Consistent Comparisons Between Monopoly and Perfect Competition

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Exposition of the social welfare consequences of monopoly power is one of the central features of courses in intermediate microeconomics. This exposition is based on a purely illustrative comparison of monopoly outcomes with the outcomes of competitive market structures. At its best, this exercise provides an occasion to discuss both the specific costs of monopoly and the basic methodology of welfare comparisons. The main insight that students should take from the competition-monopoly welfare comparison is, simply, that monopolies tend to produce less output and charge more for it than would a benchmark perfectly competitive industry and that this type of equilibrium leads to a deadweight welfare loss. Unfortunately, the contrived nature of this comparison gives rise to inconsistencies that may leave students feeling confused rather than informed. The purpose of this article is to identify the major inconsistencies in some standard treatments of the perfect competition-monopoly welfare comparison and to suggest more consistent and productive pedagogical approaches.

To be effective, the welfare comparison exercise must not only be internally consistent but must also conform with what students learn elsewhere in a standard intermediate theory course. Although the following analysis will indicate ways in which the exercise can be formulated to address each of these issues, any useful approach must include explicit identification of all underlying assumptions. A clear delineation of how the experiment is constructed is often absent from textbook treatments, and this omission limits the usefulness of the methodological aspect of the exercise.

The standard textbook illustration used for the welfare comparison between perfect competition and monopoly appears in Figure 1.[1] The diagram shows an upward-sloping marginal cost curve for the monopolist (MC^{s}_{m}), which is the sum of short-run supply curves for firms in a benchmark perfectly competitive industry (SR S_c). The diagram illustrates the loss of both producers surplus (area B) and consumer surplus (area A) resulting from the monopolist's profit-maximizing decision to produce less output and charge a higher price than would be the case under perfect competition. The mon-

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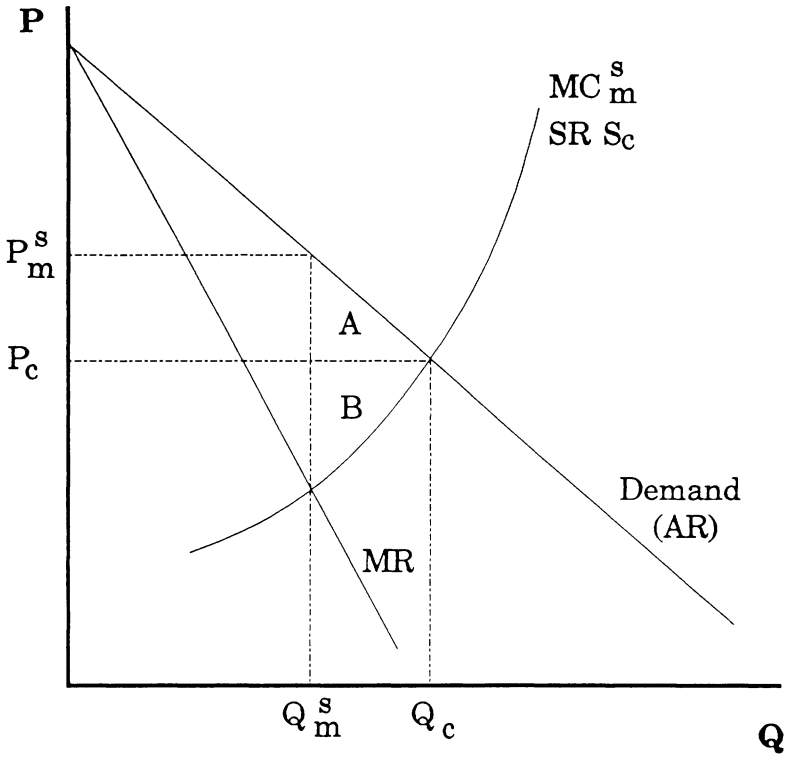
FIGURE 1
The Standard Approach



A = lost consumer surplus from monopoly.
B = lost producer surplus from monopoly.

opolist's marginal cost curve in Figure 1 is the primary source of the two types of inconsistencies commonly found in the welfare comparison. The internal consistency problem centers around the appropriate time horizon (short or long run) over which the experiment should be constructed. The external consistency problem involves the implications of alternative slopes of the monopoly marginal cost curve for other issues raised in intermediate microeconomics courses.

