IMPERFECT COMPETITION AND FALLING SUPPLY PRICE

The conception of falling supply price was submitted to a severe examination by Mr. Sraffa in his article on "Laws of Returns under Competitive Conditions," and the subject was further discussed in the "Symposium on Increasing Returns and the Representative Firm" and in two articles by Mr. Harrod. The upshot of the discussion may be summarised as follows: If competition is perfect, and if no frictions prevent firms from growing to their equilibrium size, then falling average costs for the individual firm cannot occur. Falling supply price for a particular commodity must then be due, if it ever occurs, to those economies of large scale depending solely upon the size of the single industry, of which Mr. Sraffa doubts the existence. On the other hand, if frictions prevent firms from reaching equilibrium, or if competition is imperfect, so that in equilibrium the firms may be of less than optimum size, then falling average costs for the individual firm may occur, and the possibilities of falling supply price for the commodity are very much widened. The contribution that I hope to add to these conclusions is to demonstrate that while the presumption that average costs to the firm will be falling is far stronger than these writers suggest, the presumption that supply price will be falling is far weaker than they suppose.

The problems which arise from the fact that firms take time to reach equilibrium will not be considered in this article. It is only with imperfect competition that I wish to deal. If the problems arising from the passage of time are ignored, the question which remains to be answered is this: Is the existence of imperfect competition sufficient by itself to account for falling supply price? In order to isolate this one question and to reduce it to manageable terms, certain severe assumptions must be made.

To eliminate the problems connected with time I will assume first that the efficiency and the costs of individual firms do not alter with the passage of time, but only with changes in the scale of

1 Sraffa, Economic Journal, December 1926.
2 Economic Journal, March 1930.
output; and secondly, that each firm is always in individual equilibrium, in the sense that it is always able to produce that output at which its marginal gains are equal to its marginal costs.

To isolate the effect of imperfect competition upon supply price it is necessary to assume that every other possible source of changing supply price is eliminated. I will therefore assume that every factor of production is homogeneous; that every factor is in perfectly elastic supply to the industry; and that there are no economies of large-scale industry. The last assumption requires to be elaborated. It entails that there shall be no external economies of the type which arise when some subsidiary industry is working under falling supply price, and it entails that there shall be no economies of lateral or vertical disintegration arising from the specialisation of firms upon a smaller number of products or upon fewer stages in the productive process. Lastly, it entails that the efficiency of every factor of production is independent of the amount of the factor employed in the industry. By these assumptions conditions are postulated in which, if competition were perfect, the industry would be producing at constant supply price.

Finally, to simplify the problem, I will assume that all firms are alike in respect of their costs and of the conditions of demand for their individual outputs.¹

If competition is not perfect, it is possible to draw up a demand curve for the output of each individual firm in the manner suggested by Mr. Sraffa.² This individual demand curve will be influenced by the total demand for the commodity, by the prices charged by other firms, by the number of other firms, and by the nature of the market imperfection. The fact that when the market is imperfect the individual demand curve will also be influenced by the expenditure of the firm on advertising, providing facilities to customers, and so forth, presents a problem which has never been satisfactorily solved. This problem can be evaded if we assume that the imperfection of the market arises solely from differences in transport costs incurred in respect of different purchases from the single firm, or from such differences between

¹ This does not, of course, entail that the firms are alike from the point of view of individual buyers. If they were, the market would be perfect. But individuals with different scales of preferences, as between any one firm and the others, are assumed to be grouped symmetrically, so that the demand curves of the separate firms are all alike.
² Loc. cit., p. 546.
customers in their preferences for particular firms as cannot be altered by the action of the firms themselves. It may be objected that this assumption rules out all the most common types of market imperfection; but this objection, though certainly valid, is not relevant to the particular argument here set out. On this assumption there will be a definite demand curve for the output of each firm, independent of its costs. In order to increase its sales, the firm must lower the price at which it sells. Every decrease in the price charged by a firm will lead to some increase in its sales, but not to the indefinitely large increase which would occur if competition were perfect and the individual demand curve perfectly elastic. From the individual demand curve of each firm can be derived its individual marginal revenue curve. This marginal revenue curve shows the increment of total receipts due to a unit increase in the output of the firm. It is this curve which governs the output of the firm. The profits of the firm are maximised when marginal revenue is equal to marginal cost, and the output of the firm in any situation will therefore be given by the intersection of the marginal revenue curve and the marginal cost curve of the firm. When this output is being produced, the firm is in equilibrium, in the sense that in the given situation it has no motive to increase or to reduce its output. Since we have assumed that all firms are alike, each must be supposed to act in the same way, so that a single price always rules throughout the whole market.

