Oligopoly: Static and Dynamic Analysis

Paolo Sylos Labini

Electronic version

URL: <https://journals.openedition.org/rei/1793>

DOI: 10.4000/rei.1793

ISSN: 1773-0198

Publisher

De Boeck Supérieur

Printed version

Date of publication: 15 June 2007

Number of pages: 91-107

ISSN: 0154-3229

Electronic reference

Paolo Sylos Labini, "Oligopoly: Static and Dynamic Analysis", *Revue d'économie industrielle* [Online], 118 | 2e trimestre 2007, Online since 15 July 2009, connection on 03 June 2022. URL: <http://journals.openedition.org/rei/1793> ; DOI: <https://doi.org/10.4000/rei.1793>

OLIGOPOLY : STATIC AND DYNAMIC ANALYSIS

1. — STATIC AND DYNAMIC ; THEORETICAL ANALYSIS AND EMPIRICAL VERIFICATION

After the publication in 1956 of Bain's monograph [1] and my own [12] and following Modigliani's important review article [9] several economists have discussed the theoretical model of oligopoly. They have focused their attention on the static problem of price determination neglecting the dynamic problems, even though these were amply examined by Bain and by myself. (My interest in this order of problem appeared clearly in the title of my monograph). The reason for this is easily understood: Modern economic theory is characterized by an abnormal development of static analysis, while the effort devoted to the dynamic problems has been relatively modest – a paradoxical situation in an epoch characterized by extraordinary technological, organizational and institutional changes. On one hand we have a great number of theoretical models, not verified and often not verifiable; on the other, we have an equally great number of empirical but also essentially descriptive, works. Analyses seeking to combine in a harmonious analysis both theory and empirical verification are relatively rare.

2. — THE « COMPETITION WHICH COUNTS » AND INNOVATION

At the level of static analysis, it is easy to demonstrate that in non-competitive conditions – monopoly, oligopoly and others – profit is superior to the norm and production is inferior to that which would be obtained under condi-

(*) Ce texte est la reproduction d'un article de Paolo Sylos Labini, intitulé "Oligopoly: Static and Dynamic Analysis", paru initialement chez Palgrave MacMillan dans un ouvrage collectif dirigé par Mario Baldassari en 1992 et publié sous le titre *Oligopoly and Dynamic Competition: Firm, Market and Economic System*". Nous remercions très vivement Palgrave Macmillan pour nous avoir accordé l'autorisation de re-publier le texte.

tions of competition. Unfortunately, such a demonstration is irrelevant to the task of critically weighing the social implications of different market forms: In a dynamic context, super-normal profits reinvested in plants and equipment or spent on research and development can foster greater growth of production and productivity than can small firms operating in conditions closely approximating perfect competition. These are the considerations which were forcefully put forth many years ago by Joseph Schumpeter, who had pointed out that the process of introduction and diffusion of innovations – the new against the old – one of the most significant aspects of modern economic life, reflects the ‘competition which counts’, that is much more effective than pure competition of traditional theory ‘as a bombardment is in comparison with forcing a door’ (Schumpeter [11], p. 84). Schumpeter believes that the market forms occurring more and more frequently in the modern economy are those which marginal theory defines as non-competitive. He does not deny that such a form can give rise to net harm for the society, in conformity with traditional theory. He denies, however, that this necessarily occurs each time a firm grows beyond a certain size; often, instead, it is a condition favourable to development. Upon reflection – he says – we can only conclude that at the source of the economic progress characterizing our time we find, not the small firms operating in competitive conditions, but the large concerns.

Schumpeter, therefore, refers to large enterprises, not small businesses; in my terminology, he refers to concentrated oligopolies. All the same, his argument can be extended without difficulty to small dynamic firms operating in differentiated markets which from the outset create a particular niche, offering a product or service of a new type. In some cases small firms remain in that niche where they can prosper at length. In others, protected by barriers to entry, they grow systematically, eventually becoming large. In still others, we find small firms that innovate and are absorbed by large companies or small firms that start innovations and later hand over these to larger firms which develop them. Without these small firms such developments would not take place.

In brief, generalizing upon Schumpeter’s thesis, it is possible to affirm that not only larger firms operating in a regime of concentrated or mixed oligopoly but also small firms operating in a regime of differentiated oligopoly can assume an important role both in the innovation process and in raising output and productivity – a much more important role than the one assumed by small firms producing homogeneous goods.

When it was first stated, economists were impressed by the thesis; afterwards, however, the bulk of economists marched, undaunted, along the traditional road that emphasizes the advantages of perfect competition and the social harms of non-competitive market forms. Sraffa’s thesis of decreasing returns had a similar destiny. The comparison of the Schumpeterian critique with the traditional thesis of competition and the Sraffian critique is not pure-

ly formal. The fact is that in traditional theory, in its most advanced formulation, general economic equilibrium, cannot do without two hypotheses:

1) competition should take place in most markets, if not all (1);

2) the marginal cost curve of each firm should be *U* shaped, the only form compatible with the equilibrium of firms operating under competitive conditions. Schumpeter was in effect rejecting the first hypothesis, which is strictly linked to the thesis of an *optimum* insured by competition; Sraffa was denying the validity of the curve's *U* shape. More precisely, Sraffa denied the validity of the *U* shaped curve under competitive conditions. But while his objections to economies of scale are valid if one refers to those conditions, they are not valid – as Sraffa well knew – in the falling segment of the curve when one refers to non-competitive market forms. His objections to the so-called principle of decreasing returns, instead, are valid independently of the market form. Nevertheless, for the reasons that we have already mentioned, the traditional theory cannot do without what, with a certain magniloquence, has been called « the fundamental law of economics and technology » – and therefore a desperate defense has been attempted, citing the most disparate reasons and carefully ignoring Sraffa's destructive critique.

