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AN INVESTIGATION INTO THE APPLICATION OF TRANSFER PRICING

By

Philip D. Olson

B.A. Concordia College, 1965

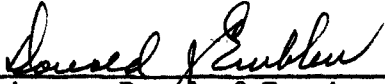
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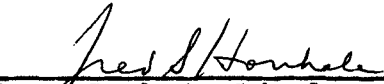
Master of Business Administration

UNIVERSITY OF MONTANA

1967

Approved by:


Chairman, Board of Examiners


Dean, Graduate School

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CHAPTER I

GENERAL CONSIDERATIONS OF THE STUDY

The control function of management is the process of making sure the objectives of a company are achieved. In small business organizations this function can be performed by direct or face-to-face contact of management alone. However, in large and complex organizations engaged in the manufacture of different products in plants spread over a wide geographical area, the informal system becomes inadequate. In such organizations, an effective information system is needed to provide control over the separate operating units. In recent years, increased attention has been directed toward placing separate operating units on a profit center basis, although other systems are frequently used. A profit center system provides a measure of performance which can be used by top management in controlling the resources of the organization or the operating unit. In some cases, it is hard to measure the profit of separate operating units because of the difficulty of measuring inter-company sales or transfers, but by using a system of transfer pricing profit can be measured and business organizations can achieve the desired control.

I. THE STUDY

Purpose of the Study

The purpose of this study is: (1) to examine the methods of accounting for transfers of products and services between separately

organized units of a company (transfer pricing), so that the objectives of a profit center can be achieved, and (2) to investigate the application of transfer pricing in a specific organization.

Validation of the Study

In stressing the validity of this study, it is necessary to show the advantage of a profit center in comparison to a commonly used control system--an expense center. After this is substantiated, an explanation will be presented showing how important transfer pricing methods are in establishing a profit center.

In a profit center, a relationship is established between inputs (expenses) and outputs (revenues). In an expense center, the only concern is with inputs, or the expenses incurred to produce the output. Thus, an expense center does not provide a measure of profitability as is accomplished by a profit center. For this reason, even though the expense center may be operating efficiently, it is not known whether or not the center is adequately contributing to the organization's profit. The system of information (the measurement of profit), supplied by a profit center, is therefore more extensive and provides a better control system.

In many companies, growth has been accompanied by greater integration of operations. An integrated company is one which performs operations on more than one stage of the production of the product. In an integrated company, raw materials and products would be transferred from one operating unit to another, as successive manufacturing or marketing steps are performed. This raises the problem of accounting for transfers between these units. In many cases, competitive market prices

cannot be used because they may not exist for items transferred between operating units. These items may be completely unique, or they may not lend themselves to outside sales, because they are used as components in another product. Therefore, in such cases, an approximation of a competitive price must be arrived at. Only when realistic transfer prices can be established is it possible to use divisional profit as a system of information in a control process.

Limitations

This study is designed to show transfer pricing methods and their usefulness in management control. The discussion will not consider the external consolidated financial reporting aspects of transfer pricing for stockholders and other third parties. If this were the case, transfers would probably be priced at cost in order to reflect the stockholders' point of view. Stockholders view these transfers between operating units as just a movement of items, and any profit made on these transfers should not be included in the consolidated report. In the past, financial reporting considerations were often the determining factor in selecting a basis for pricing transfers.¹ While this point of view may still exist in some companies, this study is not designed to consider this aspect.

The present study was conducted to investigate the application of transfer pricing in a specific organization, and the conclusions are applicable only to the particular company studied. The discussion in

¹National Association of Cost Accountants, Accounting for Intra-company Transfers (Research Series No. 30; New York: The Macmillan Company, 1956), p. 21.

Chapter II will indicate that solutions to proper income measurement and suitable transfer pricing methods, can be explored only in context with specific organizational objectives.

II. ORGANIZATION OF REMAINDER OF THE PAPER

Chapter II consists of a review of decentralization and transfer pricing methods. The objectives of top management in a decentralized company are established first. Then divisional profit measurement and transfer pricing methods are examined as means of achieving decentralized objectives of a company.

The first part of the case study is presented in Chapter III. The structure of the organization is described, and the existing control process is examined and evaluated.

Chapter IV is devoted to investigating the application of transfer pricing in an operating unit of this company, so the objective of profit decentralization can be met.

The study is summarized and the final conclusions are made in Chapter V.

CHAPTER II

REVIEW OF THE LITERATURE

In the past twenty years, the increased pressure by large companies for more effective control tools has encouraged research and writing in the areas of decentralization and transfer pricing, both by educators and others who have studied or struggled with problems in these areas. The following is a review of these two related subjects.

