In many companies, a persistent source of conflict, negotiation and controversy are transfer prices. Transfer prices are the prices at which goods are transferred from one division of a company to another. For example, one division of a company may produce semiconductors to sell to another division that assembles computers. Once assembled, the computers may be sold to a marketing organization within the same company. Transfer prices are an essential element in a system of decentralized responsibility in the modern corporation.

The modern corporation is usually divided into a number of separate accounting units. These go by various organizational names, such as divisions, departments, groups, or even companies. Organization and record keeping is constructed so that each unit generates its own income statement. Like a firm, each unit makes expenditures on things that it buys, and generates income on things it sells. The idea is to make the difference between income and expenditure as large as possible.

This organizational practice serves a number of purposes. Perhaps the most evident of these is that it allows evaluation of the performance of managers in each of the accounting units. If a large company were constructed as one vast accounting unit, it might be difficult to determine what parts of the company were operating well, and what parts were not. But multidivisional structure does more than allow for managerial incentives. It is often an essential part of the control system of the firm. It helps us understand the logistical architecture of the firm. It also helps us to see the costs and values of various kinds of operations, information that can be critical to the strategic decisions of the firm. For example, a publishing company would have difficulty determining whether to stay in the college textbook business if the activities relating to acquiring, publishing, and marketing college textbooks were co-mingled with the activities relating to the sale of hardbound best sellers, paperbacks, magazines, and encyclopedias.

The stakes involved in setting transfer prices are apt to be large, both for the individual manager and for the firm. The choice of a transfer price will affect the apparent profitability of the various units within the firm, output levels, and the actual profits of the firm. As we will see below, there are right and wrong transfer prices; that is, some transfer prices lead to better results than others. Unfortunately, there are also problems that confound the discovery and implementation of correct transfer prices.

The model of transfer pricing that follows is deliberately stark and simplified. If the model were more realistic, it would be a good deal more difficult to get to the core issues of transfer pricing and we still would not provide an exact match for any real business situation. This simplified treatment does reveal the basic principles that determine efficient transfer prices and the sources of conflict that are likely to arise.

1. The basic case

We will consider a firm with two divisions, one of which sells a good to the other. It is convenient here to refer to these units as a manufacturing division and a marketing division, but the discussion can be applied to any two organizational units within the firm that have a buyer-supplier relationship. One unit could process raw materials to a point, then sell them
to another division that processes them further. Instead of talking about the costs of marketing
we would have to talk about the costs of additional processing, but otherwise the discussion
would essentially be the same.

![Figure 1](image)

The set-up for the manufacturing division requires little elaboration, given what we have done so
far in the course. The manufacturing division has an ordinary marginal-cost curve, as shown in
figure 1. Marginal cost is denoted mmc (for marginal manufacturing cost) to distinguish it
from marketing cost below.

Marketing is a form of production. It requires resources, is subject to diminishing marginal
returns, and has cost characteristics not unlike other production processes. The marginal-cost
curve for the marketing division is shown in figure 2. It is denoted msc (marginal-selling costs)
to distinguish it from marginal-manufacturing costs. (Calling it marginal-marketing costs, or
mmc, would not have been helpful) Also shown in figure 2 is the price at which the company
sells the final good, denoted P. The final product market in which the firm sells its final goods is
assumed to be competitive.
Figure 3 shows the final good price, $P$, less the marginal cost of selling, $msc$. This difference $(P - msc)$, is the value to the firm of a unit of the intermediate good that is transferred from the manufacturing division.

Now we are ready to consider our first result. Figure 4 shows the $mmc$ and the $(P - msc)$ curves on the same diagram. The intersection between the two occurs at the optimal transfer quantity. This result comes as another application of the equimarginal principle that we have seen in other contexts. The marginal cost to the firm of producing another unit of the good is $mmc$; the marginal benefit to the firm of manufacturing another unit of the good is $(P - msc)$. Marginal cost and marginal benefit are set equal at $Q^*$. (Verify that opportunities are lost if an amount less that $Q^*$ is transferred.)

The optimal transfer price is shown in the diagram as $\rho^*$. (Note that the price of the final good, as sold by the marketing division is denoted by the upper case $P$, and the price at which the good transfers from manufacturing to marketing is denoted by the lower case Greek rho, $\rho$.)
An example may help to fix ideas here. Consider a tire manufacturer who sells only through its own company-owned stores (a fiction that we will suspend below). The manufacturing division transfers bulk tires to the marketing division. Manufacturing charges the marketing division \( \rho^* \) for these tires. The marketing division has the job of converting these bulk tires into tires that are promoted, delivered, selected for size, explained, mounted, balanced, and warranted for the motorist. That motorist pays the final good price \( P \).

