



THE
ECONOMICS
OF
PRICE
DETERMINATION

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C. CLIVE SAXTON

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THE AUTHOR intends this book to be a logical outcome of the methods of economic analysis of the theory of monopolistic or imperfect competition propounded and developed by modern economists, particularly Chamberlin and Mrs. Robinson. It applies the analysis to practical methods of price-fixing in operation in industrial practice. It clearly sets out the practical steps in the formation of prices of products under varying market and other conditions, and indicates amendments of economic theory which are necessary to fit the facts disclosed by recent research. It will be of interest not only to academic economists and those having a fair knowledge of economics, but also to the larger industrialists who are concerned with the formation of prices for the products of their industry.

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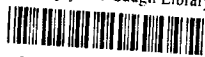
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THE ECONOMICS OF
PRICE
DETERMINATION

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THE ECONOMICS OF
PRICE
DETERMINATION

By
C. CLIVE SAXTON

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PREFACE

IN the approach to the problem of price-determination the broad statement of the emergence of a price by the interaction of supply and demand has given place in economic analysis to the theory of the equilibrium of the firm. Interest is now mainly in the conduct of the firm and an analysis of its actions is expected to disclose the price which it is likely to fix for its own differentiated product. If this is so then changes in the economic organization of the individual firm or group of firms operating in an industry will need periodical review as a check upon the assumptions which are made for the purpose of analysis. It is suggested that important changes have taken place in the organization of industry during the last twenty years which affect significantly some of the underlying assumptions upon which the economic analysis of price-determination is made to rest. This does not indicate that conventional methods of analysis should be discarded out of hand. The expansion of the marginal analysis, by economists whose work is mentioned in the text, was intended to be put to use in the very situation which is now being described, and it ought not lightly to be abandoned.

The aim of the present work is to put to empirical test that part of the theory of price-determination which relates to the setting of prices by a firm operating in conditions which have been described conventionally as 'imperfect competition'. It is a study of some typical situations in industry, chiefly of firms known to produce a significant proportion of the total output of an industry or group of closely related products. It is based on first-hand evidence of pre-war practice, and is intended to explain the methods adopted by such firms to estimate the demand for their products and to control costs. The higher strategy of business and the entrepreneur's price policy are discussed in some detail.

An analysis of the practical steps involved in the setting of prices by a firm under varying 'market' or other conditions is made, and this is used as a new starting point to test and check the conventional assumptions of the marginal

analysis of the equilibrium of the firm. Modifications are suggested which it is submitted are desirable and indeed necessary to fit the facts disclosed.

When the text had been drafted it was thought desirable to obtain some additional support on points significant for economic theory by drawing on a wider field. A form of questionnaire was prepared and submitted to entrepreneurs—it is reproduced in App. III. with an analysis of the answers to those questions which lend themselves readily to arithmetical computation. In general the answers afford a useful addition to the observations made directly. It should be clear that the text is in no sense written round nor dependent upon the answers to this questionnaire. A questionnaire is of value only in confirmation of other evidence we may have—it cannot take the place of first-hand observation. Unless we know the patterns under which the answers to the questions are likely to fall it is impossible to interpret properly answers given to most economic inquiries.

Economists who wish to read at once the sections of most significance for economic theory may turn with advantage to Chapters VI, VIII, and IX. The other Chapters of the book are written with the minimum use of specialized theoretical terminology, and on that account should appeal to those industrialists and others who have mainly a practical interest in price-fixing.

Acknowledgment is here accorded to those industrialists who supplied me with much useful information and to those who answered the printed questionnaire. Given a continuance of such practical interest in economic research the outlook for future empirical studies is distinctly encouraging.

C. C. S.

OXFORD.

31 December 1941.

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INTRODUCTION

ECONOMIC analysis used to proceed on the assumption that conditions of perfect or pure competition represented the typical situation in industry. Whether this was a mere simplification of the problem to enable it to be subjected to analysis,¹ or whether it was a generalization from observed facts, the assumption has been questioned from time to time as it did not seem in accord with the current economic organization of the firm. But it is only in recent years that economic theorists have come to regard pure or perfect competition as a limiting case with pure monopoly at the other extreme. Between the two extremes lie all the patterns of actual business conduct which may be covered by the general term 'imperfect or monopolistic competition'. In the analysis of a market subject to the conditions of perfect or pure competition, we may neglect the actions of individual buyers and sellers, because no individual or group of individuals has sufficient influence upon the price or volume of output to affect either significantly. But if some individual or group of individuals has some control of, or influence upon the price at which the product is sold because of differentiation of the product or otherwise, then the actions of those individuals are of the greatest significance.

Attention has been focused, therefore, upon the price-fixing by an individual firm in a situation conventionally described as imperfect or monopolistic competition.² The firm is assumed to have control of its own volume of output of a differentiated product, and to be in a position (or rather have the power which it may or may not use) to fix or influence by its own actions the price of its product. The demand curve for the individual firm's product is downward sloping to reflect the fact that the more output it attempts to sell the lower must be the price at which it is offered. Changes in the price of the individual firm's product are assumed not to affect the price policy of other firms in the industry because there are so many such firms that each one will be but little affected (if at all) by the change in the price

¹ Alfred Marshall, *Principles*, bk. V, chap. i-v.

² Joan Robinson, *Imperfect Competition*; E. H. Chamberlin, *Monopolistic Competition*.

policy of any one of them. To maximize profits the firm will attempt to produce and sell just that amount of output the marginal cost of which is equal to the marginal revenue.

The theory appears perfectly clear and straightforward so long as the number of firms in active competition in respect of the sale of one of the particular group of products amongst which substitution is usual or feasible, is such that the actions of any one of them have only a widely diffused effect and do not impinge directly on any particular one or a few of the firms in the industry.

For some time it has been evident that the concentration of the production of some groups of products in the hands of a very few firms, has given rise to a situation in which the price and output policy of an individual firm in that industry may possibly have a serious effect on the output and price policy of one or more of the firms in the group.