I will not undertake a critical analysis of these motivations, which I have tried to explain elsewhere (Sylos Labini [15], part IV, chapter two; Sylos Labini [18]). In order to give that « law » the force of an irrefutable truth, textbooks tend to normally illustrate it by referring to a given piece of land where by increasing doses of a variable factor (e.g. labor or fertilizers are), are from a certain point on, production does not rise proportionately. This implies, decreasing marginal productivity and, at the same time, increasing marginal costs. This kind of examples illustrate the Ricardian principle of decreasing returns in agriculture. The blunder is in this – although Sraffa already pointed it out some decades ago – that the principle to which Ricardo refers applies to agriculture as a whole and cannot be applied to a single plot or a single crop. (It is always possible to enlarge one's own field by acquiring another, thereby avoiding the decline of physical returns described in the example. In addition, it is always possible to extend the cultivation of one crop to the detriment of others). Ricardo, moreover, was referring to a country with demographic growth and was taking into account strong constraints regarding the importation of agricultural products: transportation costs and, even more important for Ricardo, protective tariffs. Once that these were removed, the trend towards diminishing returns and the consequent downward trend of the rate of profit could be neutralised at least over the long term. Ricardo placed, instead, little faith in technical progress. Historically, Ricardian pessimism has not been jus-

(1) The fact that the hypothesis of perfect competition is essential to traditional theory was already emphasized by HICKS [4], p. 81.

Advice: the numbers in square brackets refer to the Bibliography in appendix.

tified: Technical progress has more than compensated for that tendency both on a single country basis (save few exceptions) and on a world basis.

The « law » of diminishing returns then cannot be extended to either the individual firms or to the economy as a whole. (See my articles cited above).

3. — PRICE VARIATIONS AND BARRIERS TO ENTRY

The two issues which I have raised, the diffusion in modern economies of non-competitive market forms and the « law » of decreasing returns are related. They are strictly relevant for the theory of oligopoly and, in particular, for the dynamic analysis regarding this market form. The problem one should concentrate on is price variations, not the purely hypothetical and timeless variations considered by traditional theory, but variations as they actually occur in time.

Many years ago, Franco Modigliani, when discussing Bain's thesis and my own, observed that « the mere emphasis on the problem of entry is, *per se*, a significant step in the direction of a dynamic analysis ». (Modigliani [9], p. 232). For my own part, I started my analysis with the problem of price determination, not to construct a model as an end to itself, but precisely as a first step towards the explanation of price variations in time. In order to be able to solve the problem of price determination, certain structural characteristics of the market under consideration are particularly relevant: economies of scale, product differentiation determined by advertising and the capacity to innovate which in turn is conditioned by the existence of research facilities. In markets where economies of scale prevail and products are economically homogeneous concentrated oligopolies emerge. In markets where product differentiation prevails, situations of differentiated oligopolies emerge. One can, instead, speak of mixed oligopolies in these markets in which economies of scale, as well as differentiation and diversification of products promoted by investment in advertising and research are equally important. In the industrial sectors of modern economies, situations where there are concentrated oligopolies with homogeneous products are important but not very frequent. Much more frequent, instead, are forms of differentiated or mixed oligopolies, which constitute the norm in retail trade, in private services and, in particular, in credit. As it is known, the concepts of exclusion price and elimination price are useful analytic instruments in determining prices. The price determination model should find the conditions under which a price war is profitable and when instead, it would be more advantageous to have peaceful coexistence, particularly in markets where concentrated oligopoly prevails and where the firms which set the prices are either large or very large. Further approximations regard the conditions which make possible or desirable a merger or take-over of one firm or group by another, both at the national and international levels. At this point questions of a financial nature, quite different from those concerning production, prices and earnings, need to be answered. In the field of finance, potential irregularities and unpredictability of business behavior increase and the law of large numbers is inapplicable. Given the size of firms

and groups that participate in these contests, it is clearly absurd to keep referring to the tiny units of perfect competition.

The model of price determination must be extremely simplified: If it is sufficiently solid, it can withstand the weight of successive approximations. Once a model of price determination has been outlined, one must confront the problem of price variation, always in simple terms. Here is where the so-called full cost principle becomes relevant. According to this principle, the larger firms set a price by adding a proportional margin or 'mark-up' to direct cost. In a static context, such a margin has no meaning; it becomes meaningful only in a dynamic context, provided that there are firms which somehow play the role of price leaders. More precisely, once the problem of price determination has been resolved, and, therefore, once the mark-up for each firm has been explained, that margin becomes the criterion used by the firm which, period after period, leads the price by modifying it if the direct cost varies. In a static context the 'mark-up' represents a pure arithmetic expression (as it is in a dynamic context as well, in cases such as agriculture where the price is not controlled within certain limits by firms but is determined impersonally by the market).