I. OBJECTIVE OF DECENTRALIZATION

Delegation of Authority

As companies have moved into new fields of operation accompanied by expanded product lines or wider sales regions, their organizational structure has changed. The centralized functional-type organization which so well fitted the single-product company has been replaced in many instances by divisionalization and decentralization. Divisionalization usually means grouping functions on a product or geographical basis into smaller organizational units. Decentralization results from the delegation of certain chief executive responsibilities to managers of operating units.¹

In a centralized functional-type organization it is difficult for a single manufacturing executive to deal with all the different manufac-

¹Harold Stieglitz, "Patterns in Organization Structuring," Management: A Book of Readings, Harold Koontz and Cyril O'Donnell, editors (New York: McGraw-Hill Book Company, 1964), p. 188.

turing problems associated with a variety of different products; and, likewise, it is difficult for the single sales manager to cope with all the problems associated with the sales of different products. It is even more difficult for one man, the chief executive, to assume responsibility for the overall coordination of production, sales, and administration of a complex business enterprise. This is what often occurs in a centralized, functional-type organization. Also, functional specialists tend to become too concerned about their own areas (and those alone). For example, the sales department might not be very conscious of its relationship to the manufacturing operation, or to total company profit performance. Cost may not become a prime consideration, as long as new services (such as the hiring of new salesmen) increases to some degree the perfection or importance of the sales function.²

In a decentralized company (which inherently includes divisionalization), coordination of functions is in the hands of people in the lower levels of the organization, who are closer to the actual problems. These people can make a decision with a better understanding of the possible implications of their action. By setting up smaller organizational units, the relationship between efficiency and functional perfection is also more readily apparent. In general, the objective of decentralization is to achieve the advantage of smallness for effective control and efficient operation.³

²Marshall K. Evans, "Accounting Problems in Measuring Performance by Organizational Units," National Association of Cost Accountants Bulletin, XXXVI (August, 1955), 1741.

³Ibid.

A decentralized company still needs control tools. Without such tools, top management can not determine whether the performance of the manager to whom responsibility and authority have been delegated is satisfactory or unsatisfactory. One system which has been used to control decentralized authority is the profit center.

Profit Center as a Control System for Decentralization

A profit center is a semi-independent division headed by a manager who is responsible for the coordination of functions relating to the profit of the division.⁴ Thus, the division must have the necessary elements to generate a performance measure--a net profit. In other words, costs and revenues must be both definable and measurable for the division. In general, profit measurement has three objectives:⁵

1. Main guide to evaluation--profit serves as the main guide to evaluation of divisional management by top management, and the main guide by which the division manager makes his decisions.
2. Guide to goal agreement--profit should also link the goals of top management with the goals of the division managers so that each profit center, in maximizing its own profits, will do that which will maximize the profit of the entire company.
3. Measure of profitability--divisional profit performance also

⁴J. Donald DeFrancesco, "The Accounting Side of Profit-Center Organization," Management Accounting, XLVIII (December, 1966), 56-57. For the purposes of this discussion the terms "profit center" and "division" will be used interchangeably hereafter.

⁵Gordon Shillinglaw, "Toward a Theory of Divisional Income Measurement," Accounting Review, XXXVII (April, 1962), 210.

serves as a guide in future resource allocation decisions.

If divisional income is poor and efforts to increase it are unrewarding, then presumably future resources will be diverted to other areas.

For a profit center to achieve these objectives, it is necessary to:

1. Consider the assignment of responsibility.
2. Consider the freedom to deal outside the company.
3. Measure profit correctly.
4. Establish sound transfer prices.

The assignment of responsibility. Some businessmen argue that the profit center manager should be given complete responsibility for the coordination of functions relating to profit in order to make profit decentralization effective. Others feel there must be some broad restrictions or policies set by top management, for if managers are left on their own, they will seek only to maximize their own profit and not that of the company in general. This reason stems from the fact that managers are evaluated by how successful they are within their "own divisions."

As a guide, division managers must be held responsible for only that which they control. If a division manager is held accountable for the level of output, he must have full authority to determine that level. Likewise, unless he has full authority to make the decisions which affect profit maximization, he can not be expected to maximize profit. For instance, the interests of the company might be better served by having top management retain a portion of the authority to determine divisional

policies and make some decisions at the divisional level, but if this is the case, the responsibility of the division manager in maximizing profit performance is also limited.⁶

It would be unwise to hold that one approach is right and the other wrong in all situations. The degree of responsibility can be based only upon the objective of top management through decentralization.

The freedom to deal outside the company. Included in many discussions on transfer pricing, is the idea that the selling (manufacturing) and buying divisions should treat each other as though they were independent companies. This would require the manufacturing division to compete with other companies for sales to the buying division, and would give the buying division the right to decide which source will produce the item. John Dearden⁷ feels that it is neither desirable nor practicable for divisions to treat each other as though they were independent companies. The cost of idle facilities would be considerable if the buying division placed its order outside the company. In analyzing who should decide which source will produce the item and how it should be priced, Mr. Dearden classifies all items sold within a company according to the possibility of buying them from an outside company. The categories are:

- A. Items that will probably never be produced by an outside supplier.

⁶Lennis M. Knighton, "Transfer Pricing to Maximize Profit Objectives," Business Topics, XIII (Autumn, 1965), 73.

⁷John Dearden, "Interdivisional Pricing," Management Control Systems, Robert M. Anthony, John Dearden and Richard F. Vancil, editors (Homewood, Illinois: Richard D. Irwin, Inc., 1965), pp. 265-272.

- B. Items for which a change from manufacturing to buying or vice versa must be made on a more or less long-term basis.
- C. Items for which the source may be changed on a short-term basis.

