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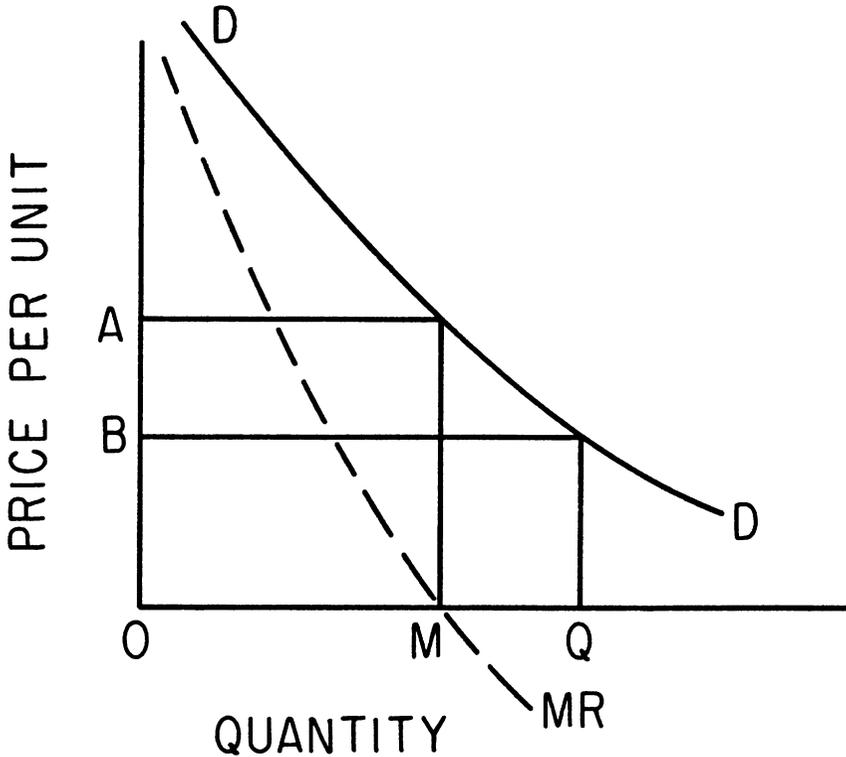
## DURABILITY AND MONOPOLY

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ASSUME that a supplier owns the total stock of a completely durable good. At what price will he sell it? To take a concrete example, assume that one person owns all the land in the United States and, to simplify the analysis, that all land is of uniform quality. Assume also that the landowner is not able to work the land himself, that ownership of land yields no utility and that there are no costs involved in disposing of the land. If there were a large number of landowners and the price were competitively determined, the price would be that at which the amount demanded was equal to the amount of land in the United States. If we imagine this fixed supply of land to be various amounts either greater or smaller, and then discover what the competitively determined price would be, we can trace out the demand schedule for American land. Assume that this demand schedule is DD and that from this a marginal revenue schedule, MR, has been derived. Both schedules are shown in Figure I. Let the total amount of land in existence be OQ. Then, if the price were competitively determined, the price would be OB (see Figure I).

We now have to determine the price which the monopolistic landowner would charge for a unit of land in the assumed conditions. The diagram would seem to suggest (and has, I believe, suggested to some) that such a monopolistic landowner would charge the price OA, would sell the quantity of land OM, thus maximising his receipts, and would hold off the market the quantity of land, MQ. But suppose that he did this. MQ land and money equal to  $OA \times OM$  would be in the possession of the original landowner while OM land would be owned by others. In these circumstances, why should the original landowner continue to hold MQ off the market? The original landowner could obviously improve his position by selling more land since he could by this means acquire more money. It is true that this would reduce the value of the land OM owned by those who had previously bought land from him—but the loss would fall on them, not on him. If the same assumption about his behaviour was made as before, he would then sell part of MQ. But this is not the end of the story, since some of MQ would still remain unsold. The process would continue as long as the original landowner retained any land, that is, until OQ had been sold. And if there were no costs of disposing of the land, the whole process would take place in the twinkling of an eye.