To meet this situation writers on imperfect competition usually submit that 'the demand curve for the individual firm may be considered to show the full effect upon the sales of that firm which results from any change in the price which it charges, whether it causes a change in the prices charged by the others or not. It is not to our purpose to consider the question in detail.'¹

This simplification of the analysis only serves to beg the question. The very influences which we would like to isolate and examine are assumed to be already known and allowed for in the demand curve. If a number of firms in an industry do in fact set the price of their respective products and take account when selling that product, of the expected reactions of their several close rivals, then it would be important to know the principles which they adopt and their effect on the price which is actually fixed.

Several attempts have been made recently to reformulate the doctrines of imperfect and monopolistic competition.² The situation of an individual producer has been defined by reference to his consciousness or otherwise of his rivals' reactions to his own price and output policy.

Three typical situations have been distinguished where a

¹ Robinson, *op. cit.*, p. 21.

² 'A Review of Monopolistic and Imperfect Competition Theories', *Amer. Econ. Rev.*, 1936, p. 637.

seller is (or must be by the nature of the case) conscious of his rivals' reactions and allows for their effects in formulating his price and output policy. They are the cases of (a) duopoly, (b) oligopoly with differentiated products, (c) oligopoly with standardized products.

There are also three typical productive situations when a seller is heedless of his rivals' reactions: (a) monopoly, (b) competition with differentiated products, i.e. monopolistic competition, and (c) competition with standardized products (pure competition).

This classification seems to suggest that the categories described are each intended to represent the situation in an industry and to be mutually exclusive. This assumption may or may not be correct, but it is thought that, for example, an industry may comprise within itself an oligopolistic group and also a number of smaller firms in monopolistic competition.

The main discussion of price and equilibrium theory is now likely to centre around the distinguishing characteristics of oligopoly with differentiated products and monopolistic competition with differentiated products.¹ The problems set by duopoly are mainly academic and not sufficiently typical of an industrial situation to be of practical importance. Monopoly is rare, if it exists at all, and perfect and pure competition if approached in practice have been well covered by theoretical analysis and can be discussed in the conventional terms. There is general agreement that product differentiation is an established fact and that situations are arising in which one or a very few firms have by their individual actions a significant effect on the price of the "group" of products made and sold by the respective firms.

The difficulty is to determine the appropriate form of analysis in respect of oligopoly, as the conventional analysis of imperfect competition does not fit the facts without straining the concept of a determinate demand curve for a firm's product.

The actual situation cannot in fact be indeterminate; even if it is difficult to cast the actual methods adopted by entrepreneurs into precise theory capable of simple analysis.

¹ 'Monopoly in Particular—Equilibrium and in General—Equilibrium Economics', *Econometrica*, April 1941, Vol. 9, No. 2, p. 121.

Superficially the firms in some industrial groups seem to be able to fix their respective prices in such manner that there are not observable changes in the output and price-policy of the respective firms. It seems that the only approach to the problem is to begin by examining the conduct of an individual firm to discover the methods adopted in practice.

This approach seems all the more necessary since doubts have recently been cast upon the general applicability of the marginal analysis itself.¹ This is much more serious for current theory than the indeterminateness of the demand curve in an oligopolistic situation, for it would strike at the very essence of equilibrium theory. If the marginal analysis is founded on error, then all the refinements of the theory of imperfect competition fail—they all require that equilibrium should be assured at that scale of output the marginal cost of which is equal to the marginal revenue. A beginning will, therefore, be made by considering the marginal analysis as it stood before doubts were cast upon its general applicability.

It may be well to set out the assumptions which are necessary for the equilibrium of the firm operating, as conventionally described, under conditions of imperfect competition.

- (1) The aim of the producer is the maximization of profits in the given situation in which he finds himself.
- (2) That the producer has perfect knowledge of the demand curve for his product and his own cost curve; from the former the marginal revenue and from the latter the marginal cost curve can be drawn.
- (3) That the cost and demand curves are independent.
- (4) That over the period of time or at the time under consideration, it is actually possible for the adjustments required to maintain equilibrium to be made by the producer, so that he can equate marginal cost and marginal revenue. E.g. there must be no hindrance in the way of altering prices if there is an alteration in demand or in the costs of raw material or wages rates, that is, if there are alterations in marginal revenue and marginal costs.

¹ R. L. Hall and C. J. Hitch, 'Price Theory and Business Behaviour', *Oxford Econ. Papers*, No. 2.

In general it cannot be doubted that entrepreneurs do make attempts to maximize their profits by every method which is open to them, though superficially their actual conduct in any given situation may appear unlikely to achieve that aim. It may be that there are many entrepreneurs who do not calculate explicitly, and thereafter equate, marginal cost, and marginal revenue. But when their actual conduct is analysed in detail it may be found that they have sought and achieved the same result implicitly. Knowledge or otherwise by the entrepreneurs of the terms invented and used in the theory of equilibrium is not necessary to an understanding of the actual practical conditions required for maximization of profits. The theory as formally stated may be much too precise to warrant an assertion of its general applicability, but this need not necessarily lead to its abandonment. With modifications or reservations required to reflect the practical aspect of business organization, it may still be a most useful instrument of economic analysis.

There is no question that on a strict interpretation of the above assumptions¹ those numbered (2) and (4) would fail in practice, and there may be some doubt about (3). The practical affairs of business are such that they are not capable of being arranged in such a way that they fall strictly within the assumptions set out above. It is not possible in practice for an entrepreneur to assess the demand for his product with more than a fair degree of approximation. The calculation of cost is only approximate and in most cases some arbitrariness is necessarily involved in its computation. In many industries contracts and arrangements may be customary or usual, which may prevent a producer from making the adjustments required to maintain equilibrium. But as economic theory cannot under any circumstances be expected to take care of every particular case, it can hardly be expected that entrepreneurs' conduct will be as strict as a theory which only purports to present the general case. The equilibrium analysis may best be regarded as an ideal state of affairs after which entrepreneurs are striving but which

¹ These assumptions are general and apply to all the forms or patterns the analysis of imperfect competition has yet taken. Cf. F. Machlup, 'A Classification of the Theories of Monopolistic Competition', *Amer. Econ. Rev.*, 1937, p. 445.

they are not likely to reach in practice. Subject to some reservations it is possible that with the dissemination of knowledge and improvement in office organization, a closer approximation to the ideal state of affairs may now be in process of being reached.

