection, therefore, is not so much between profits and production increases as between profits and investment: the former directly influences the latter; increases in production, in their turn, are directly influenced not only by investment but also by the trend of total demand. The long-term maximisation of profits, therefore, in full contradiction with the instantaneous maximisation of marginal analysis, is not to be understood as one single specific target: it implies a complex strategy which, for the purpose of economic analysis, can be studied with reference to three distinct

([4]) The proposition — which assumes constant techniques — according to which supply is very elastic up to the point of full employment and inelastic thereafter. An increase in effective demand therefore causes production and employment to increase at almost constant prices until full employment is reached, whercupon it is reflected, entirely or predominantly, in higher prices. KEYNES, op. cit., pp 295, 300, 304-5.

problems, corresponding to the three hypotheses discussed above: price determination, price change and investment financing.

6. *The investment function for large and small industrial firms*. It follows from assumption 4 (see section 3 above) that the larger firms, which can directly influence price because they hold a notable share of the market, regulate production according to variations in demand, while the smaller firms, like those operating in a freely competitive market, produce as much as they can on the one condition that they can make a minimum profit at the current price. The small firms'growth is therefore limited by their own financial means, depending on current profits, and by their possibilities of raising money elsewhere, usually with the bank, again influenced by current profits: the expansion of demand affects the growth and the investment of small firms indirectly, preventing any fall in prices and sometimes allowing the entry of new small firms. The growth of the large firms instead directly depends on changes in demand. These firms'total profits being sufficient for them to finance a large part of their investment, their dependence on external finance, and particularly on bank loans, is relatively limited. *Current* profits determine the possibilities of financing investment for small and large firms alike. The inducement to invest is given by *expected* profits. Current and expected profits depend not only on the trend of demand but also on the behaviour of prices and costs. We cannot therefore assume — as have some economists — that profits and demand must move together; this is only true when additional hypotheses are introduced about prices and costs. Profits as well as demand must therefore be listed among the determinants of investment, and a further distinction should be drawn between current and expected profits; the former affect the source of finance, the latter the incentive to invest. We can now draw our threads together and write two investment functions, one for large and one for small firms. The relevant factors for large firms are: demand, current and expected profits; for small firms current and expected profits and the availability of bank loans. Demand is relevant for the larger firms insofar as it determines the degree of utilization of their productive capacity. We can therefore consider changes in the ratio between demand and productive capacity, i.e. of the "degree of utilisation of productive capacity": this would seem the most appropriate expression of that variant of the acceleration principle known as the capital-stock adjustment principle ([5]). Current profits may be expressed by the actual rate of profit (or by the share of profits on income, which moves in the same sense as the rate of profit if the capital-income ratio is constant). Expected profits may be expressed by the rate of change of the rate of profit, or of the share of profits. Since amortisation funds are normally used to purchase new and better machines, which allow higher labour productivity, it is impossible to distinguish between net and gross investment satisfactorily: we shall therefore use

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([5])The accelerator principle is usually expressed by the function

$$I = f(Y)$$

where I is investment and Y the rate of change of income. The capital-stock adjustment principle is expressed by a function of the type:

$$I = F(Y, K)$$

or, often, in linear from, by a funcion of the type:

$$I = aY - bK$$

in which lags are iatroduced. The connection between this formula and that using the degree of capacity utilisation is clear from the following relationship:

$$U_g = Y_e / Y_{max}$$

where U_g is the degree of utilisation, Y_e actual production and Y_{max} maximum potential production; this quantity is in turn equal to the ratio of productive capacity, which can be expressed by the capital stock, K, and the ratio of capital and maximum potential income, v^*, that is:

$$Y_{max} = K/v^*$$

and therefore

$$U_g = \frac{Y_e}{K} v^*.$$

gross investment and, correspondingly, gross profits. Variations in the availability of bank credit can be measured from the variations in the liquidity of the banking system or total liquidity (primary and secondary). The investment function for *large firms* may therefore be written:

$$I^g = F\ (U,G,\dot{G})$$

where *U* is the degree of unused capacity, *G* is the share of current profits and *G* the rate of change of this share. The investment function for small firms is:

$$I^p = f\ (G,\dot{G},L)$$

where *L* expresses variations in "total liquidity ".

The aggregate investment function is ([6]):

$$I = \varphi\ (U,G,\dot{G},L)\ .$$

Before concluding we must ask whether we should consider the *level* or the *rate of change* of investment. It is reasonable to suppose that, if unused capacity is at a *low and constant* level, large firms will *increase* their investment; the same will probably happen when the rate of profit is *high and constant*. From this point of view we should relate the rate of change of investment to the degree of unused capacity and the rate of profit. The answer cannot be so clear-cut when we consider the other two variables, *G* and *L*. Whereas *G* certainly represents current profits, is *G* an adequate indicator of expected profits? And should we consider the absolute variations (first differences) or the rates of change of total liquidity? The answers to these questions cannot be given *a priori*, and must be based on empirical analysis.

7. *The determinants of industrial investment: the degree of unused capacity, the rate of profit, total liquidity*. The fundamental determinants of the variations in industrial investment are in their turn explained in the model. We may without hesitation attribute changes in the degree of unused capacity to changes in total demand for industrial products — consumer goods, investment goods and industrial exports. Since in a growing economy a *constant* degree of unused capacity normally entails an *increase* in total effective demand (or in its components), we can establish a relationship between the degree of unused capacity and the rates of change of the components of the effective demand for industrial products. That is

$$U = a - b\dot{C} - c\dot{I} - d\dot{E}^i\ .$$

It is less easy to explain the variations in the rate of profit, notably because of the well-known theoretical difficulties involved in the measurement of capital; we can try to avoid them by considering, instead of the rate of profit, the share of gross profit in income — a quantity which business men themselves find relevant. Here and later in the empirical analysis, we shall almost always use the share of profits and not the rate of profit: however, we must at least clarify the links between the two magnitudes, ignoring, for a moment, the difficulties we have mentioned. The rate of gross profit, *r*, is equal to the ratio between total gross profit, G^t, and capital, *K*, while the share of gross profits on gross income, *G*, is equal to the ratio G^t/Y, where *Y* is gross income. The average capital output ratio being $v = K/Y$, we have

([6]) The relevant causal relation is therefore from profits (as well as demand and liquidity) to investment and not vice versa. "Animal spirits" may explain something, but they scarcely help to explain short-term investment changes. See Chapter IV of the new (1967) Italian edition of Oligopoly and Technical Progress.

$$rK = GY$$
$$G = rv .$$

As we use gross and not net investment, we must similarly use gross profit instead of net profit ([7]). If we accept that the average capital-output ratio is fairly stable in the short period, the share of profits in income and the rate of profit change in the same direction, even if not by the same proportion. This is normally, though not always, true, if, over the period, the average capital output ratio moves in one direction only (either upwards or downwards) ([8]). The determinants of the rate of gross industrial profit are industrial prices and variable costs. Total gross profit, G^t, is equa1 to:

$$G^t = P^iX — L^iX — MX .$$

As $Y = P^iX — MX$, the share of profits in gross incorne is equal to

$$G = \frac{G^t}{Y} = \frac{P^i — L^i — M}{P^i — M} ,$$

where the cost of industrial labour, L^i, is equal to the ratio $\frac{S^i}{\pi^i}$.

We can use a function of the type

$$G = a + bP^i — cS^i + \pi^i — eM .$$

as a linear approximation. This relation, it is to be noted, is a way of expressing the classica1 antagonism between profits and wages. Supposing that the mark-up *q* tends to vary inversely to direct costs (§ 4) and that this mark-up, the rate of profit and the share of profits in industrial income move in the same direction, it follows that *the relative changes of prices and direct costs* (labour and raw materials) *govern variations in income distribution in industry, which is the leading sector of the economy* ([9]). We must now explain the changes of total liquidity. Central banks have come to distinguish three sources of changes in liquidity: the foreign component, Government, the private sector (the last also includes State-controlled firms). We can accept this practice and use it in our analysis. Neither the first, which reflects the behaviour of the balance of payments, nor the second, which accounts for the variations in the net indebtedness of the State to the banking system, gives rise to any problems. It is less easy to identify a suitable magnitude representing firms'behaviour affecting liquidity. We might take private investment, assuming that the greater it is the more firms have recourse to banks and, hence, the greater the liquidity created to satisfy this demand for loans. We must however remember that firms use bank loans mainly for short-term credit: typically the demand for short-term credit depends on *increases* in overall expenditure on variable factors, notably wages; wage increases will *at a later stage* be paid out of the increased current receipts but, initially, bank loans are needed. We shall therefore use the absolute variations (flrst differences) of the wages bill to represent the private sector. These three are the *objective* factors governing total liquidity; in our empirical analysis we shall also have to consider the more

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([7]) The above relationship can be modified to consider " net" profits by includine depreciation as a percentage of capital. The formula becomes $G^n = vr + \frac{k}{K}$.

[8] The above conclusion is normal and not necessary since, for example, *r* may increase if *v* falls more rapidly than *G*. In the short period, however, changes of v are small and exceptions to the "normal" case are rare.

([9]) This model, unlike recent neo-Keynesian theory, allots no part to the average and marginal propensities to consume of the various social groups in determining the distribution of income, nor of changes in it.

difficult *subjective* element: how the central bank reacts to external impulses by using its discretionary powers.

8. *Wages. Limits to the oscillations in the rate of increase of money wages.* We have concentrated our attention in this analysis on industrial investment, assuming that this is the driving force of the entire economy. Profits, among the other variables, influence investment and are in their turn influenced by wage changes: if hourly wage rates rise more rapidly than productivity, profits — other things being equal — will fall. As we shall see, wages also influence investment in another way, by affecting the volume of consumption and hence the degree of unused capacity. We must therefore ask how wages are fixed and how they are changed: we shall again concentrate, as with investment, on industrial wages and we shall assume that the behaviour of wages in other sectors depends on that of industrial wages. Thus, throughout this paper, industry is considered as the prime mover of the entire system. In our attempt to explain the determination and — *a fortiori* — the variation of prices, and particularly of industrial prices, we have abandoned the path of traditional marginal analysis. We have assumed constant marginal cost and we have seen that overall demand (for all the firms operating in a certain market) alone has any relevance in oligopolistic conditions: in this case — which is the most frequent in modem industry — price cannot be determined from marginal revenue curves. Similarly, to explain the behaviour of wages, we have to abandon traditional marginal analys ([10]).