The individual equilibrium of the firms is established in this way. We must next consider the equilibrium of the industry. If entry into the trade is possible, the industry will only be in equilibrium when profits are normal. If profits are more than normal, new firms will tend to enter the industry, and its output will tend to increase. If profits are less than normal, firms will tend to leave the industry, and its output will tend to decrease. Only when profits are normal will there be no tendency for the output of the industry to alter.

The notion of free entry into the trade may appear at first sight to be incompatible with the notion of an imperfect market. The same causes which make markets imperfect—for instance, the goodwill of old-established firms—make entry difficult. If the market is imperfect, the prospect of profit necessary to tempt a new firm to enter it will therefore be higher than if it were perfect. But it does not follow that profits in the industry are more than normal, for the entry into other trades may be equally

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1 This is the "increment of aggregate demand curve" of Mr. Harrod.
difficult. The level of profits may be everywhere kept high by the existence of market imperfection, but it is only in a trade into which entry is unusually hard that profits will be unusually high. In any case, this objection is irrelevant, for under the conditions postulated the level of profits earned when the industry is in full equilibrium is independent of the size of the industry. It is sufficient to define normal profits in respect to the particular industry, and it is that level of profits any excess above which will attract new firms. The proposition that the industry is in equilibrium only when profits within it are normal is then reduced to a tautology. It is only when no level of profits, however high, is sufficient to overcome the resistance which prevents firms from entering the industry, that this proposition fails to be true. When such a case occurs, we may say that the industry is always in equilibrium or never in equilibrium, whichever we please.

I will postulate, therefore, that in our industry there is a certain level of profits which is normal in this sense. Then, since all firms are assumed to be alike, there is no difficulty in including normal profits in the long-period cost of the firm. Average cost for the firm will include the average, per unit of output, of the normal profit, along with other costs. It follows, when average cost is defined in this way, that the industry is in equilibrium only when price is equal to average cost.

The equilibrium of the industry thus requires a double condition. Marginal revenue must be equal to marginal cost, and price must be equal to average cost. This double condition of equilibrium can be fulfilled only when the individual demand curve of the firm is a tangent to its average cost curve. For if the demand curve everywhere lies below the average cost curve, no output can be produced at normal profits. And if the demand curve anywhere lies above the average cost curve, there will be a range of outputs at which an abnormal profit can be made; among these outputs the firm will choose the most remunerative, and profits will be more than normal. Only when the demand curve is

1 It must be freely admitted, however, that this whole method of approach is very artificial. An increase in demand attracts new entrepreneurs to the industry directly, by opening up some new possibility of profitable investment, rather than indirectly, by making their mouths water at the sight of the high profits of the existing firms. The abnormal profits are a symptom rather than a cause of the situation in which new firms will find it profitable to enter the trade. But the artificial device of regarding the abnormal profits as a causal factor is of great assistance in simplifying the formal argument, and provided that its artificiality is recognised, it seems permissible to make use of it.

