



Munich Personal RePEc Archive

Price, target rate of profit and entry preventing

Jael, Paul

August 2015

Online at <https://mpra.ub.uni-muenchen.de/65970/>
MPRA Paper No. 65970, posted 07 Aug 2015 05:47 UTC

Price, Target Rate of Profit and Entry Preventing

Paul Jael

August 2015

1- The marginalist controversy

The marginalist theory of producer's equilibrium is the result of a development that culminates in the impressive work of Joan Robinson "Theory of imperfect competition", published in 1933. It claims that in perfect competition as in monopoly or in oligopoly, the firm will choose to produce the quantity that equates marginal revenue¹ with marginal cost, because that is the way to profit maximisation.

Less than ten years later, this theory will be openly challenged by the economists of the Oxford Economists Research Group (OERG), who confront it with the practice of entrepreneurs consulted during interviews. The main contributors are Hall and Hitch, Andrews and Harrod.

Revelation is that the perception of entrepreneurs absolutely does not match the marginalist analysis. Without going into the details of the argument, or in peripheral ideas and disregarding nuances among stakeholders, we can summarise the essence of criticism by these leading ideas:

- Entrepreneurs ignore the elasticity of their demand, do not know their marginal revenue and marginal cost curves and are not concerned about equalising these two variables.
- Instead of that, they apply a rule of thumb. Price is based on the "full cost". There are two variants: following Hall and Hitch, it results from the addition of three terms: direct cost, indirect cost and profit margin. According to Andrews, who calls it "normal cost", it results of multiplying the direct cost by a factor, which implicitly determines a margin to cover overhead and profit.
- Full cost pricing (FCP) results in some price stability; entrepreneurs are reluctant to change the price as often as maximising short-term profit would require.
- Companies are not trying to maximise profit in the short term but in the long term; so they avoid such pricing that would generate a rate of profit high enough to attract new firms in their market, which would result in a future decline of their individual demand.
- The price being set at full cost, producers will try to sell a production as wide as what the market can absorb, an amount in excess of that which normally equates

¹ In perfect competition, marginal revenue equals price.

marginal cost with marginal revenue. The equalisation of these two variables is therefore disqualified.

In his essay, Harrod mentions three reasons for firms to prefer full cost pricing to the marginalist rule:

- Not tempting candidates for entering the market.
- Avoid overinvestment¹ : why bother investing in a capacity when the optimisation rule commands to use it only partially? Harrod strongly fights what he calls "The doctrine of excess capacity."
- Take out insurance against uncertainty: selling the maximum means occupying the market. Is there a better advertising for a firm than seeing its products widespread in society² ? The enterprise is consolidating its chances of future survival.

Proponents of marginalism reply. Thereof follows a debate known as the "marginalist controversy" or the "full cost of controversy." The main defenders of marginalism are Machlup, Austin Robinson and Heflebower.

Here, we skip mentioning the numerous formal and methodological criticisms, to retain only the substantive arguments:

- The full cost is presented as an alternative to the influence of demand on price, but the vagueness concerning the determination of the profit margin calls it implicitly in the game again.
- The explanation of the profit margin is barely sketched, which is unforgivable in the eyes of a profession accustomed to formulas and mathematical proofs. A theory with such a hole in its centre is not credible.
- The firm such as described by the full costers has a lazy management, in that it would give up profit opportunities. According to marginalism which combines rationality and profit maximization, this behaviour is unacceptable. Hence, the evolutionary theory of the firm that dooms such behaviour to disappearance.
- Rather than a denial, full cost theory gives only some additional information to marginalist theory about how optimum is reached. Optimum remains the point of equalisation between marginal revenue and marginal cost, where the margin is given by Joan Robinson's formula:

$$p = C_m \frac{\varepsilon}{(\varepsilon-1)} \quad (1)$$

where p is the price, C_m is marginal cost and ε is demand elasticity.

Lee and Irving-Pressman give some examples, among which the review of Hall and Hitch's article by A. Robinson where he "suggested that the mark-up over average direct cost could be treated as a proxy for the price elasticity of demand" (1992, p.284).

Experts generally consider the Heflebower response as bringing the controversy to its end. It asserts the third line of defence with force and it seems to have convinced the

¹ In imperfect competition, the tangency between the decreasing demand and the average cost happens normally at the left of minimum average cost.

² Edwards sums it up by the aphorism "Goodwill snowballs" (1955)

vast majority of neoclassical economists, who turned the page over. We can therefore speak of a victory of marginalism. More recent commentators write in these terms¹: “By and large, FCP was “marginalized” in both senses of the word” (Mongin, 1992). “The controversy over the normal-cost prices doctrine came to an end with its absorption into the theory of imperfect competition” (Lee, 1992).

Until the late fifties, economists like Edwards, Bain, Lanzillotti and especially Sylos-Labini bring improvements to full cost theory. Unfortunately, spotlights are already out, neoclassical economists do not respond. The contributions of these economists do not come out of relative anonymity.

The purpose of this article is to show that three basic ideas advanced by the full costers and their successors, form the basis for a credible alternative to marginalism:

- preventing entry of new competitors,
- the target rate of profit,
- “competitive price leadership”.

The two last ones date from the "after Heflebower"; they solve two deficiencies pointed by the opponents of full cost: non-explanation of the profit margin and the rejection of demand.

Given these three factors, the main criticisms stated by marginalists lose their relevance. But credibility of the alternative implies their articulation in a coherent whole, a result of which it is doubtful whether it has already been reached. In the following, I will propose a concept of pricing based on these three pillars; I'll call it “full cost pricing”, while being aware that it is only a concept of full cost among others.

2- The three pillars in the literature

2.1- ENTRY PREVENTING

This theme is strongly affirmed by Harrod in his essay “The Theory of Imperfect Competition Revisited”. The price must be set so that no profit is generated; otherwise the profit would be wiped out by the arrival of new competitors. The price so established thus equals the cost of production because it cannot include profit.

This view is not unanimous. “Much of Andrews’s writings suggests, however, that some premium in the form of a profit margin in excess of normal profits (...) can be secured where entry is not easy” (Bhagwati, 1970, p. 302). This idea will be developed by Bain and Sylos-Labini in several books and articles and by Modigliani (1958) who will formalise their approach. It is called the *SBM model* (Sylos Bain Modigliani). It constitutes thus a partial retreat in relation to Harrod’s theory.

The central concept in this context is what Modigliani called "entry preventing price" and Bain "limit price": this is the highest price that the incumbents think they may ask without causing the arrival of competitors.

¹ Acknowledgement of this victory does not necessarily mean that these authors consider it as theoretically justified.