Because class A items will probably never be produced by an outside supplier, class B and C items only will be discussed.

Mr. Dearden concludes that the manufacturer of class B items, which require a substantial investment, should be determined by a central staff group and any changes in sources of supply be made by mutual agreement or arbitrated by the central group. Prices on these items, to promote efficiency, should be at current competitive levels, adjusted for any short-term abnormalities. If difficulty arises in determining competitive price, alternative transfer prices, which will be discussed in the next major section of this chapter, can be used.⁸

In the case of class C items, which involve a relatively small investment of plant and equipment, the selling and buying divisions would together decide on who should produce the product. The prices on these items should be established and maintained on the basis of current competitive levels. The selling division would have the right to appeal to the central group if it feels that what the buying division wants to do is contrary to company interests. This would not be true, of course, if the selling division cannot meet the current competitive price.⁹

In most situations, the ideal of letting the divisions have complete freedom to deal outside does not exist, but here again the

⁸ Ibid.

⁹ Ibid.

determining factor is the company's objectives with respect to decentralization and control.

Measure profit correctly. A reliable measure of profit is also essential to achieve the objectives of a profit center. Two areas which must be considered in profit measurement are: (1) allocation of the costs of company service units, and (2) determination of transfer prices.

The allocation of the costs of company service units (such as home office, and research and development) to the divisions tends to be arbitrary. Some business firms feel the division manager has no control over these costs and should not be held responsible for them. Others feel they must be included to give an accurate profit figure. This point might be more significant, if comparisons on profit performance were to be made with similar outside companies. The profit figure of each division will differ depending on which approach is taken. If these costs are not allocated, the profit figures of the divisions will be higher than if they are allocated.

The second area to consider in establishing a reliable measure of profit is the pricing of goods transferred between divisions (intra-company transfers). Determining a price which will be fair to both divisions is vital because this price will be directly related to the profit of each division. Because of its importance, the establishment of a sound transfer price will be discussed in the following sections.

Another aspect to consider in measuring profits correctly is that division managers will maximize that for which they are motivated. Therefore, top management must create an atmosphere and measure profits in such a way as to avoid placing too much emphasis on current profit

performance. Activities of the profit center must be directed so as to assure long-term gains are not destroyed because of eagerness to earn short-term profits. This may require looking beyond the limits of profit reports by top management. It may consist of setting standards and goals for divisions to reach which involve a consideration of other activities, such as share of market, utilization of capacity, and improved production methods.¹⁰ Of course, the determining factor on correct profit measurement depends on the type of organization, the circumstances within which it operates, and the objective of top management in profit measurement or decentralization.

Establishing a sound transfer price. As mentioned earlier, the problem of transfer pricing is really part of the problem of measuring divisional profit correctly. Transfer pricing, or the determination of a proper valuation of goods transferred from one profit center to another, is probably the most difficult problem in income measurement for decentralized operations; and it is for this reason that transfer pricing methods are so important. In appraisal of transfer pricing methods, the most important test is the extent to which the method promotes agreement between division and overall company goals. Without this consideration, the system will not promote efficient action among profit center managers in maximizing company profit.¹¹

II. ALTERNATIVE TRANSFER PRICING METHODS

From the standpoint of profit measurement, there are two ideal profit centers. The first is one which sells and buys entirely outside

¹⁰ Knighton, op. cit., p. 75.

¹¹ Ibid.

the company, having no transactions with other profit centers within the company. The other ideal profit center is one whose product is a competitive good. This product has an established market price, as it is sold by many producers in the open market. In both these cases, divisional profit determination is relatively simple. Regrettably, these two situations can only be classified as ideal cases, for many profit centers trade exclusively with other divisions in their own company, and the products which are transferred are those which do not have an established market price. Setting a value for the goods transferred from one center to another in these cases requires determining a suitable transfer price. In lieu of a competitive price, a market-based negotiated, or cost-based pricing method must be used.

Market-based Prices

A market-based transfer price is an estimate of what the actual price would be if the product were sold outside the company. It is considered a fair price because it puts each profit center in the same position it would occupy if it were an independent company. Although there are probably many different methods used to estimate a market price, depending on the stage the product is in, one method which can be used by many companies is asking for bids, or price quotations from outside companies.

In asking for bids, outside prospective suppliers must know they will receive at least part of the business they are bidding on, if they outbid the division within the company. In other words, these possible suppliers will not prepare a realistic bid for business they will not get, no matter what their bid. In some cases, it might be a good practice

to give some of the business to the lowest outside bidder, even though the division within the company was the low bidder.¹² Without this consideration, this technique will not be successful in approximating competitive prices.

In other instances, quoted prices by prospective outside suppliers may reflect (1) the desire to obtain an initial order, or (2) ignorance of cost. This price would tend to be temporary and not valid to use as a transfer price for the manufacturing profit center.¹³ Thus, market-price data obtained in this manner must be interpreted with sound judgment.

Another method which could be used in setting an estimated market price is to adjust the market price of a product which is similar. Without adjusting this price it would be unfair to either the manufacturing or buying division, depending on whether the quality of the similar product was inferior or superior. For example, if the product were superior, the transfer price would be too high and the buying division would be paying too much for the product.