INTERNAL CONSISTENCY: THE TIME HORIZON

To maintain internal consistency, teachers need to clarify the time horizon for students when introducing the monopoly-competition welfare com-

parison. It is well known that this comparison should involve long-run equilibrium positions. Use of a short-run competitive equilibrium implies that further exit or entry may occur in the industry, making the welfare-loss calculation valid for only the period of time that the equilibrium exists. Because the monopoly equilibrium is the same in the short and the long run, because of the existence of insurmountable entry barriers, it is natural to compare it to the long-run competitive solution. Monopoly marginal cost is commonly accepted to be represented by the sum of the marginal cost curves of the individual competitive firms. Thus, if we want to compare the monopoly outcome to the long-run perfectly competitive outcome, and if we want to be as consistent as possible, teachers of intermediate theory should be using the long-run competitive supply curve as an equivalent for the monopolist's marginal cost curve and, thus, for the appropriate welfare comparison between monopoly and perfect competition. Further, because demand also varies with time, consistency argues for use of the long-run demand curve.

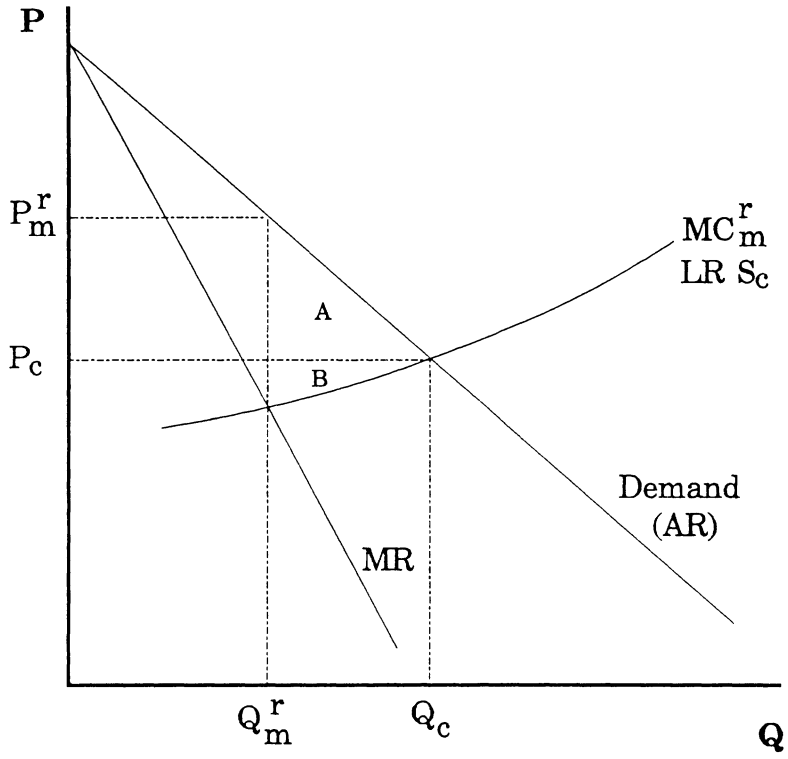
EXTERNAL CONSISTENCY: SHAPE OF THE CURVE

Use of the long-run competitive supply curve as the relevant marginal cost curve for the monopolist along with the long-run demand curve addresses the time-horizon concern very effectively and results in an internally consistent experiment. However, the issue of the appropriate shape for the marginal cost curve, and thus of external consistency, remains. The long-run competitive industry supply curve could be presented as either upward sloping or horizontal (i.e., perfectly elastic). The first approach, although more general, involves a potential contradiction with another maintained hypothesis in standard courses: that perfect competition among firms leads to zero profits in long-run equilibrium. The second, simpler, approach implies no contradiction but does require meticulous exposition of the particularly strong assumptions that must be made about the nature of costs in the industry in question.

An upward-sloping, long-run, competitive industry supply curve creates the necessity for an explanation of the existence of long-run excess profits (i.e., producer surplus) in the competitive industry. Most texts, when illustrating the welfare comparison, depict a situation in which the competitive industry earns significant producer surplus, a concept often explained as a combination of firm profit and economic rent.[2] The comparison in this case would appear as in Figure 2.