*Figure I*

It might be objected to this supposed behaviour under which land is sold in separate transactions involving blocks of land, probably of diminishing size, that it would be even better if the landowner sold the land by infinitesimal units, thus maximising his total revenue. But this is neither here nor there. Whatever the intermediate steps are assumed to be,  $OQ$  land will be sold. And given that  $OQ$  is going to be sold, the value of a unit of land is going to be  $OB$  and given this, no buyer of land will pay more than  $OB$  for it. Although the demand schedule may be correctly drawn in that, if the quantity of land is  $OM$ , the price would be  $OA$ , the landowner would find himself in the position that, if he were charged more than  $OB$ , he would sell nothing. The demand schedule facing the original landowner would be infinitely elastic at the competitive price and this even though he was the sole supplier. With complete durability, the price becomes independent of the number of suppliers and is thus always equal to the competitive price.

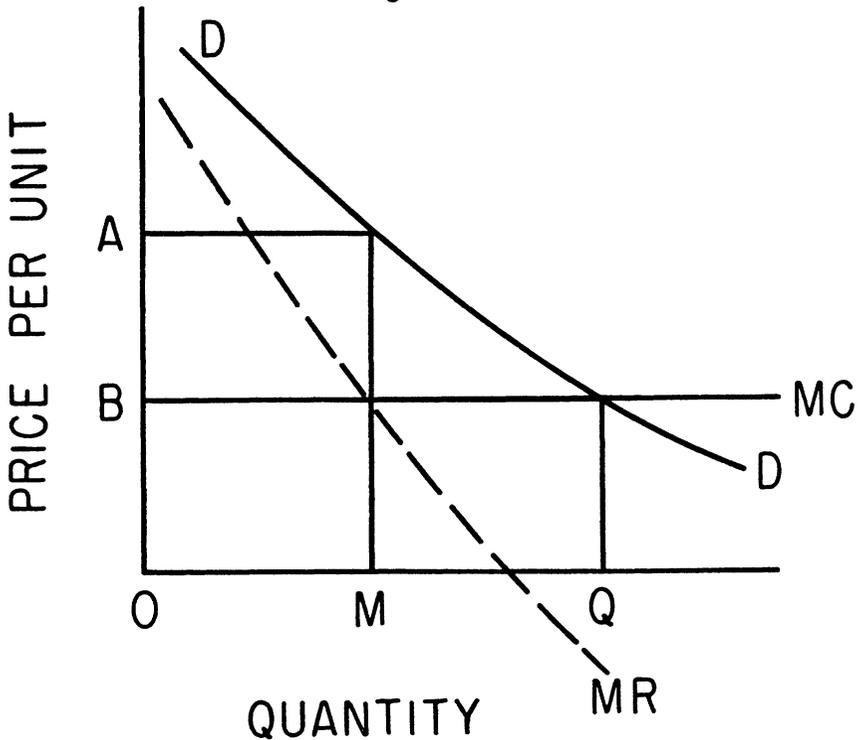
How could the landowner avoid this result? He could do this and obtain the price OA from the sale of OM land by making special contractual arrangements with the purchasers of land by which, as a condition of sale, he agreed to hold unsold in perpetuity the quantity of land MQ. Alternatively, he could agree to buy back any land that was offered to him in the future at a price just under OA, thus making it against his interest to sell more than OM land. Another way in which essentially the same result could be obtained would be for the landowner not to sell the land but to lease it for relatively short periods of time. It would then be comparatively easy for him to assure lessees that no increase in supply will occur during the lease period either by entering into all leases at the same point in time, or by announcing that he would not change the rental price during the lease period or by agreeing to adjust the prices charged to existing lessees if a lower charge is made to others during the lease period. In any case, even if such contractual arrangements cannot be made, lessees have some reason to believe that the landowner will not, in fact, lease more than OM land by charging lower prices for some of the unutilised land (after having entered into contracts at OA) because it would not be in his self-interest to do so. With this kind of leasing, the total earnings of the landowner depend largely on the rents at which land can be leased in future periods and the yield from these rents will tend to be higher the greater the confidence the lessees have that the amount of land leased during the lease period will not be more than OM. That confidence would obviously be weakened and the rent that could be charged in future reduced, if extra land above OM is leased during the current lease period. It is this which would tend to give lessees confidence that such extra land will not be leased. Of course, the negotiating of such rental contracts for short periods for each piece of land might be extremely costly and indeed might be so costly as to offset the gain in revenue from the limitation in the amount of land utilised. But, if not too costly, leasing would tend to ensure that only OM land was utilised. Another alternative would be for the landowner to give MQ land to someone who is less concerned about money-making than he is. For example, the landowner might donate MQ land to the government to be used "in the public interest". Some such contractual or institutional arrangements as these would enable the landowner to charge the monopoly price. But in the absence of such arrangements, the price charged will be the competitive price.

