From a section of Chapter 3 of The Product Manager's Handbook, 4e

Gauge *relevant* costs for price decisions

Evaluating the costs related to the pricing decision is often more difficult than it seems. Companies use different approaches for allocating costs, so the variable and fixed costs can become blurred. Nevertheless, definitions of these common pricing terms are relevant.

As mentioned earlier, v*ariable costs* are those that vary (in total) with production of the product or service. This could include direct materials and labor. For a given production level, these are constant per unit and provide the floor for pricing decisions. In the long run, *all* costs must be covered, and the long-term pricing of products should consider all costs. However, in the short run, any price obtained that exceeds variable costs can at least contribute to fixed overhead and (potentially) profit.

The cost of goods sold (COGS) line item on financial statements is perhaps your best approximation of variable costs (even though it traditionally includes some standard allocations) and therefore might provide the only incremental costs relevant to a pricing decision. There are exceptions when fixed costs are incurred for a bid situation, for example, that are incremental to that decision. In that case, the incremental fixed costs must be added to the variable costs to determine the floor for pricing decisions.

The following break-even formula can be used as a starting point for evaluating a price. The standard break-even formula shows the number of units that must be sold at a given price to cover all costs. The formula is:

$$\text{Break-even units} = \frac{\text{Fixed costs}}{\text{(Price - Variable cost per unit)}}$$

Suppose a product manager of consulting services handling ten projects for $10,000 each has direct costs of $4,000 per project and overhead costs of $42,000. Based on that data, it would be necessary to generate sales of seven units to break even. By experimenting with different price levels and matching that with expected demand, the product manager can begin the pricing analysis. In addition, a target return (profit) can be included in the numerator (along with fixed costs) to assess the unit sales necessary to contribute a specified profit. For example, if a required profit of $12,000 were added to the fixed costs in the numerator, it would be necessary to generate sales of nine units to break even.

Building on this example, we can look at contribution margins and evaluate different decisions. Each project contributes $6,000—the difference between the current price and the variable costs—to overhead and profits. The operating profit would be $18,000, as shown in the first column of Figure 3.4.

Figure 3.4 Price/Profit Comparison

	(1)	(2)	(3)
Revenue			
(10@ 10,000)	$100,000		
(10@ $9,000)		$90,000	
(12@ $9,000)			$108,000
Cost of sales			
(10@ $4,000)	$40,000	$40,000	
(12@$4,000)			$48,000
Contribution margin	60,000	50,000	60,000
Operating expenses	42,000	42,000	42,000
Net operating income	18,000	8,000	18,000

If the product manager drops the price to $9,000 per project, each project would contribute only $5,000 to overhead and profit. Assuming no other changes, the new revenue would be $90,000, and the new bottom-line profit would be $8,000. The 10 percent drop in price (from $10,000 to $9,000) would result in a 55 percent drop (from $18,000 to $8,000) in operating profit (see the second column in Figure 3.4).

To keep its profit at $18,000, the firm would need to land two more jobs. Because we assumed that operating expenses—fixed costs—don't change with an increase in unit sales, the objective is to provide a contribution margin of at least $60,000. Hence, the firm would need to handle twelve projects rather than ten ($60,000 divided by the new per-project contribution of $5,000), as shown in the third column of Figure 3.4. The two additional jobs represent a 20 percent increase in sales to compensate for the 10 percent drop in price.

By adapting the break-even formula presented earlier, it is possible to quickly look at the impact of a price change. The modified formula is shown in Figure 3.5. CM stands for contribution margin (the difference between price and variable cost, or $10,000 - $4,000 = $6,000, in this example). The %CM refers to the contribution margin per unit expressed as a percentage of the price ($6,000 divided by $10,000). The result is the percentage change in unit sales necessary to contribute the same profit return as now. In other words, with a 60% contribution margin, it would require a 20% increase in sales to have the same bottom line impact after the 10% price cut.

Figure 3.5 Modified Break-Even formula for a Price Change

$$\text{\% break-even sales change} = \frac{-\ (\text{\% price change})}{(\text{\%CM} + \text{\% price change})}$$

$$\text{\% break-even sales change} = \frac{-\ (-.10)}{.60 + (-.10)} = \frac{.10}{.50} = .20$$

This formula can be used in a spreadsheet to display the impact of price changes. Putting relevant contribution margins in the columns, potential price changes in the rows, and the formula in the cells yields a spreadsheet similar to Figure 3.6. Note the solid blue lines (1) connecting the 60% contribution margin and the 10% price with the cell yielding the 20% increase in sales.

Figure 3.6 Spreadsheet example of break-even analysis of price changes

Price change %	Contribution Margin								
	0.65	0.60	0.55	0.50	0.45	0.40	0.35	0.30	0.25
0.10	-0.13	-0.14	-0.15	-0.17	-0.18	.0.20	-0.22	-0.25	-0.29
0.09	-0.12	-0.13	-0.14	-0.15	-0.17	-0.18	-0.20	-0.23	-0.26
0.08	-0.11	-0.12	-0.13	-0.14	-0.15	-0.17	-0.19	-0.21	-0.24
0.07	-0.10	-0.10	-0.11	-0.12	-0.13	-0.15	-0.17	-0.19	-0.22
0.06	-0.08	-0.09	-0.10	-0.11	-0.12	-0.13	-0.15	-0.17	-0.20
0.05	-0.07	-0.08	-0.08	-0.09	-0.10	-0.11	-0.13	-0.14	-0.17
0.04	-0.06	-0.06	-0.07	-0.07	-0.08	-0.09	-0.10	-0.12	-0.14
0.03	-0.04	-0.05	-0.05	-0.06	-0.06	-0.07	-0.08	-0.09	-0.11
0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.07
0.01	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04
-0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04
-0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.07	0.09
-0.03	0.05	0.05	0.06	0.06	0.07	0.08	0.09	0.11	0.14
-0.04	0.07	0.07	0.08	0.09	0.10	0.11	0.13	0.15	0.19
-0.05	0.08	0.09	0.10	0.11	0.13	0.14	0.17	0.20	0.25
-0.06	0.10	0.11	0.12	0.14	0.15	0.18	0.21	0.25	0.32
-0.07	0.12	0.13	0.15	0.16	0.18	0.21	0.25	0.30	0.39
-0.08	0.14	0.15	0.17	0.19	0.22	0.25	0.30	0.36	0.47
-0.09	0.16	0.18	0.20	0.22	0.25	0.29	0.35	0.43	0.56
-0.10	0.18	0.20	0.22	0.25	0.29	0.33	0.40	0.50	0.67

What would have been the necessary change if the variable costs were lower (e.g., $3,500) so that the contribution margin was 65 percent, with everything else equal? In this case, it would have been necessary to increase sales by only 18 percent to break even. What if variable costs were significantly higher (e.g., $7,000) so that the contribution margin was only 30 percent? Again, with everything else the same, what sales change would be necessary to break even? Now the answer is 50 percent, or five additional projects. Price changes can also be evaluated by using the modified break-even formula contained in Figure 3.6. However, if a price increase is being considered it can be useful to time the increase with a product change or additional service that adds value.

So, in looking at price changes it is necessary to understand what impact those changes have on required volume to break even, and then ask a couple of questions. How much leverage do competitors have? If their variable costs on this product are lower, they would be able to withstand a price cut longer. How likely is it that they would want to cut price and sustain it? Also, how sensitive are customers to price changes? Is it possible to sell the required volume change? Remember that the information in the spreadsheet doesn't give you "the answer." It simply provides one data point to help you make a better decision.