A market price could also possibly be estimated for a product which is in some stage of its development. This price could be derived by subtracting from the price of the finished good, those costs (including profits) added after the stage of development, on the product for which the transfer price is desired.

¹²Robert N. Anthony, "Notes on Transfer Pricing," Management Control Systems, op. cit., p. 259.

¹³National Association of Cost Accountants, Accounting for Intra-company Transfers (Research Series No. 30; New York: The Macmillan Company, 1956), p. 26.

A market-based transfer price which is unstable in many cases is not a good transfer price. The manufacturing division will be trying to maximize its profits by making transfers when the transfer price is high, and the buying division will be trying to maximize profits by buying transfers when the price is low. The division with the most bargaining power will show a better profit, but action of this type (increasing profit at the expense of another division) will not necessarily increase the entire company's profit.¹⁴ If the manufacturing division is required to transfer its product as soon as it is finished, this problem can be eliminated. But in this case, the division manager's control over profit performance would be limited.

The availability and reliability of market-based prices vary widely in different circumstances, and as a consequence, they must be interpreted and used with good judgment.

Negotiated Prices

Negotiation is another method used to estimate a market price, but because of its significance it is discussed separately. A negotiated transfer price is set when managers of the concerned divisions meet in negotiation to determine a market price which is mutually acceptable. This method seems fair in that it produces a price which the manufacturing division could receive if it sold the product outside the company, but in certain instances it can be unsatisfactory. In the first place, when two divisions enter into negotiation, a considerable amount of time

¹⁴Robert K. McLain, "Transfer Pricing Can Contribute to Divisional Performance Evaluation," National Association of Accountants Bulletin, XLIV (August, 1963), 31.

might be spent before a price is agreed upon, and this in itself might be a great waste. In the second place, negotiation may not produce a price which is equitable or realistic, because the divisions may not be in equal bargaining positions. The absence of outside sales markets or purchase opportunities would complicate the establishing of an equitable transfer price.¹⁵ Therefore, some method of arbitration to quickly solve the disputes that arise, and a system to insure equitable transfer prices must necessarily be considered before adopting this method.

Cost-based Prices

Cost can also be used as a basis for pricing intra-company transfers. Where this is the case, costs used are defined in a variety of ways to fit the purpose management wants to accomplish. Full cost, marginal cost and cost plus will be discussed.

When full cost is used as a transfer price it includes all the costs associated with producing the product, including allocated general administration, research, and advertising expenses charged to the division by the central office. In most cases, full cost should be a standard or predetermined cost. If it is not, the manufacturing division will have no incentive to control costs, for recovery is assured in the transfer price. If an appropriate and accurate standard cost is used, inefficiencies will have to be accounted for by the manufacturing division.¹⁶

Where full cost is used, the transfer price equals the cost; and the operating unit can not be evaluated as a profit center because there

¹⁵Knighton, op. cit., p. 77.

¹⁶Anthony, op. cit., p. 260.

is no profit included in the transfer price. There are two situations where a transfer price which equals cost may be useful. One case is when transfers between units are so insignificant that cost, the simplest method of accounting for such transfers, is used. The other situation is when it is not practical to evaluate the operating unit as a profit center, because it does not lend itself to profit calculation or evaluation. A good example is a research and development department.¹⁷

It might also be beneficial to base the transfer price on marginal or incremental costs, when idle capacity exists. This method is a short-run pricing technique, because products are sold at prices with return something less than a full share of fixed cost.¹⁸ But in this case also the operating unit can not be evaluated as a profit center.

When cost plus a fair return is used as a transfer price, an amount is added to cost to provide a profit for the product transferred. The cost, as mentioned above, should be standard cost, because by using it there will be an incentive to control costs. In order to provide an incentive to reduce costs, there should be a mechanism to insure that the manufacturing division will benefit from new methods which improve efficiency. One solution will be to leave the standard cost unchanged for a period of time after the new method for reducing costs is in use.¹⁹ Consequently, by reducing its cost, the manufacturing division increases its profit, during the period of time the standard cost is left unchanged.

¹⁷William L. Felix, Jr., "Intracompany Pricing," (unpublished Master's thesis, University of Montana, Missoula, 1965), p. 11.

¹⁸National Association of Cost Accountants, op. cit., p. 36.

¹⁹Anthony, loc. cit.

Without these incentives to control and reduce costs, the cost plus method will be of little value in setting a transfer price, because the buying division will not be evaluated independently of the selling division. In other words, part of the buying division's profit performance will be based on how efficient the manufacturing division is in producing the product.

III. SUMMARY

After consideration of the objectives of top management in a decentralized company, two areas were examined, (1) how these objectives can be met through the use of divisional profit performance, and (2) transfer pricing methods used in calculating divisional profit. Throughout the chapter an attempt has been made to show that the measurement of profit, along with the determination of transfer prices, is a function of only the objectives of the decentralized organization.

CHAPTER III

EXAMINATION OF A CONTROL SYSTEM

As previously stated, part of this study was devoted to investigation of the application of transfer pricing in a specific organization. The purpose of this chapter will be to describe the organization by examining (1) its structure and circumstances within which it operates, (2) the present control system, and (3) the inadequacy of the present control system.