Modigliani's model defends ardently the existence of the said premium and analyses mathematically the factors that influence it. It is based on two pillars:

- 1- As oligopoly suppliers are not negligible elements on their market, the arrival of a new firm will reduce the market price; it is this reduced price which must allow the newcomer to achieve profitability, a condition that he should normally have expected. Understanding this game therefore gives incumbents a safety margin.
- 2- The basic assumption of Modigliani's model is what he calls the "Sylos postulate." Sylos-Labini, analysing the entry of new firms, considers that incumbents do not change their production and comply with the price reductions resulting from the enlargement of supply¹.

Modigliani comes to the following formula which gives an approximation (i.e. the maximum) of the entry preventing price (P_0):

$$P_0 \approx P_c \left(1 + \frac{1}{\epsilon S}\right) \quad (2)$$

P_0 is:

- higher when the average cost curve is steeper;
- lower when the market size (S) is larger²;
- lower when the elasticity of demand (ϵ) is higher around the competitive price (P_c), which corresponds to the minimum average cost.

Sylos-Labini and Modigliani find it natural to assign the new comers almost no part of the existing demand. Edwards ventures the following rationalisation: goodwill ties customers to their usual supplier, especially in the area of capital goods. However, he admits that if the incoming lets those customers discover they were "exploited" before his arrival, he would easily take up most part of the demand.

Edwards notes that in addition to profit, inefficiency among incumbents is also an incentive to entry. If the entrant is more efficient, its success is assured.

Afterwards the SBM model is criticised in turn. Bhagwati considers that the premium as shown in this model is overestimated. He gives the following arguments:

- The existence of this premium makes entry more attractive and thus stimulates attempts, which has the effect of reducing the premium. The risk of failure will be more readily accepted if the potential benefit is greater.
- We must not assume too confidently that existing firms will survive first. The investors often see initial losses as inherent in the investment. As entrants are often multiproduct firms active on adjacent markets, they usually have reserves which allow bearing these losses.
- In many cases, market demand is growing, which allows the incomer to take a market share without subtracting it to the incumbents.

These arguments seem very convincing; that is why it is dubious that the premium is usually high.

¹ He explains this behaviour by the will to dissuade entrants and the fear of a rise in unit cost due to the falling of production.

² S is the ratio of the quantity taken by the whole market at price P_c on the output minimizing the average cost of the firm.

Of course, the incumbents have advantages due to their presence in the market: customer relationships, trained personnel, routine, technical expertise... These assets are not all closed to incoming candidates, but these ones have to make more effort. On his side, the incomer may also enjoy advantages: plant designed according to the most modern standards, reputation of being a price cutter, spin-off related to a university... Business models should logically assume that the entrant's general situation is as favourable as that of its installed competitors; simply, otherwise he would not have come¹. As a corollary of the equal ability of incomers, incumbents will suffer an erosion of their market share, unless the sector is growing strongly.

As observed by Harrod, incomers are not necessarily small businesses condemned to achieve a breakthrough to have the same strengths as incumbents. Often very large companies are investing in new markets to diversify their production; diversification is even not necessarily a step into the unknown: technology evolution sometimes brings together productions previously far apart. Think of Apple's entry into telephony, Sony's coming in computer industry... Edwards and Bhagwati point out that an incomer already present on adjacent markets is more able to withstand the initial losses resulting from the price war eventually provoked by his arrival.

2.2-TARGET RATE OF PROFIT

In 1958, Lanzillotti revives the investigative technique of interviewing entrepreneurs about their practice. The purpose of the article "Pricing Objectives in Large Companies" is to remedy the "inadequate state of knowledge of the price-making process" (1958, p. 921). Twenty companies were surveyed among the 200 largest American industrial companies, who faced a variety of competitive environments. The questions were designed to identify the objective that guides pricing but also to understand procedures.

The most frequently cited goals are:

1. "pricing to achieve a target return on investment"
2. "stabilization of price and margin"
3. "pricing to realize a target market share"
4. "pricing to meet or prevent competition"

Target rate of profit comes first. A common strategy is to tolerate fluctuations in profit rate from year to year, at the condition that the goal should be achieved over a longer period. Price calculation is based on a standard activity level, to prevent that fluctuations in the real rate of activity unduly affect the price.

Lanzillotti assimilates the second goal to "cost-plus" methods which include the full cost pricing. He believes that the distinction between the first two goals is difficult to define and concludes: "Cost-plus, therefore, may be viewed as one step on a road to return-on-investment as a guide" (1958, p932).

Lanzillotti also believes that "target-return pricing implies a policy of stable or rigid pricing, even though exceptions are found within particular product lines" (1958, p 940).

¹ With such a requirement, attempts are less frequent, but their success is more likely

Sylos-Labini, on his side, has presented the formula for determining the profit margin and price. He gave several versions and kept improving it after the publication of his famous book "Oligopoly and Technical Progress." Such as it appears in the article « La théorie des prix en régime d'oligopole et la théorie du développement » published in 1971, it clearly fits the target rate of profit:

$$p = v + \frac{k}{x_n} + r \frac{K}{x_n} \quad (3)$$

Where p is the price, v is the variable unit cost, k is the total fixed cost, x_n is the annual production, r is the target profit rate and K is the capital.

As Lanzillotti, Sylos believes that « les grandes entreprises qui jouent le rôle de 'price leaders', ont l'intention de réaliser un taux de profit non dans chaque année isolée mais sur une série d'un certain nombre d'années¹ » (1971, p 250).

According to Sylos, the target rate of profit is somehow « le taux permis par les barrières de protection dont jouit l'entreprise. Et puisque celles-ci sont différentes entre les divers marchés et même à l'intérieur de chaque marché, les taux de profit pris comme objectif seront différents² » (1971, p. 256).

2.3- THE MARKET PRICE

Each firm calculates its own full cost to determine the price it will quote. But if buyers are rational, there can be only one market price. How will this be established?

Traditionally, full costers use the concept of "price leadership" to solve this problem. Andrews, followed by Sylos-Labini, sets the paradigm as follows: the firm with the highest output size has a lower production cost, which makes it the price leader, because inevitably it will attempt to impose a price based on that cost.

In an article titled "Price Competitive Leadership: a Critique of Price Leadership Models" published in 1957, Lanzillotti shows the shortcomings of traditional models of price leadership and attempts to promote a new conception.