2 I am indebted for this proposition to Mr. R. F. Kahn, who, in turn, derived it by pursuing Mr. Sraffa's argument to its necessary conclusion.
a tangent to the average cost curve will profits be normal.\footnote{Mr. Harrod (ECONOMIC JOURNAL, December 1931, p. 572) appears to suggest that the double condition of equilibrium—that price should equal average cost while marginal revenue equals marginal cost—will be fulfilled only by an accident. This suggestion is not confined, as he maintains (see ECONOMIC JOURNAL, September 1932, p. 492), to a mistake in drawing the diagram, but is embedded in the structure of his argument.} Thus, whenever the demand curve of the individual firm lies above its average cost curve, new firms will be attracted into the industry by the abnormal profits, and their competition will lower the individual demand curve again until it is once more tangential to the average cost curve. For the output at which the demand curve and the average cost curves are tangential the marginal revenue curve must cut the marginal cost curve.\footnote{A formal proof of this relation can be derived from Mr. Harrod’s formula (loc. cit., p. 570): $M = A - \frac{A}{\varepsilon}$, where $M$ is a marginal value, $A$ the corresponding average value, and $\varepsilon$ the elasticity of the average curve. For the output at which two average curves are tangential, $A$ (in this case the price) is the same for each, and $\varepsilon$ is the same for each. Therefore $M$ must be the same for each.} This is obvious from the fact that at this output the difference between total revenue and total cost is at a maximum. In each diagram $AC$ and $MC$ are the average and marginal cost curves of the firms,\footnote{These curves are shown as rising after a certain point. But one of the benefits of the method of analysis inaugurated by Mr. Sraffa is that it is equally applicable to cases in which the optimum size of the firm is indefinitely large.} $AR$ is the demand curve, or average revenue curve, $MR$ is the marginal revenue curve. $OM$ is the output produced when the firm is in individual equilibrium, $MC$ is the average cost of the output $OM$, and $MP$ is the price. In Fig. 1 the firm is making abnormal profits. Then, although the firm is in equilibrium, the industry is not. The abnormal profit is shown by the area $APCB$. \fig{1}
In Fig. 2 profits are normal, C and P coincide (average cost is equal to price), and the area APCB disappears. The double condition of equilibrium is thus fulfilled when the individual demand curve is a tangent to the average cost curve.

We have now reached the first stage in the argument. In conditions of full long-period equilibrium it is not only true that average costs for the individual firm may be falling; they must be falling. But the question remains: Is it the case that falling average cost to the firm necessarily leads to falling supply price for the commodity? Each writer who has contributed to the discussion so far appears to regard the prevalence of falling supply price as established as soon as he has established the fact that

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1 Mr. Shove (in the "Symposium") and Mr. Sraffa do not contemplate full equilibrium of the type here described. They observe that under imperfect competition average costs for the firm may be falling, or may be rising, and this is, of course, perfectly correct, for the industry may be out of equilibrium. Mr. Harrod discusses long-period equilibrium, but he does not appear to recognise that the mere existence of imperfect competition is a sufficient explanation of falling average costs for the firm in equilibrium conditions, and that it is definitely incorrect to say that in equilibrium average cost may be rising. He resorts, for an explanation of falling average costs, to the fact that the optimum size of a firm (at which average cost is a minimum) may alter faster than the firm can grow (loc. cit., p. 574). This is a point of great interest, but it is not necessary to the matter in hand. The firm will be of less than optimum size, in an imperfect market, however long the optimum remains unchanged. Further, he introduces into the argument the reluctance of firms to combine, although competitive marketing costs may be reduced by amalgamation (loc. cit., p. 573). Here he is hard to follow. Surely the principal advantage of amalgamation arises not from a reduction in marketing costs, but from the fact that the elasticity of demand, for any individual productive unit, is less the larger the proportion of the total output that it controls? In more old-fashioned terms, is not the chief inducement to firms to amalgamate the prospect of making a monopoly profit? Until Mr. Harrod has discovered why, in the face of this inducement, firms are not combined, he has no reason to be puzzled that the possibility of saving on advertisement cost is not a sufficient inducement to make them combine.
average costs to the firm may fall. The purpose of this article is to challenge that view, and to show that, when average cost for the firm is falling, it by no means follows that supply price for the commodity is falling.