In traditional theory there are market structures in which for a single firm the price is not given but is a variable: these structures are represented by monopolies and imperfect competition. The case of oligopoly, however, has been put aside; furthermore those economists who wish to be rigorous and concrete are well aware that the model of the instantaneous maximization of profits does not correspond to reality. Thus Baumol [2] and Marris [8], who have had direct experience with firms, aware of the fact that the equality between marginal revenue and marginal cost is a myth, and that the instantaneous maximization of profit has no interpretative value, not even in the short term, have worked out alternative explanations. According to Baumol, managers seek to maximize sales in the short term, provided that profits do not fall below a certain minimum limit. Marris concentrates his attention on the relationships between profits, investments and growth – relationships that have great relevance in reality, but that in a static analysis, where growth is ruled out, do not and cannot have any role. In 1971 I maintained that, taking into account the financial requirements, the target of sales maximization over time and profit maximization in the long term tend to coincide, even if such a criterion allows for a variety of behaviours and cannot be formalized in terms like those of marginal analysis, which are simple and rigorous but not realistic (Sylos Labini [13]). I should emphasize that the maximization of long-term profits is not at all in conflict with price strategies linked to the principle « full cost » which I will briefly discuss in the next section. Maximization is not *only* in conflict with these strategies, but represents their logical extension with reference to the problem of the firm's growth.

And here one must ask the question: Do barriers to entry constituting the base of the market power of oligopolistic firms necessarily give rise to above-normal profits?

There are a number of concrete indications that lead to a positive answer to that question (Sylos Labini [16], p. 143). But much more important than the sheer size of profits is their duration. This presents an opportunity for reflection.

In their first phase of growth, new industries, born in the wake of some great innovation, are characterized by a series of small innovations and improvements through which the more dynamic firms tend to secure their places in the market and, possibly, expand their market shares. Also in subsequent phases firms tend, insofar as they are able, to reinforce barriers to entry. To this end, one should note that the most important barriers are not so much those which are relatively stable, but those which are particularly dynamic, such as the barriers erected by their capacity to continuously produce new products or products which are continuously differentiated. In brief, the advantages of monopolies and oligopolies are temporary when seen from a dynamic point of view and considered individually. They become lasting, if not permanent, precisely because of the firm's capacity to innovate and diversify products almost without interruption: The water that forms the jet of a fountain changes continuously, but the jet itself remains.

4. — THE FULL COST PRINCIPLE: TWO CRITERIA

It appears that price strategies adopted by firms endowed with market power are of two types: The first strategy that can be formalized in very simple terms consists of applying a mark-up over direct cost – « target mark-up pricing »; the second consists in pursuing a certain rate of profit – « target-return pricing » (2). Substantially the two strategies are equivalent; it appears that the first criterion is followed in changing prices, the second is used to control the trend of profitability.

Far from representing only a rough and approximate rule for behaviour a 'rule of thumb', the full-cost principle can be fully rationalized. If until now, attempts in this direction have been few, this is due to the fact that the full-cost principle is meaningful only in a dynamic analysis which has been largely neglected because of the predominance exerted by the essentially static traditional theory. The full-cost principle immediately poses a theoretical problem of fundamental importance, since that principle is incompatible with decreasing returns. With technology, unchanged, returns are constant. However, technology changes even in the short term and this implies either a decrease in the inputs of raw materials or, more often, a lowering of the input of labour, or,

(2) The first criterion can be formalized with the expression $p = v + qv$, where p is the price, v the variable cost, or direct cost and q the mark-up. The second criterion can be expressed with the expression $p = v + k/x_n + rK/x_n$, where k represents overhead costs, K the value of capital, x_n the normal or standard output, r the rate of profit. In both expressions the direct cost, v is assumed to be constant with respect to actual changes of output.

inversely, an increase of productivity. Since direct cost per unit of output is given by the cost of wage labor and the cost of raw materials – $v = aW/\pi + bMP$ –, technological changes can reduce one or the other element of direct cost, or both.

As a rule, in order to modify prices, managers base themselves on direct unit costs, which can vary either because of technology or because of changes in factor prices, wages and the prices of raw materials. (The prices for intermediate products and energy can be added to these).

The main reasons why direct costs are taken as the base for price changes are two: 1) the majority of firms produce several goods: For each one of them it is relatively easy to impute direct costs while it is difficult or impossible to impute overhead costs. Often the imputation refers to the conditions of demand (« what the market can bear ») rather than to factors relating to the conditions of supply; 2) overhead costs vary much more widely among different firms in the same industry and the variations of those costs differ even more. Direct costs also vary, but less widely. In particular, variations in wages and prices of raw materials and energy sources regard all firms. More precisely, the prices of raw materials, having an international market, affect all the firms of the world, while wage changes are different in diverse countries and changes in labour productivity differ even among firms of the same industry, so that in each industry the relevant change in productivity is the minimum change common to all firms.

