June 2003

Monopsony and the All-or-Nothing Supply Curve:
Putting the Squeeze on Suppliers

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Abstract

The textbook monopsony model implicitly assumes that the monopsonist "lets" competitive suppliers move out their marginal cost curves and that the price for a given quantity is thus equal to industry marginal cost, presumed to be at or above average cost. It is obviously desirable, however, for the buyer to pay the lowest price possible for a given quantity. A single buyer, unlike competitive buyers, could use dictatorial market power to force suppliers into an all-or-nothing decision in which their alternative was to supply the dictated quantity at the stated price, or supply nothing at all. Exertion of such buyer power can be seen to force competitive suppliers off of their usual (marginal cost) supply curve and down to the average cost curve, which Friedman defined as the all-or-nothing supply curve.

This article extends the textbook monopsony model to account for the all-or-nothing supply curve, and also revisits the textbook case for a U-shaped average cost curve. Resource allocation, distributional, and social welfare consequences of each case are graphically developed.

Compared to the competitive norm, the traditional textbook monopsony shows a net social welfare loss, higher final consumer prices, and lower (but generally positive) profits in the competitive input industry. In contrast, a monopsonist's exploitation of the competitive industry's all-or-nothing supply is shown to lead to a competitive allocation of resources; however, the monopsonist expropriates all of the profits in the competitive supply industry. To the extent that the competitive market allocation of resources and income is used as a standard for social welfare, as in some antitrust law, the exploitation of the all-or-nothing supply by the monopsonist results in an efficient allocation of resources, but the allocation of income is unfair.

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The competitive market model has long been the mainstay of the agricultural economics profession for classroom teaching, econometric specification, duality theory development and application, policy prescription, and welfare analysis. Recently, however, the rapid horizontal consolidation and vertical integration of the domestic and global food system is turning attention toward imperfectly competitive markets and the welfare effects of a growing imbalance of market power at some market levels in a vertical food chain.

The textbook model of pure monopsony is often used to gain insight into the resource allocation and income distribution consequences of buyer power; similarly, the textbook model of pure monopoly is often used to give insight into consequences of seller power. These textbook models are often combined to show the consequences of a single firm having both pure buyer power and pure seller power. Components of the models have also been used to show the consequences of power facing power in the bilateral monopoly model in which a single (downstream) buyer faces a single (upstream) seller.

Although the monopoly and monopsony models are simple abstractions from reality, they are nevertheless of considerable importance in understanding and analyzing the emerging food system which is a patchwork of horizontally concentrated and vertically integrated firms. The models are important in teaching because they give valuable insight into pricing, resource allocation and distributional consequences of market power. As such, the models are thus valuable stepping stones to more complicated and more sophisticated models of imperfect competition ranging from Cournot, Bertrand and Stackleberg duopoly models, to the dominant firm model, to contestable market models, and to highly stylized and esoteric game theoretic models.

While complex game theoretic models are conceptually appealing, they are often difficult to implement empirically, in part because they may require extensive data that are unavailable. Simpler models, such as monopsony and monopoly models modified to make market power a parameter, are less data intensive and may thus be important in empirical analysis. Bresnahan reviews several simplified empirically operational models of market power in the new empirical industrial organization (NEIO) literature. Sexton argues for theoretical and empirical use of simplified market power models in agriculture because they give insight into the allocative and distributional consequences of growing market power in the food system.

Monopsony and All-or-Nothing Supply Curves

With market power a critical policy issue surrounding the evolving food system and even surrounding much of the global economic system, it behooves economists to develop a more thorough and more complete understanding of the ways in which buyer or seller market power could be exerted and how resource allocation is affected. The textbook monopsony model is based on several assumptions, including: (1) the competitive firms are free to choose the quantity that they will provide to the monopsonist; (2) that the input purchase price for the monopsonist is assumed equal to industry marginal cost; and (3) that the monopsonist has perfect knowledge of the industry supply curve and will exploit that knowledge.