Starting from a position in which the industry is in equilibrium, suppose that the total demand for the commodity is increased. The individual demand curves will then be raised, and since all firms are assumed to be always alike in respect of conditions of demand, all the demand curves will be raised in the same way. The output of each firm will then increase, and its average costs will fall. The price of the commodity may rise, fall, or remain constant, but, in any case, the firms will receive a surplus profit in excess of the normal profit which is included in average cost (cf. Fig. 1). New firms will now be attracted into the industry; since every factor is in perfectly elastic supply, these new firms will have the same costs as the old. The total output of the commodity will be further increased, and the competition of the new firms will lower the individual demand curves of old firms. A new position of long-period equilibrium will be established when the individual demand curves are once more tangential to the average cost curves.

The question which I set out to answer still remains. In the new position will the price of the commodity be less than before? Clearly the answer depends upon the manner in which the demand curves move as they fall back towards an equilibrium position.

If the individual demand curve does not alter its slope, it will fall back to exactly the same position as before. The output of each firm will be the same in the new position as in the old, and the increase in the number of firms will be in proportion to the increase in the total output. The price of the commodity will be unchanged.

1 It would be possible to pause at this point and examine the short-period situation, but such a discussion would be lengthy and not immediately relevant to the argument. The short-period supply curve for a fixed number of firms in an imperfect market can be constructed by means of technique similar to that which is here employed. A discussion of Mr. Harrod’s treatment of the subject would start several fresh hares.

2 It is therefore impossible to draw up a supply curve for the commodity without postulating what type of change in demand is to occur. This difficulty does not only arise, as Mr. Harrod appears to suggest (loc. cit., p. 572), from the fact that the individual demand curves may not be independent of the cost curves of the firms. It has equal force when the individual demand curve cannot be affected by expenditure undertaken by the firm. But I think it is misleading to have the feeling, which I myself had for a long time, that the supply curve under perfect competition really is a supply curve in a sense in which all other supply curves are not. In every case, in drawing up a supply curve, it is necessary to make some assumption about the conditions of demand for the separate firms. The assumption of perfect competition is merely the simplest and the most usual of all the assumptions that can be made.
If the individual demand curve is less elastic in the new position, it will reach an equilibrium position in which its point of contact with the average cost curve is to the left of the old point. The output of each firm in the new situation will be smaller than in the old situation. The increase in the number of firms will therefore be more than in proportion to the increase in output. Since the output of the individual firm has decreased, its average cost will be raised, and the price of the commodity will be raised.

Conversely, if the individual demand curve is more elastic in the new situation, the price of the commodity will be lowered. In each diagram $AC$ is the average cost curve of the firm, $AR_1$. 

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**Fig. 3.**

**Fig. 4.**

**Fig. 5.**
and $AR_2$ are the old and new demand curves, $OM_1$ is the output of the firm in the old situation and $M_1P_1$ its price. $OM_2$ is the output in the new situation and $M_2P_2$ its price. In Fig. 3, $M_2P_2$ is equal to $M_1P_1$. In Fig. 4, $M_2P_2$ is greater, and in Fig. 5, less, than $M_1P_1$.

From this analysis we can obtain the answer that, in the conditions postulated, an increase in the total demand for the commodity may either raise or lower its price, or leave it unchanged. The conclusion reached in the "Symposium" that the mere existence of market imperfection may account for falling supply price is therefore confirmed, but the suggestion that it is likely to lead to falling supply price is not supported by the formal argument. Some kinds of increase in demand will lower price, and some will not.

But less purely formal considerations must also be taken into account. We must inquire what type of change in demand will lower price and what types would raise it or leave it unaltered. A full discussion of this topic would lead us far afield, and I will here do no more than suggest an example of each type.

First consider a case in which price will be unchanged. This might occur if the increase of demand came about by the addition to the market of a new group of customers. As new firms are set up, these additional buyers, whose demand was temporarily satisfied by the old firms, may be supposed to forsake them for the new firms; the demand curves of the old firms would then fall back to their former position, and the new demand would be satisfied by the new firms. For example, suppose that the imperfection of the market is due to differential transport costs, and that the increase in demand comes entirely from a fringe of newly-established suburbs on the outskirts of a town. The inhabitants of the suburbs would at first buy from the various firms in the centre of the town, but as soon as firms were set up in their own districts, they would transfer their custom to the new firms. The elasticity of the individual demand curve would then be the same as before.

