

Elasticity of Markup

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Learning Goal

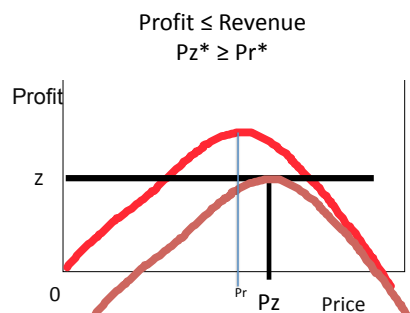
- The elasticity of the markup can be used to indicate if a price change will increase or decrease profit.

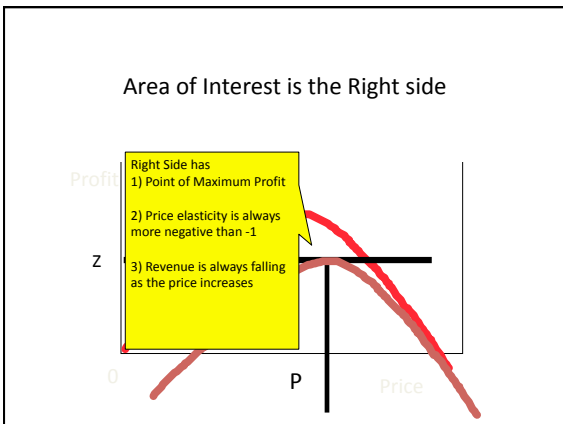
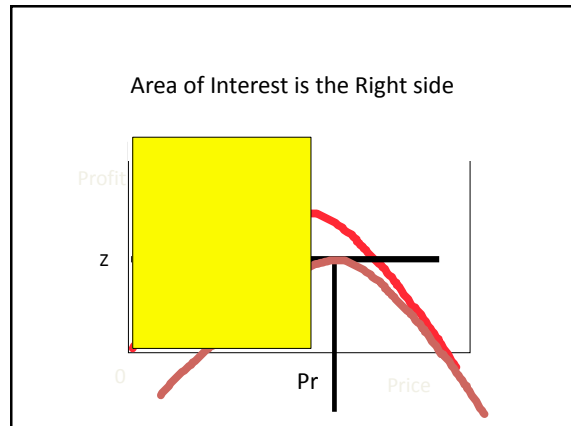
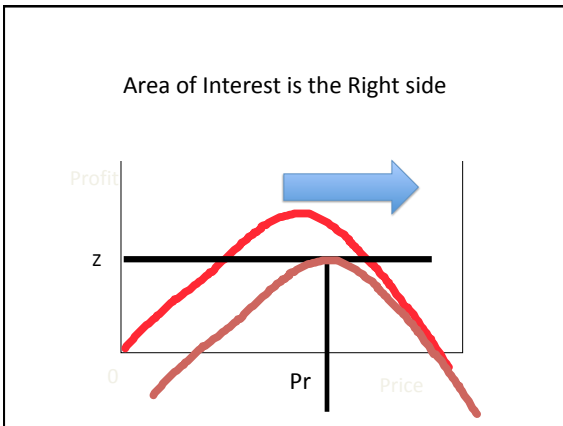
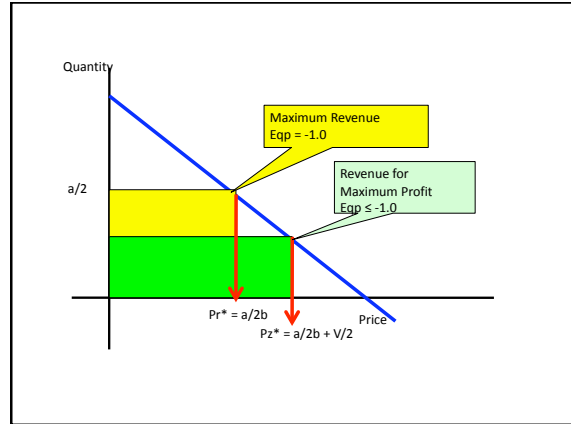
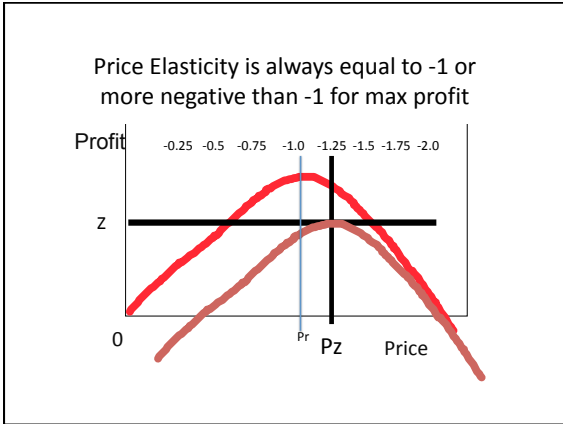
- We saw that price elasticity was a benchmark for maximizing revenue
- We want an elasticity that can be used as a benchmark for maximizing profit!**