We may consider wages at any moment as determined by the standard of living already attained by the workers; determined, that is, by historical and social circumstances which we must take as exogenous data ([11]); we can therefore concentrate our attention on the problem of wage changes. At a given wage rate, the employer will take on that number of workers appropriate to the technique used, which in turn is related to the size of his market share. In a developing economy the entrepreneur will lay down his plant ahead of demand, so productive capacity will usually not be fully utilized. If demand falls temporarily, capacity utilization will diminish, working hours will be reduced and some machinery will remain idle. Accordino to our hypothesis, such variations will not influence average variable costs but only average total costs, which will rise because of the increase in average fixed costs. (The temporary fall in demand and production does however imply a reduction in average direct costs if all machines are not equally efficient and if it is the less efficient machines which remain idle; this however is a *lower level* of average direct costs and not a *continuous* falling curve of marginal cost). If, at a given price, the entrepreneur is faced with an

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([10]) Constant short-period marginal cost (plant given) does not necessarily imply that the marginal productivity of each variable factor is also constant. Mathematically speaking, marginal cost is a simple, and marginal productivity a partial, derivative; the economic significance of a partial derivative in our case would seem to be irrelevant an additional weaver, for example, cannot weave the air, he must be given the amount of cotton or wool required by the techniques used. Marshall was aware of this and always spoke of the *net*, not *marginal*, product of labour; by net product he meant the increase in the value of the product " after the deduction of ineidental expenses ", i.e. the additional expenses incurred for raw materials and other things in employing an additional worker *(Principles of Economics*, VIIIth edition, 1949, pp. 337 and 427-31). The notion of a partial derivative is clear-cut and Marshall (rightly) did not imply it, since he was considering the increase in production due to a *simultaneous* increase of the variable factors, quite a different thing. The average productivity of variable factors, understood as the inverse of the input of each variable factor (production coefficient or the quantity of a factor used per unit of product) is perfectly admissible and it is true to say that, given techniques and constant marginal cost, productivity is constant. If, as it does, average productivity varies over time, this is not due to changes in the quantity produced but to changes in technology. An economist of note, Gardner Ackley, supports the view that average productivity is generally constant for variations in production in a simple but convincing empirical enquiry. He continues however to make the customary assumption of "decreasing returns" on grounds similar to those given by Hicks for continuing to assume generalized competition (G. ACKLEY, *Macroeconomic Theory*, Macmillan, New York, 1961, pp. 95-101; J. H. Hicks, *Value and Capital*, Oxford, 1946, p. 84). The above refers to the short period, when plant is given. The possibility of using marginal productivity, in a rigorous sense, in the long period may exist but becomes irrelevant if we pose, as does the author, the problem of the choice of techniques in discrete, not continuous, terms.

([11]) This approach has some connections with that of the classical economists and was suggested by Pierangelo Garegnani.

unexpectedly rapid increase in demand, he may find it expedient to increase production by using less efficient and hitherto idle machines, by working overtime and by paying higher wages — as long as the higher direct costs still leave him an adequate margin. His decisions, however, will be made on the basis of averages and not of marginal variations in the true sense. Employers will constantly seek to introduce improvements so as to increase average labour productivity (quantity produced per hour worked). Such increases entail a fall in labour costs (as the ratio between hourly earnings and productivity falls) and an increase in both unit and total profit. At the same time, when effective demand for their products increases employers will seek to take on more workers: they will succeed in doing so at the same or only slightly higher wages if unemployment is relatively high, but they will have to pay higher wages if unemployment is low. When wages per hour rise at the same rate as hourly productivity the relative shares of profits and wages will not change unless raw material or product prices do so; when wages increase more rapidly than productivity the share of profits falls. Assuming a constant capital-output ratio a fall in the share of profits entails a fall in the rate of profit (see section 7 above). If the rate of profit falls below the minimum level, many firms will cut investment and there will be a general recession: unemployment will again rise above the frictional level and the rate of increase of wages will begin to fall. (The minimum level of the rate of profit may be taken to be near to the long-term rate of interest). Trade Unions exert continuous pressure to raise wages, above all by collective bargaining: during depressions they try to prevent wages falling and, if the cost of living rises, they seek to keep them in step. When productivity increases rapidly, Union claims find less resistance from employers who, indeed, often increase wages of their own accord in order to keep their labour force and to attract new workers, and then the "wage drift" makes its appearance ([12]). In short, there are two limits to wage variations; an upper limit, given by that rate of increase in wages which, allowing for gains in productivity per hour, will bring the rate of profit down to the minimum acceptable to firms; and a lower limit given by changes in the cost of living. Both limits will therefore change over time, because of changes in productivity and in the cost of living. As the variation of the upper limit, influenced by changes in productivity per hour, is not the same everywhere, we must expect different rates of change of wages between different industries and, indeed, between firms in the same industry when actual total earnings are considered. (It is important to note that the differentials of wage changes and the price movements of individual products tend to iron out differences in the rates of profit between industries: but this tendency only operates fully in those industries where barriers to entry are not very high and only in the long period). All in all, variations in money wages depend basically on three factors: the level of unemployment, changes in the cost of living and changes in productivity per hour. We use the reciprocal of unemployment since, as Phillips has shown, equal percentage changes have different effects at different levels: a 2% change from 10% to 8% has for example a weaker effect in pushing up wages than a change from 3.5% to 1.5% ([13]). The relation is ([14]):

([12]) In the empirical analysis presented in the second section, actual earnings per hour have bern adopted and the problem of the relationship between the former and contractual wages has been neglected. In the author's view, the wage drift is essentially due to competition between employers to hold workers or to attract labour and is largely independent of the absolute level of contractual wages (which is mainly due to Trade Union pressure). Competition among employers in the labour market may for example raise actual carnings 10% over the contractual level; this 10% increase would occur, in the author's opinion, whether the contractual level were 100 or 90 or 110: it is due to rivalry between employers in a relatively tight labour market.

([13]) The full titles of Phillips's study and of other empirical studies quoted in the text are given in the Appendix.

([14]) Various economists have proposed equations of this type; some stress unemployment (Phillips and others), others, like Kaldor, profits, and others (Lipsey, Perry) occupy an intermediate position. The difference between their work and the present study lies not so much in the variables considered as in the analysis of the links between the independent variables and the rate of change of wages.

$$\dot{S}^i = a + bD^{-1} + c\dot{V} + d\dot{\pi}^i \ .$$

In this paper the rate of change of the cost of living, $\dot{V}$, and productivity per hour, π^i, are the lower and upper limits, respectively, for wage increases; unemployment, *D*, influences the relative strength of the two opposing groups, workers and employers, and therefore helps to determine at what point in the range fixed by the two limits wages will settle. (Unemployment does not entirely eliminate the area of indeterminancy: Unions, like Employers' Organisations, do not react automatically to objective — favourable or unfavourable — factors, but to a greater or lesser extent use their discretion, which may be affected by legislative or administrative action on the part of the public authority). The two variables determining the range of money wage increases do not work symmetrically. Let us take the cost of living first. There is no doubt that Unions plead cost of living increases, if any, when renegotiating wage agreements at national or firm level. If, as is the case in Italy, wage contracts automatically include an escalator clause it is clear that an increase in the cost of living causes an increase in wages. It is not however clear that both will increase in the same proportion. Does a one percent increase in the cost of living result in a one per cent increase in wages? This question can only be answered empirically. In general we can expect that the coefficient of the cost of living variable in the equations expressed in rates of change is higher in those countries where an escalator clause is generally applied in wage contracts than in those countries where it is not. Where such agreements are standard practice, wage increases obtained at the bargaining table because of increases in the cost of living are *over and above* those automatically ensured by escalator clauses. This fact, we must point out, does not necessarily have inflationary effects since, as we shall see, within certain limits a wage increase encourages production without pushing up prices. Unlike the cost of living, productivity per hour, which is here taken as the upper limit for wage increases, works discontinuously: it puts a brake on wage increases when they become such as to force the rate of profit of a considerable number of firms below the minimum level (approximately the long-term interest rate). Productivity increases cannot play, as an upper limit to wage rises, the same role as the cost of living: changes in the latter affect all workers in the same way, whereas the former, which influence each firm's ability to pay, are not the same for all firms. It is therefore doubtful that a clear relationship can be found between the yearly changes in wages and in productivity. Such a relationship may perhaps exist when the effective rate of profit of a large number of firms is near the minimum level and wage increases are continually bumping against the upper limit, or when rates of profit do not differ widely. In any case, this type of problem arises when we seek to explain the *average* trend of wages. From a theoretical point of view the problems of variations in *average* wages must be kept clearly distinct from those of variations in the wages actually paid by individual industries. Thus there is no doubt that changes in productivity per hour, insofar as they affect the firms' ability to pay, must somehow also affect the wages actually paid by firms whenever Trade Unions have acquired any power. This link may not however be apparent in *average* variations in wages and productivity, whereas it might become clear in a disaggregated analysis. As a matter of fact, it seems that in Italy, in periods of rapid economic progress, there is a high rank correlation between individual industries ordered according to the rate of increase of hourly earnings and of productivity; which means that the more dynamic industries productivity-wise are also the more dynamic from the wages point of view and are presumably those which have pushed up *average* wages in the period. We shall return to this point in the second part, where we shall also consider other relationships which may help to elucidate some problems of differential wage variations (II, § 5). In the model, for simplicity's sake, we shall concern ourselves only with changes in average wages.

9. *Two determinants of wages: the cost of living and unemployment*. The cost of living is an index made up of the retail prices of commodities, services and rents. Let us begin with the retail prices of

commodities. Conditions of imperfect oligopoly seem to prevail in retail trade. The small shopkeeper is in direct competition with a few others, mainly those in the direct neighbourhood: the whole system of retail trade is made up by the chain of these small oligopolistic groups ([15]). The boundaries existing between each group — and even within the same group — are the "imperfections" discussed in the theories of imperfect or oligopolistic competition. The retailer's main cost elements are the wholesale prices of the commodities he buys and labour costs — the relation, that is, between wages and labour "efficiency" in retail trade ([16]). This "efficiency" can be expressed as the ratio between the volume of consumer goods sold and the number of employed workers. That is,

$$P^m = a + b\,P^g + c\,\frac{S^c}{\pi^c}$$

where P^m and P^g are, respectively, the retail and wholesale price indices, S^c is the index of wages in retail trade and π^c the index of relative "efficiency" determined by C/O^c. If wholesale prices remain stationary but labour efficiency rises less than wages, the cost of labour increases. Italian. experience has shown that, in the retail trade, efficiency increases more rapidly in periods of rapid industrial development: young workers with some sort of job in trade prefer to move, if they can, into industry, where pay and prospects are generally better; this tends to reduce overcrowding in trade and to increase efficiency. This happened in Italy during the boom of 1959-1963. In general, however, efficiency in the retail trade has increased less rapidly than in industry; this has contributed to the increasing gap between wholesale and retail prices ([17]). The mechanism of retail price changes can only be understood when it is considered that foreign competition is totally absent and that domestic competition is less sharp than in the wholesale markets of industrial products. It is therefore probable that cost increases are entirely shifted onto the consumer, so that the mark-up remains constant when costs increase. When, instead, costs fall the mark-up should increase because, owing to market imperfections, the fall in costs is not passed onto the consumer. We can therefore expect asymmetrical variations: the mark-up q will be constant when costs increase and will increase when costs fall. As in the case of industrial prices, the behaviour of q results directly from the sum of coefficients of the rates of change of variable commercial costs. Concentration increases efficiency in retail trade and greater efficiency shows itself in smaller retail margins. In other words, where large-scale organisations — supermarkets, chain stores, etc. — prevail, margins will be smaller than in economies where small units are the rule. The problem of retailing inefficiency is, in Italy, particularly serious in the food sector. Though the spread and development of large scale units can only be a gradual process, public intervention can be effective in reducing inefficiency, particularly, as we have seen, in periods of rapid industrial progress. Large scale retail units can exert a competitive pressure and reduce the gap between retail and wholesale prices only if they have come to cover a sufficiently large share of retail sales, so that competition among them has become relatively strong; otherwise they will not lower prices but only profit from their lower selling costs. This point is of great importance, not only from the consumers'point of view but also — which is more important — from the point of view of development: an increase in the cost of living due to an increase in retail prices results in an increase in money wages of no benefit to the worker, whose purchasing power remains unchanged, and of possible harm to the producer whose labour costs rise. The positive effect which an increase in wages might have on

([15]) See T. N. WOLFE (who quotes KALDOR), "The Problem of Oligopoly ", *Review of Economic Studies*, 1953-54, n.56, p. 181.

