

ECONOMIC COSTS



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Context and concepts

- Context: You need to decide whether to exit a product line. What costs should you include when you compute the product's profitability?
- Concepts: economic costs, cash flows, opportunity costs, sunk costs, incremental and marginal costs.

The pen factory

- Factory produces pens of all colors
 - Can produce 8000 pens in an 8-hour day
 - Cost of "pen machine" is \$1000/day (\$125/hour)
 - Materials/labor cost is 15¢/pen
- Market for pens:
 - 30¢ for first 5000 red pens, 20¢ after that
 - 25¢ for blue pens
- Firm decides to produce 5000 red, 3000 blue, netting profit of 50 = $5000 \times (.30 - .15) + 3000 \times (.25 - .15) - 1000$
- Question: Are blue pens profitable?

Consultant's cost analysis

	Red Pens	Blue Pens
Revenues	1500	750
Expenses	1375	825
Materials/labor	750	450
Machinery*	625	375
Profit	125	(75)

*Allocated proportional to production

Question: Should we shut down blue pen production?

Answer: It depends! (on the nature of the machine cost)

Scenario A (sunk cost)

Suppose: Machine was bought years ago, cost represents amortization and interest, and we're stuck with it (it's "sunk")

Profit without blue pens is $5000 \times (.30 - .15) - 1000 = -250$
 => we're better off making them!

Revised cost analysis:

	Red Pens	Blue Pens
Revenues	1500	750
Expenses	750	450
Materials/labor	750	450
Contribution to overhead	750	300

If we do not produce blue pens, we throw away 300 "contribution"

Scenario A (marginal cost)

There's another way to think about the previous scenario: When we compare making blue pens and not making them, what matters is how revenues and expenses change. We care about the "incremental" or "marginal" cost of making them.

Incremental revenue: 750 (no change)

Incremental cost: 450 (there's no extra cost associated with using the machine, since we're stuck with it)

Incremental profit from producing blue pens: 300

Comment: the term "marginal cost" is more typically used to describe very small changes (using calculus), but it's the same idea. More on this later.

Scenario B (opportunity cost)

Suppose: Machine was bought years ago etc BUT we can rent it to the local crayon maker for 105/hour

We say: "Opportunity cost" of using the machine is 105/hour, even though we've already paid for it

Revised cost analysis:

	Red Pens	Blue Pens
Revenues	1500	750
Expenses	1275	765
Machinery (opp cost)	525	315
Materials/labor	750	450
Surplus	225	(15)

Answer: shut down blue pens, rent machine to crayon maker

Scenario C

Suppose: You lease the machine for \$1000/day, regardless of how many hours you use it. It is impossible to rent the machine for a fraction of the day.

Answer: As regards the choice of shutting down one of the product lines, answer is as in the case of a sunk cost. But now must also consider decision of shutting down the entire factory. But since total profit is positive, answer is (a) leave it open (b) keep both lines functioning.

Formal definitions

- Economic costs of doing A rather than B:

$$\text{Economic Costs} = \text{Actual Expenditures} + \text{Opportunity Costs} - \text{Sunk Costs}$$

- Actual Expenditures** are the cash outlays incurred if Choice A is picked.
- Opportunity Costs** (associated with Choice A) are the revenues (benefits) foregone by choosing A instead of B. A.k.a. "imputed costs." They affect the choice between A and B even though no actual expense is incurred.
- Sunk Costs** are actual expenses that would be incurred whether or not A or B is chosen. Therefore they do not affect the choice between A and B.

Examples of opportunity cost

- Jury duty
 - Actual cost to judicial system: zero
 - Opportunity cost: lost work of jurors
- Airbus A300-600, a.k.a. Beluga
 - Actual cost: development, production
 - Opportunity cost: foregone income from leasing
- Additional examples in lecture notes

Examples of sunk costs

- Software upgrades
 - Should we upgrade to XP?
 - license vs purchase?
- Shoreham nuclear plant
- Eurotunnel
- Airbus (again)
 - huge initial investment through subsidies
 - currently profitable
 - what if subsidies had been loans?
- Additional examples in lecture notes

Allocating overhead

- The consultant's analysis of the pen factory shows that even a "reasonable" allocation of overhead (pro-rated) can produce a bad decision (shut down blue pens).
- Problem: Costs shouldn't affect decisions if they can't be changed; eg, if they're irreversible (sunk) or fixed.
- Paul Corrado's example: Allocate overhead proportional to revenue. Then the line of business doing the best gets an *increased* share of overhead, possibly making it look worse than it should.

Takeaways

- The costs that matter in deciding between A and B are those that differ between the two decisions.
- Opportunity costs involve no cash outlay, but matter to decisions.
- Sunk costs do involve cash payments, but do not matter to decisions (they can't change).
- Overhead is particularly troublesome, especially its distribution across lines of business. In deciding whether to exit a business, the question is whether this would reduce overhead. If not, then the cost is irrelevant to the exit decision.