



# Make or Buy



Factors influencing the Make/Buy  
Decision



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# Factors influencing the Make/Buy Decision

- Cost
  - Capacity
  - Need for direct control over production or quality
  - Design secrecy
  - Supplier reliability
  - Capabilities (buyer/supplier, technology/labor)
  - Workforce stability
  - Capital requirements
  - Desirability of multiple sources
  - Spares
  - Strategy--see next.
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# Factors influencing the Make/Buy Decision--Strategy

- In addition to these factors, the coherence of those items made in house should be considered. The make or buy decision should be a part of the firm's strategy development process.

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# Costs: All relevant costs must be considered

- Make Option
  - Delivered purchased materials costs
  - Direct labor costs
  - Incremental overhead
  - Incremental managerial costs
  - Incremental purchasing costs
  - Incremental inventory carrying costs (raw material)
  - Incremental capital costs

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# Costs: All relevant costs must be considered

- Buy Option
  - Purchase price
  - Transportation costs
  - Receiving and inspection costs
  - Incremental purchasing costs
  - Inventory holding costs

# Costs

- Time factor
  - Must consider entire product life
  - Must consider changes in future events
  - Discounting is appropriate
- Should all costs be incremental?
- Bids from potential suppliers may be unreliable
  - RFQ not taken seriously
  - Buying in
    - Capabilities lost are not easily regained

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# The economists view of markets

- Pure competition
- Monopoly
- Oligopoly
- “Typical” Market
- Free Market
- Variable-Margin Pricing

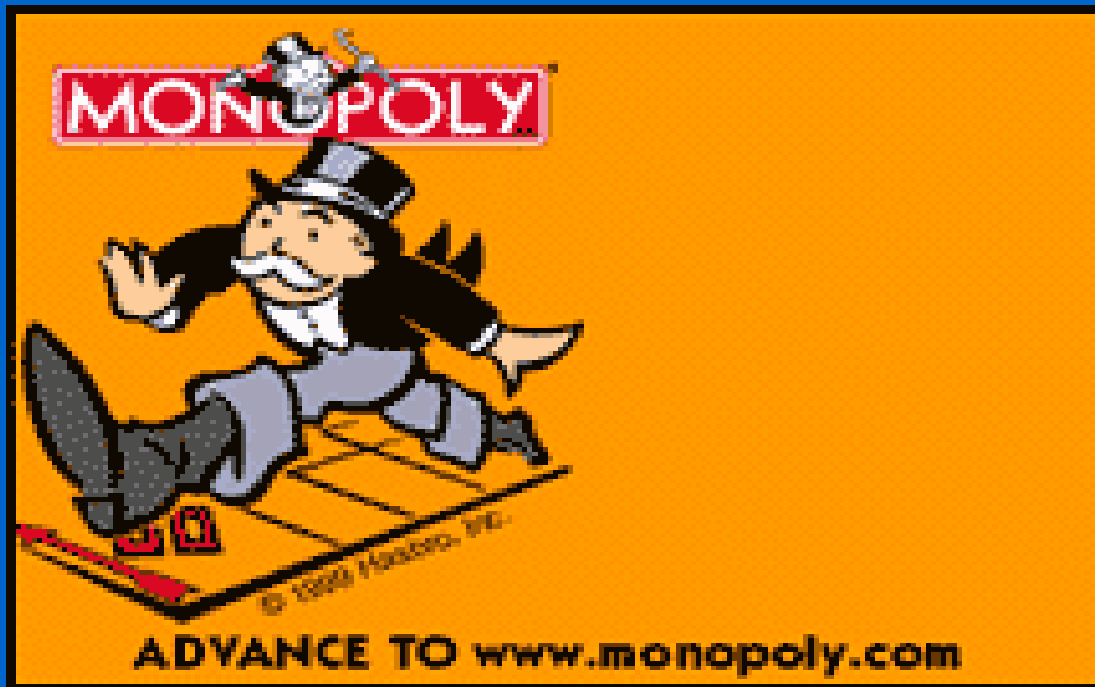
# Pure Competition

- Large number of buyers and sellers of equal importance
- Homogenous products
- Buyers and sellers have full knowledge of the market
- Buyers act rationally
- Sellers are free to enter & exit market



# Monopoly

- One firm controls entire commodity and sets supply to maximize profit





# Oligopoly

- A few firms control commodity.  
Competition or collusion may result.





