AN ECONOMIC EVALUATION OF CONTRACT MARKETING

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"*But he finally found that the second most valuable commodity today is information*"

Len Deighton, The Ipcress File

This paper analyses the efficiency consequences of the introduction of contract marketing. It interprets contracts as a means for extending the use of information and increasing the efficiency of its transmission. It is shown that the present system, based on spot markets, falls short of the ideal in which the marginal value product of informational resources equals their marginal cost, marginal cost being the least technically possible. Contracting reduces this disparity and in so doing improves short and long run resource allocation, accelerates innovation, diminishes overhead costs and enhances the efficiency of obtaining information.

INTRODUCTION

Although long and extensively used in the manufacturing sector, contract marketing has only relatively recently extended into agriculture. The development has occasioned a considerable amount of discussion among economists and agriculturalists. Much of this discussion, however, has been concerned with reasons for and ethical implications of the movement; it has largely ignored the important question of the efficiency consequences thereof. This paper is devoted to an examination of this latter question. The first step in the analysis is to set up an ideal for a marketing system. Next, it is shown where the actual system falls short of this ideal. Then the role which contracting plays in bridging the gap between the actual and the ideal is presented, together with the resultant gains in efficiency.

1 AN IDEAL MARKETING SYSTEM

Before proceeding, it is necessary to point out that the concept of marketing adopted in this paper is more restrictive than the conventional one, and refers to marketing exclusively as the obtaining of new information[1]. Since contracting is concerned with the supply of new goods, this information relates to the future when the production process is complete.

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[1] This viewpoint is elaborated in the author's "A Revised Approach to Marketing", this *Review*, vol. 36, no. 1 (March, 1968), pp. 28–36.

In such a model there are two conditions necessary for an ideal marketing system. The first is that the marginal value product of informational resources equals their marginal cost. The derivation of these two quantities may be stated briefly as follows[2]. The marginal value product of informational resources is their utility in averting over- and under-use of resources in production. The marginal cost of informational resources is their opportunity cost in production. The second condition is that the marketing mechanism used in obtaining and transmitting information should be technically the most efficient. The marketing mechanism in this model refers to all the individual and institutional devices for information-getting[3].

2 THE ACTUAL SYSTEM

The actual system is based on spot markets alone. It will be seen that this system departs substantially from the ideal just presented. Part of this discrepancy is due to underutilization of informational resources—contra the first condition: the other part is due to relative inefficiency of the market mechanism—contra the second condition[4].

The former deficit occurs at several levels. In the first place it results in misallocation of resources in the short run. In the present system, little effort appears to be taken by producers to ascertain information on wants and supplies and, hence, the price prevailing, when production is complete. Rather, reliance is placed on past prices as the guide to the future. And, almost inevitably, expectations are confounded. The result is recurrent over- and under-use of resources—the classical cobweb cycle. The successive opportunity and actual social losses, due to departures from equilibrium, are represented, for the stable cobweb cycle, by the shaded areas of figure 1[5].

In the second place when the demand for existing products rises or when improved varieties of them are developed, there is often a long lag in the proper allocation of fixed (long-run) resources to the product[6].

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[2] See further in *ibid*, pp. 33–5.

[3] *Ibid*, p. 33.

[4] It must be noted that it is not possible to ascertain the relative importance of these two factors as sources of market inefficiency.

[5] That these areas do represent social losses, given constant marginal utility of money, is demonstrated by L. G. Tweeten and F. H. Tyner in "The Utility Concept of Net Social Cost—A Criterion for Public Policy", *Agricultural Economics Research*, vol. 18, no. 2 (April, 1966), pp. 33–42. The reader will be aware that the rather rigid framework of the previous section is not being used explicitly here. However, it does implicitly underlie the analysis. The marginal value product of information may be derived from the social losses represented in figures 1 to 3 just as it was obtained in the article cited in footnote 1. But to do this here would unduly complicate the analysis.

[6] This lag must not be confused with the normal adjustment lag due to the time taken to wear out old equipment.