The Elasticity of Markup on Price

aka,
Elasticity of Pricing Efficiency
or the
Elasticity of Return on Sales

- The Point Elasticity of Markup is the percentage change in revenue divided by the percentage change in markup
- Point Elasticity of Mp = $\% \Delta R / \% \Delta Mp$**
- When the elasticity of markup = -1.0, Then the optimal price for maximum markup is reached





- Fixed or Period Costs have no role in finding the price that maximizes profits.
- Net profit = $(P-V)Q - \text{Fixed costs}$
- Only Variable costs count in the Equation
- $Pz^* = a/2b + V/2$
- We want the price that maximizes gross profit
- $(P-V)Q = \text{Gross Profit}$

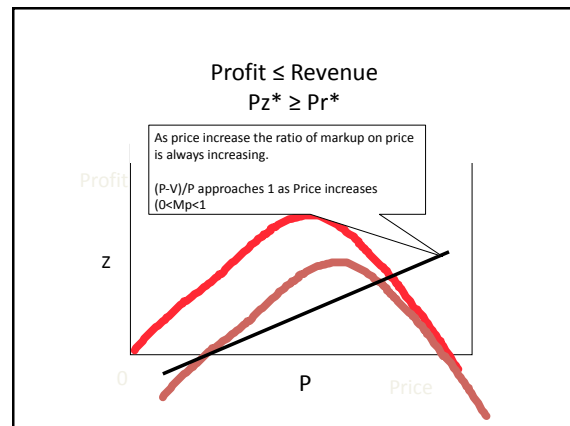
Remember

- Price Elasticity was started by the idea that the firm has an efficiency at converting its selling price into Revenue
- Efficiency is the ratio Revenue to selling price
- Revenue = Revenue/Price x Price
- BUT
- Revenue = $Q \times P$

Measures of Operating Efficiency

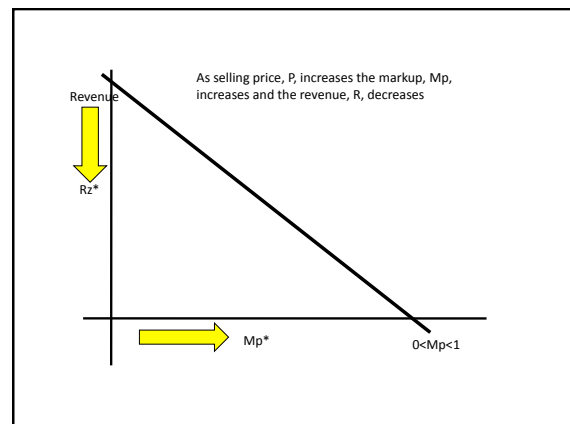
- A firm has an efficiency at converting Revenue into Profit
- Efficiency is the ratio Profit to Revenue
 - Classic Return on Sales or Net Profit Margin = Z/R
 - Marketing Return on Sales = M/R
 - Gross Return on Sales or Gross Profit Margin = G/R
 - Markup on Price = $(P-V)/P = M_p$
- The Interesting one is
- Gross Profit = $G/R \times R$