# “Typical” Market

- Many sellers producing differentiated products.



# Free Market

- “...(market where sellers) are free, within broad limits, to adjust their prices at will that competent buyers can obtain better prices (bottom, page 243).
- In a free market, prices are negotiable.
- Approximately 70% of markets can be considered free.

# Variable-Margin Pricing

- Most firms price their products to generate a satisfactory return on the whole line, that is, the profit margin on each product is different.
- If a suppliers product is high volume and efficiently produced, then using an average profit margin is excessive (from the buyer's standpoint), and the buyer should be able to negotiate a price that includes a lower profit margin for the supplier.

# Costs

- Fixed Costs do not vary with production
  - Building, equipment, interest, advertising, R&D
- Variable Costs vary directly with production
  - Materials, production, labor, consumable tools
- Semivariable Costs contain both a fixed and a variable component
  - Energy consumption is one example
- Total Costs are the sum of fixed, variable and semivariable costs

# Costs

- Direct costs are those costs that can be allocated to specific products.
- Indirect costs (overhead) are costs that cannot be specifically identified with a particular product.

# Costs

- Although direct and indirect costs sound a lot like fixed and variable costs, they are not the same thing.
  - Direct/indirect costs result from the firm's ability to assign costs to a specific product.
  - Direct costs can be fixed or variable: A supervisor may be paid a salary to supervise the production of one single product--the salary is fixed but directly assignable to the product.
  - Indirect costs can be fixed or variable: The consumption of supplies varies with production, but the costs are not usually applied to specific products.



# Costs

- In industry costs are usually broken down as:
  - Direct Labor
  - Direct Materials
  - Overhead (allocated)

# What will firms bid?

- Assume a firm estimates the following costs on an RFQ:

Cost of Materials                      \$12,000

Cost of Direct Labor                      \$3,000

Cost of Overhead                      \$4,500

Total Costs                      \$19,500

Profit                      \$2,340

Price                      \$21,840

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## What will firms bid?

- What is the minimum price a desperate firm would quote?
- What is the highest price a firm would quote?
- Why would a firm consider a price of \$17,000?
- In the long run, what price must a firm take?

# Break-even analysis

- Two purposes for a break-even analysis
  - Determine if production volume is sufficient for a firm to produce a given product
  - Estimate break-even sales level for a supplier to determine how eager he is for new business

# Break-even analysis

- To determine the break-even point for the make/buy decision, three pieces of information are required:
  - The fixed costs of producing the product
  - The variable costs of producing the product
  - The purchase price per unit

# Break-even analysis

- A graph can then be plotted by:
  - Setting up the graph with total cost as the vertical axis and # of units as the horizontal axis.
  - Plotting the purchase cost line, which starts at the origin with slope equal to the per unit purchase cost.
  - Plotting the make cost line, which starts at quantity zero with a total cost equal to the fixed cost, and has a slope equal to the variable cost.
  - The intersection is the break-even point.

# Break-even analysis

- For example, suppose that a make-buy decision is being made for an injection molded plastic part. The fixed costs of making this part are \$200,000. The variable cost to make this part is \$0.40. The lowest bid received from the pool of qualified buyers is \$0.75 per part. What is the break-even quantity?

# Break-even analysis

- It is the point where the total cost to manufacture equals the total cost to purchase. Letting  $Q$  be the break-even quantity, we can calculate this as:

$$200,000 + 0.40Q = 0.75Q$$

- And, with a little algebra

$$Q = 200,000/0.35 = 571,428$$

- So if the company plans to use more than 571,8000 of these parts, it is cheaper to make them (ignoring discounting of the cash flows).