In applying economic theory to practice there does not seem to be any objection to taking the assumptions mentioned above 'in the large' or interpreting them broadly. For example, even in considering the concept of average revenue from which the marginal revenue curve is drawn, the selling price of the product would have to be averaged over some period significant for the entrepreneur's decisions. To take the price and conditions at any point of time would be of little value. Similarly, costs of production from which the marginal cost curve is drawn would be taken as an average over the period under discussion. For the purpose of analysis the product of a producing firm is regarded as homogeneous, i.e. the analysis in its simple form is only capable of dealing with one product at a time. In fact British industry is organized on a mixed basis and many diverse products may come from one factory in a different variety of designs and types. But it may be that without doing undue violence to the concepts the many products and the costs and prices can be averaged in some way. The production of a variety of products may in itself be a factor in the conduct of the producer by which he is enabled to make variations in the output and costs of each product. In this way he may be able to make adjustments which lead to a closer approximation to the maximization of profits. On a balancing up for a given period it is possible that taken in the large marginal cost and marginal revenue may have been equated, if computed as an average over the period by making adjustments in the manner above described. It is not to be expected that the entrepreneur will know very much about the economic concept of equilibrium nor any of the terms such as Marginal Cost, nor the method of its computation. But it may be found that when his actual conduct and his own computations of costs are examined in detail, he will have sought and may have found his most favourable position. If that were so it could then be asserted, in a general way, that the theory fits the situation.

There is one important matter of which the conventional analysis does not seem to take account. The equilibrium of the firm is assured by the equating of marginal cost and marginal revenue and presumably this refers to actual costs incurred. It is certain that in the practice of industrial production we shall find that more than one step is involved in the attempt to bring about this result. In most industries and in respect of most products it is the custom to fix prices for some long or short period ahead, over which it is not possible on account of existing contracts or convenient to change them, and also to fix prices before the actual costs of production can be ascertained by post-costing. The effect of this is that when the entrepreneur is making his decisions about the output upon which he will base his prices and spread his costs, his expectations are based upon some notional figure of costs projected into the future for the length of period under consideration.

We may, therefore, have to examine the basis upon which expectations are formed and the steps which are taken to implement them during the period under consideration. It may be that actual practice will disclose that there are two separate aspects of the problem; the first before production is commenced and the second during the period of production to ascertain in what way the entrepreneur can make adjustments during the period to bring the results into close conformity with his expectations. We may anticipate that the entrepreneur will during the period of production:

- (a) Adjust costs wherever possible so that the sum of the deviations of actual from expected costs will tend to zero;
- (b) That he will utilize contractual arrangements to ensure that actual costs of purchases of raw material will be approximately the same as those expected; and
- (c) If it is possible to influence the demand for his product he will do so by advertising or otherwise.

The Present Enquiry. To begin the investigation a search had to be made for a firm possessing adequate records which could be submitted to a long and careful examination from every possible angle. This requirement, regarded as the

most essential starting point of any enquiry into the equilibrium of the individual firm, proved for some time the most difficult to satisfy.¹ Many of the firms known personally to the writer could give valuable oral information but had insufficient records to satisfy exacting analysis. Many firms who possessed, or were thought to possess adequate records were found to be unwilling to allow them to be examined, probably from the fear that some comment upon them when published might refer too closely to their activities. This is an attitude quite common in industry and one to be respected. It can only be overcome gradually, and in the meantime the search for those willing to offer their records for examination must go on.

Firms were ultimately found who were prepared to give a large amount of information in strict confidence, and over a period of some months it was carefully analysed. The main points arising were discussed in detail with directors and other officials of companies having charge of the price policy of their firms, and tested by comparison with other firms.

It seems clear that this close examination of the detailed records of firms known to have control of a most significant proportion of the total output of the industry, and therefore, some control over prices, is of prime necessity in any discussion of the price fixing process. If we are able to examine the evidence upon which decisions are taken by the firm as to the kind and quality of product which it will produce, the output which is to be attempted and that which is achieved, the expected and actual costs of production, and how the price of the product is calculated and fixed, we are then in a position to discuss the conditions which will ensure the equilibrium of that firm. We shall be able to establish the place of that firm in the industry in which it is engaged and in addition to generalizations about the conduct of firms similarly placed, information may come to light which will enable us to generalize about the other firms in that industry.

¹ 'The only possibility for a fruitful empirical enquiry into these problems lies, I think, in the more subtle technique of analysing a series of single business decisions through close personal contact with those responsible for those decisions. We have had a paucity of that sort of investigation as I do not need to remind you.' F. Machlup, 'Theory of Monopolistic Competition', *Amer. Econ. Rev.*, 1939, p. 227.

By interrogating, orally or in writing, a sample of entrepreneurs, some of whom are producing a substantial proportion and others who are producing a small proportion or an insignificant proportion of the total output of their industry, we shall be able to ascertain the actions of dominant and subordinate firms and compare them.

Upon the business practice discovered by the detailed examination of the affairs of these firms, a questionnaire was formulated to test the general applicability of the methods described. It was circulated amongst all sizes of firms in nearly all British industries where it was expected that producers would have some influence over price. The pattern under which the answers were expected to fall was printed under each question in an endeavour to obtain some uniformity of answer and to make it easier for a firm to complete the form in a reasonable time. These patterns were generalizations from business experience and were discussed with many entrepreneurs before being finally settled.

The support given by the answers to the questionnaire, is indicated under each section, and generally by an analysis of replies (see Appendix III). The sample replies are not as numerous as might have been wished, but as they cover a wide range of industries it is not anticipated that any larger sample would vitiate the conclusions except perhaps in small minor details which are of little significance. The form has been completed by many important firms, and a very large number have expressed their interest in and desire to support research of this kind. Many have offered to fill up 'practical' questionnaires and furnish information when the war is over and they recommence their normal peacetime activities.