It is plausible, however, that a single buyer would be able to exercise power over competitive firms by dictating the quantity that will be purchased, thereby using market power to force the suppliers off of a traditional supply (marginal cost) curve and down to their average cost curve[1]. As Hildred and Pinto note, for example, Wal-Mart is often held up as the model for successful supply chain management, but that "in some instances, Wal-Mart's behavior (in purchasing from smaller suppliers) approaches the dictatorial."

A report prepared by Dobson Consulting for the European Commission (p. 3) also notes the ability of buyers to extract discounts from suppliers: "Apart from the ability to extract discounts on transactions from suppliers, buyer power may manifest itself in the contractual obligations (as vertical restraints) which retailers may be able to place on suppliers."

If buyer power is exerted to push input prices downward, the industry supply curve faced by the monopsonist may be the average cost curve for the supply industry, not the marginal cost curve assumed for the traditional textbook monopsony model. In essence, the sellers may be forced down to the boundary line between economically feasible and infeasible points, a line which Friedman called the all-or-nothing supply curve which he appropriately recognized as the average cost curve.

Friedman presented two cases of all-or-nothing supply. In one case, the alternatives include supplying less than the indicated amount. In this case, the boundary line between the attainable and unattainable points is AC to the left of minimum AC and MC to the right[2]. Although his definition and verbal discussion are somewhat muddled, his chart for

[1] For example, in the market for slaughter cattle, there is increasing evidence that buyer power is being exerted (Taylor) and exclusive contracts between suppliers and the oligopsonistic buyers can be used to specify the quantity supplied.

[2] Friedman's explanation of this all-or-nothing case is that we might suppose the seller to have "the alternative of supplying the indicated amount or any smaller amount." This explanation is confusing at best and nonsensical at worst. If, for a price above minimum AC, the firm is not permitted to chose the quantity associated with P = MC, then the firm would choose a quantity as close to that associated with the profit maximizing point, as long a P=> AC. But this would not necessarily be on the AC curve to the left of minimum AC.

At first it may seem implausible that the monopsonist could dictate quantity to the left of minimum AC, and not dictate quantity otherwise. However, the point at which price is equal to minimum AC might be something of a boundary between what might be loosely termed a buyers market (low derived demand for the factor) and a sellers market (high derived demand). In a buyers market, the sellers, in order to remain in business, may be more inclined to accept the quantity dictates of the monopsonist than they would in a sellers market. Worded another way, the market power of the monopsonist may depend on the quantity purchased relative to the cost structure of the competitive supply industry. Thus, Friedman's second case—which we will henceforth refer to as the augmented textbook monopsony case--is thus not totally implausible.

this case may be relevant for the textbook pure monopsony model, extended to allow for a U-shaped AC curve because a monopsonist may find it profitable to purchase a total quantity of the input that is less than that associated with minimum AC and competitive suppliers may find it acceptable to supply such a quantity as long as factor price is greater than AC.

In Friedman's other case, the AC curve is the boundary line between attainable and unattainable points for all quantities. Thus, for a monopsonist who can dictate both price and quantity, the AC curve—not the usual MC curve--can be seen to be the limiting all-or-nothing (comparative static) supply curve for the monopsonist.

Blair and Harrison (p. 73) further develop Friedman's idea of an all-or-nothing supply curve in the context of collusive oligopsony and monopsony. They state:

> *"The standard supply curve reveals the answer to the following question: What is the quantity that suppliers will provide at a given price? By answering this question for various prices, one obtains the price-quantity combinations that form the usual supply curve. The choice confronting the seller is how much to supply at a particular price. The all-or-nothing supply curve, however, is a different matter. It reveals the answer to the question of what is the maximum quantity suppliers will make available at each price when the alternative is to sell nothing at all. By framing the question in this fashion, the buyer seeks to extract all of the producer surplus. Accordingly, the all-or-nothing supply curve lies below the standard supply curve. This enables the monopsonist to exploit its power by pushing the sellers off their traditional supply curves and onto their all-or-nothing curves."*

Thus, there are two types of input supply curves relevant to monopsony. One of these is the MC curve used in traditional textbook monopsony models, augmented by AC to the left of minimum AC. The second, which we refer to as the all-or-nothing supply curve, is the entire AC curve.