In these models, roles are codified and the price leader is clearly identified: he rings the bell and the followers automatically apply the rises and falls in prices which he decides. Lanzillotti criticises these models for their static nature. Dynamic forces at the source of these behaviours are ignored. "Moreover, the models appear to be based largely on highly institutionalised structures wherein interfirm price relationships are essentially settled, under which circumstances price leadership emerges as a type of collusion with the ringleader clearly identifiable" (1957 p55). According to Lanzillotti, markets in the real economy are rather characterised by instability; weakness of

¹ The large firms which act as price leaders intend to get a profit rate, not in each isolated year but on a series of a certain number of years.

² The rate allowed by the barriers protecting the enterprise. And as these vary from market to market and even inside each market, the profit rates aimed at will be different.

traditional models to account for the working of these markets is obvious. They are relevant only for a very particular type of case.

Lanzillotti proposes a new model he calls "Competitive Price Leadership" (CPL), because "the prices set are those which materialise from the operation of competitive forces" (1957, p 55). This contrasts with the collusive behaviour in previous models. He enumerates the characteristics of these markets. We miss the place to list them here, but I can sum them up in a few words: a real competition, but with a limited number of firms.

"Competitive Price Leadership" is the title of the paper written by Ante Farm (2014) where he ventures on the path traced by Lanzillotti. He analyses the process of price formation in the market that he so summarises: "In this model, the market price goes down if and only if a price cut appears profitable for a firm even if its competitors follow suit, while the market price goes up if and only if a higher market price is profitable for every firm. Thus, the market price is determined by the lowest market price preferred by a firm..." (2014, p.1).

The "collusive price leader" attempts to maximise the benefit of the industry, the "competitive price leader" is guided by maximising its own profit. The competitive price leader is simply defined as the firm which prefers the lowest price. "If there are many such firms, the choice of a price leader among these is immaterial and may be expected to vary randomly or depend on which firm is assumed to have the best information on market conditions" (2014, p10).

In Farm's model, businesses watch the prices of their competitors to imitate or to counter them. Such a practice would be blameworthy in the case of tenders, but it is perfectly legitimate when prices are set without negotiation by the seller, as is the case of consumer goods, to which Farm limits its analysis.

My opinion is that what Lanzillotti and Farm describe is simply competition as it works, not in economic literature but in the real world. The attribution of the label "price leadership" seems to me unnecessary and even confusing. Cases certainly exist where suppliers are split between a leader who has the initiative and followers, but the economic literature seems to see price leadership wherever there is oligopoly. Notwithstanding this observation, the Lanzillotti-Farm model is a remarkable achievement.

Farm's rule was applied implicitly by Sylos-Labini some decades sooner (1962, pp 41-50). I say "implicitly" because Sylos' model works with specific hypotheses: there operates on the market, three groups of businesses- small, medium and large- with unit costs decreasing in that order. The question is to determine towards which price and which distribution of firms among the three groups we are moving, given the total demand of the initial situation and the different cost structures. Of course, the big corporations have the privilege to set the price and thus to determine, according to their benefit, which categories of firms will survive at their side. Sylos' conclusion reads as follows: "the price tends to settle at a level immediately above the entry preventing price of the least efficient firms which it is to the advantage of the largest and most efficient firms to let live" (1962, 50).

2.4- ENTRY PREVENTING AND COMPETITION BETWEEN INSIDERS

Why do so many models acknowledge to outsiders the ability to influence insiders' behaviour, while the same power is refused to the other insiders? A priori, the same motivations are present in the competition between insiders. The sacrifice of a part of profit as a response to uncertainty keeps its relevance when incumbents act behind a closed door. Occupying the market remains an advantage. Not to maximise production reinforces the risk of being left behind by competitors. The outdistanced firm, lacking recognition and economies of scale, can be eliminated from the market. In balanced duopoly, it is unlikely that a firm can increase production quickly enough to satisfy all the customers of its rival and grab them. However, with, say, ten firms, it only takes each to increase moderately its production to have one of them, less dynamic, become superfluous.

What is the difference between an insider who wants to raise his market share and an outsider who wants to enter it? In fact, microeconomics does traditionally ignore the wish to raise market share because of two reasons:

- The belief in U-shaped cost curves
- Enterprises are not necessarily satisfied with their market share. Economic theory considers them as mere numbers devoid of past (and age) and of own objectives. However, their market shares result of their history and provide contrasted gratifications. Dissatisfaction of some suffices to provoke a Bertrand-type price war, which would hold the price at the full cost level.

Internal competition joins external threat to convince enterprises to exploit their demand to the fullest.

*

The full cost mechanism will be stated at section 5; beforehand, sections 3 and 4 clarify some preliminary concepts.

3- Competition and market structure

The easy domination enjoyed by marginalist theory has been favoured by an ill-concept of competition.

3.1- FORMS OF COMPETITION

What is the object or what are the objects of competition? According to Chamberlin, firms handle three parameters to get a place on the market:

- price,
- product quality,
- marketing spending.

It has become common to oppose "price competition" and "nonprice competition", the latter including the last two categories of Chamberlin.

When firms compete on price, the adjustment variable can be either cost or profit margin. In the real economy, costs cutting is omnipresent. Yet most models of price competition give prominence to profit margin adjustment. Among the first ones to be open to other forms of competition, Chamberlin shows himself however unable to distinguish between these two types of adjustments and to grant cost competition its rightful place.

I would classify the forms of competition according to their object as follows:

Table 1

object		price effect		nature	
profit margin	M	price direct	PD	strategy	St
cost	C	price indirect	PI	performance	Pe
quality	Q	non price	NP	performance	Pe
image	I	non price	NP	performance	Pe

In fact, there is an important difference between *M* competition and all others. Competitions *C*, *Q* and *I* consist in a race to performance. Firms try to be more productive than competitors, to offer better products or to create brand preference. By contrast, we cannot say that enterprises pursue the objective of better pricing¹. *M* competition flattens prices and profit margins to a level to be explained by economic models. It has a standardising effect. On the contrary, *C*, *Q*, *I* competitions offer businesses the opportunity to shine. In my opinion, the essential distinction is the one which opposes *St* vs *Pe* competitions. The hegemony of *M* competition in the economic literature is paradoxical regarding the importance of various forms of *Pe* competition in the real economy.

Excessive emphasis on *M* competition leads to underestimate the chances of success of entrants in a market. Market entry is generally based on an innovative idea that allows the entrant to face adversity.

3.2- TYPOLOGY OF MARKETS

Which pricing method inhabits which market structure? This important question cannot be adequately answered without a correct classification of market structures. Again, traditional theory seems perfectible.

This theory classes market structures on a line of progression of demand elasticity: in ascending order, we have: monopoly, imperfect competition (which consists in oligopoly and monopolistic competition) and perfect competition. In fact, oligopoly appears as a monopoly whose characteristics would be less clear-cut. The concrete criterion underlying the classification (and determining the elasticity), is the number of firms supplying the market.