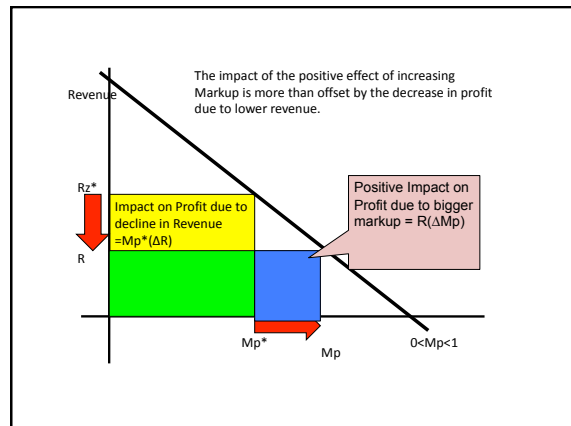
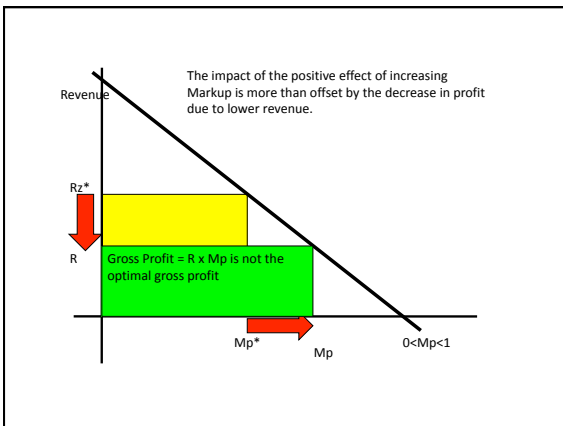
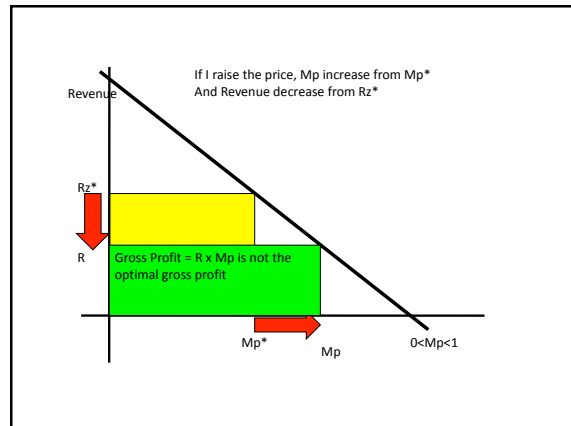
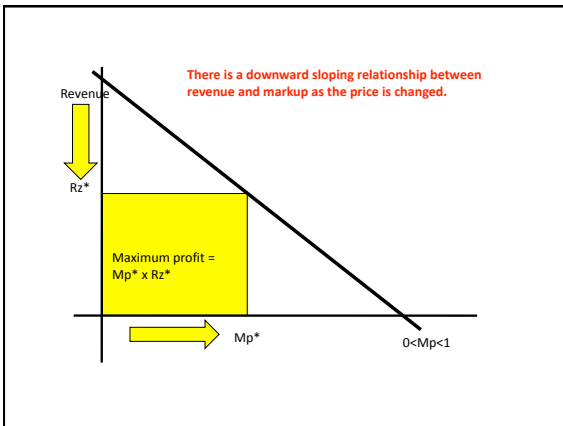
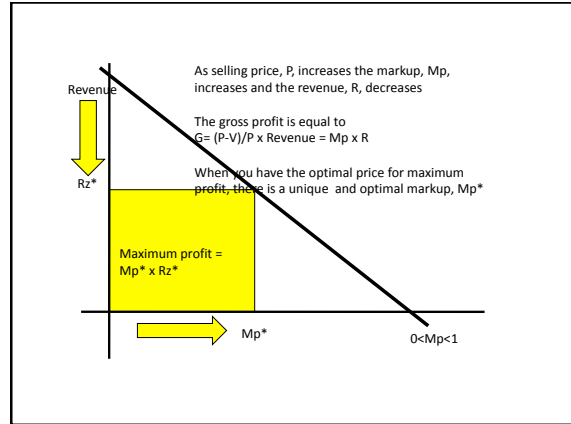
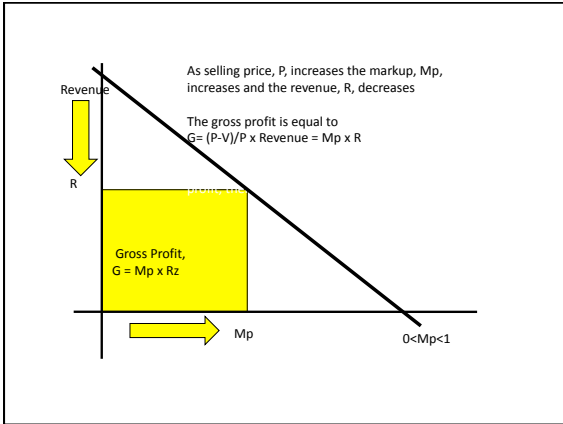
- Gross Profit = $G/R \times R$
- where
 - $G = (P-V)Q$
 - $R = PQ$
- then
- Gross Profit = $(P-V)Q/PQ \times \text{Revenue}$
- Gross Profit = $(P-V)/P \times \text{Revenue}$
- Gross profit = Markup on Price x Revenue