This paper graphically develops the all-or-nothing supply model. For simplicity, a single output, single input model is used. The paper also illustrates the profound implications of all-or-nothing monopsony for resource allocation, for income distribution, for definition and specification of demand and supply, and for econometric identification. The standard comparative static (snapshot) approach is used initially, followed by discussion of some of the economic and econometric implications of model extensions, including dynamic considerations. We begin by briefly reviewing the textbook monopsony model, then augmenting it for all-or-nothing supply to the left of minimum AC, and finally augmenting the model for all-or-nothing supply to the right of minimum AC. Development of the model is in the context of a vertical value-added chain because this is relevant to many timely monopsony issues in food markets, but the concepts are more general.

Traditional Textbook Monopsony Augmented

Graphics of the standard textbook monopsony model (e.g. Blair & Harrison, pp. 26-42; Carlton and Perloff, p. 105) show an upward sloping marginal cost (supply) curve for the competitive factor supply industry, and the single buyer's marginal factor cost, MFC, based on that industry supply curve (see Figure 1). It is assumed that the monopsonist will exploit knowledge of the competitive industry's supply (MC) function. Implicit in the textbook monopsony model is the assumption that the competitive suppliers will be free to choose the quantity each provides to the monopsonist. Furthermore, it is implicitly assumed that the monopsonist does not engage in price discrimination among the suppliers. Under these textbook monopsony assumptions, MFC to the monopsonist lies above the competitive industry MC curve, but the price paid to competitive suppliers will be equal to aggregate (industry) MC (and not MFC) at the aggregate quantity purchased by the monopsonist.

A deficiency of the standard textbook monopsony model is that it shows MC and MFC but does not show average cost, AC. Assuming that the comparative static AC curve is U-shaped, there is a kink (or discontinuity) in the competitive industry supply curve associated with minimum AC. That is, the industry supply curve for quantities to the left of minimum AC is not industry MC because firms would incur losses at these low quantities and the monopsonist could not induce provision of the factor by paying a price less than minimum AC.

A monopsonist, however, might find it profitable to pay a price at least equal to AC to induce the competitive suppliers to provide specific quantities to the left of minimum AC. With this reasoning, it can be seen that the supply curve facing the textbook pure monopsonist is actually AC to the left of minimum AC, and MC to the right, which makes the industry supply curve facing the monopsonist discontinuous at the input quantity associated with minimum AC.

The kink in the competitive supply facing the monopsonist introduces a discontinuity (or jump) in MFC for the traditional monopsonist. To the right of minimum AC, the industry supply curve is R(x) = MC(x); thus the traditional textbook monopsony MFC(x) is given by,

$$
\begin{aligned}
(1)\quad dTC(x)/dx &= d(x \bullet R(x)x)/dx \\
&= d(x \bullet MC(x))/dx \\
&= MC(x) + x \bullet (dMC(x)/dx) \\
&= MFC(x)
\end{aligned}
$$

To the left of minimum AC(x), however, the industry supply curve is R(x) = AC(x). If the monopsonist exploited knowledge of the AC portion of the industry supply curve, then,

$$
\begin{aligned}
(2) \qquad dTC(x)/dx &= d(R(x)\bullet x)/dx \\
&= d(AC(x)\bullet x)/dx \\
&= AC(x) + x\bullet(dAC(x)/dx) \\
&= MC(x)
\end{aligned}
$$

Equation (2) shows that exploitation of industry supply to the left of minimum AC(x) would make MFC(x) equal to industry MC(x). To the right of minimum AC(x), MFC(x) is above industry MC(x) because MC(x) has a positive slope, as shown in Figure 2. Therefore, there is a discontinuity (jump) in MFC(x) associated with the minimum AC(x), as shown in Figure 2.