It may be thought that this argument does not apply if the permanently durable good is produced by a monopolist supplier rather than being part of nature. But this is not so. Assume that the demand schedule for this good is DD, representing the present value of its future services for various quantities of the good. Assume that it is produced by a single firm and that marginal costs are constant. MR represents the marginal revenue schedule and MC the

marginal cost schedule. All schedules are shown in Figure II. Cost and demand conditions are assumed to remain the same in the future. In effect, this means that if the competitive output,  $OQ$ , is produced originally, nothing will be produced in later periods.

A similar argument to that used in the case of the landowner will demonstrate that the price that this producer will charge (assuming outright sale) will not be  $OA$ , the apparent monopoly price, but will be  $OB$ , since the demand for his output of this good is infinitely elastic at this price up to the output  $OQ$ . Again, it is possible to introduce conditions into the contract for sale which would avoid this. An agreement not to produce any more of the good after  $OM$  has been produced, an offer to buy back the good at any time in the future at a price just under  $OB$ , or the use of leasing rather than outright sale, would all have the effect of making it possible to charge  $OA$  (just as similar arrangements would enable the monopolist landowner to achieve the monopoly price).

*Figure II*



Some of these arrangements may not be legally enforceable and, in any case, are likely to involve additional costs as against those incurred in outright sale. There is, however, an alternative which was not available to the hypothetical landowner and that is to make the good less durable. This may raise the costs of providing the stream of services afforded by the durable good, may result in charges over the future which have a present value greater than OA and a supply of services less than that afforded by OM of the durable good. Profits will also be less than they would be if this firm could sell OM at price OA. But this is not a real alternative in the absence of the various contractual arrangements mentioned. If the durable good is produced, the output will be OQ at price OB. If a less durable good is produced, a higher price can be charged because consumers do not have to fear an increase in supply if they buy at the monopoly price. The production of a less durable good as against a more durable good is very similar to a policy of leasing since, by making the good less durable, the producer sells the services provided by the good for short periods of time (because the good wears out) whereas in leasing the same result is achieved by selling the services of a given durable good in short period segments. The reason why making a good less durable enables a producer to charge higher prices than he could if the good were extremely durable is that it makes it in his self-interest not to increase supply since, if he did this, it would tend to lead consumers to believe that he might do this again in the future, a belief which would make it impossible for him to charge the monopoly price (as was explained in the case of land for leasing). Another circumstance reinforces the conclusion that making a good less durable will enable the monopolist producer to charge a higher price. What a consumer has to fear is an increase in supply during the period in which he (or someone to whom he transfers the good) is deriving services from the good. The less durable the good, the shorter is this period. But the shorter the period that the supplier has in which to increase supply, the greater will be the additional costs of increasing supply. Lessened durability reduces the gain from an increase in supply and thus reduces the likelihood that it will occur.