([16])Strictly, the " cost of labour " can only refer to shopkeepers employing paid assistants; for the others the "cost of labour" is at most a hypothetical term, not necessarily valid in the short period. It should be added that retail prices are probably also influenced by indirect taxation. Such an influence, however is likely to manifest itself only in a disaggregated analysis.

([17])In Italy, wholesale prices remained, on average, stationary between 1953 and 1961, retail prices rose about 1.5% per year and the cost of living (which also includes services and rents) about 2.5%.

development (an increase in demand) is nullified by the increase in retail prices. Rents also enter into the cost of living. Here, too, markets are typically imperfect and, as in industry and retail trade, price variations depend mainly on variations in costs and not on demand. More precisely, the price of housing depends on building costs and on those of sites. Changes in demand, while not influencing the price of housing directly, do affect the price of land. The demand for such land depends on the rate of urbanization; its supply, though influenced by the physical scarcity of land, mainly depends on the speed with which the infrastructures necessary to turn agricultural land into building land are created. The price of land has no production costs behind it, it gives rise to Rent or, more precisely, to a monopoly gain, since every plot is different from every other ([18]). If we want to explain variations in rents we should therefore resort to a system of two equations: in the first rents (or house prices) vary as a function of the components (wages, productivity, the price of building materials) of production costs proper and of the price of sites; this latter price in turn would be explained as a function of internal migration and of the speed with which infrastructures are created. This model however could hardly apply to the whole country; it would have to be worked out for individual zones. In Italy in the period we are considering, legally regulated rents had a preponderant influence in the cost of living index used in escalator clauses; rent restrictions, moreover, were gradually eased over the period: owing to these facts and to the degree of public activity in the field of popular housing, rents are considered as an exogenous datum in the model illustrated in the second part of this paper. Lastly, the level of wages is influenced by unemployment which in turn may be considered a function of investment. Thus, we accept Keynes'proposition that, with a relatively stable propensity to consume, the level of employment will increase only *pari passu* with the increase in investment ([19]). This proposition is of course to be qualified if, unlike Keynes, we admit: 1) that the working population is increasing and 2) that there is technical progress. The first proviso implies that the absolute changes in employment are not equal to those (of opposite sign) of unemployment; the second implies a constant level of employment for a given increase in investment. These qualifications do not prevent the existence of a functional relationship between unemployment and investment, though they affect its shape. In accordance with the assumption, made throughout this work, that the important movements of the entire economic system depend on industry, we shall consider industrial investment as the independent variable, while the whole of non-agricultural unemployment will be treated as the dependent variable: in the short period the movement of employed and unemployed workers between industry and other non-agricultural activities is relatively free ([20]) and we may consider non-agricultural unemployment as a relatively homogeneous aggregate.

10. *The problem of the optimum wage increase.* According to employers, the less money wages increase ([21]) the better for growth: the optimum would seem to be constant wages and rising productivity. Profits would rise, and profits are both the incentive and the source of investment: the bigger the profits the greater the investment and the more rapid, therefore, the growth process. We may call this the "empioyers' view ". The Trade Unions maintain, on the other hand, that the more rapidly wages rise the more quickly the market expands and the faster, therefore, is the growth process, which also benefits from the faster technical progress induced by strong and continuous pressure from wages. If bottlenecks (monopolistic barriers, inflexibilities of supply) impede progress it is the Government's duty to remove them. This is a much simplified but, we hope, not misleading picture of the two points of view. The relative validity of the two opposing points of

([18]) Cf. A. BREGLIA, *Reddito sociale*, Ateneo, Roma, 1965, XXI. A simple but effective measure of the behaviour of building "rent" is given by the ratio between the index of average rent for a certain town and the index of building costs; when the ratio is constant building "rent " is unchanged, an increase means that the price of sites, and hence building "rent", is rising.

([19]) General Theory, pp.98 and 113.

([20]) Obstacles to the movement of workers from agriculture to other activities are considerable, only the building industry absorbs agricultural workers at all readily.

([21]) The hypothesis of falling money wages appears unrealistic in present conditions and is not considered.

view — wages as costs or wages as incomes appears from the preceding analysis. As we have seen, if industrial wages rise more than productivity — raw material prices remaining constant — direct costs will increase by *more* than prices. Profits will fall and industrial investment slacken. On the other hand, wage changes, together with changes in the number of dependent employed workers, cause changes in the total wages bill. If these workers have a stable propensity to consume approximating to unity, changes in the wages bill induce almost equivalent changes in the demand for consumer goods. This in its turn causes a fall in unused capacity and thus stimulates investment. That is:

$$\dot{R} = a + b\dot{S}^i + c\dot{O} \qquad U = a - b\dot{C} - c\dot{I} - d\dot{E}^i$$

$$\dot{C} = a + b\dot{R} \qquad \dot{I} = a - bU + cG + d\dot{G} + cL$$

$\dot{S}^i$, U, $\dot{C}$, $\dot{I}$ and $\dot{E}^i$ we have already encountered, O is the employment of dependent labour and R dependent labour income. (The dot above the symbol indicates, as usual, the rate of change). These all enter into the model and illustrate the "Trade Union view". There is finally the problem of the balance of payments: imports of consumer goods and, indirectly, of investment goods vary with changes in wages and in consumer demand. Industrial exports are influenced by income growth abroad and by the behaviour of costs, which determines prices and is itself influenced by wage changes. A wage increase outrunning that in productivity may create a bilance of payments deficit which in various ways (see Part II, § 3 below) can slow down and even temporarily arrest the process of development. On the other hand, only in the short run will a slower increase in wages than in productivity encourage exports by reducing costs and prices and inducing producers to seek new outlets abroad. In the long run, as we shall see later, sluggish wage rises encourage neither exports nor development because they hinder the expansion of consumption and investment and eventually check the rise of productivity itself. A stagnant or sluggish internal market does not, moreover, encourage the diversification of production necessary for export growth. Thus too rapid and too slow wage increases both create problems: in the first case the squeeze on profits and/or balance of payments difficulties put a brake on the growth process; in the second case the problems arise from an insufficient expansion of consumption and investment. For the purposes of growth, the optimum rate of increase of wages is that which promotes the expansion of demand without causing a profit squeeze and a growing deficit in the balance of payments. At first this "optimum rate" might seem to be the same as the rate of increase of productivity: if wages and productivity rise at the same average rate, labour costs do not rise and profits are not squeezed while at the same time consumption and investment grow. This, however, is not necessarily the case. We must again make a distinction between the short and long period. If, in the short period, changes in productivity can be assumed to be independent of changes in wages and employment, this is not true in the long period. Take the short period first. There are at least three exceptions to the rule that the "optimum" increase of wages is that which coincides with the (given) increase in productivity. First, a faster increase in wages than in productivity may not push up costs and squeeze profits if the price of imported materials is declining. Secondly, when wages and productivity rise at the same rate, the *share* of profits remains constant, but the *rate* of profit will only do so if the capital-output ratio does not change; otherwise if the *rate* of profit is to remain the same, wages must grow at a different rate from productivity (see 7 above). Thirdly, if wages should fall behind productivity, the expansion of consumption and investment need not be affected if foreign demand is at the same time growing more rapidly ([22]). In the short period therefore the optimum rate of increase of wages

([22])This happened in several years between 1953 and 1960. Wages between 1961 and 1963, instead, rose "excessively" with adverse effects on the economic situation in 1964. This was only the second instance — the other was 1906 and 1907 — of an "excessive" wage rise in the century which has elapsed since the Unification: the evil has usually been the opposite — wages have usually risen too slowly. (The example of 1906-07 has been pointed out by G. Fuà).

— optimum from the point of view of development does not necessarily coincide with the actual rate of increase of productivity but will usually be close to it, except for notable changes in the countervailing forces. Productivity increases cannot be assumed to be independent of wage changes and employment in the long period: we must here distinguish between economies with heavy structural unemployment and those where structural unemployment is absent ([23]). Heavy structural unemployment usually entails a low rate of increase of wages; static or nearly static unemployment will slow down increases in overall consumption and hence in investment. In the long period a low rate of growth of wages may damp down productivity increases, as the speed of mechanisation is infiuenced by the expansion of investment and the intensity of wages pressure ([24]); technical progress is also checked by the slow growth of income as a whole of which consumption is the largest part. In such cases public measures to increase wages and raise the propensity to consume of the various income groups will have positive effects on investment and on productivity. If, however, the rate of increase of wages is repeatedly and frequently higher than that of productivity, the internal and external difficulties mentioned above will check the increase in productivity and growth in the long period as well. The problem of wage increases is therefore more complex in the long period. While it is still true that wages and productivity must grow at about the same rate, it should be remembered that the behaviour of the two cannot, in the long period, be considered independent: occasional *temporary* and limited divergences between the two rates may encourage the growth process.

11. *Changes in distributive shares*. The equality between the rates of growth of wages and productivity, at given raw materia1 prices and at a given level of plant utilization, may seem to imply a constant distribution of income between wages and profits. This is almost exactly true for the industrial sector alone, but when we look at the economy as a whole we must consider, not two, but four distributive shares —— wages and salaries, profits (includine interest), rents (particularly building rents), and the income of the self-employed. To some extent, this last is a pre-capitalist survival which cannot be broken down to fit into the three traditional categories (wages, profits, rent) of the modern capitalist system, whereas rent in a strict sense and self-employed income, though scarcely relevant in the industrial sector of a modem economy, may be important in the economy as a whole. Considering the income shares in the economy as a whole, it is clear that an increase in the share of wages and salaries does not necessarily imply a fall in the share of profits as both might rise at the expense, for example, of the self-employed ([25]). This point is of great importance, since most distribution models consider only the two shares of wages and profits, and conclusions or forecasts as to the trend of overall consumption, as well as of consumption and savings propensities, are often based on changes in the share of dependent labour income. An increase in this share is not necessarily followed by a fall in the average propensity to save, even if we accept as we do — that the propensity to save of dependent labour is sensibly lower than that of "capitalists " (out of profit and interest incomes). Thus the fact that in Italy, from 1953 to 1960, the share of dependent labour income and the share of private saving increase together does not disprove the hypothesis that wage and salary-earners have a notably lower propensity to consume than the "capitalists"; the likely explanation is that the self-employed, whose relative share fell in the period, have a propensity to save about as low as that of dependent workers ([26]). The relevant shares are therefore four, though we have here devoted most of our attention to two — wages and

([23]) L. Meldolesi suggested this distinction, which also forms one of the premises of GAREGNANI'S *Note su consumi, investimenti e domanda effettiva.*

([24]) See R. ROSTAS, *Comparative Productivity in British and American Industry*, Cambridge University Press, 1948.