# Price analysis

- Some form of price analysis is required for every purchase--how else does the buyer know that the price is reasonable.
- Four methods of price analysis are
  - Competitive proposals
  - Regulated
  - Catalog price
  - Market price

# Competitive proposals

- At least two qualified, responsive, independent bids.
- The lowest bidder does not have an unfair advantage--bid may be lower, but not as low as possible.
- The lowest bid is reasonable--the supplier understands the requirements, is capable of providing the part and is not lowballing.



# Regulated

- Regulated prices are set by law--recent trend is to deregulate (oil, natural gas, air fares).





# Catalog price

- Should request evidence (a sales summary) to see that significant quantities are sold at catalog price--remember, everything is negotiable.





# Market price

- Generic products traded on the open market



# Price analysis

- Historic prices
  - Evaluate price against historic prices that have been previously established as reasonable.
  - Must evaluate whether
    - Conditions have changed
    - There were one-time charges (engineering, tooling, etc.)
    - There was an impact from inflation
    - Learning effects
  - Independent cost estimates
    - Subject of chapter 13



# Purchasing design work

- When supplier provides design work, there are two major issues:
  - Ownership of the design
  - Recovery of the sunk costs in design work and tooling



# Purchasing design work

- Ideal method of pricing for the buyer is to separate the costs into:
  - Price for design and development work
  - Price for special tooling and equipment
  - Price for manufacturing parts
- This allows both parties to know exactly what the transactions cover.





# Purchasing design work

- If supplier does not want to break out costs, then contract should allow for competition once a reasonable period of time has elapsed for the supplier to recover his fixed costs.



# All-in-cost

- The buyer must remember that the total costs of an acquisition (all-in-costs) must be considered, not just the price. Delivery performance, quality, reliability can have far reaching impact.
- The Lopez stool--
  - Price
  - Service
  - Quality

# Documenting a price analysis

- Can be a summary of bids in competitive bidding
- Can serve to document goals prior to negotiation and serve to justify resulting price
  - Should be performed before negotiation-- discipline of writing report helps to clarify purchasing agent's thoughts

# Documenting a price analysis

- Price report should indicate
  - Information considered
  - Weight given to information
  - Logic used

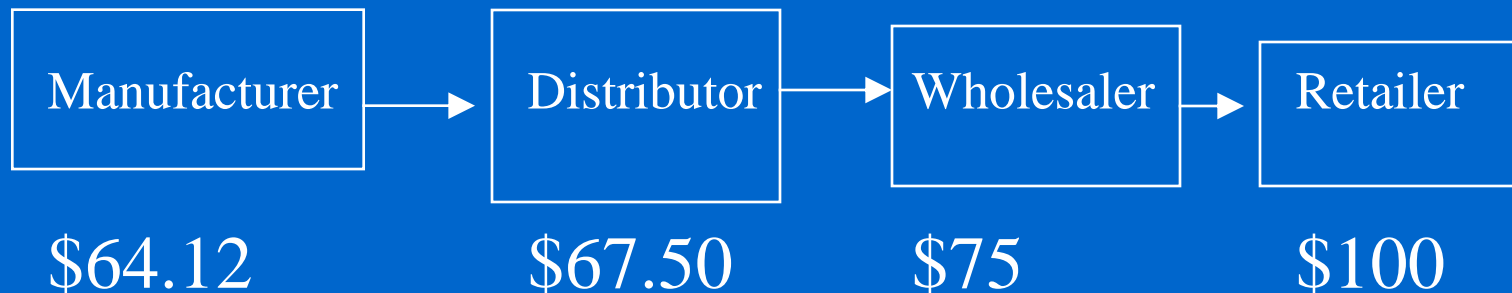
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# Discounts: overview

- Trade discounts
- Quantity discounts
- Seasonal discounts
- Cash discounts

# Trade discounts

- Frequently structured as series discounts
  - For example, if the series discounts are 25, 10, and 5% and the retail price is \$100, then:

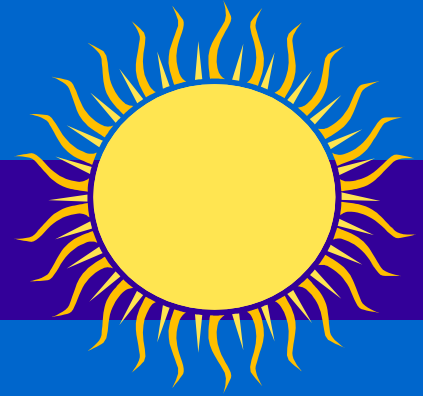


# Quantity discounts

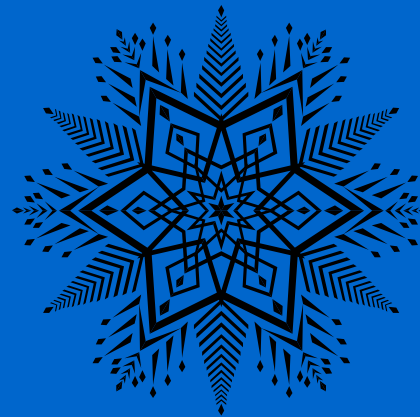
- For a specified quantity
  - All units discount - every unit gets same price

0-	100	\$4.00 each
100-	1000	\$3.50 each
1000-	10,000	\$3.00 each
10,000 +		\$2.80 each
  - Incremental discount - additional units get lower price
- For a specified dollar amount
- For a specified dollar amount over a specified period

# Seasonal discounts

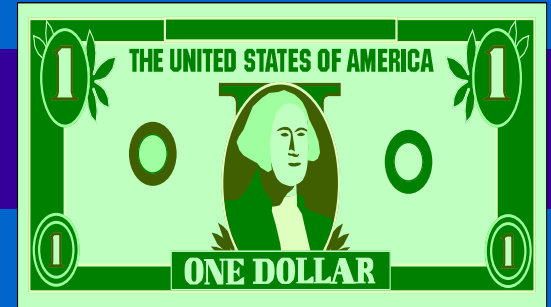


- Purchases in off season discounted





# Cash discounts



- 2/10 net 30
  - 2% discount if paid within 10 days, payment required within 30 days
  - This is a significant discount - paying 20 days early is just like earning 36.5% interest
- EOM (End of Month)
  - 2/10 EOM - 2% discount if payment made within 10 days from the end of the month
- Cash discounts are one area where negotiation is possible - even if the price is non-negotiable

# Cost analysis

- A review and evaluation of actual or anticipated cost data.
- If a cost analysis is required, a cost breakdown should be requested with each RFQ (request for quote). This should be requested using the following statement:
  - “The buyer will only consider quotations accompanied by a cost breakdown”.
- Supplier may not want to furnish this information, however, if required by the RFQ, the supplier cannot claim an extra cost since the cost analysis is required to prepare the quote.

# Low cost producer

- May differ from product to product, year to year
- Factors affecting cost
  - Management capabilities - primary source of efficiency
  - Efficiency of labor - management or labor's responsibility?
  - Amount/quality of subcontracting
  - Plant Capacity - firm must be right size
    - Large enough to be efficient
    - Small enough to be coordinated
    - Supplier size affects power in buyer/supplier relationship