¹ To be sure, a firm can have better inspiration than another in its pricing strategy, but the traditional model of competition is not interested in these differences and it assumes a homogeneous behaviour determined by pure rationality.

The only market structure renowned for being really competitive is perfect competition. This market structure captures a major part of the attention of economists. Of course, they admit that the simultaneous satisfaction of all its conditions is uncommon in the real world. But as its name suggests, perfect competition is erected in a theoretical perfection which the competitive sector of the economy is supposed to approach. As such, it is a sublimated representation; otherwise the effort of analysis that is devoted to it would be disproportionate.

However, situations are known where thousands of bakers apply prices recommended by their professional association and sell their bread at a higher price than supermarkets, which are fewer but engaged in fierce competition. Traditional theory therefore overestimates the importance of the number of suppliers at the expense of two factors that seem much more sensitive: the spirit of competition present or absent among entrepreneurs and managers, as well as the ease of access to the market by new firms.

Is perfect competition really a simplified and sublimated representation of a vast reality? Some of its properties make it doubtful. For example, the long-term equilibrium of the producer makes him work at his optimum size; in consequence, an increase in market demand can only be met by a change in the number of firms. Is this, even if simplified, a representation of real economy?

In my opinion, perfect competition is representative of a very specific markets type: organised markets, such as those of some raw materials. Other situations deviate. Ideally, the term "perfect competition" should even be replaced by that of "organised markets". In fact, what is "perfect" in this market structure is not the competitive combativeness of protagonists but its adaptation to the needs of economic modelling.

Schumpeter wrote on this subject :

“Neither Marshall and Wicksell nor the classics saw that perfect competition is the exception and that even if it were the rule there would be much less reason for congratulation than one might think” (1976 p.78)¹

“But in capitalist reality as distinguished from its textbook picture, it is not that kind of competition that counts but the competition from the new commodity, the new technology, the new source of supply, the new type of organization (...) This kind of competition is as much more effective than the other as a bombardment is in comparison with forcing a door and so much more important that it becomes a matter of indifference whether competition in the ordinary sense functions more or less promptly” (1976 p.84).

An observation of real economy may reveal some correlation between the number of suppliers and the level of competition. But this is not enough to deny the relative independence between these two variables, given the importance of market culture and free access. Consequently, the "oligopoly" category is not a homogeneous block. It is crossed by the border separating competition of non-competition. Logic commands to

¹ Besides Marshall and Wicksell, Schumpeter might have mentioned most great economists.

divide this block. Such a split must resonate up to the terminology. The bringing to light of a competitive oligopoly is all the more necessary when we limit the sphere of perfect competition to organised markets.

In the above mentioned essay, Harrod regrets that the horizontality of individual demand curve is established as the supreme criterion to determine the types of markets and that, therefore, all markets with a downward curve are classified together in the non-competing sphere. About terminology, he writes: "We lack a vocabulary that is both well established and appropriate" (1952, p.171). Above, I put facing each other the competition camp and the non-competition camp. The first one includes perfect competition and a part of oligopoly; the second one includes monopoly and the other part of oligopoly. Speaking of the first of these two camps, Harrod proposes the following terminology:

"Free competition" is an expression often used in popular literature, and it might be convenient to adapt this for technical purposes. It would be natural to use it for all cases where there is unrestricted (or relatively unrestricted) entry, and these would be divided into those of free competition with a perfect market and those of free competition with an imperfect market (downward-sloping short-period particular demand curve (1952, p.179)

"Free competition with imperfect market" is his proposal to designate the firmly competitive subset of oligopoly. Of the four basic market structures to be considered after breaking the oligopoly block, this one – I think- is the most widespread in real economy. Competition is the norm in our economic system and organised markets are in minority. This structure deserves thus better than such a convoluted name while others have simple and direct labels. In the rest of this article, I call it "oligopolistic competition". As a corollary, we have also defined another structure: the non-competitive oligopoly, which I will call "monopolistic oligopoly."

*

As oligopolistic competition has suffered from a lack of analysis by economists ¹, this article will describe a form of full cost pricing that is perfectly suited to it. This is not to exclude that fairly close forms of full cost pricing are usually applied under monopolistic oligopoly. But the extent of this article is limited to pricing in oligopolistic competition.

4- Framework, definitions and assumptions

4.1- DEFINITIONS ET NOTATION

The developments contained in sections 5 and 6 that follow, will operate on the usual categories of microeconomics: total revenue, average revenue, marginal revenue, total cost, average cost, marginal cost and profit. However, I find it necessary to make further distinctions about profit and cost:

¹ To the point of not being recognised; it is generally assumed that with few enterprises on a market, competition is weak.

- **Normal profit** is the annual return on capital that produces no incentive for the capitalist and the entrepreneur to invest or to disinvest. It includes a risk premium that varies from one enterprise to another. The ratio of normal profit on capital represents the rate of return expected by financial markets.
- **Gross profit** is the total annual profit earned by the company.
- **Net profit** is gross profit from which the normal profit is deducted.
- **Normal profit margin** (π_m), **gross profit margin** (π_g) and **net profit margin** (π_n) are the margins included in price, to secure corresponding profit.
- **Gross cost** (C_g) is the sum of all costing elements of the firm.
- **Net cost** (C_n) is gross cost minus normal profit margin¹.

Our notation mentions in this order:

- dimension: total (T), average (A) or marginal (M)
- category: C_g , C_n , π_g , π_n , R (revenue) ...
- subscript *st* or *lt* to specify *short term* or *long term*, if necessary.

For example, AC_{gt} is the average long-term gross cost.

4.2- ASSUMPTIONS

H1 : We are in oligopolistic competition.

H2 : Firms have no individual influence on the market price of the factors they buy.

H3 : The objective of the firm is profit maximisation; profit opportunities will never be neglected for non-rational reasons.

H4 : Firms are subject to risk aversion.

H5 : Available information, both technical and commercial, is important. Firms use it intensely and even conduct surveys to enlarge it (in the limits of an acceptable cost); they competently form their expectations and estimates.

H6 : Consumers are rational. They pay more, only for superior utility.

H7 : The average cost and marginal cost curves do coincide and are horizontal, at least in the area of sizes in which enterprises really operate². This shape seems most common, although other shapes are possible in special cases. For simplicity, we only consider flat curves.

Heterodox economists, group to which full costers belong, usually attack the dogmas of perfect rationality and of perfect information. In neoclassical economics, perfect rationality goes with profit maximisation. This assumption is challenged by the Herbert Simon School and its critique was to be found in the article by Hall and Hitch.

