

Relevant Costs & Revenues

Non-Routine Business Decisions

Non-Routine Business Decisions

Examples:

1. Whether to make or buy your product.
2. Whether to accept a special customer order.
3. Whether to discontinue or add a product line.
4. Whether to install a new computerized accounting system.

Costs and Revenues Relevant for Non-Routine Business Decisions

Relevant costs and revenues are the costs or revenues which should affect our decision.

$$\text{Relevant Costs/Revenues} = \text{Differential Costs/Revenues}$$

Differential costs and revenues are future costs and revenues that vary among decision alternatives. Such costs and revenues are sometimes referred to as direct costs and revenues of a decision alternative and are avoidable if the other option is selected.

Identifying Relevant Costs/Revenues

<u>Fly to California</u>	<u>Drive to California</u>
Airfare	Auto Gas/Wear
Airport Parking	(1,300 miles)
Car Rental	Auto Wear in Calif.
	(500 miles)
	Las Vegas Fun
	Opportunity Cost

Opportunity Costs are foregone revenues arising from a decision alternative.

Sunk costs are past costs.
Past costs are always irrelevant.

Make vs. Buy

Examples of Non-Routine Decisions

1. Whether to make or buy a component part or product.

Example: ABC, Inc., a game manufacturing company, is considering contracting out the manufacture of its chess boards. A Malaysian company has agreed to make the boards according to ABC's specifications for **\$5.10** a unit. ABC's current per unit cost of manufacturing the board themselves is as follows:

Direct Materials	\$2.50	} \$4.75
Direct Labor	\$1.50	
Variable Mfg. Overhead	\$.75	
Fixed Mfg. Overhead	\$.50	
	\$5.25	

The fixed manufacturing overhead cost per unit is calculated, based on a volume of **100,000** units. Therefore, the total fixed manufacturing overhead cost is **\$50,000**. If production is discontinued, then **60%** of these fixed overhead costs (**\$30,000**) can be avoided.

Manufacturing Supervisor Salary	\$30,000
Rental Cost of Mfg. Facility	\$20,000
Fixed Manufacturing Overhead	\$ 20,000

Assume sales/production volume is anticipated at **100,000** units. Would it be better economically to buy the chess boards from Malaysia or continue to manufacture them ourselves?

	<u>Buy</u>	<u>Make</u>
Contract Cost (\$5.10 × 100,000)	\$510,000	
Fixed Supervisor Salary		\$ 30,000
Variable Product Costs (\$4.75 × 100,000)		\$475,000
	<u>\$510,000</u>	<u>\$505,000</u> ✓

Assume sales/production volume is anticipated at **80,000** units. Would it be better economically to buy the chess boards from Malaysia or continue to manufacture them ourselves?

	<u>Buy</u>	<u>Make</u>
Contract Cost (\$5.10 × 80,000)	\$408,000	
Fixed Supervisor Salary		\$ 30,000
Variable Product Costs (\$4.75 × 80,000)		\$380,000
	<u>\$408,000</u> ✓	<u>\$410,000</u>

Assume sales/production volume is anticipated at **100,000** units. Would it be better economically to buy the chess boards from Malaysia or continue to manufacture them ourselves? Also assume we can sublease the space used to produce the chess boards for \$10,000.

	<u>Buy</u>	<u>Make</u>
Contract Cost (\$5.10 × 100,000)	\$510,000	
Fixed Supervisor Salary		\$ 30,000
Variable Product Costs (\$4.75 × 100,000)		\$475,000
Sublease Revenues	(\$10,000)	
	<u>\$500,000</u> ✓	<u>\$505,000</u>

or

Contract Cost (\$5.10 × 100,000)	\$510,000	
Fixed Supervisor Salary		\$ 30,000
Variable Product Costs (\$4.75 × 100,000)		\$475,000
Foregone Sublease Revenues	\$10,000	\$ 10,000
	<u>\$510,000</u> ✓	<u>\$515,000</u>

Discontinue vs. Add

2. Whether to discontinue or add a product line.

Example: ABC, Inc. had net income from operations last year of **\$85,000** which included the following results from the Checkers product line:

	<u>Keep</u>	<u>Drop</u>
Sales Revenues	\$150,000	\$ 0
Variable Product Costs	(90,000)	0
Variable Period Costs	(30,000)	0
Contribution Margin	<u>30,000</u>	<u>0</u>
Direct Fixed Product and Period Costs	(20,000)	0
Income before Indirect Costs	10,000	0
Indirect (allocated) Fixed Product and Period Costs	(15,000)	(15,000)
Operating Income (Loss)	<u>(\$5,000)</u>	<u>(\$15,000)</u>
		↙ ↘ (\$10,000)

Problem: Add vs. Drop a Product

Jones Company has three divisions with the following operating results:

	<u>P</u>	<u>Q</u>	<u>R</u>	<u>Total</u>
Sales Revenue	\$75,000	\$125,000	\$50,000	\$250,000
Variable Costs	(43,000)	(67,000)	(27,000)	(137,000)
Contribution Margin	<u>32,000</u>	<u>58,000</u>	<u>23,000</u>	<u>113,000</u>
Direct Fixed Costs	(12,000)	(24,000)	(19,000)	(55,000)
Indirect / Allocated Fixed Costs	(8,000)	(12,000)	(7,000)	(27,000)
Operating Income (Loss)	<u>\$12,000</u>	<u>\$22,000</u>	<u>(\$3,000)</u>	<u>\$31,000</u>

Jones is considering termination of Division R because of its operating loss. What would be the effect on total operating income with the termination of R assuming that there is no alternative use of the resulting idle capacity?

Solution: Add vs. Drop a Product

	<u>Continue All</u>	<u>Discontinue R</u>	<u>Differentiated Revenues/Costs</u>
Sales Revenues	\$250,000	\$200,000	(\$50,000)
Variable Costs	(137,000)	(110,000)	27,000
Contribution Margin	<u>113,000</u>	<u>90,000</u>	<u>23,000</u>
Direct Fixed Costs	(55,000)	(36,000)	19,000
Indirect / Allocated Fixed Costs	(27,000)	(27,000)	0
Operating Income (Loss)	<u>\$31,000</u>	<u>\$27,000</u>	<u>(\$4,000)</u>

Total net income would be reduced by **\$4,000** in the event that Division R is terminated.

Special Order

3. Whether to accept a special order from a customer.

Example: ABC is considering a large special order from an important customer for **10,000** units of a board game at a discounted price. What would be the lowest price possible before ABC would actually lose money on the sale given the following game costs:

Direct Materials	\$7.00/unit
Direct Labor	\$2.50/unit
Variable Mfg. Overhead	\$1.00/unit
Variable Selling and Admin.	\$.20/unit

Additional direct fixed manufacturing overhead costs amounting to **\$2,000** would be incurred as a result of this special order. All other fixed manufacturing overhead and selling and administrative costs would be unaffected by the order (there is sufficient capacity to accommodate the order).

Differential Per Unit Costs of Special Order:

Direct Materials	\$ 7.00
Direct Labor	\$ 2.50
Variable Mfg. Overhead	\$ 1.00
Variable Selling and Admin.	\$.20
Fixed Mfg. Overhead	
(\$2,000 ÷ 10,000 units)	\$.20
Total Per Unit Cost	\$10.90

Are there any qualitative issues which should be considered in the decision as to whether to accept such a special order?

Product Emphasis

4. Which product should be emphasized in a situation of limited critical resources.

Example: A company which manufactures bicycles and tricycles is extremely successful in marketing their products and can sell as many units as they can produce of either product. The relative contribution margin per unit of the two products is as follows:

	<u>Bicycles</u>	<u>Tricycles</u>
Sales Revenues	\$70	\$50
Variable Product and Period Costs	<u>40</u>	<u>25</u>
Contribution Margin	\$30	\$25

Assume that fixed product and period costs are the same regardless of which product is manufactured and sold. Production volume is based on direct labor hours and it takes three hours to make a bicycle and two hours to make a tricycle. Direct labor hours employable by the company are limited due to factory size and limited available capital for expansion. Which product line yields greater overall profitability to the company?