The optimal transfer price has some very desirable properties. When the transfer price is \( \rho^* \), incentives of each of the divisions are compatible with the interests of the company as a whole. The manufacturing division, confronted with the price \( \rho^* \), will conclude that it can maximize profits by producing \( Q^* \) units of output. Similarly, the marketing division, confronted with the same price, would also find that it maximized its own profits at \( Q^* \). Notice that the surpluses of the marketing and manufacturing divisions are the areas labeled a and b, respectively, in figure 4.

(As an exercise, consider what the equilibrium would be if a transfer price were set above \( \rho^* \).)

This completes the analysis of what the transfer price should be, given that there is no outside market for the intermediate market (bulk tires). As we will see below, however, much of the art and strategy of setting transfer pricing stems from the fact that marginal manufacturing cost and net marginal benefit (\( P - msc \)) are not directly observable in most real-world cases. So the optimality results that seem to follow so easily from figure four will not necessarily translate readily into practice. Before we consider these informational problems, we will take up two cases in which an external market for the intermediate good exists. The existence of an external market actually simplifies the transfer-pricing problem.

2. An external market for the intermediate goods

In many cases, a division sells products to both internal and external customers. Mallinckrodt sells the raw material for a pain reliever both to its own pharmaceutical products division and to other drug makers. Goodyear sells through its own company-owned tire stores and through separate independent distribution channels. In other cases, a division will market goods made by the company's own manufacturing division as well as goods purchased outside. For a while, IBM sold printers that were made in IBM's own plant as well as printers sold by Epson. Dell computer sells its own computers and a line that is made outside. Ford sells its own cars as well as cars that are assembled on contract by Mazda.

In the examples below we will assume that there is no technical problem with selling the intermediate good in the external market. Such a problem can occur. There may be trade-secret, brand-name, quality, or other strategic problems raised by such outside dealings. Where such concerns are important we are back to the case in which there is no external market. Because we have assumed that the final-goods market is a competitive one, there is no particular concern that outside sales "spoil" the market for the firm's own final-goods production. Finally, we also assume that the external market for the intermediate good is competitive.
Figure 5 shows a situation in which the firm should be selling the intermediate good in the external market. The manufacturing division is large enough that it can profitably supply more at the external price that the marketing division can usefully absorb.

If the external price is $\rho$, the manufacturing division should produce $Q_m$, the marketing division should market $Q_s$, and the difference should be sold outside. Notice why this is profitable. For units beyond $Q_s$, the manufacturing division can still earn margins over marginal cost by selling in the outside market. But beyond $Q_s$, a unit of the good is not as valuable to the marketing division as it is to the outside market ($P - msc$ is less than $\rho$). Notice that under this arrangement, the surplus of the marketing division will be the area market $a$, and the surplus of the manufacturing division will be the sum of the areas marked $b$, $c$, and $d$.

Where technical and market conditions allow, the external market provides profitable opportunities for the firm, as well as a simple and observable solution to the transfer pricing problem. But life is not that simple. In these cases, there will be strong incentives for one division or another to lobby to suppress the external market. This problem is illustrated in figure 6.
Figure 6 is similar to figure 5, but it also shows $\rho^*$, the optimal transfer price if there are no outside sales, in addition to the external price $\rho$. If outside sales were suppressed and the transfer price set at $\rho^*$, the surplus of the marketing division would increase by the areas e, f, and the surplus of the manufacturing division would fall by the same amount plus d. The loss of area d is a loss to manufacturing that is not offset by a gain to marketing and thus is a loss to the firm as a whole.

Figure 7 shows the case in which the firm should buy some of the intermediate good in the external market. Intuitively, what is going on in this case is that the capabilities of the marketing division are large relative to those of the firm's own manufacturing division. Again $\rho$ is the external price of the intermediate good. The manufacturing division should manufacture Qm and the marketing division should market Qs. To do this, the marketing division will need to purchase Qs - Qm units of the intermediate good in the outside market.

Notice the logic of this result. Beyond Qm, the manufacturing division cannot produce the intermediate good as cheaply as it can be produced by others. Manufacturing has run into its own capacity limitations. Marketing, on the other hand, has the capacity to market goods profitably well beyond Qm, all the way to Qs. Notice also what the surpluses of the two divisions would be. The surplus generated by marketing is equal to the sum of areas a and b, while the surplus generated by manufacturing is equal to area c.
Again there is an incentive for one of the divisions to lobby to suppress outside transactions, but this time it is the manufacturing division that would benefit from such suppression. Figure 8 illustrates the interests involved. Again $\rho^*$ is the optimal transfer price if there are no external transactions involving the intermediate good. The manufacturing division benefits because the internal transfer price is greater than the external price, increasing its surplus by the area d. The losses to the marketing division are $d + b$, so that the net loss to the firm is b. The loss to the firm occurs because profitable transactions are foregone as a result of dealing only inside the firm.

