The History of the Oxford Challenge to Marginalism, 1934-1952

The principle of full cost pricing and P.W.S. Andrews' theory of normal cost pricing have long been empirical and theoretical thorn-in-the-side of neoclassical price theory. Initially, they were seen as quite inconsistent with marginalism, and hence constituted challenge, a specifically Oxford challenge, to it. They were also seen by non-marginalists as contributing to the empirical and theoretical foundation development of a non-neoclassical theory of prices. However, the controversial features of the full cost principle and normal cost pricing procedures were ultimately dismissed or ignored by neoclassical economists. The purpose of this article is a reconsideration of the Oxford challenge to marginalism. Starting with the formation and operation of the Oxford Economists' Research Group, the article presents the history of the Oxford challenge, dealing with the full cost principle, Andrews' theory of manufacturing business, and the marginalist controversy. The last section concludes that the challenge is far from dead and thus warrants renewed consideration.

Oxford Economists' Research Group, 1934-1939

In May 1934, Hubert Henderson resigned his Civil Service position as economist for the Economic Advisory Council and accepted a senior research fellowship at All Souls College, Oxford. Upon his arrival in Oxford, he became involved in the formation of the Institute of Statistics. His interest in the Institute was driven by his view of what he saw as deficiencies in current economic studies. That is, when working with the Economic Advisory Council, he

became quite skeptical of economic theories which eschewed reliance on facts and became more insistent on empirical research. His decision to move to Oxford was motivated by his desire to undertake realistic investigation of economic theory. However, shortly after his arrival he became concerned that the forces pushing for the formation of the Institute were also going to have the Institute emphasize research on mathematical statistics and economic theory as opposed to applied economics. Consequently, he began searching for another vehicle for undertaking empirical research directed at testing economic theory. He found it by establishing a study group to deal with problems in economic theory which had immediate practical importance. (Howson and Winch, 1977; Henderson, 1931 and 1939; Kittredge, 1934 and 1935).

Because of his belief in the need for facts before constructing theories, Henderson felt that the young Oxford economists and their theories needed to be confronted with the experience of the businessman to show that their formal economic systems were much too simplistic for dealing with the complicated interdependence of the economic world. To this end, he sent a letter to Harrod on February 20, 1935, spelling out his idea of bringing businessmen to Oxford in order to allow Oxford economists to interview them. In particular, Henderson suggested that the young Oxford economists, through their questions, might be able to elicit information from businessmen that would have some bearing on major economic controversies of the day. To illustrate what he was driving at, he made reference to the controversy between Hawtrey and Keynes regarding the degree and the *modus operandi* of the influence of changes in the rate of interest upon prices and trade activity. To arrive at some kind of authoritative statement about the Hawtrey-Keynes controversy among others, Henderson suggested that the study group interview businessmen to see what they would have to say about the matter. After all, he suggested, it was the businessmen who were the actors in the economy and it would be of real interest to see whether they closely followed the script articulated by economists in their writings and lectures. Harrod and the Oxford Fellows responded enthusiastically to Henderson's suggestion. So, over the next few months, the Fellows and Henderson worked out the particulars of establishing a study group, called the Oxford Economists' Research Group (OERG), and by the end of the beginning of the 1936 Hilary Term it was in operation. Because the basic goal of the Group was to

unflinchingly compare economic theory to the real world with the anticipation of arriving at original and, if possible, paradoxical results, most of the Fellows of the Economics Sub-Faculty and some individuals employed by the Institute participated (Henderson, 1935, 1936a, and 1939; Harrod, 1935 and 1953; Phelps Brown, 1936b, 1980 and 1986; Hargreaves, 1973; Roberthall, 1979 and 1980a).

The Group was formed with the object of investigating the influences determining the trend of economic activity in Great Britain since 1924. More specifically, Henderson and the Oxford economists wanted to find out what factors affected businessmen when making their business decisions and how businessmen made their decisions over the trade cycle. Thus, two topics quickly emerged for the Group; the effect of changes in interest rates on business behavior over the trade cycle and the price policy of businessmen over the trade cycle. The Group's objective and particular topics obviously reflected the existence of massive unemployment in the inter-war years and the arguments to eliminate it. The first topic reflected the prevailing interest in whether government action to control the trade cycle, such as instituting public works or reducing the interest rate, would ignite the response from the private sector necessary to be successful. In particular, it not only reflected the interests Henderson, Harrod and the other Oxford economists had in Keynes' and Hawtrey's arguments about the effects of the interest rate on investment, but also reflected Henderson's standing disagreement with Keynes over the causes and cures of unemployment and the National Government's claim that their cheap money policy promoted the 1930s housing boom. The second topic reflected interest in the arguments by members of the Macmillan Committee, Henderson and numerous industrialists that a reduction in money wages would reduce costs and prices, hence making the export industries more competitive, thus decreasing unemployment. To see if the arguments were sound, the Fellows needed to know if a fall in the money wage would reduce prices or re-divide national income in favor of capitalists and rentiers; and this required knowledge of how firms set prices. Thus in a very real sense, the topics investigated were a microcosm of the interests and concerns of economists in general. (Henderson, 1936a; Kittredge, 1936 and 1937; Andrews, 1952b; Shackle, 1979; Phelps Brown, 1980; Harrod, 1972).