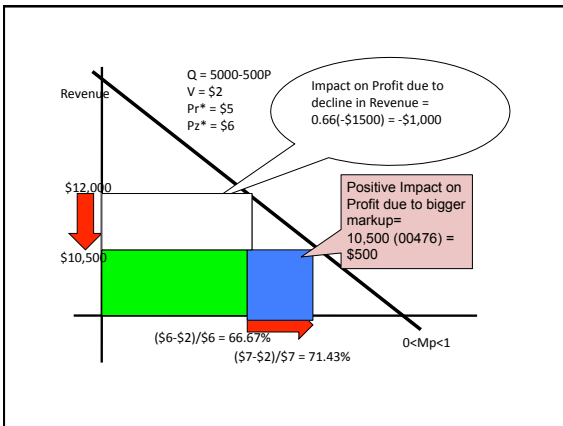
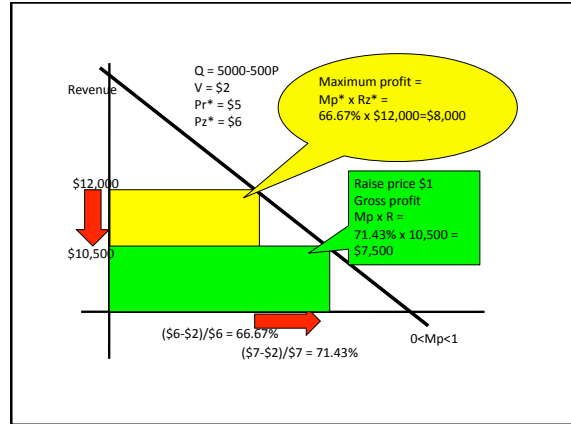
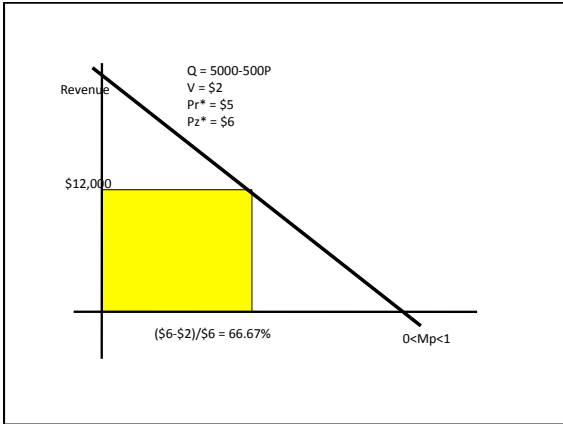