I. SETTING OF THE CASE

The ABC Company is engaged in diversified operations within the forest products industry. It manufactures and sells many grades and species of lumber and other related products. Like most companies in the industry, growth has been accomplished through integration. This company has production facilities for procuring the trees; sawing these trees into rough green stock; finishing (drying and planing) the rough green stock; and producing various wood products, such as mouldings and lath. Most of these functions are grouped into smaller organizational units in the company (divisionalization), and therefore, raw materials and products are being transferred from one operating unit to another for further processing.

The ABC Company has no forest land of its own, and therefore is greatly dependent on federal timber offerings. But this problem is alleviated somewhat, because the sawmills of this company are located

in different areas; this makes available more federal timber sales.

This study was limited to one operating unit of the company--a sawmill. This particular sawmill is located in an area in which ponderosa pine is prevalent, and therefore it saws mainly this species. The rough green stock from this mill is transferred to another location, where it is mixed with stock from other sawmills and finished. This stock is presently transferred at cost, because there is no competitive market price for green lumber of this species. Certain species of rough green stock do have market prices, but when pine is in this stage it can not be readily used for anything, so no market price exists.

II. PRESENT CONTROL SYSTEM

The present control system of this particular sawmill is based on the expenses incurred to produce the rough green stock, and for this reason we shall call it an expense center. The characteristics of this expense center are:

1. It is a separate coordinated work group in the production process.
2. It is large enough to give sufficient cost detail.
3. Authority has been delegated to a manager who is responsible for costs and coordinating the activities of the center.

It should be emphasized that decentralization is present in this sawmill. Top management has delegated authority to the sawmill manager, and he becomes the key figure in the control system. The manager has authority over the resources used in producing the rough green stock, namely, men, materials, and machinery and facilities. A discussion of each of these will be presented in the following paragraphs.

The manager has full control over the number of hourly personnel employed. If he feels additional laborers are needed to make his operation more efficient, he has full authority to employ them. Supervisory personnel are in some cases placed in the mill by top management, but these situations are discussed with the manager beforehand.

Although the manager does not have complete control over the prices paid for the logs sawed in the mill, he does have a considerable amount of influence in this area. When timber is up for bids, the manager accompanies the company buyers and together they bid on the timber. All other materials used in the production process are under the complete control of the sawmill manager.

In the area of machinery and facilities, the manager serves as the initiating factor. Every six months, he makes out a capital budgeting report which is submitted to the general manager of the company. In this report the manager states what expenditures he feels are necessary to improve operations. The general manager reviews this report and decides which investments are reasonable. If he cannot justify a certain investment, the manager is told why it was rejected. If the sawmill manager is still not satisfied, he can resubmit it at a later date with a more thorough analysis. Reports on how well the new investments are doing are kept by the sawmill manager and reviewed by the general manager. Although there is no well established cut-off point, the manager does have authority to make small investment decisions without home office approval.

Top management realizes that in delegating to the manager authority over a segment of the operations, it must measure accurately what the manager spends and review and appraise his expenditures. At the end

of each month, expenses are totaled and evaluated by the general manager. No standard, such as a budget, is used in which a manager must operate, or by which he is evaluated. Instead, past monthly operating statements of his and other company mills are used for comparison. Some major expense areas of other sawmills are very similar to this particular sawmill, and for this reason can be used for comparison. If any area seems to be out of line, the general manager questions and discusses the trouble spot with the sawmill manager so that corrective action can be taken, if necessary.

In summary, the benefits which top management feels are achieved in this expense center are:

1. Cost information is compiled on a monthly basis so that the manager can take corrective action in the event of trouble areas.
2. Cost information is made available for top management use in controlling and planning the operation of the sawmill.
3. Expenses are related to the person responsible for controlling them. Therefore, the manager is made cost conscious, and will in most cases use the resources in the most efficient way.

III. INADEQUACY OF THE PRESENT SYSTEM

The performance of an operating unit may be measured in terms of its effectiveness and efficiency. Effectiveness relates to how well the operating unit performs in relationship to the organization's goals (such as profit), whereas efficiency is the amount of output per unit

of input, which is usually compared to some standard.¹ An important fact in the relationship between these two measures is that two operating units can both have the same efficiency, but are not equally as effective, as one unit may be producing more profit than the other (an illustration will be provided below).

The present control system in the sawmill examined in this study is based on expenses incurred. Effectiveness cannot be measured in financial terms in an expense center, because no attempt is made to measure the value of the output. Therefore, the sawmill is evaluated on its efficiency, that is, how well its current operating expenses compare to its own and other company sawmills' past operating expenses. Top management does not feel this is adequate, and they would like to develop a system of information (control system) which measures both effectiveness and efficiency. If the sawmill could be changed to a profit center, management's objective might be achieved.

To further explain the objective of profit measurement in this sawmill, an example is presented in Illustration 1.

Illustration 1. Measurement of Effectiveness and Efficiency.