Granting that within industry the oligopoly is the more common market form and granting, therefore, that within certain limits, price changes depend on decisions based on direct costs, empirically we should find a close correspondence between the variations of price and those of direct costs. We must keep in mind, however, that in open markets, price increases are restrained by competition from other countries, while price cuts are carried out only when they are seen as inevitable owing to price falls occurring in one or more competitor countries. This, however, under current conditions, is a rather uncommon occurrence.

The industrial wholesale price equation, therefore can be written in the following terms:

$$(1) \hat{P}_f = a \hat{L} + b \hat{RM} + c \hat{P}_{w-int}$$

where $L = W/\pi$ is the labor cost per unit, RM the index of prices of raw materials and energy, P_{w-int} the index of international prices of finished products, and the cap over each variable indicates a rate of variation. In industrialized countries, a large share of raw materials are imported, so that the price index must be corrected for the variations in foreign exchanges; an analogous correction must be made for the international prices of finished products. For the reasons hinted above, the shift of prices to changes in labor cost is partial and asymmetric (higher upwards, lower downwards) while the adjustment to changes in raw material prices is, instead, tendentially complete. For its part, the international price index of finished products expresses the moving ceiling

for the shifting on prices of costs, especially of labour costs. Decreases in direct costs are less frequent and, in any case, are, as a rule very small. The fact is that while the prices of raw materials may decrease even significantly in certain periods, the cost of labor seldom decreases. This happens when productivity increases more than money wages, which increase at varying speeds but without interruption, not only because of union actions but also because, in a growing number of sectors, the market power of labourers has increased for reasons analogous to those that are at the origin of the growth in firms' market power and which are to be related to the processes of concentration and differentiation. In any case, even when the cost of labor decreases, prices decrease much less than proportionately, taking into account the relative weight of labor in direct cost. The final result of these interconnecting variations is that in the long run wholesale prices of finished goods tend to increase, since cost increases are more frequent and more pronounced than decreases (3).

Thus mark-up is not constant, but varies over the course of time; generally speaking it diminishes when direct cost increases, and increases in the opposite case and while in the short term the mark-up fluctuates, over the long term it varies by little. In the very long term two contrasting tendencies are at work. On one side the margin should increase because overhead costs per unit tend to grow and the mark-up is primarily used to cover those costs. (Sylos Labini [16], p. 193-4). On the other side the broadening of markets tends to reduce the margin of prices over direct costs and, in any case, tends to reduce the *margin* of profit necessary to obtain a given *rate* of profit. All considered, it seems reasonable to expect that in the long term the mark-up remains relatively stable or increases to a limited extent (4).

5. — DIRECT COSTS, DEMAND AND PRICES

Nowadays the econometric models that successfully employ a price equation similar to the one indicated above are numerous; the results are positive, and this is all the more noteworthy since the variables are usually expressed not in terms of levels or logarithms of levels, but in terms of rates of variation. It is true that several economists, in addition to elements of direct cost, have introduced in the price equation a variable intended to represent the demand pres-

- (3) Thus in the United States from 1950 to 1987 the wholesale prices of finished products increased more than four times (up to 1973, that is, before the explosion of oil and raw material prices, the increase of those prices had already been remarkable: 1.6 times). In the same period the prices of finished products have decreased only in three years: in two years to a very small extent (1961: - 0.4 %, 1963: - 0.8 %); in 1986 the decrease was not negligible (- 2.9 %), but it was almost entirely due to the sharp fall in the prices of the sources of energy (- 25 %).
- (4) Empirically, from 1952 to 1988 in Italy the mark-up in the manufacturing industry oscillated around 1.8; in the United States, instead, where the relative weight of large firms is greater, the mark-up increased from 1.75 % to nearly 2.0 (see SYLOS LABINI [17], op. cit.); the figures have been brought up to date on the base of non-published estimates.

sure. Even apart from traditional theory, the idea that demand influences prices seems to respond to simple common sense. Nevertheless, common sense can be dangerous; if technology is unchanged and returns are constant, the pressure of demand would cause an increase in output, not in prices. The idea, however, is that when production approaches full capacity, the rise in prices is not as much caused by increases in costs as it is the result of relative scarcity (two aspects which should be well distinguished). Nevertheless, this way of reasoning neglects the fact that in an open economy, demand, beyond a certain point, can move abroad; only when the degree of utilization approaches full capacity in all the major industrialized countries does the scarcity of certain industrial products become truly relevant (5). In fact, the variables chosen to indicate demand pressure are questionable, or are lacking significance or, finally, indicate a pressure affecting the prices of finished products only indirectly, that is, via the prices of raw materials (Sylos Labini [14]). In effect, the logic governing the variations in the prices of finished product is different from the one regulating the price variations of raw materials. In the first case price variations depend on direct costs; in the second they depend on demand and supply. In the first case the variations of demand regulate variations in output and only occasionally prices. If it does at all, demand comes into play indirectly, as it has been said, through raw materials. At the basis of the two patterns for price variations is the fact that in the case of finished industrial products oligopolistic market forms prevail, while in the markets for agricultural products and most markets for mining products, in which differentiation is practically absent, conditions close to perfect competition prevail.

