Price/Volume Trade-Offs

Raising sale prices may vary well cause sales volume to fall. Cutting sales prices may increase sales volume – unless competitors lower their prices also. Higher sales prices may be in response to higher product costs that are passed through to customers. Increasing product costs to improve product quality may jack up sales volume. Increasing sales commissions (a prime revenue-driven expense) may give the sales staff just the incentive needed to sell more units. Spending more on fixed operating expenses – such as bigger advertising budgets, higher rent for larger stores, or more expensive furnishings – may help sales volume.

None of this news to experienced business managers. The business world is one of trade-offs among profit factors. In most cases, a change in one profit factor causes, or is in response to, a change in another factor.

Most analysis of profit contributors tend to only change one factor at a time; the other profit factors are held constant. In the real world of business, seldom can you change just one thing at a time. This article analyses the interaction of changes in two or more profit factors.

SHAVING SALES PRICES TO BOOST SALES VOLUME – An Example

Suppose the managers in charge of three profit lines are seriously considering decreasing their sales prices 10%, which they predict would increase sales volume 10%. Of course, competitors may reduce their prices 10%, so the sales volume may not materialize. But the managers don't think their competitors will follow suit. The company's products are differentiated from the competition (brand names, customer service, and product specifications are types of differentiation.) There always has been some amount of sales price spread between businesses products and the competition. A 10% cut should not trigger price reductions by competition, in the opinion of the managers.

One reason for reducing sales prices is that the business is not selling up to its full capacity. This in not unusual; many businesses have some slack or untapped sales capacity provided by their fixed expenses. In this example, assume that the fixed expenses of each product line provide enough space and personnel to handle a 20 to 25% larger sales volume. Spreading total fixed expenses over a larger number of units sold seems like a good idea. Rather than downsizing, which would require cutting fixed expenses, the first thought is to increase sales volume and thus take better advantage of the sales capacity provided by fixed expenses.

Danger: Of course, the managers are very much aware that sales volume may not respond to the reduction in sales price as much as they predict. On the other hand, sales volume may increase more than 10%. In any case, they would closely monitor the reaction of customers. Obviously there is a serious risk here. Suppose sales volume doesn't increase; they may not be able to reverse directions quickly. The managers may not be able to roll back the sales price decrease without losing customers, who may forget the sales price decreases and see the reversal only as price increases.

Standard Product Line		
Sales price		$100.00
Product cost		$65.00
Revenue-driven expenses		$8.50
Unit-driven expenses		$ 6.50
Unit margin		$20.00
Sales volume	100,000	
Contribution margin	$2,000,000	
Fixed operating expenses	$1,000,000	
Profit	$1,000,000	

Generic Product Line		
Sales price		$75.00
Product cost		$57.00
Revenue-driven expenses		$3.00
Unit-driven expenses		$ 5.00
Unit margin		$10.00
Sales volume	150,000	
Contribution margin	$1,500,000	
Fixed operating expenses	$500,000	
Profit	$1,000,000	

Premier Product Line		
Sales price		$150.00
Product cost		$80.00
Revenue-driven expenses		$11.25
Unit-driven expenses		$ 8.75
Unit margin		$50.00
Sales volume	50,000	
Contribution margin	$2,500,000	
Fixed operating expenses	$1,000,000	
Profit	$1,000,000	

Figure 1.1 Profit models for three product lines

Tip: Before the managers make a final decision, wouldn't it be a good idea to see what would happen to profit? Managers should run through a quick analysis of the consequences of the sales price decision before moving ahead. Otherwise they are operating in the dark and hoping for the best, which may actually turn out to be the worst. Figure 1.2 presents the analysis of the sales price reduction plan.

	Before	After	Change
Standard Product Line			
Sales price	$100.00	$90.00	-10%
Product cost	$65.00	$65.00	
Revenue-driven expenses	$8.50	$7.65	-10%
Unit-driven expenses	$6.50	$6.50	
Unit margin	$20.00	$10.85	-46% ←
Sales volume	100,000	110,000	10%
Contribution margin	$2,000,000	$1,193,500	-40%
Fixed operating expenses	$1,000,000	$1,000,000	
Profit	$1,000,000	$193,500	-81%