	<u>Bicycles</u>	<u>Tricycles</u>
Contribution Margin Per Unit	\$30	\$25
Direct Labor Hours Required To Produce	<u>÷ 3</u>	<u>÷ 2</u>
Contribution Margin Per Hour	\$10	\$12.50

Problem: Product Emphasis

A convenience store has limited shelf space and is considering replacing boxes of cookies with candy bars in a certain area. The space can hold **10** boxes of cookies for which the contribution margin per unit is **\$1.00** or **30** candy bars with a contribution margin of **\$.25** per unit. Management believes that the cookie and candy bar inventory will turnover **4** and **6** times, respectively. Assuming all other things are equal, which product should they stock in this limited space?

Solution: Product Emphasis

	<u>Cookies</u>	<u>Candy</u>
Contribution margin per unit	\$1.00	\$.25
# of units in inventory/space	<u>x 10</u>	<u>x 30</u>
Contribution margin per inventory turn	\$10.00	\$7.50
Inventory turn per month	<u>x 4</u>	<u>x 6</u>
Contribution margin per month on limited shelf space	\$40.00	\$45.00

The candy bars should be stocked rather than cookies as long as this decision will not have any effect on sales of other products and there are no other differentiating costs.

Further Processing

5. Whether to process a product further creating a higher grade product.

Example: Joe's Ice Cream manufactures and sells an economical ice cream brand at the following per unit profit given a volume of **1 million** cartons per year:

	<u>Per Unit</u>
Sales Revenues	\$2.00
Variable Product and Period Costs	(1.00)
Fixed Product & Period Costs	(.35)*
*(1,000,000 × \$.35/unit)	\$.65
	\$350,000

The company is considering the manufacture and sale of a more premium brand of ice cream and has determined that it can be produced by further processing the existing brand with some additional ingredients. The additional per unit processing costs would be as follows:

Direct Materials	\$1.30
Direct Labor	.30
Variable Mfg. Overhead	.10
	<u>\$1.70</u> /unit

Assume this premium brand could be sold for **\$4.00/unit**. No additional selling and administrative expenses or fixed manufacturing overhead costs would be incurred if the premium brand was manufactured in place of the economy brand. What would be the effect on profits if **50%** of the **1 million** units of volume were converted to premium production?

Differential Revenues and Costs for **500,000** units of Premium Brand:

Differential Sales Revenues	\$2.00 /unit
Differential Product Costs	<u>1.70 /unit</u>
Differential Profit	<u>\$.30 /unit</u>
	500,000 × \$.30 = \$150,000

Joint Costs: Common costs in the production of two products at different grades.

Heavenly Molds Part 3

HEAVENLY MOLDS, INC.	
Manufacturing (Product) Costs:	
Variable Costs Per Unit-	
Direct Materials	\$.30
Direct Labor	.20
Manufacturing Overhead:	
Employer Payroll Tax	.02
Machine Lease	.08
Indirect Materials	.03
Workman's Compensation	.02
Utilities	.05
Mold Depreciation	.10
	<u>\$.80</u>
Fixed Costs Per Month-	
Machine Lease	\$2,000
Indirect Materials	300
Indirect Labor	250
Utilities	160
Building Rent	1,120
	<u>\$3,830</u>

Selling and Administrative Costs:	
Variable Costs Per Unit-	
Sales Commissions	\$.10
Fixed Costs Per Month-	
Building Rent	\$280
Utilities	40
Telephones, Fax, etc.	300
Copy Machine, Paper	250
Other Office Supplies	150
Liability Insurance	50
Accounting Service	500
	<u>\$1,570</u>

Budgeted sales at a price of \$2.50 per unit:

Sept.	Oct.	Nov.
2,000	3,000	4,000

CVP Analysis:
 Breakeven point = 3,375 units per month
 Units of sales needed to reach
 \$2,000 / month of net income = 4,625 units per month

Operational Budgets:
 Cash capitalization of approximately \$43,000 required during the first three months of operations.
 At risk capital is approximately \$20,000 (cost of production mold)

Problem: Special Order

The Provo Pioneer Association offers to buy 1,000 jello molds in September but can only pay \$1.80 per unit.