([25]) This probably happened in Italy between 1951 and 1960: the share of wages and that of industrial profits both increased, while the share of self-employed income fell, mainly because the number of this kind of workers declined. The shares of both wages and profits would have increased more if the share of building rents had not also risen.

([26]) The common opinion that the savings propensity of the self-employed is appreciably higher than that of dependent workers is based on the behaviour of heads of households and not on that of dependent workers as a whole; the savings propensity of the numerous family workers in the category is probably very near unity, though the question needs much more statistical study.

profits — because our interest has been concentrated on industry. The trend of the share of wages in income has been much discussed. Contrarily to a once widely-held conviction, this share, instead of remaining constant in the long period, appears to have risen considerably, mainly — but not only — as a result of the progressive fall in the number of self-employed and of a corresponding increase in the number of wage-earners. If this is so, it is probable that the share of profits and interest is relatively stable in tht long-term. Such stability would be the work of the contrasting forces, described above, which influence the behaviour of wages and profits: wages cannot grow faster than productivity for long because at some point the system will react negatively, investment will fall, unemployment will rise and the increase in wages wil1 be checkcd. In the opposite case when productivity increases faster than wages — the growth process, though not coming to an abrupt end, will slacken, owing to an insufficient increase in demand. But this cannot continue very long because not only the rate of development but also the rate of increase of productivity will fall: the gap between the ìncrease in wages and the increase in productivity will gradually lessen and the share of profits will cease to grow. In short, in a capitalistic system an increase in the share of wages (unless it is due to shifts from the non-dependent to the dependent labour category), or an increase in the share going to proflts and interest, is only possible within certain limits.

12. *Investment and economic relations with the rest of the world.* We have already briefly considered two ways in which foreign economic relations influence industrial investment: through changes in industrial exports which affect the degree of unused capacity, and through the behaviour of the balance of payments which affects total liquidity. We must now consider the behaviour of the main items in the balance of payments ([27]). The most important invisible items in the Italian balance of payments are tourist income and capital movements. Earnings from tourism increase more or less steadily: if retail prices do not rise much more sharply than those of other countries we may expect this trend to continue, since it depends on the growth of average per capita income in other countries and on transport facilities. Capital movements, following a distinction made by Marco Fanno, may have a normal or abnormal character ([28]). Normal movements of long- and short-term capital depend on the rates of interest and profit throughout the world. Movements of long-term capital seldom oscillate greatly from year to year. The Central Bank has a decisive influence on short-term movements both via interest rates and by direct intervention with the commercial banks ([29]). It may therefore be assumed that swings in these capital rnovements will be particularly relevant only when the Central Bank chooses to allow them as means of reinforcing or offsetting total liquidity changes induced by "objective factors ". Hence, important short-term capital movements may be considered as one of the means adopted by the Central Bank to carry out a restrictive or expansionist policy; in other words, this is a possible manifestation of that discretionary element introduced into the model by means of the "dummy variable" in the equation for liquidity. Abnormal capital movements are often associated with political factors: with periodic waves of mistrust unleashed by fiscal or economic measures considered with disfavour by the capitalists. The most important abnormal capital movements today seem however to be those set off by expectations of devaluation following a serious balance of payments crisis, and therefore they depend on the previous behaviour of the balance of payments. Since the other invisible items either move according to a fairly well-defined trend or are relatively stable, the balance of payments tends to move with the trade balance (even if the sign is not necessarily the same). We may therefore concentrate our attention on changes in the trade balance, at least for a country like Italy ([30]).

([27]) This section profits from ideas put forward by Franco Modigliani in a seminar at the Bank of Italy in April 1965, and from a largely empirical study by Sergio Sgarbi, who fitted the "foreign"equations in the model.

([28]) M. FANNO, *Normal and Abnormal International Capital Transfers*, University of Minnesota, Minneapolis, 1939.

([29]) F. MASERA, " International movements of bank funds and monetary policy in ltaly ", *Banca Nazionale del Lavoro Quarterly Review*, December 1966.

([30]) For our purposes (the trade balance is one of the determinants of liquidity) it is the *direction* of changes in the trade balance, not its level or its sign, which is important; since the trade balance and the balance of payments are assumed to move together, the inclusion of the trade balance alone simplifies the model.

Imports vary with changes in income and in the ratio between domestic and world prices. More precisely, exports of consumer and investment goods depend on consumption and investment demand respectively. Visible exports vary directly with changes in world demand and inversely with the ratio between domestic and world prices.

$$IM^C = a + bC + b\frac{P^C}{P^{MC}}$$

$$IM^I = a + bI + b\frac{P^I}{P^{MI}}$$

$$E = a + bDM - c\frac{P^E}{P^M}$$

where P^E are export prices and P^M world prices. If internal prices changes are moderate and near to those prevailing elsewhere, we may expect that domestic income (or world demand) will be the major factors in determining changes in imports (or exports). It should also be remembered, when considering the ratio between domestic and world prices, that the export price of a product may differ from the price at which the same good is sold on the home market. Even in the absence of customs duties various factors can be responsible for such a difference: transport costs, for instance, or marketing advantages which the domestic producer enjoys in his own territory due to his knowledge of local usage and law, his possibilities of making long-term contracts with retailers, or his control of the distributive system. As a result, export prices rise less than domestic prices, or do not rise at all, in inflationary periods. Exports are also influenced by the trend of internal demand: if this is growing rapidly and if prices are rising, producers will find it expedient to dispose of their increasing production on the easier and more profitable home market. Exports, therefore, depend on world demand and on the ratio between domestic and world prices, and also on internal demand.

Empirical Aspects

1. *Preliminary questions: reliability of the data; economic significance of the aggregates.* The reliability of the data used is very important. The mere fact that empirical verification does not confirm a theoretical hypothesis may not mean that the hypothesis is invalid: responsibility may lie with the terms of its formulation, the suitability of the series used, or — what concerns us here — the reliability of the statistics. We have here adopted two criteria in judging the reliability of the data. Firstly, the reliability of economic statistics is influenced both by the manner of their compilation and by the facts underlying them. Employment and unemployment figures — particularly those regarding agriculture — and the average prices of agricultural products are among the most unreliable. Secondly, variations are always more reliable than absolute levels. The question of statistical reliability partly overlaps that of the logical meaning of aggregates and averages. The problem of aggregation should be considered case by case; in some cases aggregation is only possible or meaningful if the behaviour of the basic series is of one type and not another. For example, the aggregation of direct costs at the level of the individual industry or for the industrial sector as a whole is logically only possible if we accept that total cost is a linear function of output (that is if marginal cost is constant). Apart from these cases, aggregation influences the values of the parameters and of the constant in the equations and makes their interpretation problematic: if the relationships considered have a real economic meaning, however, they are neither disguised nor obscured by aggregation.

2. *The model for the italian economy.* The hypotheses behind the equations used and, in sme cases, the specific forms that they should take, were outlined in the preceding section. Here therefore we

shall only reproduce the model (see Table 1) and comment on the equations fitted, particularly on those which for some reason differ from what theoretical analysis would have led us to expect. This model is only a first attempt to combine theoretical and empirical analysis into an organic whole, and the author, who is not an econometrician, is aware that it has various limitations ([31]). Works of this kind are, however, rare, particularly in Italy; if the attempt is fruitful, other better-equipped students can make more comprehensive and sophisticated studies and establish what results are generally valid for all industrial countries by comparison with them.

THE MODEL - EQUATIONS FITTED

(with the econometric collaboration of Dr. Elio Ugonotto)

TABLE 1

			R^2	t (coefficients)				Significance %				DW**
1	Agricultural prices	$P_A = 122.400 - 0.774\ O^d + 0.772\ C^v$	0.927	6.69	3.35			99	99			1.57
2	Industrial prices	$P_I = 48.738 + 0.249\ S^i - 0.223\ \pi^i + 0.492\ M$	0.908	5.91	4.94	3.55		99	99	99		1.35
3	Industrial investment	$\dot{I} = -64.381 + 0.761\ G - 2.553\ U + 0.832\ \dot{L}$	0.989	5.59	7.34	1.97		99	99	95		1.82
4	Unused capacity	$U = 13.353 - 0.521\ \dot{C}^e - 0.158\ \dot{I} - 0.113\ \dot{E}^i$	0.811	1.81	3.23	2.73		95	99	99		1.74
5	Industrial profits	$G = -3.703 + 1.155\ P_I - 0.793\ S^i + 0.706\ \pi^i$	0.927	3.83	7.68	6.80		99	99	99		1.82
6	Total liquidity	$\Delta L = 899.835 + 2.096\ SA + 1.064\ \Delta T + 1.520\ \Delta R + 702.815\ B$	0.978	11.39	3.23	19.89	8.35	99	99	99	99	1.43
7	Industrial wages	$\dot{S}^i = -0.621 + 18.903\ D^{-1} + 1.198\ \dot{V}$	0.855	6.61	18.19			99	99			2.09
8	Wages in the retail trade	$S^e = 37.427 + 0.572\ S^i$	0.988	22.71				99				—
9	Retail prices	$P_m = 30.134 - 0.122\ \pi^e + 0.455\ P_E + 0.375\ S^e$	0.987	1.43	4.24	8.14		90	99	99		1.89
10	Non-agricultural unempl.	$D^{-1} = 0.083 + 0.041\ I$	0.910	11.51				99				—
11	Dependent labour income	$\Delta R = -26.003 + 129.170\ \dot{S}^i$	0.787	6.65				99				—
12	Private consumption	$\Delta C^v = 0.845 + 0.005\ \Delta R$	0.904	10.70				99				—
13	Imports	$IM = -19.878 + 0.760\ C^v + 0.396\ I$	0.979	9.67	4.16			99	99			1,28
14	Exports	$E = -67.013 + 1.679\ DM$	0.983	26.97				99				—
15	Industrial exports	$E^i = -3.076 + 1.027\ E$	0.998	219.50				99				—

IDENTITIES AND DEFINITIONAL EQUATIONS

1	Wholesale prices	$P_E = 0.204\ P_M + 0.796\ P_I$	6	Private cons. at current prices	$C^v = \Delta C^v + C^v_{t-1}$
2	Industrial investment	$I = \Delta I + I_{t-1}$	7	Private cons. at constant prices	$\Delta C^c/\Delta C^c_{t-1} = 0.906\ \Delta C^v/C^v_{t-1} - 0.724\ \Delta V/V_{t-1}$
3	Industrial wages	$S^i = \Delta S^i + S^i_{t-1}$			
4	Cost of living	$V = 0.934\ P_M + 0.061\ A$	8	Trade balance	$SA = 31.08\ E - 42.98\ IM$
5	Cost of living	$V = \Delta V + V_{t-1}$			

*

([31]) For example: unlike in the real world, almost all the relationships in the model are linear, hence they are only valid for moderate changes in the various quantities.