The analysis up to this point has proceeded on the assumption that marginal costs were constant for the durable good. It needs modification if marginal costs rise with increases in the rate of output. With constant marginal costs, production would take place in the first period and would then cease. With rising marginal costs, production would extend over a period of time, although, since price would fall as the stock of the durable good increased, the rate of production would decrease as time passed. Since sales occur sequentially, in setting the price in later periods, the producer will not take into account the fall in the value of the existing stock (which is, of course, owned by others). To this extent the behaviour of the producer will inevitably be com-

petitive in character and the stock (and price) will move towards the competitive level. Because of this, consumers will pay less (and the producer's profits will be less), than they would if, through an agreement as to the total quantity that could be produced or an agreement on a re-purchase price or through the use of leasing, production were limited to the monopoly output. Reducing the durability of the good is an alternative policy which might be more profitable (as was argued in the case of constant marginal costs).

There is an additional element introduced by the fact that production will continue over a period of time. The producer will have to consider the effect his actions have on the expectations of consumers about his actions in future periods. He can in general be counted upon to refrain from expanding output when any gain that he might make through disappointing consumers' expectations (if they thought he would restrict production) would be less than the loss he would suffer in future from not fulfilling them. However, there is no reason why conditions should not be such that it would always pay to disappoint consumers' expectations of a restriction in output (if they held such expectations) and in such circumstances, output in all periods would be such as to make marginal cost equal to price (if some of the arrangements mentioned earlier were not used). This result is particularly likely since, in the assumed conditions of rising marginal costs, prices and production will decline over time. Even in conditions in which the producer would not wish to disappoint consumers' expectations of a restriction in production, it is by no means easy to say how things would work out in practice since neither the producer nor the consumers would necessarily have clear, or the same, ideas about the future. A full analysis of this situation would be very complicated but could not affect the main contention of this note, that with durability some contractual or institutional arrangement of the type mentioned earlier may be a less costly and perhaps the only way of achieving a monopoly price or that reduced durability may prove to be a better way out of the difficulty.

One other qualification should be mentioned. The analysis up to this point has assumed that demand and cost conditions remained unchanged, in effect, that the economy was in a stationary state. The present value of any given amount of the durable good will always take into account future demands, but if demand remains the same, the present value of its future services (for any given amount of the durable good) will remain the same as time passes. However, with increasing demands present values will rise and future production will be greater than has been assumed (with constant marginal costs there will be some future production as against none). This enhances the importance of the considerations discussed in the previous paragraph, since the future loss from not restricting output will tend to be greater. Whether the expected increase in demand would be sufficient to lead the producer to restrict output

in earlier periods depends on its extent, on the rate of discount, on the nature of the cost schedule, on whether costs are expected to increase in the meantime (and by how much) and on the confidence with which these views about the future are held. An expected increase in demand may or may not obviate the need for the contractual arrangements mentioned earlier (or a reduction in durability) if the monopolist producer of a durable good is to secure the monopoly price.

The business practices which I have suggested as devices which a monopolist supplier might use to cope with the problem of durability may, of course, be adopted for reasons which have nothing to do with my argument. A land developer, in selling land on which houses are to be built, may agree to hold neighbouring land off the market to improve the amenities; the supplier of a durable good may agree to buy it back at some specified price in the future because consumers are willing to pay for this reduction in risk; leasing is often a less costly way for the consumer to obtain the services of a durable good; a reduction in durability may enable a supplier to provide a given stream of services at lower cost. Even when these practices are adopted to avoid the consequences of durability on demand, they are not necessarily undesirable—an agreement not to produce more than a certain quantity may be a necessary condition in the competitive supply of a durable good for which marginal cost is less than average cost. Nevertheless, these business practices, including reduced durability, may be essential elements in securing a monopolistic price. However, these practices have their costs and they may not, in fact, always be feasible. Furthermore, some of the contractual arrangements will not be enforceable over a long period. In such circumstances, the competitive outcome may be achieved even if there is but a single supplier.