This paper deals with the resource-allocation effects of possible increases in the bargaining power of groups of farmers. The major theme is the effects of the exercise of monopoly power by farmers on the "quality" of resource allocation. That is, we first develop the notion of a desirable allocation of resources and then inquire about the impact of a farmer monopoly on this allocation.

Let us consider a simple setting for our problem. Let us assume that:

1. Labor is the only resource.

2. Each industry produces only one kind of consumer good in a one-stage production process.

3. In each industry there is only one kind of work, and this kind of work is different from the kind of work done in each other industry.

4. There is a market for each consumer good and for each kind of work.

5. On the buying and the selling side of each market there is perfect competition (a homogenous product and enough buyers and sellers so no buyer or seller thinks he individually can affect the price).

6. Each worker works a fixed total number of hours per week but is free to choose the distribution of his time among kinds of work.

Let us assume that the society identifies the price of labor for a given kind of work as the marginal social sacrifice associated with that kind of work - the social sacrifice caused by using the last unit of labor in the given kind of work. That is, if each worker does some of each kind of work, he allocates his own time so that, relative to other kinds of work, the wage for the last hour of each kind of labor just compensates him for the sacrifice he makes by being unable to devote that hour of labor to any other kind of work.

Similarly, let us assume that the society identifies the price of a consumer good with the marginal social significance of the good - the social significance of the last unit of the good produced. That is each consumer can be assumed to divide his expenditures among consumer goods so that the amount of money he pays for his last unit of a good indicates the importance he attaches to it.

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On the basis of the above interpretations, the marginal social sacrifice in using a marginal unit of labor on consumer good A is equal to the price of a unit of labor used on A. (This price may be different from the price of the same kind of labor used for other purposes, since the laborers may have preferences among kinds of work.)

Similarly, the marginal social significance of using a marginal unit of labor on A is the price of A times the resulting number of extra units of A. For the use of a marginal unit of labor on A, let us define

\[ R = \frac{\text{price of A times resulting number of extra units of A}}{\text{price of labor used on A}} \]

If the price of labor used on A is constant from the standpoint of the producer of A, the marginal cost of A (when the use of labor is increased) is equal to the price of labor used on A divided by the resulting number of extra units of A; in this case, R can be written as

\[ R = \frac{\text{price of A}}{\text{marginal cost of A}} \]

We shall define "R criterion" as the criterion according to which R must be 1 for all uses of all resources, which would mean that prices of all goods are equated to the marginal costs of producing them. We assume that the society adopts the R criterion as a measure of the quality of resource allocation.

Perfect competition in all markets tends to satisfy this criterion; in a perfectly competitive market each seller can maximize his profit by making marginal cost equal to price. Since prices are equal for all producers, the R criterion is clearly satisfied.

The monopolist (the sole seller in an industry) maximizes his profit by choosing an output at which in expanding output he increases his cost exactly as rapidly as he increases his revenue. (Marginal revenue is defined as extra revenue per extra unit of output.) The monopolist will make the marginal cost of \( X_A \) equal to the marginal revenue of \( X_A \). Since the price of \( X_A \) will be greater than the marginal revenue of \( X_A \), R will be greater than 1 in a monopolized industry.

If some industries are monopolized and others are not, then on the basis of the R criterion, monopolized industries tend to produce relatively less than is desirable from the viewpoint of resource allocation. A monopolist maximizes his profit by making his good scarce. He keeps the marginal social significance of his product high relative to the marginal social sacrifice needed to produce it. He forces the rest of the society to put resources to relatively unimportant uses.

In some cases there may be reasons why the society is unwilling to use the R criterion without modification. For instance, in a particular situation society may not wish to identify marginal social sacrifice and marginal social
significance with quantities entering the calculations of individual firm managers. A resource use may involve either social sacrifice or social gain that does not affect the profits of the firm using the resources, leading to a disassociation between sacrifice and gain.

For instance annexation of adjoining areas into a city may be needed to associate tax payments with use of city streets so that all persons using the streets may help pay for them. Or, discharge of untreated chemical wastes into streams may be prohibited, particularly if the cost of treatment is slight in relation to the damage done by untreated wastes. Similarly, prizes may be given to encourage firms to design plants that will be an aesthetic asset to the community. In each case, restrictions to reduce the disassociations in addition to the R criterion may be considered.

In other cases, price discrimination (charging two or more prices for different units of a given product) will make it difficult to judge resource allocation. When price discrimination is possible investigation must be more detailed than that associated with a simple resource allocation criterion. The lack of a unique set of prices (one for each product) makes it difficult to evaluate the associated resource allocation.

**Resource Allocation and Markets for Intermediate Goods**

We have been concerned largely with interpreting the R criterion. Let us now consider how the value of R in the market for a consumer good is affected by conditions of competition in the market for an agricultural good used in producing the consumer good. If we do not have perfect competition on both sides of the market for the agricultural product, will this market affect adversely the market for the consumer good?

Let $X_A$ be the quantity of an agricultural good used in the production of a consumer good $A$. We have seen that perfect competition on both sides of the $X_A$ market would not create any tendency for $R$ to deviate from 1 in the $A$ market. Since the $X_A$ market affects the $A$ market only through the quantity $X_A$, we want to know whether $X_A$ under specified conditions will be the same as it would be if there were perfect competition on both sides of the $X_A$ market.