* Dr. Ugonotto gave fundamental econometric help in the estimation of the parameters and, in part, in the specification of the relationships; he supervised the proparation of the programmes, organised the statistical data and helped in their collection, choice and analysis; he instructed those who joined the project at a later stage helped to free the reduced form of the model of the inevitable formal imperfections resulting from its long gestation and to complete the links necessary for its correot functioning; his collaboration lasted for the fifteen months of the statistical verification and was financed by the C.N.R.

Dr. Ugonotto will present and comment on the reduced form of the model in a forthcoming article. The results seem positive: for example, the model "foresees " the recessions of 1958 and 1964 satisfactorily.

** The Durbin-Watson test does not indicate the presence of positive or negative autocorrelation in any case; in five instances however (equations 2, 4, 6, and s) the test is indeterminate far a positive autocorrelation: it neither suggests nor excludes it.

SYMBOLS

Endogenous variables.

P^a	=	farm prices (here considered as equal to agricultural wholesale prices)
P^i	=	wholesale industrial prices
P^g	=	wholesale prices
G	=	index of the share of profits (manufacturing industry)
P^m	=	retail prices
V	=	cost of living
S	=	hourly earnings in manufacturing industry
C	=	personal consumption (v = at current prices; c = at constant prices)
R	=	dependent labour income
I	=	industrial investment (at constant prices)
D	=	percentage of non-agricultural unemployment
U	=	percentage of unused capacity (manufacturing industry)
L	=	total liquidity (ΔL: first differences at end-year)
IM	=	total imports at current prices
E	=	total exports at current prices
E^i	=	industrial exports at current prices
SA	=	trade balance

Exogenous variables.

O^d	=	supply of agricultural products (home production + net imports)
π^i	=	index of hourly productivity in industry
π^c	=	index of productivity in retail trade
A	=	index of rents
T	=	net indebtedness of the Treasury
B	=	dummy variable, liquidity equation (1961 and 1962 = + 1; 1951 and 1964 = − 1; other years = 0)
DM	=	world demand
M	=	index of raw material prices

Other simbols: • rate of variation; Δ first difference; time index *t*.

The equations have been estimated on the basis of statistical series for the period 1951-1965; each equation has been separately fitted by the least squares method. For each coefficient we give its *t* (how many times the value of the coefficient is greater than the standard error) and the significance of the coefficient itself (per cent probability that the value obtained is not a random value). In some equations the variables are absolute values, or index numbers expressing absolute values, in others they are rates of change or first differences. The theoretical reasons for the choice of one or the other form have been given in the preceding section. In general, absolute values have been avoided when the variables to be explained and all (or some) of the independent variables show an obvious trend: in these cases the risk of multicolinearity is high and is best avoided by using rates of change or first differences ([32]). Both equations in abso1ute values and equations in rates are therefore used in the model: hence the necessity for a number of identities to transform absolute levels into rates of change and vice-versa. Some of the equations used are similar to or identical with equations already used by others (those for industrial prices and wages for example); others imply almost intuitive links and hardly need comment; others instead are here proposed for the first time (agricultural

([32]) To simplify the mode!, absolute levels have been used in three cases where rates of change or first differences would have been indicated; as a check, subsidiary equations using rates of change were also fitted in all three cases.

prices, retail prices of goods, industrial investment, total liquidity). Some subsidiary equations have also been fitted in order to verify a particular hypothesis or to eliminate or reduce uncertainties in the equations of the model itself (see Table 2). Comments follow the order and the numbering of the equations used in the model: "subsidiary" equations have the same number as the corresponding equations in the model and also bear a letter.

SUBSIDIARY EQUATIONS — TABLE 2

			R^2	t (coefficients)			Significance %		
1a	Agricultural prices	$\dot{P}_a = -119.918 - 0.017\ \dot{O}^i + 0.751\ \dot{C}^v$	0.917	5.99	2.93		99	99	
1b	Agricultural prices	$\dot{P}_a = 108.512 - 0.503\ \dot{O}_a + 0.514\ \dot{C}^v$	0.892	3.13	6.08		99	99	
1c	Agricultural prices	$\dot{P}_a = 117.223 - 0.378\ \dot{O}_a + 0.264\ \dot{C}^c$	0.909	2.96	6.77		99	99	
1d	Fruit and vegetable prices	$\dot{P}_o = 68.256 - 0.377\ \dot{O}_o + 0.761\ \dot{C}^v$	0.862	2.06	5.30		95	99	
1e	Meat and dairy prices	$\dot{P}_z = 112.553 - 0.360\ \dot{O}_z + 0.223\ \dot{C}^v$	0.822	3.26	6.01		99	99	
2a	Prices of industrial goods	$\dot{P}^i = 0.084 + 0.400\ \dot{L}^i + 0.386\ \dot{M}$	0.758	3.85	4.25		99	99	
2b	Furniture prices	$\dot{P}_{mo} = 2.274 + 0.186\ \dot{S}_{mo} - 0.516\ \dot{\pi}^{mo} + 0.635\ \dot{M}_{mo}$	0.953	1.80	4.72	7.70	90	99	99
2c	Textile prices	$\dot{P}_e = 1.564 + 0.322\ \dot{S}_e - 0.325\ \dot{\pi}_e + 0.364\ \dot{M}_e$	0.703	3.17	2.54	2.24	99	95	95
3a	Industrial investment	$\dot{I} = 39.188 - 1.932\ U + 0.840\ G - 1.099\ i$	0.867	4.07	4.21	0.73	99	99	75
6a	Total liquidity	$\Delta L = 818.139 + 1.195\ SA + 1.140\ \Delta T + 1.518\ \Delta R$	0.828	3.94	1.29	6.29	99	90	99
7a	Industrial wages	$\dot{S}^i = 5.567 - 0.463\ D + 1.386\ \dot{V}$	0.837	2.53	5.20		99	99	
7b	Industrial wages	$\dot{S}^i = 2.020 - 0.396\ D + 1.488\ \dot{V} + 0.381\ \dot{\pi}^i$	0.883	2.38	6.15	1.99	95	99	95
7c	Industrial wages	$\dot{S}^i = 4.830 + 15.878\ D^{-1} + 1.201\ \dot{V} + 0.403\ r_{t-1}$	0.887	2.01	4.37	1.36	95	99	90
9a	Retail prices	$\dot{P}_m = 1.483 + 0.740\ \dot{P}_g + 0.211\ \dot{L}^c$	0.722	1.97	4.99		95	99	
9b	Retail prices	$\dot{P}_m = 0.067 + 0.620\ \dot{P}_g + 0.359\ \dot{S}^c$	0.793	3.00	4.64		99	99	
10a	Non-agricultural unemployment	$D = 17.055 - 0.158\ I$	0.866	9.17			99		
11a	Dependent labour income	$\dot{R} = 1.530 + 0.861\ \dot{S}^i + 1.360\ \dot{O}_n$	0.753	5.72	3.24		99	99	
11b	Dependent labour income	$\Delta R = -239.559 + 67.545\ \Delta S^i + 1.258\ \Delta O_n$	0.842	7.48	2.85		99	99	
13a	Total imports	$\dot{IM} = -50.695 + 21.831\ X + 1.083\ \dot{C}^v + 0.409\ \dot{I}$	0.861	5.32	2.37	2.88	99	95	99
14a	Exports	$\dot{E} = -38.075 + 1.415\ \dot{DM}$	0.666	4.90			99		
15a	Industrial exports	$\dot{E}^i = 36.884 + 1.025\ \dot{DM}^i - 0.399\ \dot{P}^{ie}/\dot{P}^{im}$	0.620	2.75	2.10		99	95	

1a $\dot{O}^i$ = domestic agricultural production.
2a $\dot{L}^i$ = rate of change of the cost of labour: $\dot{S}^i/\dot{\pi}^i$.
3a i = long term rate of interest.
6a Does not include the dummy variable B.
7c r_{t-1} = rate of profit (de Meo), lagged by one year.
9a $\dot{L}^c$ = rate of change of labour costs in retailing: $\dot{S}^c/\dot{\pi}^c$.
11a and 11b $\dot{O}_n$ and ΔO_n = rate of change and first difference of non-agricultural employment.
13a X = dummy variable: 1957-58: −1 (abnormal fall in the value of imports, due to the fall in raw material prices following the U.S. recession); 1959-60: +1 (exceptional rise in imports, probably influenced by the start of the Common Market).
15a $\dot{DM}^i$ = world demand for industrial products, rate of change; $\dot{P}^{ie}/\dot{P}^{im}$: ratio between export prices and world prices of industrial products.

1) The equation for *agricultural prices* has already been discussed in section 2 of Part I. Demand is given by the total flow of private consumption at current prices; the algebraic sum of domestic production and net imports — all quantities measured at constant prices — gives the available supply. It might seem improper to consider net imports in addition to domestic production, since the former partly depend on the demand for consumption goods, which is the other explanatory variable. However, we are considering an *ex post* relation; thus, when the internal demand for agricultural products increases more than production, prices may .remain constant only if an increase in imports causes total supply to rise in proportion to demand. But such an increase may not occur, for various reasons customs barriers and restrictive import policies, transport costs, world-wide scarcities, and others). The price rise in agricultural markets is a precise measure of the tension resulting from disequilibrium between demand and supply, however caused. From this standpoint consideration of total supply, and not only of domestic production, seems justified. In any case, a variant of the equation for agricultural prices using domestic production instead of total supply has been calculated: the result is almost equally good: for the first equation R^2 is 0.927, for the second one 0.917 (equations i and ia). The equations in the model are based on the series of the new National Accounts. Two other equations for agricultural products as a whole have also been fitted using the data of the National Institute of Agrarian Economics (*Istituto Nazionale di Economia Agraria*): in the first the flow of consumable goods is expressed at current prices (as in the equation used in the model), in the second at constant prices. These equations, too, give very good statistical results, both for the R^2 and for the relative1y small standard error of the coefficients (equations ib and ic). Lastly, equations have also been estimated for particular classes of products:

these equations (for fruit and vegetables and meat and dairy products) ([33]) also give statistically positive results (equations id and ie).