What would be the impact on net income(loss) if there was sufficient excess capacity to produce the additional units with no additional direct fixed manufacturing and selling costs associated with this order except for a \$200 finder's fee to the President of the Provo Pioneer Association? (Assume the \$.10 per unit sales commission will have to be paid on this order).

Additional Questions:

What would be the lowest per unit price that Heber would be willing to sell these additional 1,000 units for before incurring a loss on this order?

What qualitative issues may exist in this decision to accept this order?

Problem: Special Order

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Heavenly Molds Part 3

Solution: Special Order

Differential Revenues and Expenses in Accepting the Special Order:

Sales Revenues (\$1.80 x 1,000 units)	\$1,800
Variable Manufacturing* (\$.80 x 1,000)	(800)
Variable Selling (\$.10 x 1,000)	(100)
Finders Fee	(200)
Differential income from special order	\$ 700

In other words, acceptance of this special order would reduce the projected loss by **\$700**.

*This amount, **\$.80/unit**, includes depreciation of the production mold (**\$.10/unit**), however, this inclusion could be disputed. If the straight-line method of calculating depreciation had been used, then the depreciation would have been a fixed cost unrelated to the # of units produced or sold. Whether this cost should be included or not probably depends upon whether the actual deterioration of realizable value of the production mold is time dependent or volume dependent. Assuming it is volume dependent (similar to mileage on a car) it is properly included in this analysis.

Solution: Special Order

Additional Question:

What would be the lowest per unit price that Heber would be willing to sell these additional **1,000** units for before incurring a loss on this order?

Total differential costs of order	\$1,100
	÷ 1,000 units
	\$ 1.10 per unit

What qualitative issues may exist in this decision to accept this order?

(See Walk Through for answer)

Problem: Make vs. Buy

Heber has spoken to a local injection molding manufacturing business about the possibility of them manufacturing the jello molds for Heavenly Molds, Inc., on a contract basis at a price of **\$1.50** per unit assuming Heber provided his own production mold. If Heber contracted out the manufacturing of the jello molds, he believes he could operate out of his apartment and avoid all manufacturing costs except depreciation of the production molds and the building rent. (Assume for this problem that Heber has already signed a two-year lease on the building beginning **September 1**, but he expects that he could sublease it for **\$1,600** per month and make a **\$200** per month profit on the sublease if he chose not to use it for his own business). If Heber operated out of his house he would still incur all of the budgeted fixed selling and administrative costs.

What would be the net effect on Heber's profitability based on **2,750** units of budgeted production if Heber contracted out the manufacturing of those units?

Additional Questions:

What would be the effect on relative costs at higher levels of volume?

What might be some qualitative considerations involved in this decision on whether to contract out the manufacturing process?

Problem: Make vs. Buy

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Problem: Make vs. Buy

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Building Rent	\$280
Utilities	40
Telephones, Fax, etc.	300
Copy Machine, Paper	250
Other Office Supplies	150
Liability Insurance	50
Accounting Service	500
	\$1,570

Solution: Make vs. Buy

Differential (Avoidable) Costs of Decision Options:

	Manufacture Yourself	Contract Out
Contract Cost (2,750 x \$1.50)		\$4,125
Manufacturing Costs:		
Variable (excluding dep'n)		
(2,750 x \$.70)	\$1,925	
Fixed (excluding bldg. rent)	2,710	
Opportunity Cost (sublease)	1,600	
	\$6,235	\$4,125
	\$2,110	

If Heber contracts out the manufacturing of **2,750** units, net income will improve by **\$2,110** based on sales of the total **2,750** units.

Heavenly Molds Part 3

Solution: Make vs. Buy

Additional Questions:

What would be the effect on relative costs at higher levels of volume?

At higher levels of volume, the lower cost of contracting out the manufacture of the jello molds is diminished. In fact, at significantly higher volumes, the decision to manufacture the jello molds yourself becomes preferable.

What might be some qualitative considerations involved in this decision on whether to contract out the manufacturing process?

Contracting out the manufacture of the jello molds may result in the loss of quality control, timeliness in production, and control of future product costs.