The rigorous approach illustrated in Figure 2 uses the long-run competitive supply curve (LR S_c) as the monopolist's marginal cost curve (MC_m^r), leading to an output level of Q_m^r and a price of P_m^r. Deadweight welfare loss in this case consists of areas A + B. Note that the long-run competitive supply curve in Figure 2 is flatter than the short-run curve in Figure 1 because of the increased flexibility accorded to firms in the long run in the absence of any fixed factors of production. The positive slope of the curve

FIGURE 2
Rigorous Approach



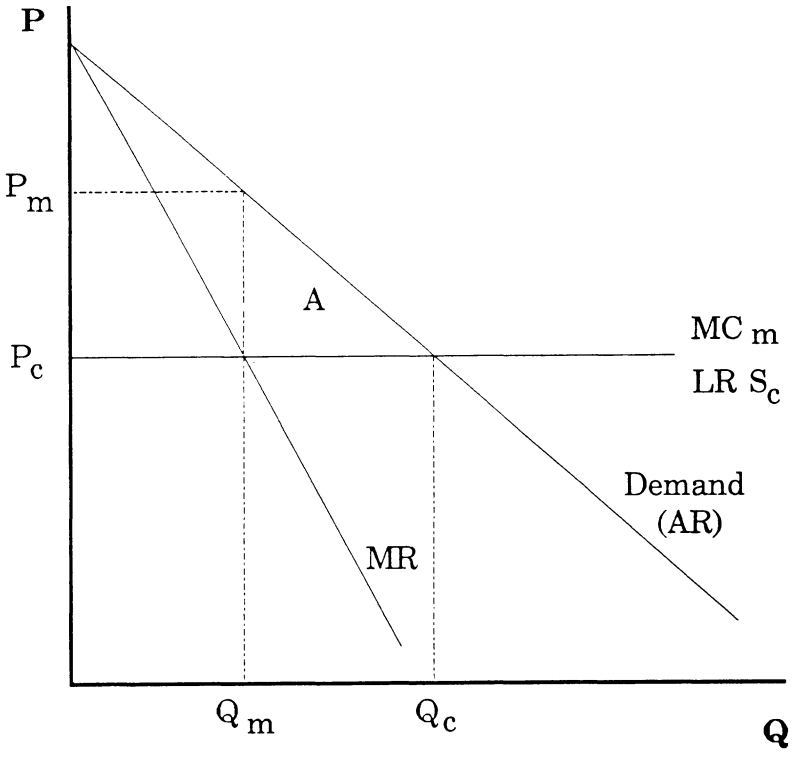
A = lost consumer surplus from monopoly.
B = lost Recardian rents from monopoly.

comes from assuming either that the competitive industry is an increasing cost industry or that differential costs exist across firms.[3]

We have found that intermediate-level students often question the inconsistency inherent in the illustration of a competitive equilibrium with positive profits. If we are supposed to be looking at a long-run competitive (zero profit) equilibrium, then how can we justify a welfare-loss calculation that includes a loss of "producer surplus" (area B in Figure 2)?

The resolution of this apparent contradiction requires a careful presentation of the reasons for the existence of producer surplus in a long-run equilibrium. Clearly, the assumptions that generated the upward-sloping supply curve must be made explicit so that the excess profit can be explained as pure Ricardian rent accruing to infra-marginal firms from locational or

FIGURE 3
Constant Returns/Constant Costs Version



A = lost consumer surplus from monopoly.

nonreproducible productive efficiency advantages. Given scarce "most efficient" productive units, diseconomies of scale exist, and the marginal long-run disincentive for entry into the competitive industry is preserved. The deadweight loss of monopoly in the rigorous case illustrated in Figure 2 can be explained in just this manner. This approach requires that a significant amount of time be spent on precise explanations of the concepts of Ricardian rent and efficiency. Because examples of industries with scarce "most efficient" productive units are more plentiful in the real world than examples of industries with homogeneous firms, this approach may well be quite intuitive for some students.