	<u>Sawmill A</u>	<u>Sawmill B</u>
Revenue	\$ 9,000	\$10,000
Cost	<u>6,000</u>	<u>6,000</u>
Profit	\$ 3,000	\$ 4,000
No. of 1,000 bd. ft.	2,000	2,000
Cost per 1,000 bd. ft.	\$ 3.00	\$ 3.00
Profit per 1,000 bd. ft.	1.50	2.00

¹Robert N. Anthony, "Note on Responsibility Centers," Management Control Systems, Robert N. Anthony, John Dearden, and Richard F. Vancil, editors (Homewood, Ill.: Richard D. Irwin, Inc., 1965), p. 168.

Assume that both sawmills have the same investment and are operating at capacity. Suppose the company is planning on expanding one of these mills. If the performance of the sawmills is measured in terms of efficiency (cost per 1,000 bd. ft.) alone, the company would not be able to decide in which mill to invest, because both sawmills are operating with the same efficiency (\$3). However, if the performance of the sawmills is measured by a profit center system, Sawmill B would be the logical mill in which to invest. Sawmill B is more effective, for it is producing more profit per 1,000 board feet (\$2), in comparison to Sawmill A (\$1.50). Profit, because it is related to and measures both effectiveness and efficiency, would serve as a guide in allocating future resources between these sawmills.

The real difference between the two sawmills in the illustration is that Sawmill B received more revenue for its product. Assume that the extra revenue Sawmill B received was due to the higher quality logs sawed in this mill. It might be said, that on the average each sawmill would be paying more for higher quality timber, and therefore the profit per 1,000 board feet for each sawmill would on the average be the same. However, this is not always the case, since federal timber sales are sold through a competitive bidding system, and where there are very few bidders, the sale price does not always reflect the quality of the timber which is sold.

Where only one sawmill transfers its stock to a finishing unit it would not be necessary to know how much profit the sawmill produces. Such a sawmill could operate as a department or expense center within the finishing unit, as the profit of the sawmill would be directly

correlated with that of the finishing unit. But in the ABC Company, there is a situation where more than one sawmill transfers its stock to a finishing division. This stock is mixed, due to order demands, which makes it impossible to correlate the profit of the finishing division with each individual sawmill. These sawmills are presently using expense center systems. The ABC Company would like to maintain their measure of efficiency, and in addition, desires to determine the effectiveness, or profit, of each mill, as a guide for future resource allocation among these mills. Consequently, a profit center system is deemed necessary.

The particular sawmill being examined in this study is of special interest, in that the profit of this sawmill will probably be the most difficult to measure as compared to the other mills. As mentioned earlier, this sawmill saws mainly ponderosa pine, which in its rough green form has no established market price.

CHAPTER IV

INVESTIGATING A POSSIBLE TRANSFER PRICING METHOD

The present transfer pricing method used to transfer rough green stock, from the particular sawmill being examined, to a finishing division of the ABC Company is cost. Under this method the sawmill can not be evaluated as a profit center. In order for profit to serve as a guide in future sawmill resource allocation (objective of profit decentralization), it will be necessary to consider transfer pricing methods which include profit in the transfer price. This chapter is devoted to investigating the feasibility of a competitive transfer pricing system, but first, some characteristics of this proposed profit center will be examined.

I. CHARACTERISTICS OF THE PROPOSED PROFIT CENTER

The area the sawmill is located in has some effect on the profit of the mill. A mill which is located in an area where there are very few other mills, and therefore probably very few bidders on federal timber sales, might be able to buy timber at a price which does not always reflect the quality of timber which is being sold. The sawmill manager would not have control over the number of other mills located in his area; consequently, he could not be held completely responsible for the profit of the mill. This characteristic would need to be considered when home office management evaluates the sawmill manager.

The freedom for this proposed profit center to make sales outside the company would be limited, because it will probably not have an alternative market for its stock. This situation is caused by a high degree of integration in the forest products industry. Today, many companies have their own sawmills which fulfill their needed quota of rough green stock; consequently, they do not need to purchase rough green stock from other companies.

Home office management does not allocate general overhead to the operating units; therefore, this would not be considered in the measurement of income of the proposed profit center. Probably the most difficult problem in income measurement, as mentioned in Chapter II, is establishing a competitive transfer price. Market based, cost plus a fair return, and negotiated prices are transfer prices which include profit, and for this reason will be discussed. A market-based method seems to be the only workable solution to this problem, although the other methods will be discussed to show their shortcomings.

II. POSSIBLE TRANSFER PRICING METHOD

Market prices for the rough green stock can probably be estimated by subtracting from the price of the finished lumber those costs (and profits) added after the logs have reached their rough green form. In this particular case, other factors will necessarily have to be considered, and because information on these factors was not available at the time of this study, a round-about approach was taken in setting the transfer prices. This procedure is somewhat different than the procedure which could be used if the needed information was available and which will be presented later.