It is clear from the comments of entrepreneurs upon questionnaires generally, that there is little possibility of drawing up a form of questionnaire which will apply to all and every business or industry without many modifications,¹ but it is possible that the modifications can be effected in the pattern of the answers rather than in the actual questions themselves, and this was attempted in the present questionnaire.

¹ As to the limitations of some of the types of questionnaire which have been used, cf. article by Machlup referred to on p. 8.

APPENDIX I

THE Y.Z. CO., LTD.

BUDGET FOR THE PRODUCTION YEAR 1937-8

1. *Demand.* The demand for the Company's products expanded rapidly last year (1936-7), but it is not expected that this will continue for the following year.

The comparative figures are as follows :

			<i>Sales in Units</i>	<i>Profit Nett.</i>
1936-7	...	...	210,000	151,500
1935-6	...	...	187,500	144,750
1934-5	...	...	179,500	139,250
1933-4	...	...	167,750	128,750
1932-3	...	...	155,000	110,000

The Company has sold a little more than its usual proportion of the total sales in the Industry, as far as can be ascertained from the information available.

It is proposed to budget for sales of 180,000 units in the forthcoming year, at the following prices:

<i>Design</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
<i>Number</i>	36,750	30,000	63,000	31,500	9,000	9,750
<i>Selling Price</i>	£10	£10	£15	£17 10	£20	£30

Reports show that a slight recession in demand is likely, as the popularity of some designs may wane a little, but it is not considered opportune, or indeed necessary, to effect any changes in design this year. Products A and D may have to be redesigned next year, dependent upon the new designs which it is understood are proposed by X.N., Ltd., and T.P., Ltd., whose products compete fairly closely with ours. T.P., Ltd. (with an output about one-fifth of our output) kept up its price for a design similar to our A design last year when we reduced ours by 5 per cent. It is understood that our sales of that design increased a little on this account, but as we redesigned our product most of the increase may be attributable to the advance in design. They are proposing to redesign their product and sell it at or about our usual price, but are awaiting a move by us. It is believed that their costs are on the high side because of their lay-out which has not been changed for some years past. Firm X.N., Ltd. (an output about the same as ours) is continuing its product similar to our design A this year, and we learn is not proposing a change in price, which is 5 per cent below ours.

The L.O. Co., Ltd., is likely to redesign type E this year and fix a slightly lower price than last year. They have done well with that

type and it may mean a further small loss of sales to us this year, as they are effecting some further improvements. When we see their new design we can then decide whether or not we shall change ours next year and fix the price a little lower. This can be effected by reducing slightly the present raw material content, and one process (*y*) may perhaps be avoided or telescoped with (*x*). Alternatively, the price may well be fixed a little higher than the X.N. Co., Ltd., as we learn the quality and finish of their product is reported to be a little below ours. We could then put in an extra finish (*lm*) and stress this in usual advertising.

Export. Good progress was made last year with designs *E* and *F* at prices 4 per cent below those for our product in the home market. We do not budget for these export sales in our programme, and the contribution they make to fixed costs and profit is not high as yet, but may become substantial. It is proposed to continue the policy of selling in these markets at discriminating prices which just more than cover variable, i.e. direct costs.

Contribution. The Schedule sets out the additional units to be sold if prices are reduced by ten shillings per unit in respect of each design. This is the smallest practicable change in price. Even in the event of a reduced price not being followed by one or two firms, it is not expected that sales would respond sufficiently to provide the same total profit as can be expected from the present price fixed in the Budget. In the case of design *A* sales would have to increase by 17 per cent, which is extremely unlikely for a price change of 5 per cent when the design of the product itself is unchanged.

2. *Output.* The plant is now laid out for a maximum output of 208,800 units, achieved by making minor adjustments during the last year. The normal output is about 180,000 units to work without fear of stress or strain, or the emergence of bottle-necks, and to keep some plant in reserve for emergencies. The result of last year's extraordinarily high output has been to strain the plant at many points and running costs and labour costs have risen sharply, and nett profit has not risen proportionately. Overtime and night-shift work are consistently disappointing. In certain development periods it may be necessary to use night-shift work, but it is very costly and should not be part of regular policy. The plant, as shown in the books, appears to be about 15 per cent below the reasonable requirements for the output achieved last year.

It is suggested that provision be made over the next three years to install additional plant, and balanced round a normal output of 210,000 units. This will keep in hand a production reserve of about 30,000 units, which can be achieved if demand expands, without straining or stressing the plant. The full maximum output for which such

lay-out would be designed would be about 243,600 units, but this could not be achieved in practice.

There must be a measured attack over the next three years, if demand shows signs of increasing, upon a removal of known 'bottle-necks'. A capital expenditure of £50,000 would be called for.

Reorganization is proposed to reduce the number of 'short settings'. Arrangements for a smoother flow of material and storage facilities are now available.

The Schedule of New Hourly Cost draws attention to the difference between the costs of dayshift and three-shift working when using expensive items of plant as compared with cheaper plant and tools. Further consideration must be given to this aspect of the advancing technique of production.

3. Costs. Estimated for 1937-8.

Design A. Proposed Selling Price £10

	£	s.	d.	%
1. Raw Material and semi-manufactured goods	4	19	4	52.3
2. Labour	2	1	3	21.7
3. Plant Costs :				
(a) Short Period Plant, &c.	10	8		5.6
(b) Plant Operation	14	3		7.5
(c) Fixed	14	3		7.5
4. Establishment and Financial	6	10		3.6
5. Selling Costs	3	5		1.8
	£9	10	0	100.0
Add 5% for Profit	10	0	0	5.0
	£10	0	0	105.0

(Similarly for other designs B, C, D, E, F.)

Materials. Contracts have been arranged for 80 per cent of raw material and 95 per cent of semi-manufactured goods required during this year, for the volume of output mentioned herein.

Labour. Allowance has been made herein for increases in wages rates which have been agreed and which will come into force in one month. No further change is anticipated during the year.

There is always difficulty in adding to the nucleus of skilled employees. The training scheme is working fairly well, but if this year's policy should be reversed and output expanded more rapidly this aspect of costs will require close attention. Until a modicum of

skill has been attained by the new employees coming in, more supervision is required to ensure that production is not slowed down at certain points.