The primary method of investigation used by the OERG was to interview businessmen in Oxford and to have field interviews with

businessmen at their firms between academic terms. To bring the businessmen to Oxford, Henderson would send a letter to the prospective businessman, who was usually the chairman or chief executive of the firm and already personally known to him, outlining the nature of the OERG and its interest in having him come to talk. Some introductory letters included a list of questions on which information was desired; otherwise, a list of questions would be sent to the businessman once the invitation was accepted, indicating the points on which information was desired. The questions, which were continually revised so as to help the businessman understand and focus on the particular concerns of the Group, served as an outline for the discussion that would then take place. The areas covered by the questions included those on the determination of direct and overhead costs, the determinants of price changes, the carrying of stock and the role of the interest rate in making investment decisions. The businessman would then come to Oxford, usually on a Friday or Saturday, and dine with Henderson at All Souls College; after the meal, some eight to twelve members of the Group would join them. It was hoped that the businessman would be willing to give insights into his business decision in an informal atmosphere. The field interviews required that a member of the Group go to a particular firm and discuss with the chairman or chief executive such topics as the factors determining decisions on the timing of changes to greater mechanization or about their policies of pricing, both for purchases and for retail sales. The interviews in both cases were then written up and circulated among the members of the OERG and sent to the businessmen for their comments (Roberthall, 1979; Henderson, 1936b, 1937 and 1938b; Andrews, 1939; Phelps Brown, 1936a, 1936b, 1937, 1979 and 1980; Shackle, 1979; Bretherton, 1980; Hargreaves, 1973; Harrod, 1936).

The meetings at Oxford were a lively and open affair. The businessman would start with a brief summary of the business itself, such as the commodities produced by his firm, the firm's size and the degree of competition within the industry. Then he would proceed with how his firm set prices and finally end with a discussion of the factors which affected the firm's investment decisions. With the latter two topics, the members of the Group would interject with clarification questions aimed at gaining a better understanding of how prices were set and investment decisions made. For example, it was common to find businessmen who denied that their investment

decisions were directly affected by changes in interest rates, in part because of the overriding uncertainty surrounding such decisions. When pressed closely by the economists about this, the businessmen frequently resorted to detailing the methods of calculation they used when determining projects of capital expenditure and the *methods presented altogether disregarded variations in interest rates.* Thus the Oxford economists obtained a clear but unexpected answer to the Hawtrey-Keynes controversy – neither position was correct in regard to the *modus operandi* of the influence of changes in the interest rate on the level of economic activity; rather it appeared that variations in the interest rate had no direct impact on the investment decision-making by businessmen, whether it be in plant and equipment or in stocks (Henderson, 1938b; Shackle, 1979; Roberthall, 1980a; Andrews, 1952a).

As for pricing, the businessmen would start off by describing price setting, according to the simple formula of average direct costs plus overhead costs divided by expected output plus a profit margin: ADC + OHC/EO + PM = price. Then a bit later, the question would be raised as to whether prices would be increased when sales declined. The businessmen would generally misunderstand the question until the expected output variable was referred to, since a lower expected output implies a higher price, all other things being equal. Then they would bring competition into the price setting decision. In spite of this give-and-take atmosphere and the clear and consistent descriptions businessmen gave of their pricing procedures, there were still some misunderstandings by both the businessmen and the members over the terms used by each. Part of the problem was due, as Shackle (1979 and 1980) has noted, to the assumption tacitly made in most economic theorizing that individuals possess all the data they need in order to act rationally, whereas businessmen were describing how they set their prices in the face of constant and unforeseeable shifts in market conditions, changes in technological knowledge, financial conditions and politics. Another aspect of the problem was that the businessman was not familiar with the theoretical points the members were interested in. For example, when the businessman explained how prices were set, he always assumed some expected level of output on which to determine costs. Since the description of price setting did not conform to the marginalist approach to pricing, so familar to the members, their reply would be: "How do you know that the predetermined level of output will sell at the price