2) Direct costs are used as the independent variables in the equation on *industrial prices*. For the sake of linearity, labour cost has been taken as the difference, and not the ratio, between wages per hour and productivity per hour. The index of prices of imported raw materials has been adopted on the assumption that technical progress in their use is negligible, at least in the short period ([34]). The conclusion reached in § 4 that the mark-up should increase when direct cost falls and diminish when the latter increases has been tested by fitting an equation of the type:

$$\dot{P}^i = \alpha \dot{L}^i + \beta \dot{M}$$

where $L^i = S^i/\pi^i$ and the dots over the symbols stand for rates of change ([35]); clearly the mark-up q is constant if $\alpha + \beta = i$, whereas it will vary inversely to direct cost ($L + M$) if $\alpha + \beta < i$. The results confirm the hypothesis: the correlation is good and the sum of the coefficients of the two components of variable cost, equal to 0.79, is less than unity by a non-negligible amount (equation 2a). The result applies to manufacturing industry as a whole. To eliminate the possibility that it is an optical illusion due to aggregation rather than the outcome of a genuine economic relation, it would be desirable to test it at the individual industry level; no easy task, due to the difficulty of collecting homogeneous series of data. To obtain some rough indication, however, the parameters relating to a few individual industries have been calculated; the results are similar to those for the aggregate equations: the sum of coefficients is 0.82 for textiles and 0.69 for furniture (equations 2b and 2c).

3) The equation for *industrial investment* is substantially as expected: investment and total liquidity are expressed as rates of change while the degree of unused capacity and the share of profits in gross industrial income are expressed in percentage terms. (The share of profits and not the rate of profit has been used for the reasons discussed in Part I). The coefficient of the rate of change of the share of profits, which was considered an index of expected profit, is not significant. The hypothesis cannot however be discarded out of hand: non-significance may depend on the data used and not on the absence of a genuine economic relationship. Also the long-term rate of interest (equation 3a) is not significant as an explanatory variable: here however there seem to be valid theoretical reasons for rejecting changes in the interest rate as a relevant influence on investment. As for total liquidity, the rate of change rather than first differences appears to be significant.

4) The equation for the *degree of unused capacity exactly* corresponds to the one expected: the fact that the coefficients of the three independent variables (private consumption, investment and industrial exports) also correspond fairly well to their weights lends credibility to the result. All three variables are expressed in rates of change (see above, I, § 7).

5) Strictly speaking, the relation for the *share of profits* in gross industrial income is not an equation but an identity ([36]). In the model however, it appears as an equation ($G = a + bP^i$ — $cS^i + d\pi^i$), for two reasons: i) some of the data on which the share of profits has been calculated are not homogeneous with respect to those for prices and for the elements of direct costs; 2) this identity

([33]) Other dasses of product could not be considered because the available price and output series were defective. Fruit and vegetable and meat and dairy products are however among the most important groups in Italy at the present stage of economie development.

([34]) Strictly speaking, a suitably weighted average of domestic agricuitural products and of imported raw materials should have been used, since both are external to the industrial sector as a whole; for simplicity, the index of imported raw material prices — which include some agricultural products — has been used.

([35]) The non-linear form presents no difficulties here: it verifies a hypothesis and does not enter the model.

([36]) The behaviour of the share of profit and the rate of profit (calculated by de Meo, see Apppendix I, No. 4) is generally similar, though with variations in the depth of oscillations; 1961 is an exception: a relatively strong dip in the capital-output ratio caused the share of profits to fall while the rate of profit continued to rise (see Part I, § 7).

would have implied a non-linear relation between some of the terms which also appear in other equations, whereas we are interested in a linear relation. In the calculated equation, the coefficient for imported raw materials is not significant and has therefore been omitted. Non significance in this case may depend on the data used or on the fact that the index of imported raw material prices varied only slightly in the period ([37]).

6) *Total liquidity* depends on the state of the balance of payments, on changes in net Treasury indebtedness towards the banks and the public, and on changes in the total wage- and salary-bill. As has been seen, the trade balance may be used in place of the whole balance of payments. Since we are concerned here with the *flow* of total liquidity, we have considered the first differences for total liquidity itself, for Treasury indebtedness and for the wages bill; we have instead used the absolute value (at current prices) of the trade balance. Changes in liquidity, however, cannot be held to depend exclusively and automatically on these "objective" factors: the Central Bank's decisions, although influenced by such factors, can enhance or mitigate their effects to a greater or lesser extent. This discretionary element has been included in the analysis by means of a "dummy variable" to which the values of —i, o, and + i have been given. The variable has been assigned the value of + i in those years in which the Central Bank has unequivocall and deliberately followed an expansionist policy (strengthening any "spontaneous" expansion), the value of — i in years of deliberate credit restriction and a zero value in years of "neutral" policy, when the discretionary element was unimportant because the Bank probably created liquidity as the "objective" factors indicated, without trying to influence their effects on liquidity. The use of annual data requires that we consider the banking policy which prevails over each year as a whole, or at least over the greater part of the year. The values assigned to variables are bound to be somewhat arbitrary and those of other than zero have therefore been used sparingly, only for those years when there were many and unequivocal reasons for doing so ([38]). The dummy variable noticeably improves the fit: the R^2, which is equal to 0.828 without the dummy variable (equation 6a), rises to 0.978 when the dummy variable is introduced and all the coefficients, including that of that variable, have a 99% significance. Technically speaking, the Bank can carry out its expansionist or restrictive policies in various ways; the method most commonly used in recent years has been that of granting, refusing or limiting the commercial banks'power to borrow abroad. The dummy variable in some sense expresses the specific discretionary behaviour of the monetary authority — or, for those who prefer it — of the Governor of the Central Bank. 7) and 8) There are two equations for *wages*: the first for industrial wages and the second for those in retail trade; the latter are "explained" by the former in accordance with our assumption that industry is the mainspring of the economy. The use of absolute levels may be justified despite the risks of multicolinearity (wages show a sharply rising trend) for the second equation, which is subsidiary to the first, but the first equation cannot be treated in the same way and is therefore written in terms of rates of change. Several versions of this equation have been fitted, using the cost of living, non-agricultural unemployment and hourly productivity, or

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([37]) The share of profits in gross industrial income — the variable to be explained — has been calculated with the formula $\frac{VA-W}{VA}$ or $\frac{G^t}{VA}$, where *VA* is value added *W* the wage and salary bill and G^t total gross profits. Since value added is obtained by subtracting from total receipts (P^iX) the total expense for raw material (MX), and the wage and salary bill can be seen as the product of the expense for workers and employees per unit of output $\left(L^i = \frac{S^i}{\pi^i}\right)$ and total output (X), we have:

$$\frac{G^t}{VA} = \frac{P^iX - MX - L^iX}{P^iX - MX} = \frac{P^i - M - L^i}{P^i - M}.$$

This ratio precisely expressed the share of profits in gross industrial income.

([38]) The value of + I has been assigned for 1961 and 1962 and —a for 1951 and 1964. Though the credit restriction began in September 1963, 1963 as a whole has been awarded a zero since expansionary policies were continued into its early months. See P. BAFFI, A. OCCHIUTO, M. SARCINELLI, " Per la storia della politica monetaria in Italia ", in *Letture di politica monetaria e finanziaria*, Banca Popolare di Milano, 1965; P. BAFFI, *Studi sulla moneta*, Giuffrè, Milano, 1965.

industrial profits, among the independent variables: rates of change have been adopted for the cost of living and hourly productivity which show obvious trends, while unemployment and profits have been expressed in percentages. The cost of living (whose changes are taken as the minimum limit of wage variations) and the percentage of non-agricultural unemployment are always significant, as is the rate of change of hourly productivity (equation 7b), although barely so. The doubts expressed for theoretical reasons in section 8, and arising mainly from the large inter-industry dispersion of the rates of change of productivity (and profits) which makes the use of averages of very doubtful validity, are not dispelled by empirical analysis ([39]). The equation including only unemployment and the cost of living as independent variables has therefore been used in the model. For reasons already explained overall non-agricuitural and not merely industrial unemployment has been adopted and the reciprocal of that type of unemployment has been used ([40]). (The R^2 is 0.855 when we use the reciprocal of unemployment, which is in principle preferable, and it is only slightly lower — 0.837 — when we use, instead, the simple unemployment percentage: equations 7 and 7a). The coefficient for the cost of living (rate of change) is greater than one in both the linear (1.39) and non-linear (1.20) variants. Here interpretation is not easy: since we are trying to explain changes in total earnings, and since escalator clauses apply only to contractual wages — usually about 60-70% of total earnings — the coefficient for the cost of living should be about o.6 or o.7. On the other hand, in the first part we considered changes in the cost of living as a floor to wage changes: this hypothesis might appear confirmed by a coefficient greater than one, the "excess" being due to Trade Union pressure which, *ceteris paribus*, increases with the cost of living. The picture however remains cloudy: the coefficient of the rate of change of the cost of living does not in fact need to be equal or greater than one in order to support the "minimum limit" interpretation, which only implies that the actual increase of wages be at least equal to the rise in the cost of living, whatever force brings about this result. In conclusion, no specific economic meaning must be attached to the precise value of this coefficient which depends on the simultaneous action of the factors considered. Furthermore, as we shall see later, the above coefficient may very well be equal to or greatet than one without foreshadowing an explosive wage-price spiral. As in the case of liquidity, a discretionary element — due to the Trade Unions and/or the Government — enters into the determination of wages (I, § 8). Such an element was not included in the model only because no practicable way of setting the values of a dummy variable could be devised. The presence of this discretionary element, however, should not be neglected, though probably its action is usually of little importance ([41]). Formally, it may be held responsible for the greater part of the "unexplained" variances in the wages equation: in particular, in 1962 the estimated value is lower by about four points than the actual value, probably as a consequence of the demonstration effect of the very considerable increase in Civil Servants salaries awarded by the Government. In 1965 and 1966, On the other hand, the estimated values are higher, by 1.4 and 2.0 points respectively, than the real values: the deliberately moderate policies followed by the Trade Unions were perhaps due to their

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([39]) The wages equation has been tested with various profit indices (the share of profits, the rate of profit in the same year, the rate of profit in the preceding year) as well as with productivity per hour. The rate of profit in the preceding year (equations 7c) alone approached significance. The lag might be due to the Unionists'possibility of obtaining notable — or modest — wages rises in year *t* if the end-year profits of year *t*— 1 are notable — or modest. This argument is rather artificial and the coefficient is in any case on the borders of significance. In a similar equation, for the United States, uso for the post-war period, profits are clearly significant (G. L. Perry, pp. 50-51). Calculations made, like Perry's, on a quarterly (or monthly) basis with a three-month lag may be better suited — particularly because moving averages can be used — to the purpose, and this may have influenced Perry's results. There may, however, be a real difference in the behaviour of profits in the two countries because, for example, profits in America may, on average, have moved closer to minimum levels. As has been suggested in the text, the use of averages for this type of relation may not be justified (at least in economies where differences in profits and in profit variations are as wide as those found in Italy).

