

Problem 11-18 (60 minutes)

1. From the standpoint of the selling division, Division A:

$$\begin{aligned} \text{Transfer price} &\geq \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}} \\ \text{Transfer price} &\geq (\$63 - \$5) + [(\$100 - \$63) \times 10,000] / 10,000 \\ &\geq \$58 + \$37 = 95 \end{aligned}$$

But, from the standpoint of the buying division, Division B:

$$\text{Transfer price} \leq \text{Cost of buying from outside supplier} = \$92$$

Division B won't pay more than \$92 and Division A will not accept less than \$95, so no deal is possible. There will be no transfer.

2. a. From the standpoint of the selling division, Division A:

$$\begin{aligned} \text{Transfer price} &\geq \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}} \\ \text{Transfer price} &\geq (\$19 - \$4) + [(\$40 - \$19) \times 70,000] / 70,000 \\ &\geq \$15 + \$21 = 36 \end{aligned}$$

From the standpoint of the buying division, Division B:

$$\text{Transfer price} \leq \text{Cost of buying from outside supplier} = \$39$$

In this instance, an agreement is possible within the range:

$$\$36 \leq \text{Transfer price} \leq \$39$$

Even though both managers would be better off with *any* transfer price within this range, they may disagree about the exact amount of the transfer price. It would not be surprising to hear the buying division arguing strenuously for \$36 while the selling division argues just as strongly for \$39.

Problem 11-18 (continued)

b. The loss in potential profits to the company as a whole will be:

| | |
|----------------------------------------------------------------------------|------------------|
| Division B's outside purchase price..... | \$39 |
| Division A's variable cost on the internal transfer..... | <u>36</u> |
| Potential added contribution margin lost to the company as a whole..... | \$ 3 |
| Number of units..... | <u>×70,000</u> |
| Potential added contribution margin and company profits forgone | <u>\$210,000</u> |

Another way to derive the same answer is to look at the loss in potential profits for each division and then total the losses for the impact on the company as a whole. The loss in potential profits in Division A will be:

| | |
|-----------------------------------------------------------------------------|------------------|
| Suggested selling price per unit..... | \$38 |
| Division A's variable cost on the internal transfer..... | <u>36</u> |
| Potential added contribution margin per unit | \$ 2 |
| Number of units..... | <u>×70,000</u> |
| Potential added contribution margin and divisional profits forgone | <u>\$140,000</u> |

The loss in potential profits in Division B will be:

| | |
|-----------------------------------------------------------------------------|-----------------|
| Outside purchase price per unit | \$39 |
| Suggested price per unit inside..... | <u>38</u> |
| Potential cost avoided per unit..... | \$ 1 |
| Number of units..... | <u>×70,000</u> |
| Potential added contribution margin and divisional profits forgone | <u>\$70,000</u> |

The total of these two amounts (\$140,000 + \$70,000) equals the \$210,000 loss in potential profits for the company as a whole.

Problem 11-18 (continued)

3. a. From the standpoint of the selling division, Division A:

$$\text{Transfer price} \geq \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}}$$
$$\text{Transfer price} \geq \$35 + (\$0/20,000) = \$35$$

From the standpoint of the buying division, Division B:

$$\text{Transfer price} \leq \text{Cost of buying from outside supplier} = \$57$$

$$\text{Transfer price} \leq \$60 - (0.05 \times \$60) = \$57$$

In this case, an agreement is possible within the range:

$$\$35 \leq \text{Transfer price} \leq \$57$$

If the managers understand what they are doing and are reasonably cooperative, they should be able to come to an agreement with a transfer price within this range.

b. Division A's ROI should increase. The division has idle capacity, so selling 20,000 units a year to Division B should require no increase in operating assets. Therefore, Division A's turnover should increase. The division's margin should also increase, because its contribution margin will increase by \$340,000 as a result of the new sales, with no offsetting increase in fixed costs:

| | |
|------------------------------|------------------|
| Selling price..... | \$52 |
| Variable costs | <u>35</u> |
| Contribution margin | \$17 |
| Number of units..... | <u>×20,000</u> |
| Added contribution margin .. | <u>\$340,000</u> |

Thus, with both the margin and the turnover increasing, the division's ROI would also increase.