¹ π_m is included in C_g and in π_g . This is due to the dual nature of normal profit. Obviously π_b should never be added to C_b . The price is obtained by adding either C_n and π_g , or C_g and π_n .

² For the justification of this assumption, see Jael (2014).

My hypothesis H3 indicates that I do not share these doubts, or at least that I do not consider that the assumption of perfect rationality leads microeconomic theory in the wrong direction. What I believe is that enterprises favour long-term profit rather than short-term profit and I do not doubt that most economists share this view. The real dividing line is between those who think that maximising short-term profit is the way of maximising long-term profit and those who believe that the pursuit of short-term profit maximisation can hamper long-term profit maximisation. It is the latter position that this paper defends.

The assumption of perfect information is more harmful because it removes one of the essential dimensions of the real economy: uncertainty. H5 hypothesis states that I find it wrong, however, to fall into the opposite exaggeration. The affirmation of Hall and Hich, widely adopted by their successors, that producers have no idea of their demand curves, and marginal cost or revenue curves is excessive.

5- Price formation in oligopolistic competition

We may at last expound our concept of full cost pricing.

5.1-THE FIRM'S SUPPLY PRICE: FORMULA

Let us take the formula (3) of Sylos (see above) and express it differently:

$$p = c + \pi \quad (4)$$

$$\pi = c \frac{r}{V} \quad (5)$$

where c is the net unit cost that I shall clarify below, π is the normal profit margin (πm), r is the normal rate of profit (including risk premium) and V is the speed of capital (K) turnover in the cost of annual output (\bar{C})¹.

$$V = \frac{\bar{C}}{K} \quad (6)$$

Formula (5) shows that a same rate of profit can be obtained either by a high turnover of capital coupled with a small margin, either by slower rotation coupled with a higher margin.

r is the target rate of profit. Under free movement of capital, this rate is the one to which the capital market discounts future returns, for capital valuation. If several types of capital (equity and borrowed) are invested in the business, r is the weighted average of the $r_1 \dots r_n$, returns expected by the owners of these different funds.

The cost c is full, including direct costs, both fixed and variable, and the margin covering indirect costs. Selling expenses are included as well as production costs and overhead. Only the cost of capital is excluded. It corresponds thus to AC_{nt} .

Price p includes thus depreciation of equipment. Some authors question the validity of this imputation on the grounds that the equipment, once acquired, costs nothing to the enterprise. Neoclassical theory has always been wary of historical cost. The

¹ If q is the annual output, we have: $\bar{C} = q.c$ (7).

marginalist price must not look to the past. By denying the past, this theory deprives the firm of a future, because a time will happen when equipment is to be renewed, which would prove problematic if prices do not cover depreciation.

Some authors, such as Andrews and Kalecki propose an alternative formula to equations (4) and (5):

$$p = m.u \quad (8)$$

where u is the direct cost and m is a coefficient used to cover indirect costs and bring profit. I find it unconvincing. Either m varies from firm to firm depending on the importance of indirect costs, but then this formula does not explain anything, or m has its own meaning independent of the formula, but then this pricing method has an element of irrationality: enterprises with a large share of indirect costs would agree to be less profitable.

Commercial and technological evolution tends to reduce historically the share of direct costs and within this, the share of variable costs. Most companies are multiproduct. Each product is offered in a multitude of versions. Product cost is a tangle of elements. For instance, this product may include a direct cost c_1 , a common cost c_2 with product B and product C, a common cost c_3 with products with B, D and E etc. It seems reckless to set a price only from direct costs.

Whether direct or indirect, many costs are fixed. In this case, one gets a unit cost by dividing the amount by a quantity. Which is the right quantity therefore? The completely objective unit fixed cost does not exist. Since we seek to determine an equilibrium price, the vagaries of real output are not a relevant variable. So we select the quantity corresponding to the medium-term business objectives.

5.2- PASSAGE TO MARKET PRICE: SIMPLE CASE

Let us start by ignoring two complicating factors: cost differences between suppliers and product differentiation.

In the above developments, full cost is considered as a perfectly available datum. Obviously, the reality is quite a different matter. Full cost should be estimated by the producer. In this matter, there is no absolute rule to refer to. Each company builds its estimation formula. Excluding the objective differences between firms (technology, size, organisation ...), their estimates may still vary for methodological reasons: the methods of allocating indirect costs and even the boundaries between direct and indirect costs vary. This will be especially true when firms are multiproduct.

To properly handle this issue, we need to distinguish between the theoretical full cost (FCT) and the estimated full cost (FCE). What has been defined in previous sections is FCT. FCE, meanwhile, is plural; managers reckon it in a rather intuitive way and simple enough not to make their task impractical. In the marginalism debate, one of the most used expressions was "rule of thumb", to describe the full cost pricing procedure. In the present perspective, the rule of thumb regards FCE. FCT, for its part, is a product of rationality.

Given hypothesis H6, the market accepts only one price. Without the Walrasian auctioneer, it will need a period of trial and error before the single price arises¹. How does it emerge?

Firms price on the ground of their own FCE. What happens in case of divergence between the competitors' FCE's ? Prices will differ. Each firm can compare its price with those of competitors and buyers also do perform this comparison. Two opposing forces act simultaneously: the most expensive firms will be tempted to lower their prices to avoid losing customers. Cheaper firms understand they can increase their margins with little risk. When a firm plays the role of market leader, its price serves as a reference for the other suppliers. Otherwise, the equilibrium price will be partly a result of chance, within the range between the extreme estimates of full cost.

Participants in this tâtonnement may have the impression (not wrong, but excessive) to have to suffer the price as if they were in perfect competition. Harrod reports that many entrepreneurs complain that even outside the conditions of perfect competition, "the market does dictate a price" (1952, p.158) ; we may conjecture that this feeling comes from the tâtonnement to achieve a market price from divergent FCE's.

The influence of competitors' prices has been exposed by Kalecki, whose formula is:

$$p = m.u + n.\bar{p} \quad (9)$$

This is formula (8) arranged to reflect the influence of \bar{p} which is the average price of other firms. The parameter n is a number, positive or negative but less than one. Kalecki does not require the emergence of a single price. I think this is questionable and certainly impossible under oligopolistic competition.

5.3-PASSAGE TO MARKET PRICE WITH DISPARITY OF COSTS

For simplicity, assume here that estimated full cost is objective and that there are no other differences in cost than real differences.

There is no unanimity among economists about pricing in situation of differentiated costs. According to Knight, Andrews and Edwards, the cost of the most efficient business makes the price. Instead, J. Robinson believes it is the price of the marginal firm. In fact, it is Farm (2014), who provides the most correct answer to this problem (see section 2.3).