In the round-about approach for setting transfer prices, the data for a recent month of the sawmill was examined, along with the data at the other sawmills transferring their stock to the same finishing division. Only the data for the particular sawmill examined in this study is presented in full detail. During this month, the finishing division received all the profit for the applicable sawmills, because the mills transferred their stock at cost. The profit the finishing division made on this stock can only be estimated at around \$32,000, because it did not sell this stock during the month. In the procedure used in this study, this profit is allocated to where it was made (i.e., among both the sawmills and the finishing division), by using transfer prices which include profit. In order to accomplish this, certain information which was needed and not available had to be estimated, so that the total of the allocated profit would be close to \$32,000. The procedure and results are presented in Table I.¹ Only the sawmills need to follow the procedure presented in Table I to arrive at their allocated profit. The finishing division's allocated profit will be available from the procedure followed by the sawmills, for reasons which will be more apparent later.

Columns A through M of the illustration are based on the different classifications of lumber sawed in each mill. For instance, column A is the number of 1,000 board feet of each classification sawed in the sawmills during the month. These classifications may include as many as four or five grades. The reason the rough green stock is placed in such

¹Some of the procedure used in this approach was formed by the Accounting Manager of the ABC Company.

TABLE I
 PROCEDURE AND RESULTS OF MARKET-BASED TRANSFER PRICING
 METHOD USED IN THIS STUDY

(1,000 bd. ft.)

	A	B	C	D	E	F
	No. of 1,000 b.f. according to classi- fication or grade at sawmill	Average Finished Price over Month \$	Gross Sales (AxB) \$	Net Sales (After 7.2% discount) \$	Finishing Cost Plus Profit \$	Total Finishing Cost (inc. profit) (Ax E) \$
<u>Sawmill #1</u>						
P. Pine:						
4/4 Select	83.5	162.11	13,536	12,561	20.43	1,706
6/4 Shop	271.3	95.12	25,803	23,945	19.15	5,193
4/4 Common	50.3	67.80	3,410	3,164	20.43	1,026
6/4 Common	473.4	81.55	38,605	35,825	20.29	9,603
Timbers	15.8	75.00	1,185	1,100	9.69	153
Spruce:						
4/4	381.7	79.63	30,395	28,206	19.66	7,504
3/6	310.1	88.75	27,521	25,539	18.58	5,762
White Fir:						
4/4	14.3	50.00	715	664	22.47	321
8/4	135.8	62.35	8,467	7,857	14.25	1,935
Sub-total	1,736.3		149,638	138,861		33,203
<u>Sawmill #2</u>						
Sub-total	3,715.9		312,808	290,281		63,236
<u>Sawmill #3</u>						
Sub-total	1,180.4		75,089	69,681		16,306
TOTAL	6,632.5					

(Continued)

broad categories, is that it is very hard to determine the final grade of lumber when it is in its rough green form. By employing another grader on each work shift it would be possible to grade this stock into more categories, but still the grade given the stock at this state would not be completely accurate for reasons discussed later.

Column B represents the average finished price over the month for each classification. This required averaging together the lumber prices for each grade within the classification. Finished lumber prices fluctuate widely, and consequently each grade price was also only an average. Column C is the gross sales value of each classification. It is determined by multiplying the number of 1,000 board feet times the average price. Column D is the net sales value for each classification. This is derived by subtracting the discount (7.2%) given the buyers from the gross sales.

Column E represents the finishing cost plus profit for each 1,000 board feet. The finishing cost for each classification can be determined quite accurately by the finishing ~~division~~. The profit added to the finishing cost was a fixed profit (\$2.00 per 1,000 bd. ft.), as just about all classifications go through the same finishing process. Column F is the total finishing cost (including profit) for each classification. This is determined by multiplying the number of 1,000 board feet times the finishing cost plus profit.

Column G represents the rough green stock revenue before breakage and degrading for each classification. It is derived by subtracting the total finishing cost plus profit from the net sales value.

Column H is the loss due to breakage for each classification. Some of the rough green stock is broken in the finishing process.

Consequently, the transfer prices of each 1,000 board feet would have to reflect this loss, which is due to the nature of the product, and accordingly should be reduced. Column I is the total loss due to breakage for each classification. This is determined by multiplying the number of 1,000 board feet times the loss due to breakage.

Column J is the degrading factor for each classification. Degrading is the monetary loss suffered due to the development of defects on the rough green stock in the finishing process. Although this problem can be recognized, it is impossible to eliminate, as many of these defects cannot be seen on the rough green stock. For example, defects will develop on some of the stock which was originally classified as 4/4 select, and consequently, this stock will have to be reclassified as 4/4 common, and sold at a lower price. Column K is the total degrading factor per number of 1,000 board feet. This is derived by multiplying the number of board feet in each classification times the degrading factor.

It should be mentioned that both the loss due to breakage and the degrading factor had to be estimated for each classification, as the values for these factors were not available. This is the reason why it was necessary to use the round-about way to estimate the transfer prices. In order to determine what these values would actually be, it would be necessary to follow samples of each classification of stock through the finishing process. In most cases, these classifications will have different values, and will probably vary in each mill. When these values are known, a much easier procedure can be used to estimate the transfer prices. This procedure will be presented later.

Column L in the illustration is the rough green stock revenue for each classification. It is determined by adding the total loss due to breakage to the total degrading factor, and subtracting this value from the rough green stock revenue before breakage and degrading.

Column M is the transfer price for each category. It is derived by dividing the rough green stock revenue by the number of 1,000 board feet.