We know Three Important Things

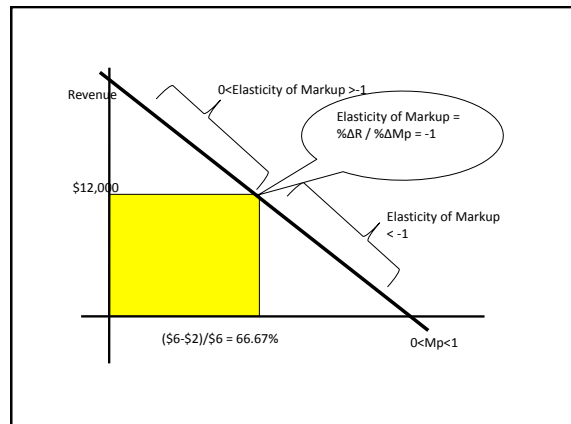
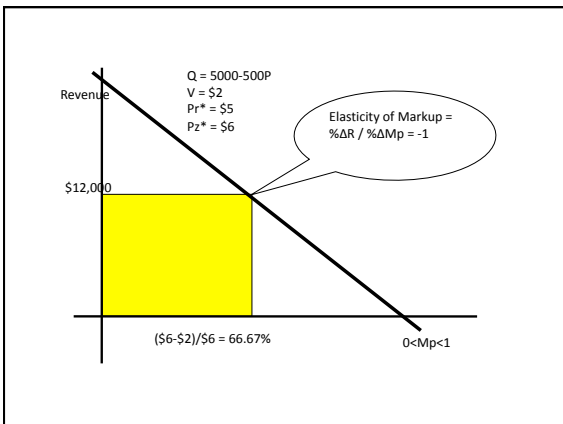
- 1) As selling price, P , increases; the markup, M_p , increases; and the revenue, R , decreases
- 2) The gross profit is equal to
 $G = (P-V)/P \times \text{Revenue} = M_p \times R$
- 3) When you have the optimal price for maximum profit, there is a unique and optimal markup, M_p^*

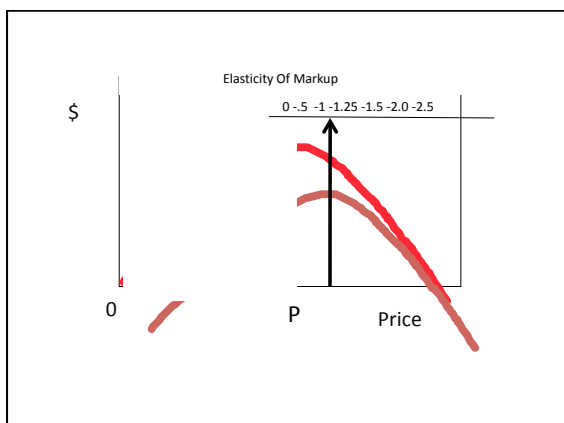






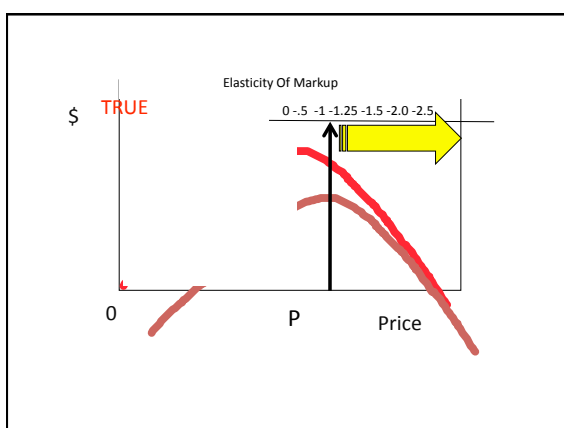
| | Period 1 | Period 2 | Change Δ | Impact on Change in Gross profit |
|---|----------|----------|-----------------------|---|
| Price, P | \$6 | \$7 | \$1 | |
| Variable Cost, V | \$2 | \$2 | | |
| Qty = 5000-500P | 2,000 | 1,500 | | |
| Revenue, R | \$12,000 | \$10,500 | $\Delta R = -\$1,500$ | $\Delta R = 0.6667(\$1,500) = -\$1,000$ |
| Mp = (P-V)/P | 66.67% | 71.43% | $\Delta Mp = 0.0476$ | $\Delta Mp = \$10,500(0.0476) = \500 |
| Gross Profit, G | \$8,000 | \$7,500 | $\Delta G = -\$500$ | $\Delta R + \Delta Mp = -\500 |
| Arc Elasticity of Markup = $\Delta R / \Delta Mp = -\$1,000 / \$500 = -2$ | | | | |