Hypothetical Derived Demand

To graphically illustrate profit maximization and the resource allocation implications of monopsony, the traditional monopsony model shows a downward sloping derived demand curve (e.g. Blair & Harrison, pp. 26-42; Carlton and Perloff, p. 105). A derived demand curve often appears in monopsony charts with little or no explanation. The seemingly magic appearance of a derived demand curve leaves much unexplained to the student since, technically, a derived factor demand curve does not exist for a monopsonist because the firm determines both price and quantity. Technically, then, the derived demand for a monopsonist is a single point (Beattie and Taylor, p. 97). However, to graphically show the resource allocation effects of monopsony, this technicality is typically overcome by introducing what may be called a *hypothetical* derived demand curve[3].

For perfectly competitive markets, derived factor demand is obtained from (or defined by) the first-order condition(s) for maximum profit. For monopsony, it is also appropriate, as we shall see, to define *hypothetical* derived demand in terms of first-order conditions for maximization of the monopsonist's profit.

Profit Maximization

To simplify mathematical and graphical presentation, consider profit for the monopsonist who produces a single product, y, with the single input, x:

[3] Blair and Harrison (p. 39) define the hypothetical derived demand curve to be the value of the marginal product (VMP) for the firm's output sold in a competitive market. The profit maximizing monopsonist equates MFC with VMP, which results in x_m units purchased at a price of R_m, as illustrated in Figure 1 (see also, Beattie & Taylor; and Blair & Harrison). With this particular specification of the hypothetical derived demand curve, output price is assumed constant, which is appropriate in the rare case that the monopsonist sells in a competitive output market. If, however, the monopsonist faces a downward sloping product demand curve and does not exploit that curve, then the appropriate hypothetical demand curve is formed by substituting the product demand relationship for product price in the VMP function. It should also be cautioned that the VMP definition of hypothetical derived demand may not be strictly valid for some models, such as the vertical value-added chain developed in this paper.

(3) $\Pi_m = P \circ y(x) - x \bullet R(x)$

where Π_m is the monopsonist's profit, y(x) is the monopsonist's production function, P is the price received for the product, R(x) is input price measured along either the AC or MC portion of the competitive input supply curve. Because the monopsonist is assumed to have no monopoly power, P is assumed constant for purposes of determining the first-order conditions for maximization of equation (3).

Profit maximization for the monopsonist who is a price taker in the product market will be:

(4) $d\,\Pi_m/dx = P \bullet (dy/dx) - R(x) - x \bullet dR(x)/dx$

which can be stated as,

(5) $P \bullet MPP(x) = VMP(x) = R(x) - x \bullet dR(x)/dx$

where MPP(x) is marginal physical productivity of x in producing y, dy/dx, and VMP(x) is the value of the marginal product of x. VMP(x) may be appropriately viewed as hypothetical derived demand for the input x by the monopsonist who is an output price-taker.

Recognizing the discontinuous marginal cost of the input to the monopsonist as given by equations (1) and (2) gives the first-order condition that:

(6) $P \bullet MPP(x) = VMP(x) = \begin{cases} MFC(x) \text{ if } MC(x) \geq AC(x) \\ MC(x) \text{ if } MC(x) < AC(x) \end{cases}$

The non-negativity condition on profit must also be imposed so that $\Pi_m \geq 0$.

Figure 2 illustrates the case where hypothetical derived demand intersects MFC(x) above the discontinuity. Profit maximization is achieved with x_m units purchased at a price of $R(x_m)$ from competitive input suppliers.

For this simplified model, the area under the VMP curve measures gross revenue to the monopsonist, up to a constant of integration,

(7) $\int_0^{x_0} VMP(x)dx = \int_0^{x_0} P_0 MPP(x)dx = P_0 \int_0^{x_0} MPP(x)dx = P_0\, y(x_0)$

Since cost to the monopsonist is given by the area (rectangle) under the input price, R_m, profit to the monopsonist will thus be given by the area under the hypothetical derived demand curve above the input price line.

Unit profit to the competitive input suppliers is (R_m - AC_m), while aggregate profit to competitive input suppliers is given by the rectangle defined by (R_m - AC_m)◦x_m in Figure 2.