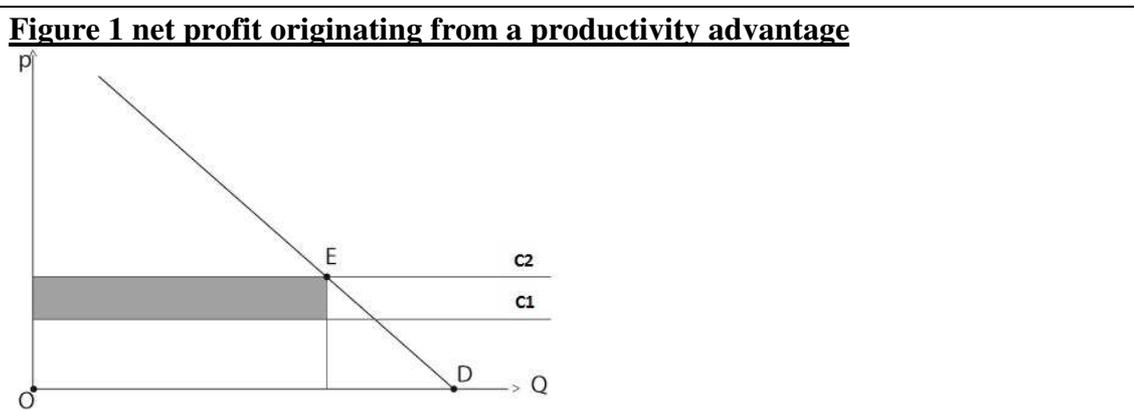
The most efficient firm enjoys a privilege: it can set the price as it pleases at any level higher than its full cost and not higher than the full cost of its competitors.

It should choose a price near its own full cost when it wants to eliminate competitors from the market. But it seems rational that the most efficient firm prefers the other option. Indeed, this is a unique opportunity for firms to achieve a net profit without the

¹ Walrasian tâtonnement is badly named, because only one agent gropes: the auctioneer. Buyers and sellers are content to be price takers. But in the search for equilibrium in oligopolistic competition, they are the groping agents.

risks that are usually associated. Maximising long-term profit prohibits net profit when available to all, but recommends it when it is a privilege.

Let there be n firms $F_1 \dots F_n$, with $C_1 < C_2 \dots < C_n$ where C_i is the full cost of the firm i . If firm F_1 chooses a price equal to C_m where $m > 1$, each firm $F_2 \dots F_{m-1}$ could impose a price lower than C_m , that firm F_1 must accept. But they have the same interest as F_1 to take advantage of net profit that is the reward for their performance.



In Figure 1, where C_1 is the full cost of the most efficient firm and C_2 a higher price it chooses, the net profit is represented by the grey rectangle.

The market price will tend towards the full cost of the marginal firm or rather of the "normal" firm. By normal firm, I mean one which does not enjoy exclusive advantages, one which is subject to management within the standard and that exploits publicly known technologies¹. But an aggressive competitive strategy may reduce the level of the market price.

5.4- PASSAGE TO MARKET PRICE WITH PRODUCT DIFFERENTIATION

As Stigler, let us distinguish the heterogeneity of products from that of buyers. Heterogeneity of buyers may lead buyers A and B to prefer product Y while C and D prefer competitor's product Z in the same conditions. In this section we postulate products heterogeneity and buyers homogeneity. That amounts to posit the existence of a hierarchy of products according to their quality, which is made objective by unanimity of demanders.

The rule that the rationality of buyers leads to a unique market prices cannot be maintained as such. But its simple suppression would lead to an irrational market. It must therefore be amended. The uniqueness of the price now relates to an abstract unit of quality. The quality is obviously not measurable. But the consumer who chooses between model A of brand X at price p_1 and model B of brand Y at price p_2 has to find a common denominator between them to base his choice, that we posit to be rational.

¹ This clarification is intended to meet the case where the marginal firm is a company in difficulty, whose performance could be exceeded by an outsider.

Figure 1 therefore remains valid: you just have to read abscissa, not as units of the product, but as units of quality. Suppose that F1 is the most efficient firm. It produces good G1 at the same cost as that of product G2 by firm F2, whose quality is lower. Horizontal line C1 is thus below C2. Firm F1 can therefore obtain a net profit by fixing the price based on the production conditions of firm F2. This net profit will be secure at least in the short run, as in the previous case.

5.5- PRICE, COST AND SUPPLY

The firm reaches equilibrium at the point where its supply curve is intersected by its demand curve (point E on Figure 1). Our explanation of equilibrium matches this comment of Edwards: “there is an equilibrium of price, but not a determinate price-output equilibrium in the usual sense. In a word, the ‘right’ (equilibrium) price is independent of the planned or achieved output of the firm” (1955, p 113).

How to build the firm's supply curve, that marginalist theory tends to identify with the cost curves? In my view, the internal factors to the firm (mainly cost) are not sufficient to determine its supply curve; market forces play also. I see the supply curve as a horizontal line at the level resulting from the confrontation of the competitor's offer prices (FCE). The horizontality of the supply curve does not reflect the assumption that cost curves have this form but the exogenous character of price.

In fact, supply, as a function of the price, is indirectly influenced by cost. In the (hypothetical) area where production cost exceeds market price, supply would be indefinite. If the process were purely mechanical, supply would cancel in this area; but the firm will maintain a positive supply if it is confident in its ability to improve its performance in the medium run.

When objective and subjective costs differ little between competitors, the AC_{glt} curve can be considered as a good approximation of the supply curve. This curve is better suited for this purpose than AC_{gct}, because it eliminates two sources of differences between firms: the size and rate of capacity utilisation. Since the enterprise's supply price is to be transmuted into a market price, too random variables like these cannot be significant.

6- Demand variations

Changes in demand have often been cited as an obstacle insuperable for the full cost theory. Let us analyse them more closely.

Changes in the firm's individual demand may be attributable to the following causes:

- Long-term trend, usually characterised by an expansion.
- Cyclical fluctuations.
- Seasonal fluctuations (for a limited number of products).
- Accidental variations (natural disasters, climatic, political conditions).
- Change in the number of competing firms or in their respective market shares.

Unlike the latter, the previous four involve a variation in industry demand.

Faced with these changes, the firm must react; it has choice between two policies:

- Price-reaction: keeping production steady and adjusting price.
- Quantity-reaction: keeping price steady and adjusting production.