based on those costs?" However, because the businessman was not familiar with the theoretical basis of the question (*i.e.*, the interrelationship between price and output as implied by a demand curve), the ensuing discussion resulted in some frustration and bafflement on both sides. The final aspect of the problem was that the businessmen and the Oxford economists were seeing common phenomena in a different light. The most important example of this, according to Hall (later Lord Roberthall), was that *businessmen saw prices as non-market clearing and not even designed to clear the market, while the members saw prices as market clearing* (Roberthall, 1980b). Thus the members of the Group had to "re-see" prices. Fortunately, Henderson was able to help bridge many of the misunderstandings that arose between the participants because his involvement in both the academic and business world had enabled him to learn both languages (Phelps Brown, 1980; Roberthall, 1980b; Shackle, 1979 and 1980; Harrod, 1953; Kittredge, 1936).

The success of the OERG was immediate. Within two years, the members realized that, in spite of the diverse and sometimes confused replies to their queries, they had novel results with respect to the effect of interest rates on investment. Shackle felt that the most interesting question raised by the Group concerned the non-influence of the interest rate on the businessmen's decision to invest because it revealed that uncertainty was the overriding factor when they made their investment decisions. Phelps Brown, on the other hand, mentioned in a 1937 letter to Wesley Mitchell that the Group had "found no manufacturer or distributor yet who had ever been influenced in his decisions by the rate of interest" (Phelps Brown, 1937). Similarly, Henderson in a 1938 letter to Kittredge of The Rockefeller Foundation noted that

> as a result of these interviews we [the OERG] are able to lay down certain propositions with regard to the effects of interest rates with a high degree of confidence. Broadly they amount to this, that the importance of the rate of interest does not lie mainly in its effects on the ordinary businessmen, whether industrialist or trader; but rather in its effects on Government finance and public utilities on the one hand and on the expenditure of private individuals through the medium of Stock Exchange values on the other. *These conclusions entail a considerable modification of what is commonly asserted without any evidence in abstract economic discussion. I do not think however that there can be any reasonable doubt as to the truth of our conclusions and I am in some hopes that they will be accepted as sufficiently conclusive and so give a new term to the shape of economic analysis in future* (Henderson, 1938a; emphasis added).

Thus the Group's findings on the interest rate, as well as Henderson's comments, were published in the first issue of *Oxford Economic Papers* in 1938. (Andrews, 1952a; Shackle, 1980; Bretherton, 1980; Henderson, 1938b; Meade and Andrews, 1938).

In the same letter to Kittredge, Henderson noted that the Group's work on "how far trade fluctuations are affected by the methods adopted in different industries in fixing the selling prices of their goods" would probably not produce any results worth publishing. However, Hall and Hitch thought otherwise. Because most of the members of the Group were confirmed marginalists, the results – that businessmen thought of prices in terms of some relationship to average total costs and totally ignored the marginalist approach to pricing – shocked them, to say the least. But what caught their attention even more was the relative stability of prices over the trade cycle and this became the phenomena which really needed to be explained. Hall in particular brooded about this, *i.e.* why a firm's price based on a cost-plus formula could be stable if it faced a downward sloping demand curve. This dilemma was resolved when he hit upon the idea of a kink in the demand curve. Hall read a paper to the Group putting forth this idea and it was received with considerable interest and curiosity. Of all the members of the Group, only Hitch saw at once that it was an idea which needed developing. So, collaborating with Hitch, Hall prepared a revision of the paper which Harrod, as President of Section F of the British Association, found interesting enough to urge him to present it at the August 1938 meetings in Cambridge. The paper was presented on August 23 under the title of "The Business View of the Relation Between Price and Cost". After the meetings, Hall further collaborated with Hitch to produce their well known article "Price Theory and Business Behaviour". (Roberthall, 1979, 1980a, and 1980b).

Full Cost Principle, 1939

The significance of Hall and Hitch's article to the other members of the Group was its delineation of the businessmen's explanation for price stability and its introduction of the kinked demand curve. The virtue of the latter was that it appeared to

reconcile the logic of marginalism with the empirical evidence of full cost price setting and price stability. In focusing their attention on price stability, the kinked demand curve and marginalism, Hall and Hitch did not pay significant attention to the full cost pricing procedures or clearly delineate what came to be known as the full cost principle. This, in turn, contributed to obscuring the Group's findings with regard to price fixing over the trade cycle and the theoretical nature of the full cost prices.