Figure 3 shows a family of three VMP curves, each for a different product price, P. VMP_3, which can be thought of as representing a high product price, is the same as shown in Figure 2. The price paid by the monopsonist to competitive input suppliers in this case is R_m^3, which is equal to MC at the optimal quantity x_m^3.

VMP_2 in Figure 3, which is for a mid-level product price, intersects MFC at its discontinuity associated with minimum AC. The optimal amount of x for the monopsonist to purchase is x_m^2; note that the optimal quantity of x is the same for the range of product prices for which the associated VMP intersects MFC along this discontinuity. The price received by the competitive input suppliers in this case is R_m^1, which is equal to both MC and AC at this quantity.

VMP_1 in Figure 3, which is associated with a low product price, intersects MC below AC. For the low product price, the optimal x for the monopsonist to purchase is x_m^1. To induce supply of this quantity by competitive suppliers, the monopsonist will have to pay a price of R_m^1 which is equal to AC (and > MC) at this quantity. Note that the price paid to induce competitive suppliers is higher in this case than for the higher product price case illustrated with VMP_2.

For the case illustrated in Figure 3, VMP_1 is everywhere below AC, but this does not necessarily mean that the non-negativity condition on the monopsonist's profit is not met. As noted previously, the monopsonist's profit is this particular model is geometrically equal to the area under the VMP curve less the rectangle showing total cost of the input[4]. If VMP intersects MFC at a quantity to the left of minimum AC, then profit will be the area above the input price, R_m^1, and below VMP_1, less the triangular area below R_m^1 and above VMP_1 to the right of the point where R_m^1 intersects VMP_1. In this particular case, it can be seen that the positive area (below VMP_1 and above R_m^1 to the left of the intersection of R_m^1 and VMP_1) is geometrically larger than the negative area (above VMP_1 and below R_m^1 to the right of the intersection of R_m^1 and VMP_1). Thus, for the case illustrated, the monopsonist's profit is positive. However, as the output price received by the monopsonist falls below that associated with VMP_1 and VMP shifts downward, the non-negativity condition will not necessarily be satisfied.

The discontinuity associated with MFC along with the profit non-negativity condition result in the monopsonist's product supply curve having two discontinuities, as shown in Figure 4. Although derived factor demand as a function of input price does not technically exist, derived factor demand as a function of *product price* does exist for the price-taking monopsonist. In the single input, single output model illustrated in this paper, derived factor demand in product price space has a similar shape and and similar discontinuities as the product supply curve shown in Figure 4.

[4] Assuming zero fixed costs.

All-or-Nothing Supply Case

For a given level of input purchases, say x_m in Figure 2, the incentive for a monopsonist to force competitive suppliers down to their all-or-nothing supply curve is given by the difference between competitive price, R_m (= MC_m) and average cost, AC_m. Forcing the competitive suppliers off of their traditional supply curve, MC, down to the all-or-nothing curve, AC, exactly eliminates profit in the input supply industry as such profits (or producers' surplus) are appropriated by the monopsonist (Blair and Harrison, p. 74).

Exertion of power to dictate quantity to competitive suppliers will, in general, change the profit maximizing output level from that for the traditional monopsonist. Since marginal factor cost for the all-or-nothing monopsonist is equal to the competitive industry's MC(x) for all levels of x and not just for x less than that associated with minimum AC, the first-order condition for maximization of the all-or-nothing monopsonist's profit is,

$$(8) \qquad P \circ MPP(x) = VMP(x) = MC(x)$$

The optimal solution for the all-or-nothing monopsonist, as given by equation (8), is illustrated in Figure 5. Notice that the optimal input purchase by the monopsonist, x_{aon}, is given by the intersection of the competitive industry supply (MC) curve and (hypothetical) derived demand, just as with competition in *both* the input and output markets[5]. Also notice, however, that the price paid by the all-or-nothing monopsonist is *not* given by the intersection of industry supply and derived demand as in the competitive case; rather input price is equal to AC (below supply) at x_{aon}.

