

Incremental Analysis

LO 1: Analysis

Terms

Incremental analysis

Relevant cost

Opportunity cost

Sunk cost

Analysis:

- Incremental analysis uses financial data that changes among alternatives to help decision making
- Incremental analysis identifies probable effect of decisions on future earnings, but does involve estimates and uncertainty
- Relevant costs and benefits are those that differ among alternatives
- Sunk costs are costs that have already been incurred and that cannot be changed by any decision made now or in the future, are never relevant
- Opportunity costs are factors in the decision-making process because they differ among alternatives.
- Incremental analysis looks at quantitative factors, but some qualitative factors should be considered as well in decision making

Types:

- Accept an order at a special price
- Make or buy a component or finished product
- Sell products as is or process them further
- Repair, retain, or replace equipment
- Eliminate an unprofitable segment or product

Example #1

B Company normally runs at capacity and the Model CY1000 machine is the company's production constraint. Management is considering purchasing a new machine, Model CZ4000 and selling the CY1000. The CZ4000 is more efficient and can produce 20% more units than the old one. If the new machine is purchased, there should be a reduction in maintenance costs. The company will need to borrow money in order to purchase the CZ4000. The increase in volume will require increases in fixed selling expense, but general administrative expenses will remain unchanged.

Required: For each cost listed below, determine whether the cost is relevant

or irrelevant to the decision to replace the CY1000.

- a) Sales Revenue
- b) Direct materials
- c) Direct labor
- d) Variable manufacturing overhead
- e) Rent on the factory building
- f) Janitorial salaries
- g) President's salary
- h) Book Value of CY1000
- i) Cost of CY1000
- j) Cost of CZ4000
- k) Interest on money borrowed to make purchase.
- l) Shipping costs
- m) Market value of old machine CY1000
- n) Insurance on factory building
- o) Salaries paid to personnel in sales office

LO 2: Special Orders

Special orders are the simplest decision: if the special order is not accepted, then nothing changes; if the special order is accepted, then the only change from the status quo is the special order itself. Therefore only the special order itself should be analyzed.

Note:

- As long as there is capacity to produce the product, the special order will not affect fixed costs
- Assume sales of other products will not be affected by the special order
- Compare variable cost per unit to sales price per unit. If sales price exceeds variable cost per unit, accept the project. Net income would increase by contribution margin per unit multiplied by number of units.

Example #2

T Company produces a single product. The cost of producing and selling a single unit of this product at the company's normal activity level of 8,000 units per year is:

Direct materials	\$2.50
Direct labor	3.00
Variable manufacturing overhead	.50
Fixed manufacturing overhead	4.25
Variable selling and administrative expense	1.50
Fixed selling and administrative expense	2.00

The normal selling price is \$15.00 per unit. The company's capacity is 10,000 units per month. An order has been received from an overseas source for 2,000 units at the special price of \$12.00 per unit. This order would not affect regular sales.

- Required: a) If the order is accepted, how much will monthly profits increase or decrease? (The order will not change the company's total fixed costs.)

LO 3: Make or Buy

Make or buy decisions do not involve revenue; rather they are least-cost decisions: is it cheaper to make the product in-house or to contract it out to a supplier? For these decisions, common allocated fixed costs are rarely relevant.

Buying the product from a supplier may make manufacturing and/or warehouse space available for an alternative, profitable use. The potential profits are opportunity costs that are added to the costs of manufacturing the product in-house.

Example #3

For many years L Company has purchased the starters that it installs in its standard line of garden tractors. Due to a reduction in output, the company has idle capacity that could be used to produce the starters. The chief engineer has recommended against this move, however, pointing out that the cost to produce the starters would be greater than the current \$10.00 per unit purchase price. The company's unit product cost, based on a production level of 60,000 starters per year, is as follows:

	<u>Make</u>	
Direct materials	\$4.00	
Direct labor	2.75	
Variable manufacturing overhead	.50	
Fixed manufacturing overhead, traceable	3.00	\$180,000
Fixed manufacturing overhead, common (allocated based on direct labor hours)	2.25	135,000
Total production cost	\$12.50	

An outside supplier has offered to supply the starter to Lansing for only \$10.00 per starter. One-third of the traceable fixed manufacturing costs represent supervisory salaries and other costs that can be eliminated if the starters are purchased. The other two-thirds of the traceable fixed manufacturing costs is depreciation of special manufacturing equipment that has no resale value. The decision would have no effect

on the common fixed costs of the company and the space being used to produce the parts would otherwise be idle.

Required: Should the company make or buy the starters?

LO 4: Sell or Process Further Decisions

Terms

Joint products

Rule: Process further as long as the incremental revenue from such processing exceeds the incremental processing costs

In some industries, multiple products can be produced from a single raw material. Typically these products emerge after some amount of processing has been done to the raw material. For example, a lumber mill will process the basic raw material, logs, up to the point at which they have been cut into lumber. Certainly the rough-cut lumber can be sold as-is, but it could also be processed further into consumer-ready products. The sawdust and shavings could also be sold as-is or processed further into products such as particleboard.

- Costs incurred in processing the basic raw materials up to the point where the separate products emerge are called joint costs.
- The point where these separate or joint products emerge is called the **split-off point**.
- Joint costs are irrelevant for any sell-or-process further decisions. **Joint product costs are sunk costs.**
- The additional processing occurs at an additional cost and generates additional sales revenue.
- The decision whether to process further is based on the incremental profit after the split off point.