FIGURE 1

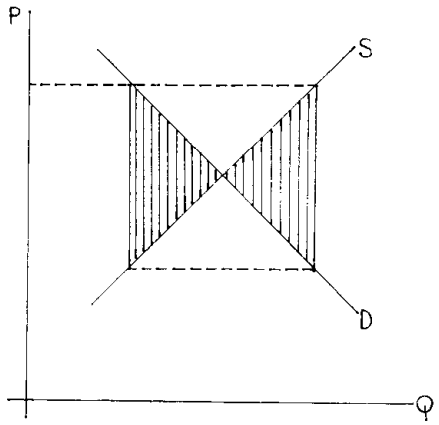


FIGURE 2

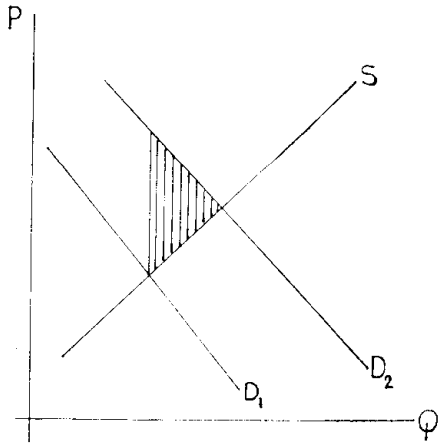


FIGURE 3

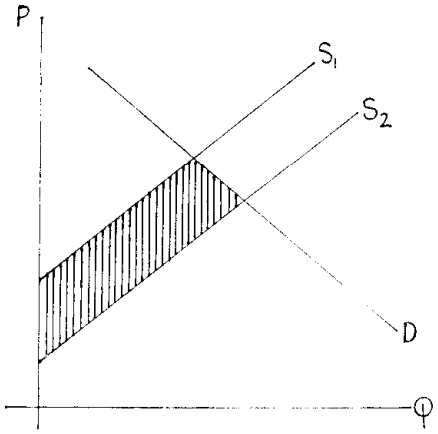
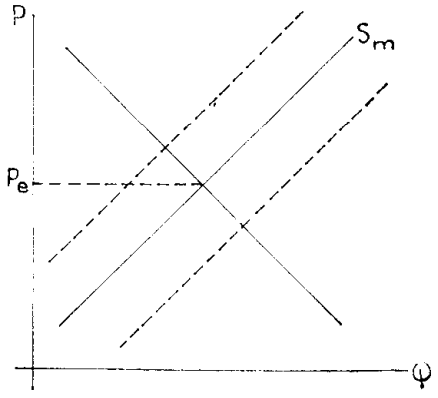


FIGURE 4



The lag is due to insufficient information possessed by present or prospective entrepreneurs or by those who normally supply them with capital[7]. This lack of information, then, forestalls entry and the extension of existing capital. The social cost incurred is depicted by the opportunity loss area in figure 2.

Third, there is often delay in the adoption of new technology. This lag is again due to the absence of the relevant information[8]. This occurs separately or in conjunction with improved products—the latter because improved products usually involve new technology. The losses to society are shown in the shaded area of figure 3.

Finally, in the present system, overhead costs are greater than otherwise[9]. There are two reasons; one a short run, the other a long run phenomenon[10]. First, higher stages in the production process lack information on the projected supplies of lower stages. This uncertainty as to supplies entails higher managerial and labour costs. Second, a by-product of the cobweb cycle, plant capacity of higher stages must be larger to accommodate the greater variability in supply from one production period to the next.

As noted previously, the actual system is also at variance with the second condition, technical efficiency of the market mechanism. In other words, since the market mechanism is the means whereby information is obtained and transmitted, the technical productivity of informational resources is not the highest attainable. There are three reasons. Firstly, with a system based on spot markets, there is only a low level of organization to co-ordinate anticipated wants and projected supplies. This situation entails individual and unrelated estimates of these variables by all producers along the production chain resulting in a considerable amount of unnecessary duplication of effort. Secondly, because there is no effective communication between them, it is very difficult for processors or retailers to estimate the projected supplies of producers. Thirdly spot price quotations are a most inefficient guide to the relative quantities of each type of the product which must be produced. One way of ameliorating this difficulty is a grading system, but such schemes are

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[7] For an interesting documentation of this and the following issue see W. T. Kelley, *Journal of Marketing*, vol. 17, no. 3 (January, 1954), p. 255. See also W. F. Mueller and N. F. Collins, "Grower Processor Integration in Fruit and Vegetable Marketing", *Journal of Farm Economics*, vol. 39, no. 5 (December, 1957), pp. 1471–86.

[8] It is seen that the inclusion of technological information extends the definition of marketing given in the author's article mentioned above. It must be noted that lack of information does not explain the whole of delay in adoption of technology in the short run; part of it is due to entrepreneurial aversion of uncertainty. But in the long-run, the problem is purely informational.

[9] The marginal value product of this kind of information may still be analysed in terms of social costs, but its derivation is less direct than in the previous three sections.