	Before	After	Change
Generic Product Line			
Sales price	$75.00	$67.50	-10%
Product cost	$57.00	$57.00	
Revenue-driven expenses	$3.00	$2.70	-10%
Unit-driven expenses	$5.00	$5.00	
Unit margin	$10.00	$2.80	-72% ←
Sales volume	150,000	165,000	10%
Contribution margin	$1,500,000	$462,000	-69%
Fixed operating expenses	$500,000	$500,000	
Profit	$1,000,000	($38,000)	-104%

	Before	After	Change
Premier Product Line			
Sales price	$150.00	$135.00	-10%
Product cost	$80.00	$80.00	
Revenue-driven expenses	$11.25	$10.13	-10%
Unit-driven expenses	$8.75	$8.75	
Unit margin	$50.00	$36.12	-28% ←
Sales volume	50,000	55,000	10%
Contribution margin	$2,500,000	$1,986,875	-21%
Fixed operating expenses	$1,500,000	$1,500,000	
Profit	$1,000,000	$486,875	-51%

Figure 1.2 10% lower sales prices and 10% higher sales volumes.

Whoops! Cutting sales prices would be nothing short of a disaster. Assuming the sales volume predictions turn out to be correct the sales price reduction would push the generic product line into the red and cause substantial profit deterioration in the other two product lines. Why is there such a devastating impact on profit? Why would things turn out so badly? For each product line sales price, revenue-driven expenses and

sales volume change 10%. But the key change is the percent decrease in unit margin for each product. For instance, the *standard product* unit margin would go down a huge 46% from $20.00 to $10.85 (see figure 1.2). This contribution margin drops 40% and profit drops 81%.

The puny 10% gain in sales volume is not nearly enough to overcome the 46% plunge in unit margin. You can't give up almost half your unit contribution margin and make it back with a 10% sales volume increase. In fact, any trade-off that lowers sales price on the one side with an equal percent increase in sales volume on the other side pulls the rug out from under profit.

Yet frequently we see sales price reductions of 10% or more. What's going on? First of all, many sales price reductions are from list prices that no one takes seriously as the final price – such as sticker prices on new cars. List prices are only a point of departure for getting to the real price. Everyone wants a discount. I'm sure you've heard people say, "I can get it for you wholesale."

The example is based on real prices, or the sales revenue per unit actually received by the business. Can a business cut its real sales price by 10% and increase profit? Sales volume would have to increase much more than 10%, which I explain shortly. Would trading a 10% sales price cut for a 10% sales volume increase ever be a smart move? It would seem not; we have settled this point in the preceding analysis, haven't we? Well there is one exception that brings out an important point.

A Special Case: Sunk Costs

Notice in figure 1.1 that the unit costs for the products remain the same at the lower sales price; there are no changes in the product cost per unit for the product lines. This seems to be a reasonable assumption. To have products for sale, the business either has to buy (or make) them at this unit cost or; if already in inventory, has to incur this cost to replace units sold. This is the normal situation, of course. But it may not be true in certain unusual and non-typical cases.

A business may not replace the units sold; it may be at the end of the product's life cycle. For instance, the product may be in the process of being phased out and replaced with a newer model. In this situation the historical, original accounting cost of inventory becomes a sunk cost, which means that it's water over the dam; it can't be reversed.

Tip: Suppose the units held in inventory will not be replaced, that the business is at the end of the line on these units and is selling off its remaining stock. In this situation the book value of the inventory (the recorded accounting cost) is not relevant. What the business paid in the past for the units should be disregarded.* For all practical purposes the unit product cost can be set to zero for the units held in stock. The manager should ignore the recorded product cost and find the highest sales price would move all the units out of inventory.

**The original cost (book value) of products that will not be replaced when sold should be written down to a lower value (possibly zero) under the lower-of-cost-or-market (LCM) accounting rule. This write-down is based on the probable disposable value of the products. If such products have not yet been written down, the manager should make*

the accounting department aware of this situation so that the proper accounting adjusting entry can be recorded.

VOLUME NEEDED TO OFFSET SALES PRICE CUT

In analysing sales price reductions, managers should determine just how much sales volume increase would be needed to offset the 10% sales price cut. In other words, what level of sales volume would keep contribution margin the same? For the moment, assume that the fixed expenses would remain the same – that additional sales volume could be taken on with no increase in fixed costs. The sales volumes needed to keep profit the same for each product line are computed by dividing the contribution margins of each product line at the original sales prices by the unit margins at the lower sales prices.