The alternative presentation of the monopoly marginal cost curve assumes that constant returns to scale exist in the long run. In such a situa-

tion, the long-run competitive supply curve, and thus the monopolist's marginal cost curve, would be horizontal and there would be no contradictory message about the existence of profits in a long-run competitive equilibrium.[4] This approach is illustrated in Figure 3, in which the entire social welfare loss of monopoly comprises consumer surplus (area A). An explicit acknowledgment that constant returns to scale imply constant long-run average and marginal costs should precede the explanation of the welfare result. The welfare-loss calculation is made more straightforward with this simpler horizontal supply curve.

The central issue, then, is whether to use an upward-sloping, long-run, competitive industry supply curve and maintain consistency by including a discussion of Ricardian rents or to use the horizontal version of the long-run supply curve and sacrifice some generality. The basic substantive result, that monopolies produce too little and charge too much, can be derived using either approach. The upward-sloping curve and the Ricardian rent discussion, however, create a complex presentation of a result that could be understood just as easily (if not more easily) using simpler assumptions. For this reason, use of the horizontal long-run supply curve may be the most satisfactory pedagogical approach for the average student.

The most thorough approach, which should be easily understood by more sophisticated students, would be to present the horizontal marginal cost case to illustrate the basic point and to follow this discussion with the more complex case involving the upward-sloping curve. This method has the added advantage of demonstrating the role of assumption making in economic analysis rather clearly. It therefore enhances the usefulness of the exercise as a demonstration of economic methodology.

CONCLUSION

Our brief review of several widely used intermediate textbooks indicates a number of different views on how to present the welfare comparison between monopoly and perfect competition.[5] However, if one considers the implicit assumptions made in the standard welfare-loss illustration contradictions clearly exist in some of these presentations. The use of the short-run competitive supply curve to represent the long-run monopoly marginal cost curve is clearly inappropriate, as is the tendency not to make underlying assumptions explicit. Intermediate economics students would benefit from a more straightforward and explicit analysis of the social cost of monopoly based on a comparison between two long-run equilibria under comparable cost conditions. We believe that the long-run competitive supply curve comprises the relevant long-run monopoly marginal cost curve, and this curve should be represented in the standard diagram. We also recommend the (explicit) assumption of constant returns to scale in the long run for the welfare comparisons when the goal is to illustrate simply the basic source of social welfare loss under monopoly. Inclusion of the more complex case involves an upward-sloping, long-run, competitive supply curve

and a discussion of Ricardian rent allows students to understand the basic sources of the social cost of monopoly while also providing them with valuable insight into some basic issues in economic modeling and methodology.

NOTES

1. One should make explicit the assumption that the monopolist and the group of competitive firms that make up the industry in the comparison have access to the same technology and face the same input prices.
2. A number of textbooks define producer surplus as that portion of the payment for a good or service that exceeds the minimum amount needed to cover the costs of production (Eaton and Eaton 1991, 266; Friedman 1990, 116–17; Hyman 1986, 267–68; Katz and Rosen 1991, 142–43; Kohler 1990, 196; Maddala and Miller 1989, 261; Varian 1990, 262–63). Others define it as related to economic rent and firm profit (Pindyck and Rubinfeld 1989, 291–92), while still others give a cursory explanation based on the concept of "economic surplus" or simply leave it out completely (DeSerpa 1988, 37–39; Call and Holahan [1983] and Nicholson [1989] do not define producer surplus).
3. Nicholson (1987, 296) defines an increasing cost industry as one "in which the entry of firms increases the costs of the firms in the industry." Entry into such an industry imposes an "external cost" on existing firms, driving up input prices and costs of production. Differential costs across firms may arise from differences in location or in access to scarce factors of production. Such an assumption is consistent with the existence of Ricardian rent in competitive equilibrium. Either of these assumptions is sufficient for the existence of an upward-sloping, long-run, competitive supply curve.
4. Nicholson's textbooks (1987, 1989) use constant marginal costs in the illustrations of the social cost of monopoly. They do not, however, identify the assumptions implied by these diagrams.
5. All of the texts use an upward-sloping competitive supply curve as the monopolist's marginal cost curve, except for the two by Nicholson. None of the texts explicitly discusses the need for dealing with the long-run curve and none explicitly addresses the assumptions made in the development of the welfare comparison.

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