All of this is not to say that it is always wrong to suppress outside transactions in the intermediate good. There may be good reasons for dealing only inside. Nevertheless there are incentives within the firm for eliminating outside dealing whether or not these good reasons apply. Further, it is important to realize that actions that increase the profits of an individual division do not necessarily increase the profits of the firm as a whole. In the case of some transfer pricing policies, an increase in profits in one part of the firm may be more than offset by a decrease in profits elsewhere in the firm. What is good for Delco may not be good for General Motors.
3. The basic case revisited: imperfect information

We turn now to the very central problem of information, a problem that will be more pronounced where there is no outside market price that can be used as a reference point. It is important to understand, for this problem and many others, that the curves that we so readily draw on the page or on the blackboard are not real. They do correspond to real things, more or less, but one cannot simply call the accounting department and get a marginal-cost function. It is very difficult to observe marginal cost at a particular output, let alone the whole function, even when all of the parties involved are disclosing all information in good faith. And we will see that the parties involved may have incentives to reveal information selectively. This is not to say that marginal cost and marginal benefits are perfectly unobservable. In fact, one of the roles that cost accountants play is to shed light on these values. But we need to avoid the mistake of pretending that these values can be observed perfectly.

If there is not a clear reference point for a transfer price, such as an external market price for the intermediate good, each division may have the opportunity to distort the transfer price away from the optimum in order to increase division profits. The manufacturing division, as the only potential supplier to the marketing division, will benefit if it can price like a monopolist. Figure 9 illustrates this case.
In this monopoly-like case, the manufacturing division seeks to maximize its profits, subject to the demand curve that it faces, just as any monopolist would. Here, the curve $P - msc$, which is the value of a unit of the good to the marketing division, becomes the demand curve facing manufacturing. The curve labeled $mr$ is the ordinary marginal revenue function that is associated with that demand curve. The optimum from the manufacturing perspective to sell $Qm$ units of output at the transfer price $\rho$, which is the monopoly solution. Notice that the losses to the firm from the monopoly solution are exactly analogous to the social losses due to ordinary monopoly. These losses are equal to the area $a + b$.

Of course, the manufacturing division may not succeed in establishing the transfer price it wants. In particular, to the extent that costs are observable, management at the corporate level will resist the monopoly price. But it would be in the interest of the manufacturing division to present cost information that would support a transfer price that is higher than their true marginal cost.

There is a symmetric problem in that the marketing division would seek to exploit its position as a single seller. This problem is called monopsony. I will work up the tools to analyze this case in class. The monopsony problem means that the marketing division will seek to purchase a smaller-than-optimal-quantity at a lower than optimal price.

4. Lessons
This analysis offers lessons about how transfer prices should be determined and how the incentives within a firm may shape their application. In brief:

1. The fundamental principle here is that transfer prices should confront each decision maker with the cost of an action (using a widget) or the benefit of an action (producing a widget). This will lead to independent decisions that are consistent with the equimarginal principle. The optimal transfer quantity occurs where marginal benefit \((P - msc)\) equals marginal cost \((mmc)\).

2. Where an outside market for an intermediate good exists, there are margins to be captured by dealing in that market. There may be offsetting concerns that would militate against outside transactions. If the firm deals in the outside market, the appropriate transfer price is the external price.

3. Absent an outside market, information problems complicate the selection of the optimal transfer price. Each division will have an incentive to bias the choice of a transfer price; the division engaged in internal sales will wish to move the price in the direction of the monopoly price, the division engaged in internal purchases will seek to move price in the direction of the monopsony price.

4. Some transfer prices are better than others. Occasionally people jump to the mistaken conclusion that selection of a transfer price is a zero-sum game. That is, they conclude that while choice of a transfer price is of interest to each of the separate divisions, it makes no difference to the firm as a whole. But the transfer price does matter to the firm. It is not just a matter of how we slice the pie; the transfer price also affects the size of the pie. A transfer price that is too high, for example, may cause the marketing division to turn down business that would have been profitable to the firm. A transfer price that is too low may cause the manufacturing division to produce too little.

5. Because of the conflict between the interests of the buying and selling divisions on either side of an intrafirm transfer, the choice of a transfer price often becomes a responsibility of corporate (not divisional) management.

6. A partial solution to the transfer pricing problem is to let the divisions negotiate unrestricted deals. In particular, if the divisions are allowed to make binding purchase commitments in addition to specifying price, they may arrive at more efficient transactions than if the rules require that they specify price alone. If they are free to engage in such contracting, they have incentives to find all production opportunities for which marginal benefit exceeds marginal cost.