Product	***Contribution Margin***		***Lower Unit Margin***		***Required Sales Volume***
Standard	$2,000,000	÷	$10.85	=	184,332 units
Generic	$1,500,000	÷	$2.80	=	535,714 units
Premier	$2,500,000	÷	$36.12	=	69,213 units

Figure 1.3 (on the next page) summarizes the effects of these higher sales volumes and shows that the number of units sold would have to increase by rather than large percents – from a 257% increase for the *generic product* line to a 38% increase for the *premier product* line. Would such large sales volume gains be possible? Doubtful, to say the least. And to achieve such large increases in sales volume, fixed expenses would have to be increased, probably by quite large amounts. Also, interest expense would increase because more debt would be used to finance the increase in operating assets needed to support higher sales volume.

Tip: The moral of the story, basically, is that a 10% sales price cut usually takes such a big bite out of unit contribution margin that it would take a huge increase in sales volume to stay even (i.e. to earn the same profit as before the price cut). Managers should think long and hard before making sales price reductions.

Short-Term and Limited Sales

The preceding analysis applies the sales price reduction to all sales for the entire year. However, many sales price reductions are limited to a relatively few items and are short-lived, perhaps for only a day or weekend. Furthermore, the sale may bring in customers who buy other items not on sale. Profit margin is sacrificed on selected items to make additional sales of other products at normal profit margins.

Tip: Indeed, many retailers seem to have some products on sale virtually every day of the year. In this case the normal profit margin is hard to pin down, since almost every product takes its turn at being on sale. In short, every product may have two profit margins – one when not on sale and one when on sale.

	Before	After	Change
Standard Product Line			
Sales price	$100.00	$ 90.00	-10%
Product cost	$65.00	$65.00	
Revenue-driven expenses	$8.50	$7.65	-10%
Unit-driven expenses	$6.50	$6.50	
Unit margin	$20.00	$10.85	-46%
Sales volume	100,000	184,332	84% ←
Contribution margin	$2,000,000	$2,000,000	
Fixed operating expenses	$1,000,000	$1,000,000	
Profit	$1,000,000	$1,000,000	

	Before	After	Change
Generic Product Line			
Sales price	$75.00	$67.50	-10%
Product cost	$57.00	$57.00	
Revenue-driven expenses	$3.00	$2.70	-10%
Unit-driven expenses	$5.00	$5.00	
Unit margin	$10.00	$2.80	-72% ←
Sales volume	150,000	535,714	257%
Contribution margin	$1,500,000	$1,500,000	
Fixed operating expenses	$500,000	$500,000	
Profit	$1,000,000	$1,000,000	

	Before	After	Change
Premier Product Line			
Sales price	$150.00	$135.00	-10%
Product cost	$80.00	$80.00	
Revenue-driven expenses	$11.25	$10.13	-10%
Unit-driven expenses	$8.75	$8.75	
Unit margin	$50.00	$36.12	-28% ←
Sales volume	50,000	69,213	38%
Contribution margin	$2,500,000	$2,500,000	
Fixed operating expenses	$1,500,000	$1,500,000	
Profit	$1,000,000	$1,000,000	

Figure 1.3 Sales volumes needed to offset 10% sales price cuts

The average profit margin for the year depends on how often the item goes on sale.

In any case, the same basic analysis also applies to limited, short-term sales price reductions. The manager should calculate, or at least estimate, how much additional sales volume would be needed on the sale items just to remain even with the profit that would have been earned at normal sales prices. Complicating the picture are sales of other products (not on sale) that would not have been made without the increase in sales traffic caused by the sale items. Clearly, the additional sales made at normal profit margins are a big factor to consider, though this may be a very hard estimate with any precision.

THINKING IN REVERSE: GIVING UP SALES VOLUME FOR HIGHER SALES PRICES

Suppose the general managers of the three product lines are thinking of a general 10% sales increase, knowing that sales volume probably would decrease. In fact, they predict the number of units sold will drop at least 10%. Sales managers generally are very opposed to giving up any sales volume, especially at a loss of market share that could be difficult to recapture later. Any move that decreases sales volume has to be considered very carefully. But for the moment let's put aside these warnings. Would a 10% sales price hike be a good move if sales volume dropped only 10%?