[10] For an empirical investigation of these two factors see S. K. Seaver, *Effect of Variability of Supply of Eggs on Wholesale Marketing Costs* (Storrs Agricultural Experiment Station Bulletin No. 231), April, 1957.

often either prohibitively costly or infeasible. Even so, because prices fluctuate so much and because individual producers may only be familiar with a narrow range of possible grades, it is very difficult for them to discern relative price differences between grades.

3 THE ROLE OF FORWARD MARKETS

Before proceeding, it is necessary to indicate the essential attributes of a forward contract. Broadly speaking, forward contracts specify, in advance of the production period, the quantity and quality of the goods to be delivered, the price to be paid and often also the technique of production to be used. Further, to enable these specifications to be effected, part or all of the capital for production is sometimes supplied. Thus, by definition, forward contracts have extended the use of information; it will be shown below that they have also provided a more efficient means for obtaining and transmitting information. The implications of this statement will now be explored in relation to the previous delineation of the actual system.

(i) It was pointed out earlier that in the present system producers make little attempt to obtain information on wants and supplies when production is complete; rather they rely largely on the past price as the augury of the future. But, when contracts are introduced, account *is* taken of the future; producers are provided directly with the information on the price and the quantities required. The question now is: does this improve efficiency and, if so, how?[11] The answer depends on whether processors and retailers make better estimates of relevant market conditions, wants, and supplies, than do producers basing their decisions on the past price. It is contended here that they do. Processors can, firstly, estimate changes in wants more accurately because their market shares are relatively constant, and they can more readily project movements in the total since these change in response to readily predictable movements in income and tastes. And, more importantly, they can estimate changes in supply more accurately—their own because it is specified in the contract, that of other processors because of the relative constancy of all market shares. If everything were contracted for in advance and if estimates were reasonably accurate, the system should eventuate close to equilibrium, thus averting the losses described in figure 1.

The above argument, however, ignores the important and vexing problem of supply variability due to natural phenomena—weather, disease, etc. The next question, then, is: does the previous result still hold therewith? The answer is that it does. The proof is a little tortuous. In the first place it is assumed that, with and without contracting, producers use as

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[11] For the moment, supply is assumed to be unaffected by weather, disease, etc. That is to say, the production function does not shift. This assumption is relaxed shortly.

the basis for their supply decisions the modal production function[12]. Secondly it is assumed that contractors expect and act upon the equilibrium price for this modal production function. That is to say, price anticipations are derived from estimated wants and supplies when the supply schedule is at the mode (S_m in figure 4)[13]. The problem now is to compare the efficiencies of the two systems under the various combinations of price expectations and supply contingencies. For this purpose it is simplest to measure their relative efficiencies under different price expectations for the non-contracting situation, for given movements of the supply curve affecting both simultaneously. There are three kinds of supply outcome which will be called submodal, modal and supramodal.

But, before examining the relative efficiencies of these situations, it is necessary to establish the effect on supply of a shift in the production function when expectations are for the modal function. This is done in relation to what will be called the *realized* supply schedule—an artificial construct which shows what should have been done if the movement in the production function was known in advance. The rationale for this procedure will be seen shortly. It is evident that, when the production function is submodal, the marginal productivity of variable inputs (the slope of the function) is lower at each level of input than that of the modal function because there are less total resources for the variable inputs to co-operate with. Correspondingly when the function is supra-modal, marginal productivity of variable inputs at each level is higher than with the modal function because co-operating resources are greater. The former situation is represented in figure 5 where P_m is the modal

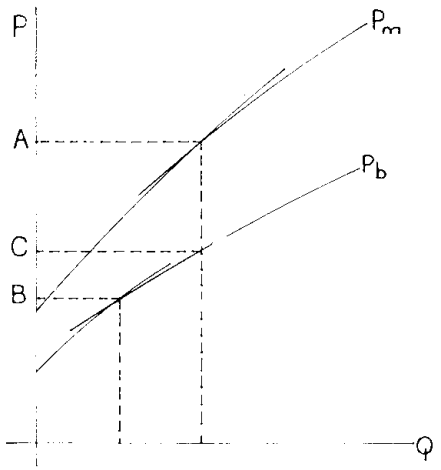

FIGURE 5

[12] The rationale for this assumption is simply that such a policy will prove correct more times than any other policy. It is obvious also that it will minimize the sum total of deviations from the modal position.

[13] That is, the expected price is at P_e. In figure 4 the supply curve is assumed to be normally distributed about S_m, the outer limits of the distribution being shown by the dotted lines.

function and P_b the submodal. The projected supply based on the expected price ratio of output to input is OA. The equilibrium supply in relation to the realized function and based on the same price ratio is OB. The *actual* supply OC lies between the two. Similarly, it can easily be seen that in the converse situation, P_m and P_b reversed, the result is exactly the same, the actual supply lying between the projected and the equilibrium.