Problem 11-18 (continued)

4. From the standpoint of the selling division, Division A:

$$\begin{array}{l} \text{Transfer price} \geq \text{Variable cost} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}} \\ \text{Transfer price} \geq \$25 + [(\$45 - \$30) \times 30,000] / 60,000 \\ \geq \$25 + \$7.50 = \$32.50 \end{array}$$

Problem 11-30 (45 minutes)

1. The Consumer Products Division will probably reject the \$400 price because it is below the division's variable cost of \$420 per HD DVD player. This variable cost includes the \$190 transfer price from the Board Division, which in turn includes \$30 per unit in fixed costs. However, from the viewpoint of the Consumer Products Division, the entire \$190 transfer price is a variable cost. Consequently, the Consumer Products Division will reject the \$400 price offered by the overseas distributor.
2. If both the Board Division and the Consumer Products Division have idle capacity, then from the standpoint of the entire company the \$400 offer should be accepted. By rejecting the \$400 price, the company will lose \$50 per HD DVD player in potential contribution margin:

| | | |
|------------------------------------------------|------------|--------------|
| Price offered per player | | \$400 |
| Less variable costs per player: | | |
| Board Division..... | \$120 | |
| Consumer Products Division..... | <u>230</u> | <u>350</u> |
| Potential contribution margin per player | | <u>\$ 50</u> |

3. If the Board Division is operating at capacity, any boards transferred to the Consumer Products Division to fill the overseas order will have to be diverted from outside customers. Whether a board is sold to outside customers or is transferred to the Consumer Products Division, its production cost is the same. However, if a board is diverted from outside sales, the Board Division (and the entire company) loses the \$190 in revenue. As a consequence, as shown below, there would be a net loss of \$20 on each player sold for \$400.

| | | |
|------------------------------------------------------|------------|----------------|
| Price offered per HD DVD player..... | | \$400 |
| Less: | | |
| Lost revenue from sales of boards to outsiders | \$190 | |
| Variable cost of Consumer Products Division..... | <u>230</u> | <u>420</u> |
| Net loss per player | | <u>(\$ 20)</u> |

Problem 11-30 (continued)

4. When the selling division has no idle capacity, as in part (3), market price works very well as a transfer price. The cost to the company of a transfer when there is no idle capacity is the lost revenue from sales to outsiders. If the market price is used as the transfer price, the buying division will view the market price of the transferred item as its cost—which is appropriate since that is the cost to the company. As a consequence, the manager of the buying division should be motivated to make decisions that are in the best interests of the company.

When the selling division has idle capacity, the cost to the company of the transfer is just the variable cost of producing the item. If the market price is used as the transfer price, the manager of the buying division will view that as his/her cost rather than the real cost to the company, which is just variable cost. Hence, the manager will have the wrong cost information for making decisions as we observed in parts (1) and (2).

Case 11-32 (60 minutes)

1. The Electronics Division is presently operating at capacity; therefore, any sales of the XL5 circuit board to the Clock Division will require that the Electronics Division give up an equal number of sales to outside customers. Using the transfer pricing formula, we get a minimum transfer price of:

$$\text{Transfer price} \geq \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}}$$

$$\text{Transfer price} \geq \$8.25 + (\$12.50 - \$8.25)$$

$$\text{Transfer price} \geq \$12.50$$

Thus, the Electronics Division should not supply the circuit board to the Clock Division for \$9 each. The Electronics Division must give up revenues of \$12.50 on each circuit board that it sells internally. Since management performance in the Electronics Division is measured by ROI and dollar profits, selling the circuit boards to the Clock Division for \$9 would adversely affect these performance measurements.

2. The key is to realize that the \$10 in fixed overhead and administrative costs contained in the Clock Division's \$69.75 cost per timing device is not relevant. There is no indication that winning this contract would actually affect any of the fixed costs. If these costs would be incurred regardless of whether or not the Clock Division gets the oven timing device contract, they should be ignored when determining the effects of the contract on the company's profits. Another key is that the variable cost of the Electronics Division is not relevant either. Whether the circuit boards are used in the timing devices or sold to outsiders, the production costs of the circuit boards would be the same. The only difference between the two alternatives is the revenue on outside sales that is given up when the circuit boards are transferred within the company.