To clarify matters, the full cost principle, as articulated in so many words in Hall and Hitch's article and without marginalist embellishments such as the kinked demand curve, consisted of the following six propositions: (*i*) that businessmen set their prices by first calculating their average total costs at an expected or standard volume of output and then adding on a margin for profit; (*ii*) that, since businessmen work in a competitive oligopolistic industrial environment, the profit margins they added to costs must be modified in order to obtain a single full cost market price; (*iii*) that the full cost price was stable with regard to variations in the flow rate of output, resulting in the actual profit margin being different from the one used to set the price; (*iv*) that long-period considerations regarding entry constrained businessmen from setting a price which would give them a greater than normal or conventional profit margin; (*v*) that the full cost price would change if input prices and tax rates changed or if there were extraordinary changes in demand; (*vi*) that the full cost price was neither a purely long-period nor a short-period price, but was a hybrid or, more significantly, a mutant. As summarized, the full cost principle consisted of a loose but consistent set of propositions which appeared to be inconsistent with marginalism.

This conclusion is further supported once the theoretical properties of the full cost price are explicitly delineated. Hall noted that businessmen interviewed did not view prices as market clearing or even designed to clear the market. This means that the full cost price market itself must be non-clearable. Moreover, the interviews also indicated that manufacturers set their prices via full cost pricing procedures well in advance of production, thus implying that actual costs incurred in production did not determine the full cost price. Taken together, they imply that the full cost price is common to many sequential exchanges, does not clear markets but in fact creates the necessary conditions for exchanges to occur again in the market, is not determined by market forces specific to a particular exchange,

and is neither a short- or long-period price nor a profit maximizing price. Thus the theoretical nature of the full cost price clearly makes it incommensurable with the marginalist price. Although the anti-marginalist flavor of the full cost principle and the full cost price was generally not recognized or given its full due by Hall and Hitch, it was recognized by Andrews, who concentrated his attention on the full cost pricing procedures and full cost prices, and thus went on to develop an alternative theory of prices to the marginalist theory of prices (Hall and Hitch, 1939; Lee, 1984).

Road to Manufacturing Business, 1946-1949

In 1937, Andrews arrived in Oxford as a postgraduate student, quickly became involved with the OERG and eventually assumed the position of the Group's secretary. In 1941 he became the chief statistician to the Nuffield College Social Reconstruction Survey and later in 1943 he became involved in the Courtauld Inquiry on the relationship between the scale of enterprise and efficiency. Initially Andrews investigated Courtaulds and other rayon manufacturers; but later the Inquiry was extended to include the boot and shoe industry. Early on in the Courtauld Inquiry, Andrews realized that his work on the rayon industry could lead to a book which examined the chances of small firms in British industry. In particular, he saw the book as a general report surveying the problem of how far the efficiency of an individual business was affected by its size and considering how far large-scale business did or did not enjoy real advantages which would not be available to smaller-scale businesses, even with appropriate changes in the organization of industry and in the economic environment of business. In addition the book would also pay special attention to the reasons for the survival of relatively small businesses in industries where they were important and thus indicate contributions that smaller-scale businesses make both to its own industry and to the economy of Great Britain as a whole.

As work on the book progressed, Andrews realized that its theme had changed to a study of the effects of environment and organization on the running of manufacturing businesses. Moreover, he also realized that his analysis of the manufacturing business was

not compatible with marginalism. That is, as a result of his research on manufacturing businesses, Andrews accumulated a great deal of data which, when viewed with an open mind, produced conclusions that were quite inconsistent with many of the theoretical propositions found in monopolistic competition and imperfect competition. For example, his investigations of Courtaulds, where the production of rayon was a tightly specified chemical process, and of the boot and shoe industry, where production was arranged in terms of teams of machines, led Andrews to view the organization of production in terms of plant segments which consisted of a specific combination of capital equipment and material and labor inputs needed to produce a specific flow rate of output. Consequently, if a firm constructed a plant that included many identical plant segments, then its short-period average direct cost curve would be horizontal, not upward sloping as depicted in neoclassical cost theory. In addition, Andrews adopted the position that managerial organization was a technique which could be altered as the firm's scale of production increased. Thus not only would the firm's average managerial costs decline in the short-period when the managerial technique was given, but also in the long-period when it could be altered. Therefore Andrews concluded that the firm's short- and long-period average total cost curves declined, instead of being U-shaped as in neoclassical cost theory, with one implication being that the neoclassical notions of the optimal size of the firm and firm equilibrium had no theoretical (or empirical) validity.