With this result established, supply corresponding to these production functions can be derived which, together with the demand curves, may be used to examine the efficiency results. The analyses are shown in figures 6 to 9, in which the notation is as follows: S_m = modal supply curve; S_r = realized supply curve (sub- or supramodal); S_a = actual supply; P_e = equilibrium (contracting) price expectation; P_n = non-contracting expectation. In the comparisons, the vertically hatched areas represent costs with non-contracting: the horizontally hatched areas represent costs with contracting. In figures 8 and 9 they are superimposed. The dotted lines S_a between each pair of supply curves represents the supply (OC derived above) which results when expectations are based on S_m and S_r eventuates. It can be seen that in each comparison, the optimal position—the standard of reference—is where the realized supply curve (derived from the realized production function) intersects the demand curve. The realized schedule is, of course, a fiction in practice but has real content in showing what should have happened efficiencywise.

In each diagram, the loss from contracting, the horizontally hatched area, is fixed for the given movement in S_r because expectations are based on P_e. But the vertically hatched area, the loss from non-contracting, will vary as the expected non-contracting price varies. In figures 6 and 7 the non-contracting loss area is drawn equal to the contracting loss area to determine the extent of ba and cd—the range within which the non-contracting loss is less than the contracting. The diagrams, in effect, show two different situations superimposed, in order to compare their efficiencies for a given movement in S_r.

It can be seen from figure 6 that, for a supramodal movement in the realized supply schedule, contracting is inferior to non-contracting when the non-contracting price expectation P_n is within the range ab. Similarly, in figure 7, for a submodal movement, contracting is inferior when the non-contracting price expectation, P_n, is in the range cd. But it is apparent that for either range, ab or cd, there is an equiprobable range on the opposite side of the equilibrium expectation, and when expectations fall therein, the superiority of the contracting result will more than cancel out the inferiority in the ranges ab and cd. This result is illustrated in figures 8 and 9. When non-contracting expectations are above ba and when they are below cd, the contracting result is always superior to the non-contracting, whatever the supply outcome. It is obvious that when non-contracting expectations are at the equilibrium, the same as contracting, the outcome in each is equivalent. The net result clearly favours contracting. The outcomes are summarized in the following table, where a plus sign indicates superiority of contracting, a negative sign inferiority.