# Cost factors

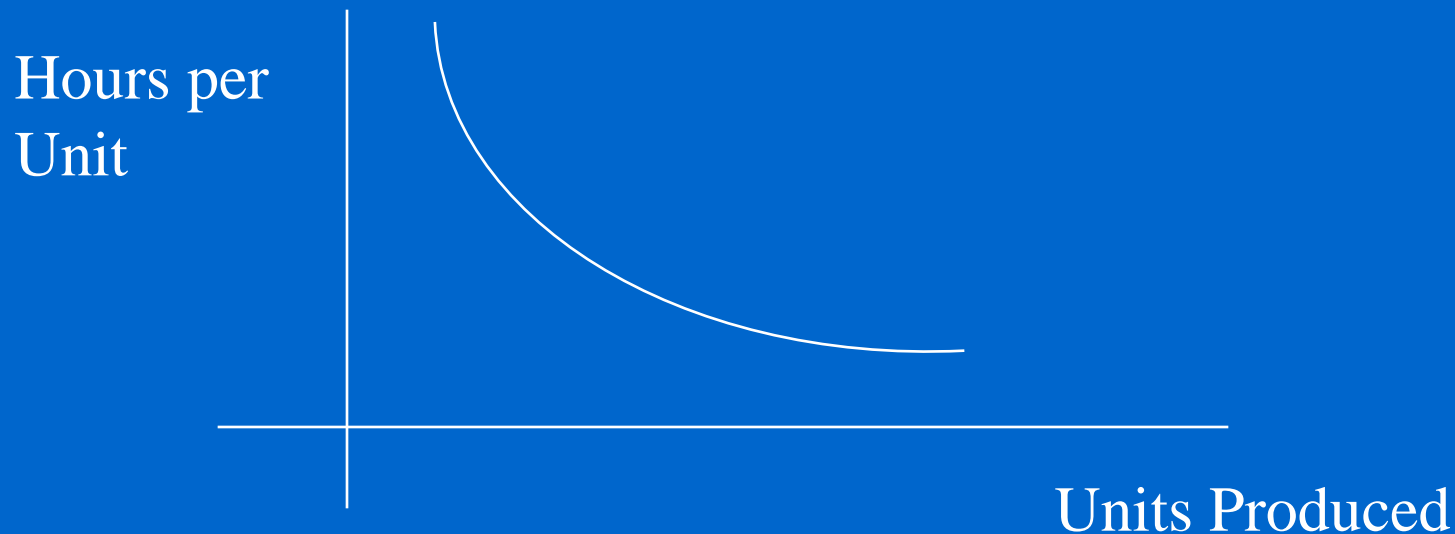
- Direct costs
  - Of primary importance since
    - They are usually the major portion of costs
    - Overhead costs usually allocated based on direct costs
    - Profit usually a small percentage of total cost

# Cost factors--example (from text)

<b>Cost Element</b>	<b>Base Case</b>	<b>25% Reduction in Direct Labor Costs</b>	<b>25% Reduction in Profit</b>
<b>Material</b>	\$8.00	8.00	8.00
<b>Direct Labor</b>	8.00	6.00	8.00
<b>Fixed OH (150% of Labor)</b>	12.00	9.00	12.00
<b>Prime Cost</b>	28.00	23.00	28.00
<b>G&amp;A OH (10%)</b>	2.80	2.3	2.80
<b>Total cost</b>	30.80	25.30	30.80
<b>Profit (10%)</b>	3.08	2.53	2.31
<b>Price</b>	33.88	27.83	33.11
<b>% Reduction</b>		17.86%	2.27%

# Learning Curves

- Empirical observation that experience reduces the time required to perform an operation, and greatest reductions occur early.



# Learning curves

- Two types of curves
  - Cumulative average cost curve
  - Unit cost curve
    - The only difference is whether reductions apply to unit cost or average.
- For an  $X\%$  cost curve, for each doubling of the production quantity, multiply the previous cost (cumulative average or unit) by  $X\%$  to get the new cost.

# Learning curve

- Example
  - Suppose the first unit of a new product requires 100 minutes to produce, and a 90% unit cost learning curve is in effect.
  - The second item will require:
    - $100 * (0.9) = 90$  minutes
  - The fourth item will require
    - $90 * (0.9) = 81$  minutes
  - And the eighth unit will require
    - $81 * (0.9) = 72.9$  minutes
  - The procedure is the same with cumulative average hours.





# Learning curve

- The learning curve when applied directly to labor is most important for low volume items like airplanes and submarines
- For high volume items, the learning curve effect may apply to total cost and may be the result of process improvements.