Through his analysis of the data, Andrews also became dissatisfied with the downward sloping firm demand curve and its implication that manufacturing businesses could in some way control their sales through their price policy. In particular, he rejected downward sloping marginal revenue curves (and with them downward sloping firm demand curves) and denied the relevance of the concept of short-period price elasticity of demand for analyzing the price behaviour of firms. Rather it appeared to Andrews, in light of his data, that goodwill was the decisive factor which determined a firm's share of market sales while the level of national income determined its level of sales. In addition, he became convinced by his analysis of the data that competitive markets need not be defined in terms of the competition of firms producing identical products, that oligopoly was the normal chacterization of markets and that oligopolistic markets were competitive irrespective of the number of firms in them. Finally, as a result of his investigations, Andrews came to believe that manufacturing businesses did not think that it was a good policy to play about with their prices in the search for maximum profit and that they did believe that their normal cost pricing policy gave them the correct prices, subject to the emergence of actual competition. Thus, when trying to analyze the rayon industry in terms of conventional oligopoly theories such as the kinked demand curve and Robinson's theory of imperfect competition and the boot and shoe industry in terms of Chamberlin's theory of monopolistic competition, he found that they simply did not fit the facts. So Andrews began rejecting marginalism and replacing it with a more realistic analysic of costs and a new theory of the relation of businessmen to their markets.

Drawing in part from his experiences with the OERG and the Nuffield College Social Reconstruction Survey, from his research with the Courtauld Inquiry and from MacGregor's work on the firm, Andrews struggled to develop a new and different theory of the manufacturing business which included theories of normal cost pricing and prices, explanation for price stability and a delineation of the firm's environment. In particular, he wes indebted to Hall, Hitch and the OERG for their documentation of the widespread usage of cost-plus pricing systems by businessmen and of the "ethical" arguments espoused by businessmen to defend the price they set as the "right price". Andrews came to realize that both sets of data implied a range of theoretical ideas regarding price fixing and prices which were incommensurable with marginalism. However, the data collected by the Group was not sufficient in itself to enable Andrews to develop his theory of manufacturing business. What he lacked was detailed knowledge of individual manufacturing businesses. This was corrected through his work with the Survey and the Courtauld Inquiry (Lee, 1989 and 1991).

Theory of the Manufacturing Business, 1949

Andrews' first presentation of his theory of the manufacturing business appeared in an article in 1949 in *Oxford Economic Papers*, while the more complete version appeared with the publication of *Manufacturing Business* (1949). His theory of the manufacturing business has been described in detail elsewhere; rather what needs to

be emphasized at this point are those features which illustrate its development beyond the full cost principle and which gives it its distinctive non-marginalist flavour. First, unlike the full cost principle, the theory contains a detailed description of the manufacturing firm. For example, the firm's average total cost curve is shown to decline both when the plant, equipment and managerial technique are given as its flow rate of output increases, and when they are variable. While the firm must necessarily administer its prices to ensure its survival and growth, its pricing choices are restricted because it operates in an oligopolistic industrial environment and because the nature of industrial buying and selling and the independence of market sales from the market price forces it to set prices which are similar to its competitors. Finally, with regard to growth, given the existence of unused capacity embodied in the managerial technique and declining average total cost due to economies of scale, the firm is always pushing to expand its sales, *i.e.* it is in a permanent state of non-equilibrium.

Secondly, with regard to pricing, Andrews' investigations confirmed the position taken by Hall and Hitch that firms set prices by adding a predetermined margin for profit to an average total cost based on a predetermined flow rate of output. However, he chose to describe the pricing procedure in terms of normal output, normal direct and indirect costs and the costing margin, which was added to the normal average total costs to set the normal cost price.[1] The normal cost price which emerged from the normal cost pricing procedures was, Andrews observed, stable like the full cost price with respect to short term variations in the firm's flow rate of output. This was partially due to the fact that the price was based on normal costs rather than actual costs. It was also due to the fact that the firm would not pursue a price policy that linked its price via the costing margin directly to short term fortuitous variations in its flow rate of output. Such a policy, if adopted, would result in a continuous and permanent loss of sales and profits when sales were above normal and in a severe reduction in profits beyond that caused by the increase

[1] In selecting the term normal cost versus full cost, Andrews was trying to make clear that firms cannot always set prices which would cover their costs and costing margin when the market price is stable. During the 1940s many marginalist economists were claiming that this was the essence of the full cost principle. So Andrews' adoption of a different term was largely driven by his desire to avoid a marginalist interpretation of his theory.

increase in costs when sales were below normal. Therefore, Andrews concluded that price stability occurred because the firm would increase its chances of survival and long-term growth by adopting a normal cost price policy and normal cost pricing procedures. Adopting any other pricing procedure and price policy, such as those associated with the marginalist approach, would be irrational since they would reduce the firm's chances for long-term survival.