Case 11-32 (continued)

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|-------------------------------------------|---------|
| Selling price of the timing devices | \$70.00 |
|-------------------------------------------|---------|

Less:

| | |
|----------------------------------------------------------------------------------------------------------------------------------|---------|
| The cost of the circuit boards used in the timing devices (i.e. the lost revenue from sale of circuit boards to outsiders) | \$12.50 |
|----------------------------------------------------------------------------------------------------------------------------------|---------|

| | | |
|--------------------------------------------------------------------------------------------|--------------|--------------|
| Variable costs of the Clock Division excluding the circuit board (\$30.00 + \$20.75) | <u>50.75</u> | <u>63.25</u> |
|--------------------------------------------------------------------------------------------|--------------|--------------|

| | | |
|---------------------------------------------------|--|----------------|
| Net positive effect on the company's profit | | <u>\$ 6.75</u> |
|---------------------------------------------------|--|----------------|

Therefore, the company as a whole would be better off by \$6.75 for each timing device that is sold to the oven manufacturer.

3. As shown in part (1) above, the Electronics Division would insist on a transfer price of at least \$12.50 for the circuit board. Would the Clock Division make any money at this price? Again, the fixed costs are not relevant in this decision since they would not be affected. Once this is realized, it is evident that the Clock Division would be ahead by \$6.75 per timing device if it accepts the \$12.50 transfer price.

| | |
|------------------------------------------|---------|
| Selling price of the timing devices..... | \$70.00 |
|------------------------------------------|---------|

Less:

| | |
|----------------------------------------------|---------|
| Purchased parts (from outside vendors) | \$30.00 |
|----------------------------------------------|---------|

| | |
|--------------------------------------------------|-------|
| Circuit board XL5 (assumed transfer price) | 12.50 |
|--------------------------------------------------|-------|

| | | |
|----------------------------|--------------|--------------|
| Other variable costs | <u>20.75</u> | <u>63.25</u> |
|----------------------------|--------------|--------------|

| | | |
|------------------------------------------|--|----------------|
| Clock Division contribution margin | | <u>\$ 6.75</u> |
|------------------------------------------|--|----------------|

In fact, since the contribution margin is \$6.25, any transfer price within the range of \$12.50 to \$19.25 (= \$12.50 + \$6.75) will improve the profits of both divisions. So yes, the managers should be able to agree on a transfer price.

4. It is in the best interests of the company and of the divisions to come to an agreement concerning the transfer price. As demonstrated in part (3) above, any transfer price within the range \$12.50 to \$19.25 would improve the profits of both divisions. What happens if the two managers do not come to an agreement?

Case 11-32 (continued)

In this case, top management knows that there should be a transfer and could step in and force a transfer at some price within the acceptable range. However, such an action, if done on a frequent basis, would undermine the autonomy of the managers and turn decentralization into a sham.

Our advice to top management would be to ask the two managers to meet to discuss the transfer pricing decision. Top management should not dictate a course of action or what is to happen in the meeting, but should carefully observe what happens in the meeting. If there is no agreement, it is important to know why. There are at least three possible reasons. First, the managers may have better information than the top managers and refuse to transfer for very good reasons. Second, the managers may be uncooperative and unwilling to deal with each other even if it results in lower profits for the company and for themselves. Third, the managers may not be able to correctly analyze the situation and may not understand what is actually in their own best interests. For example, the manager of the Clock Division may believe that the fixed overhead and administrative cost of \$10 per timing device really does have to be covered in order to avoid a loss.

If the refusal to come to an agreement is the result of uncooperative attitudes or an inability to correctly analyze the situation, top management can take some positive steps that are completely consistent with decentralization. If the problem is uncooperative attitudes, there are many training companies that would be happy to put on a short course in team building for the company. If the problem is that the managers are unable to correctly analyze the alternatives, they can be sent to executive training courses that emphasize economics and managerial accounting.