In the short run, a rising quantity-reaction is impossible when production is running at full capacity. According to Andrews, Edwards and Sylos, large companies commonly take care to have capacity reserves available.

Price-reaction expands or decreases deliberately the profit margin. Price may also vary in case of quantity-reaction, when cost is depending on quantity produced (long term average cost not horizontal).

Given the close relationship it establishes between price and cost, full cost theory implies that the quantity-reaction is preferred whenever possible. Full costers have advanced several justifications for this behaviour, especially the permanence of a trust relationship between the firm and its clients. Another reason is - in my view - not given enough attention: the reliability of forecasts. For a given change in revenue, the profit with a fixed quantity and variable price is more volatile than his alter ego with variable quantity and fixed price¹. Now, the reduction of uncertainty is a major concern for entrepreneurs.

This behaviour could be related to the empirical discovery of some price rigidity by Rotemberg (1982)², itself already confirming an earlier study by Godley and Nordhaus (1972). Based on a survey he conducted among large US companies, Blinder relates that in case of demand rise, 61.5% reported practising the quantity reaction, 4.5% the price reaction and 34.0% both. In case of demand fall, these rates were respectively 36.8%, 27.0% and 36.2% (1994, p.135).

In the case of depressed demand, the quantity-reaction may involve:

- The laying off of some part of previously active factors of production.
- The retention of factors combined with a loss of productivity.
- Stockpiling of unsold finished goods.

Business cycle is the main cause of fluctuation in demand. It deserves thus special attention. Many economists have studied empirically the cyclical changes in prices and profit margins. And these studies come to different conclusions. The three theses, procyclical, stable and countercyclical prices and margins, are each widely reported. By contrast, the pro-cyclical variation in the rate of profit does not seem challenged.

¹ The reason is that the residue of price less cost will vary more widely than price. There is nothing alike in the case of a change in the quantity. We assume here a more or less constant unit costs and we compare the effect of an equal relative variation of price or of quantity.

² The results of Rotemberg, like those of other empirical studies, do not operate the distinction between oligopolistic competition and monopolistic oligopoly which is essential in the present paper. Comparisons between these studies and our object must be treated cautiously.

That those fluctuations can be countercyclical may seem surprising. As soon as the years thirty, economists had understood that the market structure influences the profit margin. Kalecki and Joan Robinson opposed Harrod's theory of the procyclical degree of monopoly. She drew attention on a possible pro-cyclical variation of the number of enterprises. For his part, Kalecki writes :

Mr Harrod was rightly criticised in that there exists other factors which influence the degree of monopoly in the opposite direction. For instance, in the slump, cartels are created to save profits and this of course increases the degree of monopoly, while they are afterwards dissolved in the boom because of improving prospects of independent activity and the emergence of outsiders.

The margin focused by most empirical studies is that of price over marginal cost, not over average cost. Their findings are applicable to full cost pricing with caution. In addition, the estimate of marginal cost is problematic; it is an abstract concept that does not appear in any accounting and that economists have to infer from macroeconomic data. The study by Machin and Van Reenen (1993) is an exception since it is based on data from the microeconomic level and it identifies the margin with the ratio of profit to revenue. This study, more in line with our purpose, finds a procyclical margin variation. Anyway, to satisfy, full cost theory must be compatible with the three possible cycle forms, because all markets do not necessarily behave identically.

We have to adapt formulas (5) and (6) to take account of the business cycle. To the variables already present in these formulas, we are adding:

- $Q(t)$ is the real output at time t , while q is the average output over the cycle. We have :

$$Q(t) = q.(1+\alpha(t)) \quad (10)$$

where $\alpha(t)$ is a cycle index, positive in boom and negative in depression

- $R(t)$ is the real profit rate at time t .
- β is the margin sensitivity coefficient to cyclical fluctuations. It is positive for pro-cyclical variations, null for acyclical margin and negative for countercyclical variations. A highest absolute value indicates a higher sensitivity.

From (5), we deduce :

$$\pi = r.\frac{K}{q} \quad (11)$$

Let us turn this non-cyclical formula into a cyclical formula by multiplying it by an ad hoc expression:

$$\pi(t) = r.\frac{K}{q}.(1+\beta.\alpha(t)) \quad (12)$$

The real profit rate is given by the formula:

$$R(t) = q.(1+\alpha).\frac{\pi(t)}{K} \quad (13)$$

Assume that c , K and r are acyclic. We find that for $\beta = 0$, that is an acyclical margin, the real profit rate is procyclical, as $R(t) = (1+\alpha).r$. Actually, the rate of profit is always procyclical except for values of β lower than -1 . The procyclicality of $R(t)$ obviously increases with β .

Over the whole cycle, $E(\alpha) = 0$. If we replace α in formula (13) by its expectation, we get $R = r$, for all β . The determination of margin $\pi(t)$ according to formula (12) thus enables the firm to meet the objective of the target rate of profit.

The higher rate of profit during the boom will not encourage the entry of new firms; the lower profit in depression will not incite the incumbents to retire. Entrepreneurs understand that the pendulum will bring compensation sooner or later. As noticed by Sylos and Lanzillotti, they do not expect the normal profit at each stage of the business cycle.

7- Profit maximisation

Orthodox theory institutes profit maximisation as the business motivation. Let us see if its recommendations are consistent with this objective. As "its" cost includes normal profit (π_m), it is necessarily NET profit that is to be maximised. This tactic is not credible; it is based on a misconception of the factors of production, which allocates to an independent factor named *entrepreneur* the residue remaining after the remuneration of all other factors including capital. On the long run, net profit is close to zero; no factor could content itself with such a compensation. The fact is that the entrepreneur and the capitalist represent the same factor and that this is paid by the GROSS profit. In fact, the dividend of shareholders includes indistinctly normal profit and net profit. Shareholders are not interested in this distinction proper to economists. In the real economy, decisions are guided by the maximisation of gross profit, not of net profit.

Although it does not yield net profit and even because it does not, full cost pricing allows maximisation of gross profit. The net profit of the marginalist rule calls for new suppliers on the market and gradually reduces the market share of each. The net profit is maximised in relation to the existing demand, but this one gradually shrinks¹.

Marginalist rule provides thus less profit than full cost pricing and is therefore not optimal. This raises two paradoxes:

- Empirical studies (from the OERG) were needed to cast doubt on the marginalist optimisation, while its theoretical inadequacy was obvious.
- The evolutionary theory (Alchian, Friedman) of the firm came to the rescue of marginalist theory, while the firm which aims at respecting its recommendations would weaken itself. Evolutionary theory should rather be invoked to explain the preponderance of full cost in empirical surveys.