Overtime and night-work were disappointing last year. It should be avoided by bringing it within the range of day-shift management as soon as possible.

CONTRIBUTION

<i>Design of Product and Price</i>	<i>A</i> £10	<i>B</i> £10	<i>C</i> £15	<i>D</i> £17 10	<i>E</i> £20	<i>F</i> £30	<i>Total</i>
1. Profit on Products	£18,375	15,000	52,250	27,563	9,000	14,625	136,813
2. All Oncost	£56,197	74,100	233,491	136,237	44,469	45,800	590,294
3. Contribution required	£74,572	89,100	285,741	163,800	53,469	60,425	727,107
4. Number of Units	36,750	30,000	63,000	31,500	9,000	9,750	180,000
5. Contribution per Unit	£2 19 5	2 19 5	4 9 1½	5 4 0	5 18 10	8 18 3	
6. Total Cost of a Reduction of 10/- in Selling Price	£18,375	15,000	31,500	15,750	4,500	4,875	
7. Reduction in (6) is equal to Contribution on Units	6,187	5,050	7,069	3,029	757	581	
8. Additional Units required to be sold (as percentage of that assumed (4), for Budget) to provide same Total Profit	17	16.8	11.2	9.6	8.3	6	
<i>Percentage change of price</i>	5	5	3½	2.8	2½	1½	

Study of New Hourly Cost. Examples showing the cost of Running Plant using Expensive Items with Heavy Oncost as against that which is of small value with Light Charges.

						<i>Works Hours</i>
						<i>Per Annum</i>
Day-shift	...	...	...	...	...	2,400

Development of Three Shifts.

Shift No. 1	...	...	...	...	2,200
Add 2nd Shift—1,950 hours	...	...	...	...	4,150
Add 3rd Shift—1,850 hours (total hours available)...	...	...	...	...	6,000

UNION HOURS

<i>Three Shifts System</i>			<i>Per Week</i>
Shift No. 1—6 a.m. to 2 p.m.	Effective Works Hours		43
Shift No. 2—2 p.m. to 10 p.m.	Effective Works Hours		37½
Shift No. 3—10 p.m. to 6 a.m.	Effective Works Hours		37½

Allowance given

Shift No. 1	Per man, per week. The following hours are paid for but not worked.	$\left\{ \begin{array}{l} 2 \\ 7\frac{1}{2} \\ 9\frac{1}{2} \end{array} \right.$
Shift No. 2		
Shift No. 3		

Table I. EXPENSIVE PLANT

	<i>Day Shift</i>		<i>Shift No. 1</i>		<i>Mean of 1st and 2nd Shift</i>		<i>Mean of 3 Shifts</i>	
	<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>
Interest Hour	5 0	5 6	2 6	2 0	...	...	...
Tool Hour	15 0	16 6	10 0	7 0	...	...	...
Wage Hour	5 0	5 6	5 6	6 0	...	...	...
Service Hour	6 0	6 6	3 6	2 0	...	...	...
Experts Hour	4 0	4 6	2 0	1 0	...	...	...
Depreciation Hour (20 years)	5 0	5 6	2 6	2 0	...	...	...

<i>Total cost per hour.</i>	Dayshift	...	...	...	£2	Index 100.
	Mean of Three Shifts	...	...	...	£1	Index 50.

EXPLANATION	
<i>Interest Hour</i>	Cost of Interest per effective hour available.
<i>Tool Hour</i>	Cost of tools and short period plant consumed either through wear or obsolescence.
<i>Wage Hour</i>	Cost of Production Wages.
<i>Service Hour</i>	Cost of Housing, Heat, Light, Power, Area, Maintenance, Crane, Trucks, Conveyors, Oil, Establishment.
<i>Experts Hour</i>	Cost of Designers, Tool-setters, &c.
<i>Depreciation Hour</i>	Replacement fund over period indicated.

Table II. CHEAPER PLANT

		<i>Day Shift</i>	<i>Night Shift</i>	<i>Mean of Three Shifts</i>
		pence	pence	pence
Interest Hour		18	22.5	20.25
Tool Hour		12	15	13.5
Wage Hour (200 operatives)	2500		3125	2812.5
Service Hour		20	25	22.5
Experts Hour		15	18.75	17.0
Depreciation Hour (5 year)		8	10	9.0
<i>Cost Index</i>		100	125	112.5

Observations. Advancing technique of production is such that an adequate return can be had from elaborate and expensive machinery only if it is used for many more hours than those which obtain with present day-shift arrangements.

Table I brings out clearly the fact that there is great economy in working an expensive machine for extended hours, in spite of the rising wage costs. This is because of the heavy weight of material, service, and financial items, as compared with production labour.

But where cheaper plant is used, production is much more costly by any system other than one day-shift (see Table II).

The plant must be balanced and careful consideration given to the above observations when new designs of product are to be considered.

APPENDIX II

WHOLESALE AND RETAILERS

In the conventional analysis of the equilibrium of the firm no distinction is usually made between manufacturers, wholesalers and retailers. The 'seller' of the product may be either or any of them and no attempt is made to determine their respective positions in the price-fixing process. In general the analysis is used to explain the conduct of the manufacturer, who decides the amount of a product he will produce with his plant and equipment. In this sense wholesalers and retailers are not producers; they are not normally regarded as having control of the output of a product. It does happen occasionally that discussions are carried on about the location of sellers¹ and the resulting imperfection of the market, which give the impression that any economic agent who sells the products of industry may have some control of output and price.

There is a system of prices in respect of finished goods ready for sale which, subject to overlapping in some special cases, may be divided up as follows:

- (a) Producers' price, paid to producers by wholesalers and intermediaries.
- (b) Wholesale price, being that charged by wholesalers to retailers.
- (c) Retail price, charged to ultimate consumers.

There is a close connection between these prices. Wholesale and retail prices bear a certain relationship and so do producers' and wholesale prices. The base price which in general determines other prices is that fixed by the producer.