Among the attempts made to attribute relevance to demand in trying to explain the variations of industrial prices, I did not mention the hypothesis that demand pressure tends to modify the mark-up in the same direction because, when it becomes particularly intense, prices increase more than costs. This idea, too, seems to correspond to simple common sense: it seems to be self-evident, so much so as to induce some eminent economists to accept it as certain, without any verification. But the empirical evidence is against this hypothesis. The determination, or better, the obstinacy with which many economists refuse to recognize that price variations do not follow one logic only but two (cost push as well as demand pull), depends I believe, on the suggestive power of traditional theory that presupposes the ubiquity of perfect competition in which, in the short term, price variations depend, no doubt, on demand and supply.

However, with reference to markets for raw materials, the interaction of demand and supply should not let us think of hypothetical shifts of two static

(5) From 1964 to 1974, when I was a member of the Technical and Scientific Committee at the Budget Ministry and I was following the economic evolution of the industrial sector, I noted that demand pressure contributed to push upwards the prices of metallurgical products, particularly steel, in 1968, when a boom in all industrialized countries took place and steel became scarce at the world level. But, beside this instance, I would not be able to indicate other examples of industrial price increases imputable to demand pressure during that period.

curves. In the short term – say, one year – the supply of raw agricultural materials is determined by seasonal factors; thus, supply can vary but the supply curve is not relevant because the variations of output are exogenous. The output of mineral raw materials in the short term varies little; in any case, the supply of all raw materials can vary due to variations in stocks. As for the demand pressure, it can be adequately expressed by the index of world industrial production – the demand for raw materials comes from industry, which transforms them. One can think of a diagram in which supply is indicated on the axis of the abscissa and the price, on the axis of the ordinate depending on a demand curve, the position varies according to world industrial output – it shifts to the right when it increases, to the left when it decreases. But this is not the only way of describing the relations between the variations of prices, demand and supply. Another way for examining these interactions is to consider prices as a function of several variables, all expressed in terms of rates of variation (Sylos Labini [16], pp. 160-2) (6).

6. — PRICE EQUATIONS

The price equation commonly used for finished industrial products is equal or similar to the one described in Section 4: Few economists seem aware that this equation, while fully compatible with the principle of full cost (it can, in fact, be considered the formal translation of that principle) is not compatible with the traditional model that refers to the demand and supply curves. It is not even compatible with the hypothesis that the curve representing costs tends to be U-shaped; finally, it is not compatible with the theses of the monetarist school. In fact, while forecasts about short term variations of prices of finished products based on expected variations in unit labor cost and raw material prices are frequent, I have not heard of any economists who are making forecasts about prices based on the expected changes in money supply, however the latter may be defined.

If it is true that oligopolistic forms are also widely present in retail trade and in credit – in both sectors the prevalent market form is a mixed oligopoly (a concentrated oligopoly with strong differentiation) (7) – we should see if we can explain changes in returns in those two sectors by referring, after appropriate modifications, to the model of price variations under conditions of oligopoly. Preliminary attempts seem to yield encouraging results. We obtain the return per unit in retail trade services by subtracting from consumer prices the

(6) In particular, the rate of price variation for raw materials can be seen as a direct function of variations in world industrial production, and as an inverse function of variations in supply determined by changes in production and existing stocks; in turn, variations in stocks depend on expected prices for raw materials, the interest rate and the anticipated dollar rate quoted by banks which speculators apply as an alternative to real stocks.

(7) For credit, see BISCAINI, CAROSIO and PADOA SCHIOPPA [3], and VARIOUS AUTHORS [20], [21].

various elements of cost, among which are principally wholesale prices and effective labor costs or, in the case of family businesses, imputed labor costs. For simplicity, one can consider an equation symmetric to the one used for the wholesale prices of finished products (Sylos Labini [15] p. 306 and [19], p. 156):

$$(2) \hat{P}_c = a + b \hat{P}_f + c \hat{W} - d \hat{\pi}_c$$

where P_c is the consumer price index, W the wage index, and π_c , the « productivity » of retail trade which is, in turn, expressed as the ratio between real consumption and the number of employed workers: $\pi_c = C/O_c$.

Analogously, to calculate the return per unit in the credit services we must subtract the interest rates on deposits, r_d , and the cost of personnel (CP) from the interest rates on loans, r_e . In this case the « productivity » of the sector depends on the ratio between loans and the number of employed workers $\pi_{cr} = LO/O_{cr}$. total loans, in turn, depends on economic growth, which can be expressed by the index of industrial production, Y_i . One should note that, when prices increase, banks try to offset, to a certain extent, the erosion of purchasing power of the money they lend. Firms, on their part, are willing to pay higher rates than the ones that they would pay in periods of stable prices. The equations, therefore, is the following:

$$(3) r_e = a + b r_d + c \hat{CP} - d \hat{Y}_i + c \hat{P}_c$$

The equations estimated (by Dr. Mirella Damiani of the University of Perugia) in which further simplifications are introduced, are reported below. The equations regard industrial wholesale prices, consumer prices for goods and the interest rate on bank loans; the period of estimation is 1970 to 1985 for the first two equations while the third equation is estimated from 1974 to 1988:

$$(1a) \begin{matrix} P_w = 0.30 \hat{L} + 0.19 \hat{RM} + 0.40 \hat{P}_{w-int} \\ 4.95 \quad 5.31 \quad 4.59 \end{matrix} \quad \begin{matrix} R^2 = 0.95 \\ DW = 1.96 \end{matrix}$$

$$(2a) \begin{matrix} P_c = 3.51 + 0.21 \hat{P}_w + 0.36 \hat{W} - 0.27 \hat{C} \\ 1.48 \quad 5.42 \quad 4.80 \quad 2.06 \end{matrix} \quad \begin{matrix} R^2 = 0.67 \\ DW = 2.21 \end{matrix}$$

$$(3a) \begin{matrix} r_l = 1.00 \hat{r}_d + 2.19 \hat{CP} - 0.05 \hat{Y}_i + 0.17 \hat{P}_c \\ 6.84 \quad 3.90 \quad 1.88 \quad 3.90 \end{matrix} \quad \begin{matrix} R^2 = 0.91 \\ DW = 2.08 \end{matrix}$$

These results are tentatively encouraging. It is important to note that in all three equations, the variables which can properly represent indices of real demand pressure – in the first and third equations the rate of variation of industrial production, in the second the rate of change of real consumption – are negatively correlated with prices; to be precise, with the wholesale prices of finished products, with the retail prices and with the bank lending rates, which indicate the price of credit services. According to traditional theory, the correlation should be positive, not negative: It seems that the « law of supply and demand »

is applicable, but in reverse ! The « law » applies, instead, to the market for raw materials, although it should be stated somewhat differently (8).

7. — INCOME DISTRIBUTION IN THE MANUFACTURING SECTOR

The equation relative to prices of finished products opens the way to an analysis of the distribution of income in the manufacturing sector; the point of departure can be taken from an article by Michel Kalecki. It is extremely concise but, as is commonly the case with great economists, potentially very fertile (Kalecki [5]). This way of tackling the problem has several important advantages, particularly because it directly links the variations of prices with those of distributive quotas. In traditional analysis, only marginal productivities are ultimately important; neither prices – which, under conditions of perfect composition are necessarily equal to costs, nor raw material prices, absorbed in the economy considered as a whole, nor wages nor changes in the average productivity of labor due to technological and organizational change, are important. If we follow Kalecki's approach, highly praised by Keynes [6], we can properly take all these variables into account (Sylos Labini [16] chap. VIII). Moreover, in this kind of approach one must consider the indirect or general costs (salaries, depreciation and other costs in the capital account) that, as was distinctly foreseen by Maffeo Pantaleoni in 1909, tend to become increasingly relevant as large firms and large productive concerns rise in importance. Costs of this type, which are clearly extraneous to marginal analysis, play an important role in the distribution of income and its variations. It is true that the distribution of income which we are discussing regards only the industrial sector or rather, more precisely, the manufacturing sector; agriculture, private services and public administration are not, in fact, being considered. Nevertheless, one should keep in mind that the manufacturing sector is the dynamic sector par excellence. From this sector come the main stimuli for cyclical development and for variations of distributive quotas. On the other hand, Kalecki, always in his extremely concise style (too concise!), has also taken some steps towards those other directions. One should follow his lead.

(8) If there were doubt over the fact that raw material prices and wholesale prices of finished products followed different patterns of logic, it would suffice to trace a graph of the rates of variation in the two categories of prices, as formed in the international market for raw materials and in the finished goods market of an important single country, like the United States. With reference to the post-war period, the rates of variation in prices of finished products are nearly always positive. As I noted, in the United States there are only three exceptions, while the rates of variation in raw materials' prices are nearly equally distributed (positive in 22 years, negative in 16) and the range of variation is by far broader than that for the prices of finished products. Leaving out 1974, the year in which international raw material prices increased nearly 70 %, the range of variation prior to the crisis in the fixed exchange rate system, that took place in 1971, was about 8-10 %, after that crisis it became 15-20 %.

8. — ORDER AND DISORDER : AN ANALOGY DRAWN FROM PHYSICS

The regularity that one observes in the behavior of industrial prices and in the relationships between prices and direct costs can appear surprising if one thinks of the variety of strategies followed by various firms, especially those capable of influencing prices. How can one reconcile that regularity with the great variety of strategies ?

An analogy drawn from physics can, perhaps, be of help.

The microscopic motion of individual molecules of a gas is chaotic and irregular, but the behaviour of molecules as a whole is so regular as to be described with notable precision by macroscopic and simple « laws », in which pressure, volume and temperature among others appear as explanatory variables. Analogously, the movement of firms that comprise a market is chaotic and irregular – the strategies of single firms depend on the capacities of managers and can be represented by an indefinite variety of problems drawn from game theory, problems which consider the most diverse assumptions. For large firms the degree of indetermination, for certain aspects, is already reduced ; thus one can observe that the market shares of these firms are stable or vary little in the short run, even if, in a closer examination, one can observe that the composition of goods produced and sold varies and occasionally varies greatly. When one refers to entire markets, remarkable regularities appear ; regularities are even greater if one refers to a large aggregate, provided that the aggregate under consideration is tolerably homogeneous, such as the entire manufacturing sector. Regularity diminishes when heterogeneous aggregates are jointly considered, like agriculture and industry. Thus, as far as price behavior is concerned, the heterogeneity is caused by the prevailing market forms in the diverse sectors. There are, it is true, and cannot be otherwise, relations between the macroscopic and the microscopic variables, relations which, in the example taken from physics, are studied in static mechanics ; but macroscopic variables show a regularity that cannot be seen in microscopic variables.