Product supply for a profit maximizing all-or-nothing monopsonist is shown in Figure 6 relative to product supply for a profit maximizing traditional monopsonist. As long product price is high enough for the monopsonist to purchase an input quantity greater than that associated with minimum AC for the competitive input industry, product supply for the all-or-nothing monopsonist exceeds product supply for the traditional monopsonist, as can be seen from Figure 6. Different input and output levels and different prices in the two monopsony cases—traditional and all-or-nothing—have welfare implications to which we now turn.

Welfare Implications

The simplified mathematical model developed above and the associated charts show the consequences of all-or-nothing supply on the monopsonist's profit and on competitive input suppliers' economic surplus. This framework did not consider consumers of the monopsonist's product since product price was assumed constant. In practice it is doubtful that a monopsonist's output would be so small that output price would be unaffected by the firm's decisions. A more plausible assumption is that the monopsonist is large enough to affect output price; if such an effect on output price is accounted for in

[5] It should be cautioned that derived demand with competitive *buyers* of x is not necessarily the same as hypothetical derived demand by a monopsonist because production technology may not be the same with competitive buyers as with a monopsonistic buyer.

the firm's profit maximization, then monopoly power, along with monopsony power, affects resource allocation and economic welfare.

To generalize the model to account for the monopsonist's possible influence on output price, but to isolate the effects of monopsony power from the effects of monopoly power, we now make the plausible assumption that the firm is large enough that output price is affected by the firm's decision but that the monopsonist is a price-taker in the product market. (We defer to a later section the case of a single firm having both monopoly and monopsony power).

As noted by Just and Hueth, and by Chavas and Collins, economic welfare can be measured at any point in a vertical market chain with *appropriate* demand and supply relationships. As they showed, consumers' surplus can be measured in a factor market as the area between the appropriate partial-equilibrium derived demand curve and the general equilibrium demand curve[6]. For the simple model developed here, in which product price P(y) = P(y(x)) = P(x), the general equilibrium hypothetical derived demand function is derived by substituting P(x) for the constant price[7] in the formula, VMP = P*MPP. Thus,

(9) $VMP^{ge}(x) = P(x)\ MPP(x)$

where VMP^{ge} denotes the general equilibrium hypothetical derived demand function.

If P(y) is the compensated product demand function, then consumers' surplus in the product market, CS, is defined by the integral,

(10) $$CS = \int_0^{y_0} P(y)dy - P_0 y_0$$

Integrating equation (10) by substitution of the monopsonist's production function y(x) for y and noting that dy = MPP(x)*dx gives,

(11) $$CS = \int_0^{y_0} P(y)dy - P_0 y_0 = \int_0^{x_0} P(y(x))MPP(x)dx - P_0 y(x_0)$$

Note that the last term on the right hand side of equation (11) can also be expressed as,

[6] The constant of integration necessary to define absolute consumers' surplus in unknown, but if the difference between partial and general equilibrium derived demand is used to measure the change in consumers' surplus, which is the case in this article, then the unknown constant of integration cancels out.
[7] Students should very carefully note that this substitution of P(Y(x)) into the VMP formula (and thus into the first-order conditions) is made ***after*** the first-order conditions for profit maximization are obtained; substitution of P(Y(x)) before obtaining first-order conditions results in a solution for a firm that is a monopolist in the output market.

(12) $P_0 y(x_0) = P_0 \int_0^{x_0} MPP(x)dx = \int_0^{x_0} P_0\, MPP(x)dx$

Substituting the right-hand side of equation (12) for the right-hand term in equation (11) gives,

(13) $CS = \int_0^{x_0} P(y(x))MPP(x)dx - \int_0^{x_0} P_0\, MPP(x)dx$

which can be seen to equal,

(14) $CS = \int_0^{x_0} VMP^{ge}(x)dx - \int_0^{x_0} VMP_0(x)dx = \int_0^{x_0} [VMP^{ge}(x) - VMP_0(x)]dx$

Hence, consumers' surplus in the product market is geometrically equal to the area between the general equilibrium hypothetical derived demand and the partial equilibrium hypothetical derived demand associated with equilibrium product price, P_0, as shown in Figure 7. This result allows us to show the effect of monopsony on input suppliers, the monopsonist's profit, and product market consumers' surplus in a single chart. In the absence of externalities, net social welfare in this single-input, single-output model, is given by the area under the general equilibrium VMP^{ge} curve and above the average cost of producing the input (Figure 7), which is also equal to the area above the competitive industries' supply (MC) curve and below the general equilibrium VMP curve. As is typically done, and will be done here, these areas can be used to show the *change* in welfare associated with monopsony solutions compared to the competitive norm.