Wholesalers. In those sections of industry where it is usual to sell products through the agency of wholesalers or intermediaries, there is a possibility that the wholesaler may have some slight influence over the price which is charged to retailers, and thereby may affect the selling price to the ultimate consumer. But in practice the wholesaler is usually remunerated for his services by a recognized or conventional percentage on cost (producer's price) or discount from the retail selling price, if goods are priced on that basis by the producer.

In some cases merchants follow customs, self-imposed, of adding to producers' prices 'a fixed amount in the pound or shilling'. In others an addition is made to cost on the basis of the weight of goods handled. Many products are branded and advertised widely so that a wholesaler must stock them if retailers call for them. In these

¹ Cf. Chamberlin, *op. cit.*, p. 86 and *passim*.

cases the selling price is fixed and advertised by the producer and wholesalers receive recognized percentage discounts. The wholesalers' prices are dependent upon and closely related to the producer's prices.

Retailers. Many products are sold direct to retailers by manufacturers, and the retail price is often agreed when the order is given. The retailers' overhead costs and profit are usually covered by a customary discount from the agreed selling price, or alternatively by a fixed percentage on the cost price. Subject to special discounts for large lots in bulk, the producer's price to each retailer is approximately the same in respect of any particular product. The situation is similar in those cases where it is customary for a retailer to buy from a wholesale merchant.

*Price Maintenance.*¹ Those producers who are in a position to fix the price of their own product for a period or season of production are also enabled to exercise control of all prices to the final consumer. Most of them fix the retail price and allow trade discounts to wholesalers or retailers. Some industries sell their products direct to consumers and others to retailers and eliminate intermediaries. But through whatever channels the products are sold, it is now becoming part of producers' price policy to maintain the prices they have fixed by supplying only those intermediaries standing between them and the consumer, who are willing to enter into a formal agreement to comply strictly with the system of prices fixed by the producers. Sanctions are devised to enforce the agreements against any defaulting intermediary. The usual course is for the producer to refuse supplies, and to take similar action in respect of any other trader who supplies the defaulter. Trade Associations support their producer members by refusing membership to any traders on a 'stop' or 'black' list, so that the defaulter is prevented from trading in any of the products of a large number of firms.

One of the most important price maintenance systems is in operation in the tobacco industry. All prices, wholesale and retail, are fixed by the producer and made the subject of written agreements. A bonus on turnover is paid to the retailer in respect of each financial year during which the agreement has been observed. If the retailer breaks the agreement, not only does he lose the accrued or accruing loyalty bonus, which is a substantial proportion of his profit margin, but supplies may be stopped by the producers and no other traders may supply him; if they do provide him with supplies they also will lose their bonus and supplies may be refused to them. There are similar

¹ Cf. Grether, *Resale Price Maintenance in Great Britain* (Univ. of California Press, 1935).

agreements in other industries, and sanctions are used by producers to enforce them.

Conclusion. The replies to the questionnaire¹ indicate that 32 of the 50 firms fix all prices to wholesaler, retailer, and consumer. Of these 32 firms, 19 bind the wholesaler and retailer by agreement, and the other 13 firms have a tacit understanding that prices agreed upon will be maintained. The evidence seems to suggest that if wholesalers and retailers had some influence over price in the past, it is diminishing rapidly, and they now play only a passive part in the price-fixing process in respect of the products of many industries. For all industries where price-leadership is in evidence it will be sufficient to examine the producer's price policy to determine the selling price of the product to the consumer. If any important part may be ascribed to wholesalers or retailers it will be found generally to apply only in those industries where the producers' selling prices are determined quasi-automatically.

As the main part of the present inquiry is concerned with price-fixing by dominant firms who have full control of selling price of their product at all stages, it was not deemed necessary to discuss the position of wholesalers and retailers in earlier chapters.

¹ See App. III, Qq. 16-17.

APPENDIX III

QUESTIONNAIRE ON COSTING AND PRICES IN BRITISH INDUSTRY

The replies to the few questions not answered categorically, which are not capable of simple arithmetical calculation, are omitted from this summary but are mentioned in the text; all the questions are printed here for the sake of completeness.

GENERAL

- What is the general nature of the product you manufacture?
- Has your product a definite season for 'peak' sales?

<i>A.</i> Yes	29	No	21
---------------	----	----	----
- In which months of the year do you usually make plans, decide upon production of new types, designs, or styles of products?
- How soon thereafter are the new styles, &c., put into production?

<i>A.</i> 1 month	3	3 months	5	no reply	25
2 months	12	4-9 months	5		
- What time elapses from date of making plans before new styles, types, &c., can be delivered?

<i>A.</i> No delay	2	3-4 months	14	18 months	1
1 month	5	6-9 months	6	no reply	16
2 months	6				
- Do you produce goods (*a*) chiefly to customer's special order? (*b*) your own speciality or standard types in advance of orders, (*c*) closely similar to products of other competing firms?

<i>A.</i> (<i>a</i>)	14	(<i>b</i>)	24	(<i>a</i>) with (<i>b</i>)	12
------------------------	----	--------------	----	--------------------------------	----
- How many of your designs, types, or lines are (*a*) covered wholly or mainly by patents or trade-marks, (*b*) specialities of your own, (*c*) closely similar to products of other competing firms?

<i>A.</i> (<i>a</i>)	2	(<i>a</i>) with (<i>b</i>)	3	(<i>b</i>) with (<i>c</i>)	1
(<i>b</i>)	5	(<i>a</i>) with (<i>b</i>) and (<i>c</i>)	3	no reply	2
(<i>c</i>)	34				
- Number of firms in the industry whose chief products or types are in close and active competition with your own.

<i>A.</i> 2 competitors	1	12-20 competitors	13	over 175	4
3-5 "	5	25-50 "	7	large	1
6-10 "	9	75-100 "	3	no reply	7

9. Form and extent of competition: (a) price, (b) quality, (c) style, (d) advertising programmes, (e) premium bonus or gift schemes, (f) other forms. *A. Extent: Keen.*

<i>A.</i> (a) only	15	other forms including (a)	6
(a) with (b)	7	(b) and (c)	4
(a), (b), and (c)	7	others	3
(a), (b), (c), and (d)	7	no reply	1

OUTPUT

10. Do you make up a budget or output plan for a period or season of production?

<i>A.</i> Yes	26	No	24
---------------	----	----	----

11. For estimates of cost (or budget plan) and spreading of 'overhead' costs, do you (a) assume that full maximum output will be achieved, (b) that a 'normal' or 'standard' output is possible, (c) that output will be the same as last year, or (d) make a special forecast each year of what output is likely to be?