Finally, Andrews developed his normal cost theory of prices to explain, among other things, the absolute level of the costing margin. Andrews argued, like Hall and Hitch, that the costing margin would be low enough so that the normal cost market price would not encourage firms to enter the market. However, this costing margin would generally be greater than zero because of the difficulty potential competitors would have in obtaining customers and thus entering the market. Andrews denoted the entry-preventing costing margin as normal and concluded that it could vary from market to market as the difficulty of obtaining customers varied. Consequently, he saw the magnitude of the entry-preventing costing margin as a quantitative measure of the relative difficulties of entry between the various markets. Since the costing margin, hence the normal cost market price, was determined by long-term forces, *i.e.* entry, Andrews concluded that, like the full cost price, the normal cost price was a long-term price which ruled in the short-term.

Andrews could not claim that he had produced a theoretical alternative to marginalism. In particular, his analysis of the manufacturing business lacked a theoretical grounding in a theory of markets, a discussion of industry and markets, an analysis of retail trade and consumer behavior, a discussion of firm investment decision-making, and a negative critique of marginalism. Between 1950 and 1966, in a series of books and essays – the most notable being *Capital Development in Steel* (1951), "Industrial Analysis in Economics With Especial Reference to Marshallian Doctrine" (1951), "Competition in the Modern Economy" (1958), *Fair Trade* (1960), *On Competition in Economic Theory* (1964) and "Proof of Evidence" in the Net Book Agreement Case (1966), Andrews corrected these ommissions and by doing so transformed his theory of manufacturing business into a theory of industrial markets and then finally into a general theory of markets, which included retail trade and consumer markets, called the

theory of competitive oligopoly. Incorporated in the theory were his theories of normal cost pricing and prices (Lee, 1991; Lee, *et al.*, 1986).

Marginalism Strikes Back, 1939-1952

The reaction of neoclassical economists to the full cost principle and Andrews' theory of the manufacturing business varied slightly depending on which side of the Atlantic they were located. In the United States, the controversy focused primarily on the full cost principle; whereas in Great Britain and elsewhere, the controversy focused on both the full cost principle and Andrews' theory.

The marginalist controversy began in Great Britain immediately upon the publication of "Price Theory and Business Behaviour" when Austin Robinson, upon reviewing the article, conveyed the impression that the full cost principle was not incompatible with marginalist pricing methods or with the maximization of profits. Subsequently other economists followed Robinson's lead and further developed the conventional monopoly pricing model in response to the full cost principle. One step was the introduction of constant marginal costs. That is, it was argued that average direct costs were constant and thus coincided with marginal costs – a view which was widely held by economists at the time and apparently supported by the empirical evidence (Saxton, 1942; Barna, 1945; Streeten, 1949). The second step was to argue that the gross margin over average direct costs was largely determined by market forces and could thus be seen as a proxy for the price elasticity of demand. For example, Worswick (1944) clearly made this connection, while Kalecki (1943) argued that the principle was indeterminate because the amount added for profit was not well specified, so that the relative composition of indirect costs and margin for profit could vary over the business cycle and in response to changes in the level of competition. Other economists, such as Wilson (1948) and Streeten (1949) argued that the margin for profit was flexible with respect to variations in demand. Thus by 1950 all the elements existed for constructing a conventional monopoly pricing model, in which profits were maximized by equating marginal cost to marginal revenue, that was also consistent with the full cost principle.

The form that the conventional monopoly-full cost pricing model took was as follows:

$$\begin{aligned} p &= (\text{cadc})\,(1 + g)\,(1 + r) \\ &= (\text{cmc})\,(1 + k) \\ &= (\text{cmc})\,[1 + (1/e_d - 1)] \end{aligned}$$

where cadc is constant average direct costs;
cmc is constant marginal costs;
g is the percentage mark-up for average direct costs at expected, historically estimated or normal output;
r is the percentage mark-up for profit; and
k is the mark-up for gross profit and equals g + gr + r;
e_d is the price elasticity of demand.

Given the model, various strands of argument that had emerged prior to 1950 could now be clearly articulated. The first was that, as a formal exercise, it was possible to represent full cost pricing procedures in terms of a simple monopoly pricing model in which prices were set to maximize profits by equating marginal costs to marginal revenue. The second argument was that, if the full cost principle was to be truly non-marginalist, then its price must always reflect full costs, including conventional profits, irrespective of the state of sales or competitive pressures in the market. To most economists this implied the following: (1) if demand declined, the full cost price must increase because g must increase, with r remaining constant, in order for the firm to recover its full costs; (2) if demand increased, the full cost price must fall because g must decline, with r remaining constant, in order for the firm to recover its full costs; (3) the allocation of overhead costs among the firm's products must be the same; (4) the mark-up for profit must be the same for all the firm's products; (5) a percentage change in average direct costs must result in the same percentage change in the price. The third argument was that, if the conventional monopoly pricing model was to absorb the full cost principle, then both g and r must be flexible so as to reflect variations in demand and competitive forces in the market if k was to be a proxy for the price elasticity of demand. In this context, economists argued that the full cost price had marginalist attributes if the full cost price was stable in face of variations in sales (which implied that both g and r were flexible), if the allocation of indirect costs and the mark-ups for profit were different among the firm's product lines and if changes in