Example #4

U Company processes slaughtered steers. All carcasses are processed to the point where they can be sold as sides of beef to grocery stores, butcher shops and restaurants. The cost to process each steer is \$700. The carcass can be sold for \$600 and the hides can be sold for \$300 each. Joint costs are allocated to the products based on total sales value at the split-off point. 100,000 steers are processed each year.

The carcasses may be processed further by cutting them into consumer-ready products such as steaks and chops. Further processing is very labor intensive, incurring an addition \$500 per carcass. The finished products from each carcass can be sold for

\$1,300. The hides can be cleaned before being sold. Cleaning adds \$75 of additional cost. Cleaned hides can be sold for \$350.

Required: Which products should be sold at the split-off point and which products should be processed further?

LO 5: Repair, Retain, or Replace

For this decision, management needs to decide would decision would benefit the company over a period of time.

Note:

- Book value of old equipment is not relevant as it is a sunk cost
- Compare relevant costs to determine which is a cheaper alternative, including any revenue that can be generated based on the alternatives

Example #5

The Company is trying to determine whether to repair an old delivery truck, or replace it with a new one. The old delivery truck as purchased for \$60,000, and has a current accumulated depreciation of 45,000. The current truck has a remaining useful life of five years, but could be sold now for \$2,000. The new truck would have a purchase price of \$72,000, and would have a useful life of 5 years, with no salvage value. The purchase of the new truck would decrease variable manufacturing costs from \$30,000 per year to \$25,000 per year.

Required: Determine is management should keep the old truck or buy the new one.

LO 6: Eliminating a Segment or Product

For this decision, the question is whether avoiding traceable and perhaps common fixed costs will offset the lost contribution margin from the eliminated segment or product. Eliminating a segment or product may also affect the profitability of some or all of the remaining segments or products. These effects must be included in the analysis of the decision.

- It is important to only focus on the relevant costs, or the data that changes under the alternative.
- A decision to discontinue a segment or product based on the net loss is inappropriate.

Example #6

B Company, a retailing company, has two departments, X and Y. A recent monthly contribution format income state for the company follows.

	<u>X</u>	<u>Y</u>	<u>Total</u>
Sales	\$3,000,000	\$1,000,000	\$4,000,000
Variable expenses	<u>900,000</u>	<u>400,000</u>	<u>1,300,000</u>
Contribution margin	2,100,000	600,000	2,700,000
Fixed expenses	<u>1,400,000</u>	<u>800,000</u>	<u>2,200,000</u>
Operating income (loss)	\$700,000	(\$200,000)	\$500,000

A study indicates that \$640,000 of the fixed expenses being charged to Y are sunk costs or allocated costs that will continue even if Y is dropped.

Required: If Department Y is discontinued, will this be a positive move or a negative move for the company as a whole?

Solution #1

Relevant: a, b, c, d, j, k, l, m, o

Not Relevant: e, f, g, h, i, n

Solution #2

a)

Selling price		\$12.00
Direct materials	\$2.50	
Direct labor	3.00	
Variable manufacturing overhead	.50	
Variable selling and administrative expense	1.50	
Total variable expenses		7.50
Contribution margin		4.50
Units sold		2,000
Increase in Net income		\$9,000

Solution #3

	Relevant Costs	
	Make	Buy
Direct materials	\$4.00	
Direct labor	2.75	
Variable manufacturing overhead	.50	
Fixed manufacturing overhead, traceable	1.00	
Purchase price		\$10.00
Total relevant cost	\$8.25	\$10.00
Units produced	60,000	60,000
Total Cost	\$495,000	\$600,000

The two-thirds of the traceable fixed manufacturing overhead costs that cannot be eliminated, and all of the common fixed manufacturing overhead costs, are irrelevant and not included for decision making purposes. The company would save \$105,000 per year by making the parts itself. In other words, profits would decline by \$105,000 per year if the parts were purchased from the outside supplier.

Solution #4

Selling the products at the split-off point is profitable as the total sales value of each steer is \$900 and the joint costs are \$700, producing a profit of \$200 per steer.

Further processing of hides:

Cleaning the hides generates \$50 of additional revenue: \$350 sales value after cleaning - \$300 sales value at the split-off point. However, the cost of cleaning each hide is \$75. Therefore cleaning each hides results in a \$25 loss: \$50 - \$75. Hides should be sold at the split-off point.

Further processing of carcasses:

Cutting the carcasses into consumer-ready products generates \$700 of additional revenue: \$1,300 sales value of the consumer-ready products - \$600 sales value at the split-off point. However, the cost of further processing each carcass is \$500. Therefore further processing results in a \$200 profit: \$700 - \$500. Carcasses should be sold after processing beyond the split-off point.

Solution #5

	Old Truck	New Truck	Net Income (decrease)
Variable Manufacturing Cost	\$150,000	\$125,000	25,000
New Truck Cost		72,000	(72,000)
Sale of old truck		(2,000)	2,000
Total	\$150,000	\$195,000	(45,000)

Note: The company should keep the old truck as it will cost less over the 5 year period. When comparing alternatives, Alternative 1- Alternative 2= net income (decrease)

Solution #6

	<u>Continue</u>	<u>Eliminate</u>	<u>Total</u>
Sales	\$1,000,000	0	\$(1,000,000)
Variable expenses	<u>400,000</u>	<u>0</u>	<u>400,000</u>
Contribution margin	600,000	0	(600,000)
Fixed expenses	<u>800,000</u>	<u>640,000</u>	<u>160,000</u>
Operating income (loss)	(\$200,000)	(640,000)	\$(440,000)

The incremental analysis concludes that management should continue with Department Y, as if they eliminate this it will cause an additional loss of \$440,000.

Note: When comparing alternatives, make sure to recognize if the line item would initially increase or decrease the operating income.