8- Conclusion

The dominance of full cost pricing is confirmed by numerous empirical studies. Orthodox microeconomic theory got out of this difficulty by relegating it to the status

¹ In the case where the average cost function is a horizontal straight line, the most common case in my opinion, traditional full equilibrium of imperfect competition defined both by the tangency between demand and average cost and the intersection of marginal revenue with marginal cost is impossible. Firm size will tend towards zero, which is an absurd result.

of "rule of thumb". Sylos wrote: "Far from representing only a rough and approximate rule for behaviour a 'rule of thumb', the full cost principle can be fully rationalised" (2007, p. 96). The present paper aims at contributing to this project

The theoretical elements on which I insisted were:

- 1- Highlighting of oligopolistic competition and of the importance of full cost in its field.
- 2- Reaffirmation of profit maximisation. Proof that entry prevention makes full cost pricing more profitable than the marginalist rule.
- 3- Marginalist theory took advantage of two confusions to assert its authority :
 - maximisation of net profit in place of gross profit
 - insistence on margin competition in place of performance competition
- 4- Relation of full cost theory with the literature that analyses the effects of the business cycle on prices and margins.
- 5- Clarifying of the algebraic formula of full cost established by Sylos.
- 6- Distinction between the two levels of full cost that are its rationality and its estimate.

References

- Andrews, P.W.S. 1959. *Manufacturing Business*. Macmillan London.
- Bain, Joe S. 1950. "A Note on Pricing in Monopoly and Oligopoly". *American Economic Review*, vol 39: 448-464.
- Bhagwati Jagdish N. 1970. "Oligopoly Theory, Entry Prevention, and Growth". *Oxford Economic Papers*, Vol. 22 n°3 (Nov), 297-310
- Blinder, Alan S. 1994. "On Sticky prices: Academic Theories Meet the Real World" in *Monetary Policy* Editor Gregory Mankiw. The University of Chicago Press pp 117-154.
- Chamberlin, Edward Hastings. 1962. *The Theory of Monopolistic Competition*. Harvard University Press, Cambridge Massachusetts.
- Edwards, H. R. 1955. "Price Formation in Manufacturing Industry and Excess Capacity". *Oxford Economic Papers* 7 (1) Dec : 94-118.
- Farm, Ante. 2014. "Competitive Price Leadership". www2.sofi.su.se/~afa/docs/Competitive_Price_Leadership.pdf
- Godley, W.A.H, and W.D. Nordhaus. 1972. "Pricing in the Trade Cycle". *The Economic Journal*, vol 82 September: 853-882.
- Hall, R.L., and C.J. Hitch. 1939. "Price Theory and Business Behaviour". *Oxford Economic Papers* 2 (May): 12-45.
- Harrod, R.F. 1952. *Economic Essays*. Harcourt, Brace and company, New York.
- Heflebower, Richard B. 1955. "Full Costs, Cost Changes, and Prices" in *Business Concentration and Price Policy*. Princeton University Press. <http://www.nber.org/chapters/c0969.pdf>
- Jael, Paul. 2014. *Full Cost, Profit and Competition*. <http://mpa.ub.uni-muenchen.de/59630/>
- Kalecki, Michal. 1938. "The Determinants of Distribution of the National Income". *Econometrica* 6 (2) (April) : 97-112
- Kalecki, Michal. (1943) 1971. "Cost and Prices" in *Selected Essays on the Dynamics of the Capitalist Economy*. Cambridge University Press.

- Lanzillotti, Robert F. 1957. "Competitive Price Leadership- A Critique of Price Leadership Models". *The Review of Economics and Statistics*, vol. 34, 55-64
- Lanzillotti, Robert F. 1958. "Pricing Objectives in Large Companies". *American Economic Review* 18 (5) December: 921-940.
- Lee, F.S. 1999. *Post Keynesian Price Theory*. Cambridge University Press (Virtual Publishing). Cambridge
- Lee F.S., and J. Irving-Lessman. 1992. "The Fate of an Errant Hypothesis: The Doctrine of Normal-Cost Prices". *History of Political Economy* 24:2 : 373-309
- Lucas, M.R. 2003. "Pricing decision and the neoclassical theory of the firm". *Management Accounting Research*, 14: 201-207.
- Machin, Stephen, and John Van Reenen.1993. "Profit Margins and the Business Cycle: Evidence from UK Manufacturing Firms". *The Journal of Industrial Economics* 41 (1): 29-50
- Machlup, Fritz. 1946. "Marginal Analysis and Empirical Research" . *American Economic Review* 36 (September): 519-554
- Modigliani, Franco. 1958. "New Developments on the Oligopoly Front". *Journal of Political Economy*, 66(3) June, 215-232
- Mongin, Philippe. 1992. "The Full-Cost Controversy of the 1940s and the 1950s: A Methodological Assessment". *History of Political Economy* 24:2 311-356.
- Nubbemeyer, Elmar. 2010, *A Reconsideration of Full-Cost Pricing*.
www.edoc.ub.uni-muenchen.de/12313/2/nubbemeyer_Elmar.pdf.
- Oliver, Henry M. 1947. "Marginal Theory and Business Behavior". *American Economic Review* 37 (June): 375-383
- Ray, Korok, and Jacob Gramlich. 2012. *Full-Cost Pricing and Economic Pricing: Reconciling Two Approaches*.
www.korokray.files.wordpress.com/2012/11/fcpep.pdf
- Robinson, Austin. 1950. "The Pricing of Manufactured Products". *The Economic Journal* 51: 771-780.
- Robinson, Joan. 1946. *The Economics of Imperfect Competition*. Macmillan and co, London.
- Rotemberg, Julio J, and Michael Woodford. 1999. "The Cyclical Behavior of Prices and Costs". *NBER Working Paper Series*. Working paper 6909.
www.nber.org/papers/w6909
- Rotemberg, Julio J. 1982. "Sticky Prices in the United States". *The Journal of Political Economy* 90 (6): 1187-1211.
- Schumpeter J. ([1943] 1976) *Capitalism, Socialism and Democracy*, Routledge, London and New York
- Stigler, George J. 1968. *The Organization of Industry*. Richard D. Irwin, Homewood Illinois.
- Sylos-Labini. 1962. *Oligopoly and Technical Progress*. Harvard University Press, Cambridge Massachusetts
- Sylos-Labini, Paolo. 1971. « La théorie des prix en régime d'oligopole et la théorie du développement ». *Revue d'économie politique*. 81 (2) : 244-272.
- Sylos-Labini, Paolo. 2007. "Oligopoly: Static and Dynamic Analysis". *Revue d'économie Industrielle*, 118 (2e trimestre): 91-107.