If there are two or more sellers of $X_A$, we assume they are identical. We want to show a supply curve for a group of sellers (a curve showing for each given price the total quantity that will be offered by the sellers as a group). At any price, the quantity offered by $n$ sellers will be $n$ times the quantity shown on an individual marginal cost of $X_A$ curve, since each marginal cost curve will coincide with a seller's individual supply curve. Instead of drawing a new diagram to show the supply curve of the group, we assume that an $n:1$ horizontal scale factor is used; therefore, a horizontal distance representing one unit of $X_A$ with reference to an individual seller represents $n$ units of $X_A$ with reference to the group of $n$ sellers.
Fig. 8. Vertical price relationships
We make an analogous assumption about the demand side of the $X_A$ market.

In fig. 8, we show quantities of $X_A$ horizontally and price of $X_A$ vertically.

If there is perfect competition in both buying and selling $X_A$, the marginal value product of $X_A$ curve is a demand curve (a curve showing for each price of $X_A$ the quantity that will be bought) and the marginal cost of $X_A$ curve is a supply curve. The output of $X_A$ will be $OB$, and the price $BC$. Thus $R$ is 1, as suggested earlier.

If there is monopoly in selling $X_A$ and perfect competition in buying it, its marginal value product curve becomes a demand curve for $X_A$. There is a corresponding curve showing marginal revenue from the sale of $X_A$. The seller can maximize his profit by equating the marginal revenue of $X_A$ to the marginal cost of $X_A$, at the output $OG$ with the price $GK$. In comparison with the output $OB$ under perfect competition, monopoly restricts the output of $X_A$ and so indirectly restricts the output of consumer good $A$.

If there is monopsony in buying $X_A$ and perfect competition in selling $X_A$, its marginal cost curve becomes a supply curve; the monopsonist can set the price. The marginal outlay on $X_A$ curve shows the rate at which his total outlay increases as his use of $X_A$ increases. To maximize his profit, he must equate the marginal value product of $X_A$ to the marginal outlay on $X_A$, buying $OE$ at the price $EJ$. This output is smaller than it would be with perfect competition on both sides of the $X_A$ market, so monopsony in the $X_A$ market tends to restrict output of $A$ and thus to make $R$ greater than 1 in the $A$ market.

Incidentally, $R$ is 1 in the $X_A$ market, but we are concerned with the $X_A$ market only as it affects the $A$ market.

If there is monopoly on each side of the $X_A$ market (bilateral monopoly) there is neither a demand curve nor a supply curve for $X_A$. (A demand curve is based on the assumption that price is announced to the buyer, and a supply curve on the assumption that price is announced to the seller.) Buyer and seller will bargain about both price and quantity.

Ignore the buyer's costs other than his expenditure on $X_A$, and the seller's costs other than those shown in the cost of $X_A$ curve. The sum of profits of buyer and seller is shown by the area between the marginal value product of $X_A$ curve, and the marginal cost of $X_A$ curve enclosed by a vertical line drawn from the quantity of $X_A$ sold. For instance, let $OG$ be the quantity of $X_A$. If the price is $OT$, $OSKG$ is the buyer's total revenue, $OTKG$ his total costs, and $TSK$ his profit. $OTKG$ is the seller's total revenue, $OLHG$ his total cost, and $LTKH$ his profit. The sum of the bargainers' profits is $LSKH$.

Given the quantity $OG$ to be sold, $LSKH$ is the sum of the bargainers' profits whatever the price at which the $OG$ units may be sold. $OSKG$ is the buyer's total revenue, and $OLHG$ the seller's total cost. Money paid by the buyer to the seller cannot affect the sum of their profits. The profits will equal the buyer's revenue minus the seller's cost.
The bargainers can maximize the sum of their profits by making the $X_A$ quantity $OB$, giving a profit of LSC. They can then bargain about the price of $X_A$ to determine the division of LSC between them.

Since $OB$ is the perfectly competitive output of $X_A$, bilateral monopolists maximizing the sum of their profits affect the $A$ market exactly as it would be affected if there were perfect competition on both sides of the $X_A$ market.

This result may seem strange, but bilateral monopolists can determine output without determining price at the same time. A monopolist or monopsonist must determine price and output simultaneously.

Creation of bilateral monopoly may depend on horizontal combination among sellers -- either merger or concerted action among firms in the same production stage. There also may be horizontal combination among buyers. If there have been horizontal mergers followed by bilateral monopoly operations, vertical combination (merger of firms in successive stages of production) may follow. Instead of bargaining repetitively about prices and quantities of goods, negotiators may find it more efficient to bargain only once, for the rate of exchange of shares of stock in their corporations.

Once vertical integration has taken place, there is no reason for events in the $X_A$ market to influence the $A$ market unfavorably.

Bilateral monopoly in the $X_A$ market, like vertical integration doing away with the $X_A$ market, is compatible with optimal allocation of resources among processes leading to consumer goods.

**Conclusions**

Finally, we should note that society has objectives in addition to the "quality of resource allocation" objective. For instance, it is likely to be concerned with the quality of income distribution. Any social action affecting resource allocation probably will affect also income distribution. If the society wants to increase the ratio of the income of sellers in a given market to the income of buyers in the same market, it may maintain laws that tend to create monopoly, even if laws that would create perfect competition or bilateral monopoly would be preferable on the basis of the society's criterion for resource allocation.

When we deal with resource allocation, we avoid considering discrimination among persons. When we deal with income distribution, we may be particularly interested in bringing about a specified kind of discrimination among persons. Probably the institutional arrangement selected by the society will make neither the exact set of interpersonal discriminations that the society wants nor create a resource allocation entirely in accordance with the desires of the consumers and workers, but represent some compromise between these two conflicting objectives.