One must, nevertheless, distinguish between regularity in the medium and long term and regularity in the short term : one must also distinguish between regularities connected with the development process and regularities connected with the business cycle, which represents the form that the development process assumes in modern capitalistic economies.

For industries that are created as the result of great innovations and that, at least in a given country, have no precedent, one must distinguish two phases. During the first phase, « disorder » dominates, in the sense that great innovations can be compared to erratic shocks. Those impulses stimulate the overall process of development but, so it seems, do not present regularity. During the second phase the growth of a new industry begins to demonstrate a certain regularity, either following the path of a logistic curve, complete or truncated at the flex point or following the path of a parabola (Kuznets [7]). In certain

particular cases, as in the case of the electric industry, for a long period the path is that of a logarithmic straight line. In other cases, at a certain point one notes a true and clear « break » as a consequence of a new great innovation, or of another erratic shock. In the second phase growth becomes more regular and, at the same time, more rapid than that growth in the entire industry, since the latter is mostly made up of mature industries. In this phase the trend of relative prices is decreasing, even when the average level of prices is stationary or increasing, while the trend of relative incomes increases (Sylos Labini [16], part II chap. IX and [19], pp. 60-66). However, prices and incomes or, more precisely, their rates of variation are much less subject to the cyclical pattern of the economy. In a later stage the new industry slowly ceases to be new and becomes a mature industry. The process of development is cyclical keeping in mind that in certain particular periods, even long periods, the rate of variation in output fluctuates, but it never – or almost never – falls below zero. In effect, the variations of quantities in mature industries are cyclical and coincide with the average variations of relative quantities in the overall industry. Vice versa, the variations of quantities relative to new industries do not correspond to average variations. In other words, the industries that develop most rapidly and that generate the most vigorous cyclical impulses are precisely those whose variations are most irregular and reflect less than others the general economic cycle. This observation can be useful for carrying out a harmonic conjunction, in dynamic analysis, between micro and macroeconomics. Such a conjunction between the two methods is conceptually important, since, as Schumpeter rightly observes, development is, by nature, an unequal process which is essentially determined by innovations which cannot affect with the same intensity all productive activities: some are all together excluded for long periods from the great and never-ending process of change.

9 — THE INCREASE OF PRODUCTIVITY AND REAL DEMAND

The uninterrupted introduction of innovations depends on the search for profit; innovations bring about an almost continuous increase in productivity which can raise unemployment if real demand does not grow at an adequate speed. In turn, real demand can increase either because prices diminish with nominal income unchanged or because nominal income increases with prices unchanged, or because of a combination of the two mechanisms. In the past, let us say in the last century, the first mechanism or a combination of the two prevailed. Today, drops in prices have become an exceptional event, and the second mechanism prevails: stable prices and increases in monetary income or incomes which rise faster than prices. One should note that when the increase of real demand is attributable to a drop in prices, that increase is indirect. When, instead, it is attributable to an increase in monetary incomes it is direct. One should also note that while under modern conditions demand has assumed scarce importance in the variations of prices, at least as far as wholesale prices for finished goods are concerned (and leaving aside the problems related to exchange rates), it has instead become very important for the variations of production and, particularly, for its development. (This can appear to be a dynamic version of Keynesian theory).

I have many times referred to the structural transformations that have occurred in modern capitalist economies; in more specific terms, I should point out that agriculture has been shrinking to an increasingly modest share. In it, however, competitive market forms still prevail. Instead the industrial and, even more, the private service sectors, where oligopolistic market forms prevail and where consequently prices have become increasingly rigid downwards, have progressively grown. Under these conditions, if demand grows at an inadequate rate, at a rate, that is, which is not sufficient to prevent the systematic increase of unemployment, external support for the growth of the industrial system is necessary, at least for the growth of the industrial system of a specific country. This external support can be provided by either the State sector or by foreign demand. Since external demand can provide that support only in certain periods and under certain conditions, public supports remains the fundamental alternative.

I already proposed this thesis in the monograph published in 1956. It seems still valid to me today, even if it should be stated somewhat differently (Sylos Labini [17]). The most important difference is in the fact that thirty years ago I tended to place excessive weight on military spending and insufficient weight on social welfare spending. (I referred to the most important capitalist economy, the North American).