average direct costs were not precisely translated into changes in the full cost price. Once the monopoly-full cost pricing model was developed, it was widely adopted by British economists to deal with the full cost principle (Lee and Irving-Lessmann, 1992).

After 1950 the full cost principle did not by itself occupy the attention of British economists as it had done during the previous decade. This was primarily due to the emergence of Andrews' theory of the manufacturing business and specifically his theory of normal cost pricing, which most British economists viewed as either identical to the full cost principle as they understood it or as a simple extension of it. The attitude of British economists towards Andrews' theory was one of extreme disrespect. Concern over the ideological content of Andrews' theory of manufacturing business led economists by imperceptible steps to dismiss it as of low quality and to label him a poor theorist. Similarly, we find comments that his work was "full of dark sayings", unfathomable, untheoretical, or simply nonsense. However, in spite of the low opinion which many economists had of Andrews and his theory and the wish of other economists to dismiss it out of hand, the fact that it was viewed as a significant and direct attack on the theory of imperfect competition and an indirect attack on marginalism or neoclassical price theory prompted many economists to consider it seriously, even if their purpose was to show that it was nothing but marginalism in a different language (Lee and Irving-Lessmann, 1992).

The principle theoretical issue with regard to Andrews' theories of the manufacturing business and normal cost pricing was that of compatibility – were they consistent with (or equivalent to) marginalist methods of pricing and profit maximization? The answer economists gave to the question was a resounding yes. To reach this answer in light of the apparently obvious differences between the theories, they turned to the monopoly-full cost pricing model. When dealing with pricing, Andrews, as noted above, described the normal cost pricing procedures as adding a gross costing margin, which included normal indirect costs and a costing margin, to constant average direct costs. However, such a description could, in the eyes of most economists, easily be described in terms of a mark-up on constant marginal costs. Thus Andrews' normal cost pricing theory was seen to bear a strong resemblance to the monopoly-full cost pricing model described above, especially after Austin Robinson's (1950) critical review of *Manufacturing Business.*

Drawing both on his extensive knowledge of firms and industries and on extensive theoretical discussions with his Cambridge colleague concerning price formation in duopoly and oligopolistic settings, Robinson argued that, although Andrews' description of the pricing ritual was correct, the ritual was not inconsistent with profit maximization; rather, where competition was almost perfect and new competition free and rapid, it was a reasonable account of rational action for long term profit-maximization by the firm. That is, in the theory of imperfect competition, long-period equilibrium for the firm occurred when its profit-maximizing price equalled its average total costs, including normal profits. To reach this equilibrium state, Robinson argued that the firm must set prices that maximize its profits in each of the short-periods leading up to the long-period. For firms to do this, their use of normal cost pricing procedures must in some way take account of the existing market forces. More specifically, using the monopoly-full cost pricing model and his theoretical background, Robinson argued that adding the gross costing margin to average direct costs when setting the price did in fact take into account the relevant market forces and, moreover, was a result of a "balancing process" that was perhaps indistinguishable from equating marginal cost and marginal revenue. Thus, Robinson concluded that normal cost pricing was fully consistent with marginalist pricing procedures and profit maximization.

For many economists, Robinson's arguments were unanswerable and the applicability of the monopoly-full cost pricing model to Andrews' theories of manufacturing business and normal cost pricing seem quite appropriate. Moreover, his review played an important role in shifting economists' perceptions of the time orientation of imperfect competition theory. When explaining firm behavior regarding the fixing of prices and maximizing profits, it was commonly argued in the 1930s and 1940s that it was necessary for the firm to equate short-period marginal cost and marginal revenue and thereby maximize short-period profits with regard to long-period consequences. However, with the emergence of the full cost principle and Andrews' theory, which emphasized that firms set prices based on long-period considerations and deliberately did not try to "maximize" short-period profits, economists started to change their views about how firms behaved. What began to emerge was the opinion that the short-period imperfect competition picture of the pricing process made sense only as a picture of behavior in an economy where all