The profit analysis for this trade-off is shown in Figure 1.4 however before you look at it, what would you expect? An increase in profit? Yes, but would you expect the profit increases to be as large as shown in Figure 1.4? The unit margins on each product line would increase substantially, from 28% on the *premier* products to 72% on the *generic* products. These explosions in unit margins would more than offset the drop in sales volumes and would make for dramatic increases in profit. Fixed expenses wouldn't go up with the decrease in sales volume. If anything, some of the fixed operating costs possibly could be reduced at the lower sales volume level.

The big jumps in profit reported in Figure 1.4 are based on the prediction that sales volume would drop only 10%. But actual sales might fall 15, 20, or even 25%.

	Before	After	Change
Standard Product Line			
Sales price	$100.00	$110.00	10%
Product cost	$65.00	$65.00	
Revenue-driven expenses	$8.50	$9.35	10%
Unit-driven expenses	$6.50	$6.50	
Unit margin	$20.00	$29.15	46% ←
Sales volume	100,000	90,000	-10%
Contribution margin	$2,000,000	$2,623,500	31%
Fixed operating expenses	$1,000,000	$1,000,000	
Profit	$1,000,000	$1,623,500	62%

	Before	After	Change
Generic Product Line			
Sales price	$75.00	$82.50	10%
Product cost	$57.00	$57.00	
Revenue-driven expenses	$3.00	$3.30	10%
Unit-driven expenses	$5.00	$5.00	
Unit margin	$10.00	$17.20	72% ←
Sales volume	150,000	135,000	-10%
Contribution margin	$1,500,000	$2,322,000	55%
Fixed operating expenses	$500,000	$500,000	
Profit	$1,000,000	$1,822,000	82%

	Before	After	Change
Premier Product Line			
Sales price	$150.00	$165.00	10%
Product cost	$80.00	$80.00	
Revenue-driven expenses	$11.25	$12.38	10%
Unit-driven expenses	$8.75	$8.75	
Unit margin	$50.00	$63.87	28% ←
Sales volume	50,000	45,000	-10%
Contribution margin	$2,500,000	$2,874,150	15%
Fixed operating expenses	$1,500,000	$1,500,000	
Profit	$1,000,000	$1,374,150	37%

Figure 1.4 10% higher sales prices and 10% lower sales volumes

Profit can be calculated for any particular sales volume decrease prediction, of course. No one knows how sales volume might respond to a 10% sales price increase. Sales may not decrease at all. For instance, the higher prices might enhance the prestige or upscale image of the standard products and attract a more upscale clientele who are quite willing to pay the higher price. Or sales may drop more than 25% because customers search for better prices elsewhere.

How much could sales volume fall and keep total contribution margin the same? This sales volume is computed for the standard product as follows:

$$\frac{\$2{,}000{,}000 \text{ contribution margin target}}{\$29.15 \text{ higher unit margin}} = 68{,}611 \text{ units}$$

Sales volume would have to drop more than 30% (from 100,000 units in the original scenario less than 70,000 units at the higher sale prices). Sales may not drop off this much, at least in the short run. And fixed operating expenses probably could be reduced at the lower sales volume level.

Given choice, my guess is that the large majority of business managers would prefer keeping their market share and not giving up any sales volume, even though profit could be maximised with higher sales prices and lower sales volumes. Protecting sales volume and market share is deeply ingrained in the thinking of most business managers.

Any loss of market share is taken very seriously. By and large, you'll find that successful companies have built their success on getting and keeping a significant market share so that they are a major player and dominant force in the marketplace.

True, some companies don't have a very large market share – they carve out a relatively small niche and build their business on low sales volume at premium prices, the preceding analysis for the premier product line demonstrates the profit potential of this niche strategy, which is built on higher unit margins that more than make up for smaller sales volume.

END POINT

Seldom does one profit factor change without changing or being changed by one or more other profit factors. The interaction effects of the changes should be carefully analysed before making final decisions or locking into a course of action that might be difficult to reverse. Managers should keep their attention riveted on unit margin. Profit performance is most responsive to changes in the unit margin.

Basically, there are only two ways to improve unit margin: (1) increase sales price or (2) decrease product cost and/or other variable operating expenses per unit. The sales price is the most external or visible part of the business – the factor most exposed to customer reaction. In contrast, product cost and variable expenses are more internal and invisible. Customers may not be aware of decreased expenses unless such cost savings show up in lower product quality or worse service.

Last, the importance of protecting sales volume and market share is mentioned in this article. Marketing managers know what they're talking about on this point, that's for

sure. Recapturing lost market share is not easy. Once gone, customers may never return.