Those two kinds of expenditures are spurred by quite different factors; in the first case the thrust is due to strategic international factors, in the second it is due to social and political domestic factors. In either case we find motivations which are different from the one on which firms base their actions, that is, in brief, the logic of profit. Thrusts stem from needs that all States have always had even if the first – the military need – has normally prevailed over the second. However, only when average personal income decidedly rises beyond the subsistence level, not only for a small minority, but for a substantial part of the population, do the two needs, and especially the need for the welfare of the poorest social classes, grow in importance. Economic resistance in weakened fiscal revenues can be increased without much difficulty: they can, in fact grow even more rapidly than a growing income. The influence of ideologies and theories – such as the Keynesian – favoring an acceleration of the process of democratization and the reduction of distributive inequality is growing. At the same time, for reasons which we have briefly mentioned, changes in the productive structure and in market forms are making an expansion of public spending advantageous: not an uncontrolled expansion, of course, but an expansion at a speed equal or slightly superior to the growth in income however originated.

It is worth reflecting on the following data regarding the United States. (The values are at current prices. The source is the *Economic Report of the President*, Washington DC, January, 1989).

The increase in the incidence of public spending over income from the beginning of the century is impressive; furthermore, we have to remember that

Government spending in the United States

Year	Public Spending (as % of GNP)	Year	GNP	Civilian expenditure	Military spending
1903	7.4	1949	100	100	100
1913	7.7	1980	1.050	1.5089	1.100
1929	10.5				
1939	18.5	1980	100	100	100
1949	23.1	1987	166	171	206
1980	32.6				
1987	34.8				

in most European countries the increase has been even more pronounced. From 1949 to 1987 civilian public spending grew, even more rapidly than income. However, while from 1949 to 1980 military spending grew more than income, although less than civilian expenditures, after 1980 it grew more rapidly than both civilian expenditures and income. It should be noted that from 1980 to 1987, notwithstanding the efforts of the Reagan Administration, not only military expenditures but civilian expenditures as well increased more than income, even if only by a small proportion. Today's military expenditures, however, owing to an easing of international tensions, are tending to rise more slowly than in the past.

I think that the fundamental tendencies of economic development, as well as the mitigation of the negative phases of the economic cycle, should be evaluated not only in relation to the process of democratization which, with its accelerations, slowing-downs and stops, characterizes the modern age, but also with reference to the structural and quantitative changes in modern economies.

BIBLIOGRAPHY

- [1] BAIN J.S., «Barriers to New Competition», Cambridge (Mass.), Harvard University Press, 1956.
- [2] BAUMOL W.J., «Business Behavior, Value and Growth», New York, Harcourt and Brace, 1959, revised edition 1967.
- [3] BISCAINI A.M., CAROSIO G. and PADOA SCHIOPPA T., «Tassi attivi e passivi in un sistema bancario oligopolistico», Roma, Servizio studi della Banca d'Italia, Contributi alla ricerca scientifica, dic. 1972.
- [4] HICKS J.R., «Value and Capital», Oxford, Clarendon Press 1939 (Italian translation., Turin, Utet, 1954).
- [5] KALECKI M., «The Determinants of the Distribution of Income», *Econometrica*, April 1938.
- [6] KEYNES J.M., «Relative Movements of Real wages and Output», *Economic Journal*, March 1939.
- [7] KUZNETS S.S., «Secular Movements in Production and Prices. Their Nature and Their Bearing upon Cyclical Fluctuations», Boston, Houghton Mifflin, 1930.
- [8] MARRIS R., «The Economic Theory of "Managerial" Capitalism» London, Mac-Millan, 1964.
- [9] MODIGLIANI F., «New Developments on the Oligopoly Front», *Journal of Political Economy*, n° 3, 1958.

- [10] PANT'ALEONI M., « Alcune osservazioni sui sindacati e sulle leghe », 1909, republished in the volume *Sistemi di economia*, Bari, Laterza, 1925.
- [11] SCHUMPETER J.A., « Capitalism, Socialism, and Democracy », New York, Harper and Brothers, 1942.
- [12] SYLOS LABINI P., « Oligopoly and Technical Progress », Cambridge (Mass.), Harvard University Press, second edition, 1969 (orig. It. ed. 1956).
- [13] SYLOS LABINI P., « La théorie des prix en régime d'oligopole et la théorie du développement », *Revue d'Économie politique*, mars. 1971.
- [14] SYLOS LABINI P., « Industrial Pricing in the United Kingdom », *Cambridge Journal of Economics*, n° 3, 1979.
- [15] SYLOS LABINI P., « Lezioni di economia », vol. II: Microeconomia, Rome, Ateneo, 1982.
- [16] SYLOS LABINI P., « The Forces of Economic Growth and Decline », Cambridge Mass., the MIT Press, 1984.
- [17] SYLOS LABINI P., « Oligopolio e progresso tecnico: una riconsiderazione critica dopo trent'anni », *L'industria*, n° 4, 1986.
- [18] SYLOS LABINI P., « The Great Debates on the Laws of Returns and the Value of Capital: When Will Economists Finally Accept their own Logic? », *Banca Nazionale del Lavoro Quarterly Review*, September 1988.
- [19] SYLOS LABINI P., « Nueve tecnologie e disoccupazione », Roma-Bari, Laterza, 1989.
- [20] VARIOUS AUTHORS, « Modello trimestrale dell'economia italiana », Servizio studi della Banca d'Italia, Temi di discussione, vol. 2, n° 80, 1986.
- [21] VARIOUS AUTHORS, « Modello mensile monetario », Servizio studi della Banca d'Italia, Temi di discussione, n° 108, 1988.