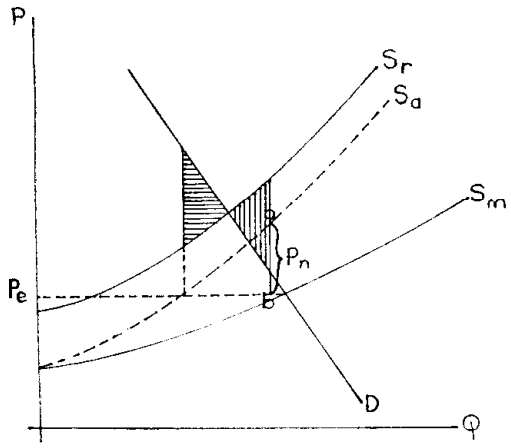

FIGURE 6

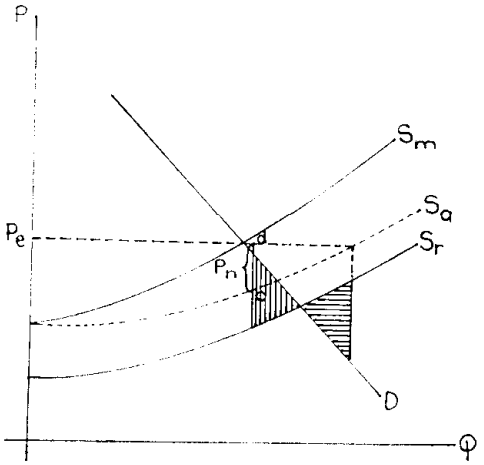

FIGURE 7

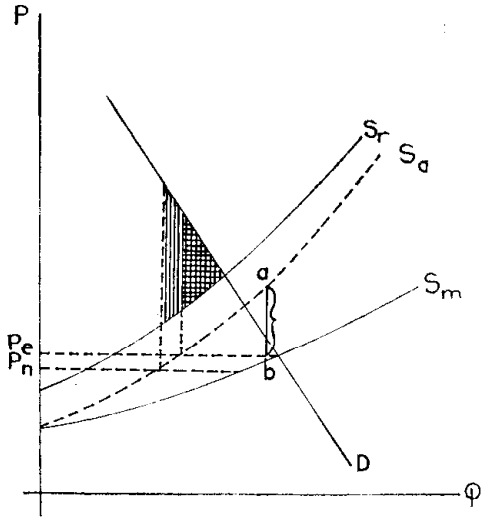

FIGURE 8

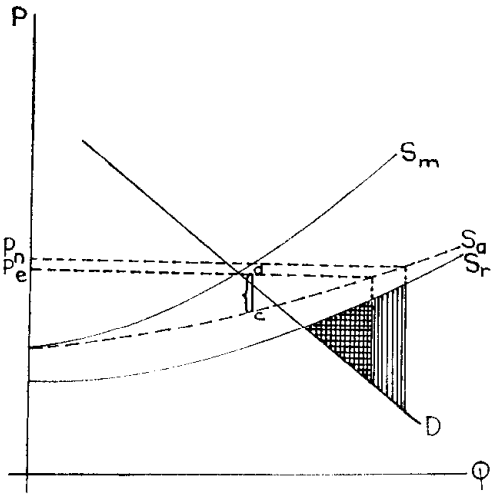

FIGURE 9

Realized Supply Schedule	Non-contracting Price Expectation			
	Below *ba*	Within *ba*	Within *cd*	Above *cd*
Supramodal ..	+	—	+	+
Submodal ..	+	+	—	+

So it is seen that contracting, with and without variability in supply, improves the allocation of resources in the short run.

(ii) Secondly, it was pointed out that producers, as a result of their own insufficient information or that of their suppliers of capital are often slow to move resources into the production of commodities for which the demand has increased or the quality improved. But forward contracts, by specifying the type of product and by providing the necessary capital, supply this information and ensure that it is acted upon[14]. The losses avoided are represented by the shaded area in figure 2.

(iii) Thirdly, it was seen that producers are sometimes tardy in the adoption of new technology, again because of lack of information thereon. The contract, however, often makes explicit provision to ensure that the most efficient techniques are used. This is made effective by providing field advisers, by specifying production techniques and by supplying inputs such as new varieties of seeds or of livestock[15]. The losses averted are those shown in figure 3.

(iv) Finally, it was indicated that uncertain and fluctuating supplies entail higher overhead costs than a known and more stable supply. The introduction of the contract considerably reduces short-run uncertainty because the supply is designated in the contract. As noted earlier, however, supply is still subject to natural phenomena and so uncertainty is not eliminated. Nonetheless, it can easily be seen that uncertainty—as measured by variability—is always less with contracting than without. The range of variation with contracting is delimited only by movements in the production function. But without contracting, incorrect expectations compound the difficulty of supply movements and variation is increased considerably. The argument is illustrated in the comparisons of figures 9 and 10, where supply variability is shown to be greater with contracting than with non-contracting. Given that higher stages form correct expectations, contracts will also reduce long-run supply variability because expectations are for the equilibrium position, which varies little from one period to the next[16].

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[14] Mueller and Collins, *op cit*, p. 1479.

[15] *Ibid.*, p. 1478.

[16] This statement is also true when supply variability due to weather, etc. is considered because such variability affects the contracting and non-contracting situation equally.

Forward contracts also increase the technical efficiency of the market mechanism. It was seen previously that the present system requires *all* producers along the production chain to make estimates of wants and supplies. But, with contracts, some or all of the duplication of effort is avoided. In the case where retailers contract with processors who in turn contract with producers, only retailers need obtain market information which is relayed to producers via processors at very small cost. Also, but in smaller degree, where processors are the contractors, producers are relieved of the responsibility of obtaining information[17]. It was also seen that in the present system it is extremely difficult for processors and retailers to obtain information on the projected supplies of producers in order to plan their short-term operations. But when contracts are used, this difficulty is diminished because processors have the information at the outset; it is contained in the contract. Again it was pointed out that, because prices fluctuate so widely and because grading systems are usually too costly, producers at present are unable to ascertain the relative amounts of each type of the commodity which should be supplied. Contracts circumvent this problem by stating explicitly the quantities of each type which are required.

4 CONCLUSION

It has been shown that contract marketing, by extending the use of information results in increased efficiency in a number of ways: it improves short and long-run allocative efficiency; it fosters the introduction of new technology; and it reduces overhead costs. Contract marketing also increases the technical efficiency of obtaining information.

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[17]They will still have to shop around for the best price, but at small cost.