firms were trying to milk their customers of all they could get today without worrying about whether they would have any customers left tomorrow. Consequently, beginning in the middle 1940s, some economists began arguing that firms maximized long-period instead of short-period profits. Therefore, by the early 1950s, numerous economists, including Robinson, had commented on the overriding importance of long-term considerations when setting both short-period and long-period prices. The end of the transition came with the publication of Harrod's 1952 essay "Theory of Imperfect Competition Revised". In the essay, Harrod interpreted Andrews' theory of manufacturing business solely within a long-period monopoly-full cost pricing model. Once the relationship was explicitly established, it became an accepted theoretical principle among economists and one that needed no empirical verification or support. The result was that the monopoly-full cost pricing model could also incorporate Andrews' theory of manufacturing business, so long as the model was interpreted in a long-period context and long-period profits were maximized (Lee and Irving-Lessmann, 1992).

Conclusion

After 1952, the official view of the normal cost prices doctrine as a theoretical attack on marginalism was that it was dead and buried. This view was supported by a three-pronged institutional defensive against the doctrine and its supporters. The first of these defensive responses was directed at the academics who supported the full cost principle and Andrews' theory of manufacturing business. In 1952, John R. Hicks and Norman Chester attempted to prevent the renewal of Andrews' Nuffield College Fellowship. Moreover, the verbal harassment, theoretical criticism and threats of professional excommunication directed at Andrews also affected those who supported his work or students who might find it of interest. Thus it is not surprising to find his supporters trying to deflect the attacks by building a bridge between Andrews and other economists. The most effective attempt to build such a bridge was by Elisabeth Brunner who put Andrews' theory of the manufacturing business into neoclassical terminology. She was so successful at it that most economists believed that it justified their view that Andrews' work was not very different from marginalism. Thus the institutional attack upon Andrews and his supporters prevented any open discussion of the doctrine from taking place (Lee and Irving-Lessmann, 1992; Lee, 1991).

The second defensive response mounted by the supporters of marginalism took place in the price theory textbooks. Since 1952 and without exception, the full cost principle and Andrews' normal cost pricing theory was presented in terms of the monopoly-full cost pricing model. Thus it became possible to believe, for example, that Andrews' theory of the manufacturing business could be completely and accurately presented with the model, as Koutsoyiannis did in her textbook, *Modern Microeconomics* (1975). The success of this defensive response was so great that by the 1980s most price theory textbooks did not even mention normal cost pricing or the full cost principle since there was no difference between them and marginalism. The third response was directed at trivializing the principal components of the full cost principle and Andrews' theory. On the one hand, various neoclassical economists showed that sales or growth maximizing models or behavioural models of the firm could account for their major features. Thus they became minor and almost irrelevant components of neoclassical price theory. On the other hand, economists connected with the field of industrial economics concentrated on the pricing procedures and subjected them to econometric testing. As a result, there emerged a mountain of tests which confirmed or disproved the hypothesis that firms used full cost or normal cost pricing procedures. The inconclusiveness of the tests, quite expectedly, depreciated the importance of the full cost principle and Andrews' normal cost pricing theory in the eyes of most economists; however, even more damaging was the reducing of the principle and the theory to an isolated empirical phenomenon which could be tested for or not.

The work of Hall, Hitch and Andrews has nonetheless been carried forward by a few individuals. As noted above, Andrews, realizing that his theory of the manufacturing business could not be viewed as a theoretical alternative to marginalism, worked to correct the omissions. The outcome of his labours was the emergence of his theory of competitive oligopoly which formed the theoretical core of what could now be identified as the normal cost prices doctrine. Another line of development that took place after 1950 was not so

much concerned with the larger picture of a non-neoclassical theory of prices, but with particular facets of the doctrine. P. Sylos Labini (1962) and H.R. Edwards (1962) dealt with the determination of the costing margin, while W.J. Eiteman (1949) and J.B. Williams (1967) dealt with the questions of sequential production, firm reproduction and firm growth. In addition, R. Robinson (1961 and 1978) and G.B. Richardson (1960, 1965 and 1967) analyzed the role of social rules and social institutions on the determination of the normal cost market price. The outcome of both lines of development resulted in a well-developed doctrine of normal cost prices which was quite different from the myth propagated by neoclassical economists and found in price theory textbooks (Lee, 1984; Lee, *et al.*, 1986).

These subsequent theoretical developments of the full cost principle and Andrews' theory of manufacturing business suggest that the initial optimism regarding the anti-marginalist features of full cost and normal cost pricing procedures was justified. The Oxford challenge should be looked at again, but this time with a mind not biased by an implicit assumption that any new idea has to be reframed in terms of the neoclassical paradigm, if it is to be acceptd.

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