Next consider a case in which price is raised by the increase in demand. This would occur, whatever the nature of the initial rise in demand, if the new firms, when they enter the industry, attract away all the most fickle customers of the old firms, and leave only those who are more strongly attached to them. The individual demand curves would then become less elastic. There may have been, for instance, a fringe of customers attached to the market of each firm who were never provided for in the manner
which they would really have preferred (for instance, the location of the old firms may all have been equally inconvenient for them). They were indifferent between the old firms. But the increase in total demand has called into existence firms which exactly meet their various requirements. The indifferent fringe of the old markets now disappears, and the new firms are each provided with a group of buyers whose preference for their wares is strong. The elasticity of the individual demand curves is then less than before.

Lastly, consider a case in which the price falls. This would occur if the increase in demand were spread evenly over the whole market—for instance, by a uniform increase in the density of population—and if the new firms were set up, so to speak, in between the old firms (either geographically or in respect of special qualities which appeal in various degrees to different customers). The difference, from the point of view of buyers, between any one firm and the next would thus be reduced, the customers of each firm would become more indifferent, and the elasticity of demand would be increased.

There are some grounds for supposing that the last type of change in demand is the most frequent. It may therefore be considered probable that an increase in total demand will lower price rather than raise it. It is worth while to remark, however, that successive increases of demand of this type would ultimately remove market imperfection altogether, and establish the optimum size as the equilibrium size of the firms; but in considering the imperfection of the market as independent of the action of the firms, I have drawn a highly simplified picture of the conditions which prevail in the real world. In the real world, when a firm finds that the market is becoming uncomfortably perfect, it can resort to advertisement and other devices which attach particular customers more firmly to itself. If a number of firms all act in this way, the market is broken up again and the equilibrium size of the firms is reduced.

The assumptions on which this analysis has been made are extremely severe. If they are relaxed, the case in favour of the view that falling supply price will be a result of imperfect competition is considerably strengthened. The assumption that all firms are alike does not affect the argument, and was made merely for simplicity of exposition. By removing it, various complications are introduced, some of which will tell in favour of falling supply price and some of which will tell against it, and the result may be in either direction.
To remove the assumption that firms are always in individual equilibrium makes way for the influences, connected with the passage of time, which, according to Mr. Shove's analysis,¹ may lead to falling supply price. Into this field I shall not enter, but it is worth while to observe, in passing, that it is intimately connected with the problem of market imperfection, since the same factors which make the market imperfect, such as goodwill, may retard the rate at which an individual firm can grow. Thus market imperfection may also have a share in causing whatever types of falling supply price arise from the influence of time.

Finally, the removal of the assumption that there are no possibilities of lateral and vertical disintegration very greatly strengthens the case in favour of falling supply price. Even under perfect competition the disintegration of firms may occur. But under perfect competition we must assume that for each scale of the output of an industry the maximum profitable degree of specialisation is already obtained. When the market is imperfect, the process of disintegration of firms is very much impeded, and a degree of specialisation that would be profitable under perfect competition is not profitable when competition is imperfect. There is here, therefore, a reservoir of potential economies of large-scale industry; an increase in the total demand for the commodity, leading to changes in the individual demand curves, may have the effect of releasing these potential economies by making a degree of specialisation profitable which was not profitable before. In short, an increase in the total demand for the commodity, when the market is imperfect, is far more likely to lower the average cost curves of the firms than when the market is perfect.

It therefore appears, after all, to be highly probable that falling supply price is a result of imperfect competition.

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¹ "Symposium," p. 113.
Imperfect Competition and Falling Supply Price
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[Footnotes]

1 The Laws of Returns under Competitive Conditions
Piero Sraffa
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1 The Law of Decreasing Costs
R. F. Harrod
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