([40])Since, as we shall see, the reciprocal of unemployment is also used in the equation explaining unemployment, no problems arise in the model due to non-linearity.

([41]) The existence of Trade Unions has much more influence on the structure of the wages equation than on the weight of the discretionary component (sec § 6 below).

appreciation, after the 1964 experience, of the negative effects on investment and employment of an excessive increase in wages.

9) The equation for *retail prices* is similar in structure to that for industrial prices, with the important difference that the mark-up should be about constant and hence the sum of coefficients relating to the components of direct cost, in the variant considering rates of change, should be approximately unity. This hypothesis also is confirmed (equations 9a and 9b). As has been seen (I, § 9), however, the mark-up *q* should remain unchanged only when direct costs increase, whereas it should rise — the sum of these coefficients, that is, should be appreciably greater than one — when direct costs fall. This hypothesis could not be tested because direct costs only fell in one year (1959) of the period. We also tried to detect the influence of changes in indirect taxation on changes in retail prices, but the result was negative, probably because such an influence cannot be seen in a disaggregated analysis (I, § 9).

10) The percentage of *non-agricultural unemployment* has been related to the absolute level of investment, as would seem to follow from one of Keynes' propositions (§ 9). The results are already good from a statistical point of view when we use the percentage of unemployment; they become even better when we use its reciprocal (R^2 rises from 0.866 to 0.910: equations 10a and 10). The reason for such non-linearity seems to be clear: a given increase in investment has effects of decreasing intensity on unemployment, as investment rises and unemployment falls. (Owing to technical progress and to the increase in the labour force, the function relating investment and the unemployment reciprocal is likely to change over time; however, this complication can be neglected in considering relatively short periods like ours).

11) and 12) In the first of these two equations the dependent variable is *dependent labour income* and the independent variables are industrial wages and non-agricultural employment. In the second, dependent labour income is the independent variable and the dependent variable is the *flow of private consumption* (at current prices). First differences have been used because the variables in both equations are subject to a rising trend. These two equations do not pose any particular problems of interpretation. The criterion of eschewing inessential variables has again been followed: thus, in the equation for dependent labour income (equation 11), industrial wages are the only independent variable, in line with our assumption that other incomes follow those in industry; dependent employment has not been considered, to avoid encumbering the model unnecessarily (the R^2 is about the same when dependent employment is included: see equations 11a and 11b). Again for the sake of simplicity, dependent labour income is the only independent variable for private consumptions, on the hypotheses that dependent workers have a propensity to consume near to unity, that the independent workers receive an income that moves together with that of the dependent ones and have a propensity similarly high, while the consumption of other social groups is of relatively secondary importance.

13), 14) and 15) Lengthy comment on the equations for *economic relations with the rest of the world* is unnecessary. Imports are largely explained by changes in private consumption and in industrial investment and exports by changes in world demand. The influence of the ratio of domestic and world prices is not significant. The price-effect may actually be of minor importance; it may also be that its action is concealed by the high degree of aggregation in the model. The latter possibility finds a certain support in the fact that, in the equation "explaining" the rate of change of industrial exports, the price coefficient is significant and has the right sign (equation 15a). In the equation for exports the attempt to test the influence of internal demand (a fall in home demand should increase the incentive to export) has failed, either because of aggregation or, more probably, because of the fact that internal demand only declined absolutely during a part of 1964. Industrial exports (the rate of change of which is one of the variables explaining the degree of unused capacity) are simply explained by total exports. The two equations for imports and exports in the

model are expressed in absolute terms. Since imports, exports and their respective independent variables are all subject to a rising trend, this is an exception in the practice here adopted of using rates of change when the dependent variables and at least one of the independent variables show a trend over time. The exception is due to the fact that the trade balance is arrived at by subtraction between absolute values of imports and exports: the use of rates of change for these two flows was technically possible but would have required other identities (to obtain the absolute levels) and excessively burdened the model ([42]). Subsidiary equations for imports and exports have also been calculated using rates of change: the results are good from a statistical point of view, though not as good as those obtained from the equations with absolute levels.

3. *Implications of the model: limits to the wage-price and consumption-investment spirals*. Though a model is a series of equations in which all variables are inter-dependent, some fundamental sequences can be identified: inter-dependence and cause and effect are not incompatible. More precisely, the variations caused by a change in any one of the elements can be seen throughout the system and those which seem most significant can be closely observed. Here we shall only consider wage-price and consumption investment sequences, both of which have been much discussed from various points of view. Several students have thought that the problem of explosiveness inherent in both could be solved by determining the range of values of the relevant parameters compatible with stability but without enquiring into the economic meaning of the maximum values. As we shall try to show here, the problem of "explosion" arises from an over-semplification of the relations considered. Let us first examine the limits to a rising wage-price spiral. Wages can increase for reasons which are endogenous or exogenous to the model. An immediate endogenous reason would be a fall in unemployment. Exogenous factors which influence wages via the cost of living are, for example, a bad harvest or restrictions on agricultural imports, or an increase in rents. Let us assume that industrial productivity is increasing at a "normal" rate and that some exogenous factor causes industrial wages to start rising considerably faster than productivity. Equation 2 tells us that wholesale industrial prices will rise. Wholesale agricultural prices may also tend upwards because the increase in wages affects demand: if employment remains constant or increases, dependent labour income will rise (in the latter case by more than wages); private consumption will increase and wholesale agricultural prices will rise if the consumption of agricultural products grows more than the available supply (equation 1). The increase in both industrial and agricultural prices raises the cost of living (assuming that the other components — retail margins, rents — do not fall) and this rebounds on wages, pushing them up even further. The increase in consumption for its part stimulates investment (equation 4), increased investment reduces unemployment and pushes wages and, hence, prices even higher. While these mutually reacting impulses tend to bring about a self-generating and even "explosive" spiral, there are offsetting factors which sooner or later may stop and reverse the trend. Equations 2 and 5 tell us that, when industrial wages grow at a noticeably higher rate than productivity, the share of industrial profits falls; hence industrial investment is depressed (equation 4)([43]), unemployment rises (equation 10) and the rate of increase of wages is consequently reduced (equation 7). The faster increase in consumption and investment, moreover, by speeding up the rate of increase of imports (equations 11, 12, 4, 3), causes a deterioration of the trade balance and hence a squeeze in the creation of liquidity (equation 7): as a consequence investment is reduced and unemployment rises. The deterioration of the trade balance is usually accompanied by a worsening of the balance of payments (§ 12). If the deficit is considerable the

([42]) The trade balance is the only link with the foreign component; since imports and exports (and the related explanatory variables) are expressed in index numbers (1963 = 100), whereas the absolute value of the trade balance is required, they have been multiplied by the coefficients 42.98 and 31.08, respectively (the value of imports was 4,298 billion and of exports 3,108 billion lire in 1963).

([43]) A fall in profits will cause a fall in investment when the countervailing forces are insufficient; the former essentially depends on the fact that when direct costs rise, domestic and foreign competition prevents prices from rising to the same extent (equations 2 and 2a) (Part. I, § 4) and profits are squeezed. A fall in profits causes, or may cause, a fall in investment and not vice versa.

Central Bank may decide to squeeze the creation of liquidity further (the dummy variable, B, in equation 6 becomes negative): again investment will fall and unemployment increase. Of course, wages may cease to rise at a rate which forces prices upwards if one of the exogenous factors triggering off the acceleration ceases to operate or even goes into reverse: if, for example, the supply of agricultural products begins to rise enough to satisfy demand or if rents stop rising. Thus, the preceding analysis shows clearly that important forces in the model itself prevent an explosion of the wage-price spiral. The requirement that the values of the coefficients in the wage and price equations should not exceed certain values — e.g. that the coefficient of the cost of living should be below unity — only arises when an insufficient number of equations is considered, that is, when the action of the countervailing forces is neglected ([44]). The preceding analysis also brings out the one-sidedness of the view which sees credit restriction and the contrived increase of unemployment as the remedy for inflation: there are many more counters in the game, and the public authority can intervene directly on some of the factors (agricultural imports, rents, retailing efficiency) ([45]) influencing the cost of living. It remains however true that in certain cases — particularly when the balance of payments deficit is increasing rapidly — intervention must be immediate and wide-ranging in its effect and that it is difficult to avoid credit restrictions if measures regarding other factors have not been prepared in time. On the other hand, as was pointed out in section 8, Trade Unions can decide whether to exploit a favourable situation to the full or to keep their wage claims within moderate limits. In the former case the long-term effect may be unfavourable to the Unions and to workers as a whole, mainly because of the resulting increase in unemployment. In any case, the forces influencing wages and prices are certainly more complex than many diagnoses and cures would suggest. Analogous remarks apply to the interaction between consumption and investment which is the essence of the multiplier-accelerator models of trade cycle or growth. Here, too, it has been maintained that the accelerator and multiplier must not exceed a certain range of values if explosion is to be prevented, whereas the problem of explosion does not appear in a less simple analysis. Our model, though relatively simple, perhaps avoids artificial explanations of spurious problems because it contains an analysis not only of certain relevant aggregates but also of certain important categories of wages and prices. Let us assume that an external impulse affects investment: it might be an increase in foreign demand for industrial products or an expansionist policy on the part of the Central Bank. An increase in industrial exports or in liquidity causes an increase in investment (equations 4, 6, 3), a fall in unemployment (equation 10) and, hence, an increase in wages and consumption (7, 11, 12) (the working of the multiplier may be seen in this way). The rise in consumption in its turn reduces the degree of unused capacity and therefore steps up investment (4, 3) (this is the accelerator principle or, more precisely, the capital-stock adjustment principle). The spiral would continue upwards if it were not first braked, then stopped and reversed, by counter-impulses similar to those already considered: rising wages due to falling unemployment will at a certain point squeeze profits and hence damp down investment ([46]). The increase in investment and consumption, moreover, has an adverse effect on the trade balance and this checks the creation of liquidity; if the deterioration is serious, liquidity-creation may be further and drastically checked by an independent decision of the Central Bank. A last general observation. The model mainly refers to the modem sector of the Italian economy: it might seem that the archaic or pre-capitalistic sector — which is very important, particuiarly in the South — has been excluded. In fact, its presence is felt in the model in various ways, mainly indirect or exogenous: through retail trade (more or less backward throughout Italy), through agricultural production ([47]), and through

([44]) The problem is encountered in single-equation or two-equation models, where one relates to prices *in general* and the other to wages; see e.g. Lipsey (quoted in Appendix I).

([45]) For instance, the increase in agricultural prices, partly due to import restrictions (particularly of meat and dairy products) and bad harvests, had a considerable influence on the exceptionally rapid rise of wages in 1962 and 1963.

([46]) The " full employment ceiling" (v. HICKS, *A Contribution to the Theory of the Trade Cycle*, Oxford, 1951) can be seen to work in exaotly this way.