<i>A.</i> (a)	6	(b)	21	(c)	10	(d)	12	no reply	1
---------------	---	-----	----	-----	----	-----	----	----------	---

12. If a normal or 'standard' output is assumed what percentage of the full maximum capacity is this normal output?

<i>A.</i> under 75%	7	80-85%	3	no reply	17
75-80%	12	90% and over	11		

13. Is there a minimum output below which it would not be profitable to continue production with the same type (not amount) of specialized equipment you normally use?

<i>A.</i> Below normal	5-10%	3	30-40%	4
	20-25%	7		
Below maximum	20-25%	2	50%	8
	30-40%	3		
	no reply	23		

14. Do you keep some reserve plant to ensure continuity of normal production without pressure?

<i>A.</i> nil	21	10-25%	14	no reply	9
5%	3	33½ and over	3		

PRICE-FIXING

15. Is there a 'charm' price favoured by consumers?

<i>A.</i> Yes	16	No	34
---------------	----	----	----

16. Do you fix the prices of your product to (a) wholesaler, and/or (b) retailer, and/or (c) consumer?

A. (a) 8 (a), (b), and (c) 32
(a) with (b) 4 nil 6

17. If final consumers' prices are fixed by you, do you bind wholesaler and retailer by agreement?

A. Yes 19 No 13

18. When do you fix your prices, (a) before production is commenced, or (b) after the goods are made and ready for sale?

A. (a) 47 (b) 1 doubtful 2

19. On what basis do you fix your prices: (a) on a system of 'standard' costing or budgetary control; (b) on an estimate of what cost is likely to be, based on previous experience or figures from accounts; (c) on a formula; (d) on actual costs, calculated after goods to that order are completed; (e) find 'market' price for a similar product and fix your own price, (i) at that figure, (ii) —% above it, or (iii) —% below it; (f) any other method?

A. (a) 12 (d) 1 (e) (ii) 1
(b) 24 (e) (i) 7 (e) (iii) 4
(c) 1

20. Do you fix your price (a) to cover a definite period within which customers will expect you not to alter it, (b) so that it can be changed on giving notice, or (c) so that it can be changed at any time without notice?

A. (a) 18 (c) 14
(b) 10 not applicable 8

N.B.—All under (b) and (c) usually keep price fixed for 6 months or more.

CHANGES

21. If selling price is fixed for a period are you able to avoid (a) changes in costs of raw material (by entering into forward contracts), and/or (b) changes in wages rates (by agreements) for the same length of period as prices are fixed?

A. (a) and (b) 5 Yes (a) 26 Yes
(a) and (b) 9 No no reply 10

22. If you are not able to avoid above changes, how do you deal with unforeseen increases in cost of raw material and wages: (a) bear out of profits, (b) reduce cost in some way, or (c) alter price?

- A. Wages (a) 27 (c) 12
(b) 3 no reply 3
23. If costs of raw material or wages decrease, do you (a) add saving thereon to profits, (b) improve product (e.g. put more or better material into it), or (c) reduce selling price?
- A. (a) only 11 (a) with (b) and (c) 4 (c) 19
(a) with (b) 4 (b) 2 no reply 5
(a) with (c) 2 (b) with (c) 3
24. If changes in prices appear to you necessary (for any reason) at any time, do you (a) make the change and ignore the possible reactions of other competing firms in the industry, (b) await information of what one particular firm is doing, (c) await general information about the actions of several other firms, or (d) await and follow market reports?
- A. (a) 22 (b) 4 (c) 21 (d) 3
25. Do you find resistance to price changes from (a) wholesaler, and/or (b) retailer, and/or (c) consumers?
- A. Increases (a), (b), and (c) 5 (b) with (c) 2
(a) with (b) 4 (c) 7
(a) 7 nil 16
(b) 4 no reply 5
- Decreases (a), (b), and (c) 1 (b) with (c) 1
(a) with (b) 4 (c) 2
(a) 2 nil -
(b) 2 no reply 38
26. Have you ever continued your old prices when competitors have changed theirs? If so, what was the effect on sales, (a) when your price was lower than competitors, (b) when your price was higher than competitors?
27. Have your competitors ever continued their old prices when you have changed yours? If so, what was the effect on your sales, (a) when your price was higher than competitors, (b) when your price was lower than competitors?
28. Assuming that competitors do not alter their prices, can you make an estimate of the change you would expect in sales, (a) if price was reduced $2\frac{1}{2}$ per cent, 5 per cent, or 10 per cent; (b) if price was increased $2\frac{1}{2}$ per cent, 5 per cent, or 10 per cent?

Costs

29. Would you consider altering your prices if changes occurred (a) in costs affecting you only (internal—e.g. processing operations or efficiency of plant), and (b) in costs affecting all firms in the industry more or less alike (e.g. basic rates of wages, raw material).

A. (a) Yes 17 No 9 (b) Yes 24 No 9

This question must be read with Q 21. Obviously the replies are not intended to indicate that prices would actually be changed in despite of quasi-contractual arrangements with customers.

30. What length of time would elapse between observed alterations in costs and the change in your prices?

A. less than 1 month 6 3 months 7

1 month 9 6 months 7

2 months 4 no reply 17

31. If your price is fixed for a season or you usually avoid changing your prices, do you find that your costs are (a) capable of adjustment when required to meet emergencies when actual costs are differing from 'standard' or estimated costs, (b) incapable of any but minor adjustments?

A. (a) 11 (b) 26 no reply 13

32. If capable of adjustment, do you effect this by all or any of these methods, (a) omitting some unnecessary process or operation, (b) subdividing some processes, (c) speeding up machinery or operators, (d) omitting part of or reducing quantity of raw material content, (e) tightening control to reduce waste of raw material, (f) altering wages or efficiency bonus, (g) designing new and faster machinery, (h) any other method.