Monopsony Welfare Comparisons

The welfare consequences of monopsony are traditionally shown relative to the competitive norm under the assumption that the hypothetical derived demand for a monopsonist would the same as aggregate derived demand by competitive producers of the product y. Under these assumptions, the competitive solution would be given by the intersection of competitive derived demand and competitive input supply, which occurs at input level x_c shown in Figure 8. Competitive welfare is given by the area below VMP^{ge} and above MC up to the input quantity x_c. In comparison, the traditional monopsony solution occurs at x_m, resulting in a loss of welfare given by the classical welfare loss triangle MCB in Figure 8.

Figure 9 illustrates the welfare consequences of exertion of all-or-nothing monopsony power. With all-or-nothing supply, the monopsonist purchases x_{aon} units of the input, which is equal to x_c, the market equilibrium with competitive producers of y. Thus, aggregate welfare with all-or-nothing monopsony is equivalent to aggregate welfare in the competitive case. However, the all-or-nothing monopsonist appropriates all of the profits that would accrue to competitive input suppliers (Figure 5). Thus, the all-or-nothing monopsony solution is equally efficient to the competitive solution, but it is inequitable or unfair compared to the competitive norm because exploitation of the monopsonist's power to dictate both price and quantity to suppliers results in appropriation of all potential profits in the input industry.

Figure 10 illustrates the special case of all-or-nothing supply for which hypothetical derived demand intersects competitive industry supply curve in its discontinuity. Although the competitive solution with the illustrated derived demand and cost curves would result in indeterminacy, the monopsony solution is determinate and leads to production, positive profit for the monopsonist (for the case illustrated), zero profit for competitive suppliers, and positive consumers' surplus in the product market. Hence, net welfare (surplus) is positive, even though input utilization is associated with the region where competitive industry MC < AC.

Monopoly and Monopsony Combined

The traditional textbook monopsony model abstracts from reality by assuming that the monopsonist has no monopoly (seller) power. Except for some heterogeneous products produced with highly specialized inputs, this is an implausible assumption in practice, as noted in the report prepared by Dobson Consulting for the European Commission (p. 3): "But often it might be that the buyer power of retailers is linked with their selling power, where one power reinforces the other, and thus the effects of one on the other and their combined influence on economic welfare take on some importance."

Traditional monopsony can be combined with either traditional monopsony or all-or-nothing monopsony. As is well known, marginal revenue to the monopolist lies below product demand. For a single firm that has both traditional monopsony and traditional monopoly, it can be shown that the firm's profit is maximized when marginal revenue is equal to marginal factor cost.

If the monopolist can dictate quantity to competitive purchasers, then we have all-or-nothing monopoly, which Friedman (p. 15) also introduced. With such buying power, the all-or-nothing demand lies above traditional product demand. In the pure case of absolute power to dictate quantity as well as indirectly determine price to the buyer, the traditional product demand curve for competitive buyers represents marginal revenue to the all-or-nothing monopolist. Power of the monopolist to dictate quantity to competitive buyers effectively allows that all-or-nothing monopolist to extract all consumers' surplus in the product market.

Although such an all-or-nothing demand curve may be implausible for final consumers, it may be appropriate at intermediate levels in a vertical chain. A single firm that has all-or-nothing monopoly power combined with all-or-nothing monopsony power allows that firm to extract not only profits from the input supply industry, but also to extract all profits and final consumer surplus for downstream industries. The combination of all-or-nothing buyer and seller power in a single firm can be shown to result in over utilization of the input and over production of the product, resulting in a loss in social welfare.