([47])The insufficient increase in the supply of certain agricultural products is due largely to the survival of numerous archaic peasant holdings, particularly in the South, and in some measure to the heavy protection of cereals. The

non-agricultural unemployment, whose level depends, among other things, on the agricultural exodus. It must however be made clear that the rôle of the pre-capitalistic sector in the model is essentially passive.

4. *The turning points of 1958 and 1963-64*. The turning points of 1958 and 1963-64, which had very different origins, may be clarified by this type of analysis. The 1958 downswing originated abroad: world demand levelled off as a result of the halt in the American economy and Italian exports, particularly industrial exports, barely increased during the year ([48]). The consequences of such a slow-down are clearly visible in the model: the fall in the rate of growth of exports increases unused capacity, industrial investment is checked and the slow-down is thus spread. The recession which began in the last quarter of 1963 and lasted until the beginning of 1965 was largely internal and much more complex in origin. This recession was preceded by a quick rise in wages, consumption and investment. The rise of wages was basically due to the rapid diminution of unemployment and to the increase in the cost of livihg ([49]). The share of industrial profits begins to fall as far back as 1960-61 (see graphs in the Appendix): from 1961 on, wages rise increasingly faster than productivity and are perhaps decisively responsible for this decline. The *rate of increase* of investment falls with the share of profits, but investment continues to rise, though at a dwindling rate, because the increase of private consumpton is still affected by the rising wages bill and by the liberal policy of the central bank (such a policy, in 1962 and in first half of 1963, was clearly too liberal: this, as is now clear, was a mistake). Three contrasting forces thus affect investment: one negative — the fall in profits — and the other two positive — the increase in consumption, which keeps the level of unused capacity low, and the exceptionally rapid expansion of liquidity, which directly stimulates investment. In 1963 and, more clearly, in 1964 the negative force prevails and investment falls absolutely: unemployment therefore rises and the rate of wage increase is checked; this in turn causes consumption to fall, unused capacity to rise and investment to fall further ([50]). At the same time the rapid increase in the wages bill and in consumption and the rise — though at a decreasing rate — of investment causes an increasing deficit in the trade balance and, eventually, in the balance of payments; total liquidity therefore falls with a depressing effect on investment. The recession becomes acute and widespread as a result of the credit squeeze by which the Central Bank attempts to correct the balance of payments deficit. This recession was one of the most serious and persistent of post-war years: it would have been graver if the favourable international economic situation had not allowed a relatively high rate of growth of exports.

5. *Useful relationships for further development of the analysis*. The model has been kept relatively simple — at the cost of no little effort in order to bring out certain fundamental theoretical points. For any further development of the analysis certain exogenous variables would have to become endogenous to the model and others would have to be disaggregated. Industrial productivity, for instance, should be treated as an endogenous variable. The well-known "Verdoorn's law", recently discussed by Kaldor, suggests the existence of a direct relationship between output and productivity. Although convincing and important ([51]) this relationship has been omitted from the model so as to avoid additional variables — industrial production in this case — and also because the "law" is much less clear for relationships between annual series than for the cross-section of

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development of the economy as a whole is affected by this short-fall, which pushes up the cost of living, causing wages to rise without any increase in the .purchasing power of wage-earners, and contributes to a rapid and continuous increase in food imports.

([48])Total exports remain stationary and industrial exports increase by only 3-4%, as compared with 17.1% in 1956 and 18% in 1957; world demand falls by more than 11%.

([49])This rise was accelerated — via a sort of demonstration effect — by the increases in salaries granted by the Government to public employees in 1962-63.

([50])See the author's "Il problema dello sviluppo economico in Marx e in Schumpeter", in *Economie capitalistiche ed economie pianificate*, Bari, Laterza, 1960, p. 30.

([51])This was recognized by the author in the article *Prezzi relativi e programmi di sviluppo* (1957) and in the paper read to the C.N.R. study group (19 February 1965) entitled *Prezzi, salari, profitti e produttività in Italia dal* 1951 *al* 1964.

different countries or industries analysed by Verdoorn and Kaldor. The link between growth of output and growth of productivity comes out from the rank correlation coefficients for different industries: an inter-industry analysis of this type avoids the uncertainties arising from aggregation. Presumably, also, productivity increases are greater in larger undertakings (large size allows both static and dynamic economies of scale). Lastly, a disaggregated analysis may bring out the influence of productivity on wages which was obscure when considering changes in *average* wages and in average productivity (§ 8). The Spearman rank correlation coefficients have been calculated for certain groups of phenomena. The results seem encouraging even if they reveal the need for a more detailed and even more disaggregated analysis ([52]):

	Value of the rank correlation coefficient
1. Productivity per hour and production, 1953-64	0.90
2. Productivity per hour and degree of concentration ([53])	0.76
3-4.Earnings and productivity per hour ([54]): 1951-61 (period of rapid expansion) 1961-64 (less rapid expansion and recession)	 0.68 0.38
5. Earnings (1953-61) and degree of concentration	0.78
6. Earnings,productivity per hour and degree of concentration	0.72

The influence of foreign competition in restraining prices when costs rise (see § 4 of Part I) has been tested by calculatimg the correlation coefficient between the pressure of foreign competition and price changes in a period of rising costs and prices in fourteen industries ([55]). The results are fairly good, if not excellent: the correlation coefficienti is —0.83 and the R^2 is —0.689. Lastly, as a curiosity and as an appendix to the equation on profits and liquidity, the coefficient of multiple correlation between industrial share prices, the share of profits, total liquidity and share prices in the United States (the leading capitalist economy) has been calculated: the R^2 is good (0.8 14) and the coefficients are all significant, though at different levels ([56]).

6. *Parameters, variables and structural changes. A mental experiment.* As in all models, not only the values of the parameters but the variables of the equations themselves are historically conditioned. The relationships which the equations seek to descrive work within a certain structural and institutional context: when it changes, the parameters and the relevant variables must also change. We can illustrate this point by — to use Schumpeter's metaphor — a mental experiment. What variables, were the data or estimates available, would have been relevant in the past, say at the

([52])Estimates made by A. Paolucci and included in the paper read to the **C.N.R.** in 1965. The indices of productivity, production and earnings are set at 100 in the base year, industries are ranked in the final year and the rank correlation coefficients calculated.

([53])The degree of concentration has been calculated using 1961 census data and Gini's method: *Informazioni SVIMEZ*,24-31 March 1965.

([54])The divergence between the two coefficients is interesting. It might suggest that, in periods of sustained expansion, firms in which the growth of productivity is highest may set the pace for wage increases. In periods of less rapid expansion and recession, on the other hand, Union pressure is mainly responsible for wage increases and differentials between industries would tend to dose, independently of present or past differences in productivity. See also Part I, § 8.

([55])The pressure of foreign competition has been measured by the ratio: value of imports/value of domestic production.

([56])The equation is as follows (the t is in brackets):

$$AZ = -2139.429 + 3.856\ G + 1.296\ AZ^{su} + 14.716\ \dot{L} \qquad R^2 = 0.814$$
$$(1.712) \quad (6.510) \quad (2.621)$$

where *G* is the share of industrial profits, AZ^{su} is the index of United States share prices and $\dot{L}$ is the rate of change of total liquidity.

beginning of the century? The equations chosen are those for wholesale agricultural and industrial prices, retail prices, investment and wages in industry. The agricultural price equation would scarcely be different: agricultural markets were competitive in the past and they are so today — with the exception, today, of those for certain important products where a minimum support price prevails. Though the parameters would certainly differ, there is no reason to suppose that the relevant variables would do so. Concentration has profoundly changed the structure of modem industry: in the past there was competition between numerous small undertakings in several industrial sectors, which were also more important. Today oligopoly prevails. The equation for industrial prices in the past would therefore be different from the one used in this study, and presumably more similar to that for agricultural prices. The equation for retail prices, on the other hand, would probably not undergo any important change, not even in the value of the parameters: this especially applies to a country like Italy where modernization of the sector has only just begun. The equation for industrial investment would instead be very different. When industrial markets were much closer to the atomistic competition of classical theory, investment probably varied as a simple function.of profits — as classical theory teaches ([57]). Perhaps also the extent to which firms could get bank credit influenced investment (given the existence of imperfections in the loan market). Neither the degree of unused capacity nor any other indicator of the pressure of demand was probably very important: in competitive conditions firms have no interest in producing less than their full potential output, except in periods of crises. Changes in unused capacity become important when the growing concentration in industry increases the influence of demand in investment and production decisions. The rate of change in the cost of living would probably not have appeared among the relevant variables in the equation for wages — which, like all the equations in the model, refers to the short period. This not only because escalator clauses are of recent origin but also, and much more important, because Trade Unions either did not exist or were much weaker a century or half a century ago than they are today: as has been said, the Unions exploit.changes in the cost of living, independently of escalator clauses, in their wage bargaining ([58]). Moreover, changes in productivity nowadays influence wages directly since union pressure for wage increases is stronger when employers'net margins are known to be increasing. The rate of change of productivity would therefore not appear amongst the variables relevant a century ago, and the wages equation would be much simpler, with the rate of change of wages in the short period depending on unemployment alone ([59]). While we can only make guesses for the other equations, the studies of Phillips and Lipsey on the interpretation of wage movements in England provide some empirical verification here. These studies cover a very long period — almost a century — and seem to demonstrate convincingly that changes in retail prices have become important as one of the explanatory variables of wage changes only in the last five or six decades, and especially after the first World War. Before that date wage changes could in large part be "explained" by the percentage of unemployment (more precisely by its reciprocal). The two authors, and especially the former, have unknowingly offered an empirical test of Marx's proposition cited in footnote 59 above, showing at the same time that, expressed in the terms Marx used, it only applies to a certain historical period. Our mental experiment would need be supplemented by a comparative empirical verification, that is, by applying the equations of the model to the data of other industrialized

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([57])"[The farmer's and manufacturer's] motive for accumulation will diminish with every diminution of proflt, and will cease altogether when their profits are so low as not to afford them an adequate compensation for their trouble, and the risk which they must necessarily encounter in employing their capital productively". (Ricardo, Principles, ed. Sraffa, p. 122). It should be noted that Ricardo here touches on the notion of the minimum level of profit adopted in he discussion on wage changes above (§ 8).

([58])With the classical economists, it may be assumed that in the past the cost of living affected wages in the long, not the short, period. They believed, realistically for the period, that wages *tended* to subsistence levels, but could fall even below such levels in the short period; Unions either did not exist or were too weak to prevent this happening.

([59]) This is exactly Marx's view: " The general movements of wages are exclusively regulated by the expansion and contraction of the industrial reserve army, and these again correspond to the periodic changes of the industrial cycles". (*Capital*, Foreign Languages Publishing House, Moscow, 1951, volume I, ch. XXV, p. 637).

countries. Since the model refers to the modem sector of the Italian economy, it is likely — though not certain — that the relevant variables will come out to be the same, economic structures being similar, whereas the parameters, which reflect the peculiar conditions of the different economies, cannot but be different, perhaps considerably different.

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