The profit figures for each sawmill can be obtained by subtracting their operating cost from their rough green stock revenue (column L). The operating cost for each sawmill during the month was, respectively, \$91,611, \$181,445, and \$47,688. The respective profit for each mill would then be \$4,092, \$13,160, and \$1,500. The finishing division, as mentioned earlier would make \$2.00 per 1,000 board feet, and therefore, its profit would be \$13,266. These four profit figures total to be \$32,017, which is very close to the estimate of what the profit would have actually been (\$32,000), if the finishing division sold only the stock which was transferred during the month.

When the values for the loss due to breakage and degrading factors are established, a much simpler and somewhat different procedure than the one used in this study can be used to estimate the transfer prices. This procedure is presented in Table II, along with a set of figures taken from Table I, which serves as an example.

Finished lumber prices fluctuate widely, and for this reason must be stabilized on a monthly or at least quarterly basis. Weekly average prices for each classification are made by the Western Wood Products Association, and these could be used to arrive at a monthly average.

TABLE II
 MARKET-BASED TRANSFER PRICING METHOD

	A	B	C	D	E	F	G
Lumber Classifications	Average Finished Price Over Month	Net Sales Price (After 7.2% discount)	Finishing Cost Plus Profit	Rough Green Stock Price Before Breakage & Degrading	Loss Due to Breakage	Degrading Factor	Rough Green Stock Price C-(D+E)
	\$	\$	\$	\$	\$	\$	\$
4/4 Sel.	162.11	150.44	20.43	130.01	6.51	3.90	119.60

Consequently, the prices the sawmill could receive on its rough green stock would not be determined until the end of each month.

The sawmill manager would be required to ship its rough green stock as soon as it was finished. If this were not the case, the sawmill manager would be trying to maximize his profit by making transfers when he thought the price would be high, and the finishing division manager would be trying to maximize his profit by buying when he thought the price would be low. This would not be in the best interest of the company, as in some instances finished lumber which was needed to meet order demands might not be available.

The procedure in Table II would be followed each month. Values for the loss due to breakage and degrading factor would probably only need to be changed when each sawmill began sawing logs from a new federal timber sale. The profit the mills would make each month would be put in terms of the number of 1,000 board feet sawed. This would give the three sawmills a comparable measure, which over a period of time could be used as a guide in future resource allocation.

At this point, it should be mentioned that if this system is used, it would probably be beneficial to grade the stock into more categories, rather than continuing with the present broad ones, especially if there is a big difference between the prices of the grades in each category. For example, a sawmill which transferred a great deal of high grade 4/4 common would receive only the average price over all grades of 4/4 common for this stock, if this present category was used, and this would not reflect the quality of the logs coming from this sawmill. To grade the rough green stock into more categories would take more time, and consequently, another grader would have to be employed on each work shift.

It was mentioned at the beginning of this chapter that the deficiencies of the cost plus a fair return and negotiated transfer prices would be discussed. In the cost plus a fair return, it would still be necessary to establish the loss due to breakage and the degrading factor for each classification. Also, it would be necessary to attach to the different classifications of rough green stock, different profit mark-ups. Presumably, these profit mark-ups would stay constant for each classification, and in this case, this method would not recognize the actual price fluctuations which occur on the finished lumber, and inherently on the rough green stock. Consequently, this method would distort the profit performance of this sawmill.

Negotiated pricing would probably also distort the profit performance of this sawmill. It was mentioned at the beginning of this chapter that the forest products industry is highly integrated. For this reason, the sawmill and finishing division would probably have no one else to negotiate with, for the sale or purchase of rough green

stock. In this case, the transfer prices set might be biased toward the operating unit with the most bargaining power. Also, it would still be necessary to establish the loss due to breakage and degrading factor for each stock classification.

CHAPTER V

SUMMARY AND CONCLUSIONS

As business organizations have increased in size, the centralized functional-type organization structure has been replaced in many instances by divisionalization and decentralization. In these organizations, an information system is needed to provide control over the separate operating units. The profit center system has gained increased attention in recent years for two reasons:

1. Profit measures both efficiency and effectiveness.
2. Profit measurement can now be accomplished in many different situations, by using the relatively new concept of transfer pricing, whereas in the past it seemed impossible if competitive market prices did not exist.

The profit center system is being considered by the ABC Company for these two reasons. The objective of profit measurement in the saw-mill is to measure its effectiveness, and to accomplish this objective, transfer prices which include profit are required. Naturally, transfer prices need not be completely accurate, for when they are applied to improve management control, the desired result can still be obtained as long as they reasonably approximate market prices. Transfer prices which include profit happen to be particularly hard to arrive at in the case of this industry. A market-based pricing method seems to be the feasible solution to the problem.

In conclusion, it will be necessary to evaluate this transfer pricing method and profit center system, in terms of the costs required to implement and use such a system, versus the return it gives of better control. The major costs which must be considered are: (1) hiring another grader on each work shift, which would enable the rough green stock to be classified into more categories, and (2) following the rough green stock through the finishing process to determine the degrading and loss due to breakage factors. The return this profit center would give would provide better control over the allocation of future resources among the sawmills.

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