The analytical and graphical framework developed in this paper for the all-or-nothing monopsonist can be extended to all-or-nothing monopoly, and extended to a firm being able to dictate quantity to competitive buyers as well as to competitive sellers. The usual case of a continuous product demand curve that intersects the vertical axis does not introduce the discontinuities found for monopsony. However, if monopoly power is exerted in an intermediate market, rather than a final goods market, discontinuities may result. Extensions of the comparative static graphical framework presented in this article to seller power and to various combinations of buyer power and seller power is left to the reader.

Dynamics

While all of the graphics in this treatise pertain to a long-run comparative static situation, the static concepts and associated graphics and can be expanded to cases where there is a distinction between, for example, average total cost, AC, and averaged variable cost, AVC. In such case, a monopsonist with power to dictate quantity can force competitive suppliers down to their AVC in the short-run. Then, the short-run all-or-nothing supply curve is AVC, but the long-run all-or-nothing supply curve is AC.

The simple model developed in this paper abstracted from entry and exit of competitive input suppliers. However, monopsony power, particularly when the buyer can dictate quantity to individual suppliers, introduces interesting and potentially critical dynamic issues as the firm may be able to determine the entry or exit of individual firms, even if the firms have the same cost structure. All-or-nothing power may permit the monopsonist to essentially control entry and exit of suppliers, particularly if the monopsonist can make selective all-or-nothing offers. But even if the supply industry is characterized by decreasing average costs, the monopsonist may not want to force the exit of all suppliers except one. Rather, the monopsonist might want to keep a sufficient number of suppliers to prevent any single supplier from gaining countervailing power. Sophisticated dynamic optimization models are required to address such interesting and potentially important issues.

Identification Problems

The problem of econometrically identifying whether price-quantity observations are on a stable demand curve with shifting supply curves, or on a stable supply curve with shifting demand curves, or both, is widely recognized in econometrics literature and textbooks. This "identification problem", first introduced with Working, has been clarified and refined to include cases of over-identification, under-identification and exact-identification of demand and supply curves.

As noted by Rao and Miller (p. 191), however, the practical problem of identification "… relates to what the researcher *thinks* he is estimating." Rao and Miller's statement takes on special meaning when attempting to estimate behavioral relationships in markets in which monopsony and monopoly power *may* have been exerted. For example, with traditional monopsony, input price is not on the hypothetical derived demand curve, but is on the industry marginal cost curve (supply) curve, unless demand is low in which case the observed input price is on the average cost curve (Figure 3). But if monopsony power includes the ability to push suppliers down to an all-or-nothing supply curve, input price is on the average cost curve (Figure 5).

If exertion of all-or-nothing monopsony power is not perfect, the input price may be somewhere between the industry marginal cost curve and the industry average cost curve. Furthermore, with the ebb and flow of market power, time-series input prices, even for a single quantity, may fluctuate between the industry average cost and marginal cost curves, making power a separate parameter to be estimated (see, e.g. Sexton; Bresnahan).

In short, introduction of the two faces of monopsony power—ability to dictate not only price but also quantity—introduces profound identification problems for the applied researcher attempting to estimate behavioral relationships in imperfectly competitive markets. Such profound identification problems are not likely to be resolved through statistics and econometric analysis only; rather, intimate qualititative knowledge of the industries being studied will be essential to complement econometrics. Market equilibrium may well fluctuate around discontinuitites in behavioral relationships (in the neighborhood of where price equals average cost), which introduces considerable complexity into model specification, identification and estimation.

Concluding Remarks

The article develops the notion of all-or-nothing supply. Exploitation of all-or-nothing supply curves in a competitive input industry by a monopsonist is shown to result in a *socially efficient* allocation of resources, but the allocation of income is not *equitable* or fair judged against the competitive market norm because the monopsonist appropriates all profit from the input suppliers. Historically, antitrust has involved balancing market power harms with efficiency benefits (Salop). However, when buyers have the market power to dictate both price and quantity to competitive suppliers, efficiency concerns may not be relevant. Rather, the distributional consequences of exertion of all-or-nothing buyer power may be the issue to be adjudicated.

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