33. If you wished to produce a little extra output (say 5 per cent above 'normal') what extra cost per unit of product would you have to incur? (a) direct labour and material only, (b) extra works or indirect costs also. What proportion of selling price (of any one product) is this extra cost?

A. (a) 32 (b) 2 no reply 16

34. If demand increases sharply or you have an unusual quantity of unfilled orders, would you increase selling prices if (a) costs were unaltered by reason of expansion in output, (b) costs decrease by reason of expansion in output, (c) costs increase by reason of expansion in output?

A. No change for (a), (b), and (c) 29 Change for (a), (b), and (c) 6
 No change for (a) and (b) 15 Change for (c) 15

Purchases

35. For what percentage of the (a) raw materials, (b) semi-manufactured goods do you make contracts at fixed prices to run for a period

A.	%	(a)	(b)	%	(a)	(b)
	0	7	7	75-89	8	8
	under 40	8	8	90 and over	14	16
	50-74	7	5			

Fixed contracts but amount not specified, (a) 6 (b) 6

36. (i) What is the average or usual length of period over which contracts are intended to run? (ii) Do these contracts (a) entirely avoid your being faced with increases of cost, (b) contain a 'break' clause which enables your suppliers to charge higher prices to you if their costs increase?

A. (i)	12 months and over	17	2 months	3
	6 months and over	16	inapplicable	7
	3-6 months	7		
(ii) (a)	34	(b)	9	

Wages

37. (i) How are the wages of operatives fixed, by (a) agreement with Trade Unions or (b) separate bargaining?

A. (a)	34	(a) with (b)	3
(b)	12	no reply	1

37. (ii) In either case are you able to avoid changes in wages rates during a period or full season of production?

A.	1 firm gave yes for	3 months	1 firm gave yes for	24 months
	5 firms	" " "	6 " "	39 firms gave no
	2 " "	" " " 12 " "	2 firms sent no reply	

38. How are operatives' wages calculated in respect of the greater part of your output? (a) time rates, (b) 'straight' piece work, (c) efficiency bonus system, (d) a special system.

PLANT

39. What proportion of the value of your plant and equipment is, (a) land and buildings, (b) fixed to the premises (e.g. conveyor systems, fixed bases of heavy machinery), (c) partly changeable (e.g. removable 'heads' which can be taken from 'stocks' or 'base' and redesigned)—often called short period plant, (d) loose tools wearing out quickly, (e) patterns, jigs, dies, &c.?

A. Firms using short period plant

<i>% of total value</i>	<i>Firms</i>	<i>% of total value</i>	<i>Firms</i>
nil	18	33-50	2
under 10	5	50 and over	4
10-20	9	unspecified	16

40. What method do you adopt for providing for wear and tear and depreciation: (a) appropriation from profit of a varying sum each year dependent on amount of profit available; (b) a fixed percentage on diminishing balance; (c) a fixed percentage on the original capital cost; (d) annuity system; (e) annual revaluation; (f) any other method?

A. Fixed plant

(a) 6	(d) nil	(f) nil	
(b) 23	(e) 1	no reply	5
(c) 15			

Short period plant

(a) 4	(d) nil	(f) nil	
(b) 15	(e) 1	no reply	18
(c) 12			

41. Do you scrap machinery before it is worn out, (a) to keep cost conditions level with your competitors, (b) to provide new types of products to meet changes in consumers' tastes, or (c) any other reason?

(a) with (b) 12	(b) 7
(a) 10	no reply 21

42. How does obsolescence written-off during the five years 1935 to 1939 compare with the amount for 1930 to 1934?

43. How has the technique of production altered since 1913? (e.g. alterations in design and speed of machinery, specialization, and subdivision of processes).

A. 1929-39

Rapid changes 16	Little change 14
Slow changes 14	No reply 6

44. By what percentage could you increase 'normal' output by adding extra machines where possible but without extending your factory buildings?

A. 0% 9	20-25 7	50-75 2	200 1
10-15 7	33-40 5	100 2	no reply 17

45. If you decide to extend the factory what extra output would the smallest practical extension provide?

A.	5%	2	33½	1	200	1
	10-15	5	50	4	no reply	26
	20-25	11				

DEMAND

46. In normal times are your sales, (a) fairly constant, (b) steadily increasing, (c) rapidly increasing, or (d) decreasing?

A.	(a)	21	(c)	1	fluctuating	2
	(b)	23	(d)	2	fluctuating violently	1

47. (i) Can you form a reliable estimate of the demand for your product?

A.	Yes	23	no.	10	no reply	17
----	-----	----	-----	----	----------	----

47. (ii) Do you collect and utilize information about demand by (a) field service organization, (b) agents' or travellers' reports, (c) wholesalers' or retailers' reports, (d) technical and trade journals?

A.	(a)	3	(b) and (c)	41	no reply	6
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PROFITS

48. Do you provide in your price-fixing for (a) the same percentage of gross profit on each line, or (b) different percentages on different lines? If different percentages, upon what considerations do you make the distinction?

A.	(a)	14	(b)	34	no reply	2
----	-----	----	-----	----	----------	---

49. Are there any conventional or accepted ideas amongst firms in the industry, about the rate or amount of annual profits?

A.	10% on cost	1	7½% nett profit	1
	5% nett profit	1	no	47

50. In deciding the amount of profits to distribute what considerations do you take into account? (a) the rate of dividend shareholders are expecting, (b) if a public company, the current market forecasts of your dividend, (c) the finance required for expansion of your business, (d) any other.

A.	(a)	2	(c)	28
	(a) with (c)	7	no reply	13

APPENDIX III

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51. If your profits increase above the average of previous years, what proportion of the increase do you (a) distribute in increased dividends, (b) place to reserve?

A. (a) 75% or over 4 (b) 75% or over 19
 50% or over 6
 33 $\frac{1}{3}$ % 1
 no reply 20

52. If your profits decrease compared with average of previous years, do you (a) maintain dividends and draw on reserve, or (b) reduce dividends?

A. (a) 4 (b) 29 (a) with (b) 4 no reply 13

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