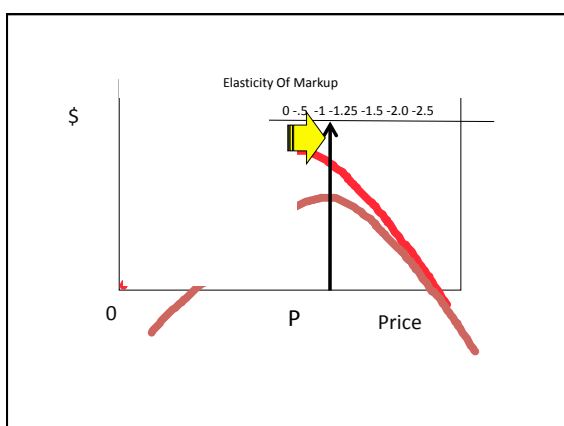
Elasticity Of Markup

- The Elasticity of Markup is used as an indicator of the change in profit to be expected from a change in selling price.
- If the elasticity of markup is more negative (i.e., smaller) than -1, then an increase in price will increase the markup on price and decrease the profit.
- True or False



Exam Question

- You have been tracking your changes in markup and revenue due to changes in price.
- Your Elasticity of Markup is -0.75 and if you raise your selling price by a small amount, then you can expect your profits to increase.
- True or False?



Markup as Operational Efficiency

- How efficiently is the firm converting its sales revenue into profits
- Revenue x Efficiency Rate = Gross Profit
- Revenue, $R = P \times Q$
- Efficiency Rate = Markup Ratio = $M_p = (P-V)/P$
- Gross Profit = (dollar markup) x Quantity sold
- $R \times M_p = (P-V)Q$
- $PQ \times (P-V)/P = (P-V)Q$

When is Markup Elasticity Used

- When the price elasticity is smaller (larger negative) than -1.0 and the variable cost is constant.
- When management wants an indication of the profit change due to a change in the selling price.

Point Elasticity of Markup Defined

- A change in selling price changes the revenue and the markup on price
- The ratio of the percentage change in Revenue due to a change in the selling price over the percentage change in Markup due to the same change in the selling price.
- $\% \Delta \text{Revenue} / \% \Delta \text{Markup}$
- $((R_2 - R_1) / R_1) / ((M_2 - M_1) / M_1)$

Arc or Average Elasticity of Markup Defined

- A change in selling price changes the revenue and the markup on price
- The ratio of the impact a change in the Revenue has on the change in profit over the impact a change in the Markup (operating efficiency) has on the change in profit.
- $\Delta \text{Profit} = M_{\text{minimum}}(\Delta R) + R_{\text{minimum}}(\Delta M) + J^*$
 - * When Revenue is declining due to an increase in price, then markup is increasing and J is always equal to zero
- Arc Elasticity = $M_{\text{minimum}}(\Delta R) \div R_{\text{minimum}}(\Delta M)$

| | Period 1 | Period 2 | Change Δ | Impact on Change in Gross profit |
|---|----------|----------|-----------------------|---|
| Price, P | \$6 | \$7 | \$1 | |
| Variable Cost, V | \$2 | \$2 | | |
| Qty = 5000-500P | 2,000 | 1,500 | | |
| Revenue, R | \$12,000 | \$10,500 | $\Delta R = -\$1,500$ | $\Delta R = 0.6667(\$1,500) = -\$1,000$ |
| Mp = (P-V)/P | 66.67% | 71.43% | $\Delta Mp = 0.0476$ | $\Delta Mp = \$10,500(0.0476) = \500 |
| Gross Profit, G | \$8,000 | \$7,500 | $\Delta G = -\$500$ | $\Delta R + \Delta Mp = -\500 |
| Arc Elasticity of Markup = $\Delta R / \Delta Mp = -\\$1,000 / \\$500 = -2$ | | | | |

- The Point Elasticity of Markup is the percentage change in revenue divided by the percentage change in markup
- **Point Elasticity of Mp = $\% \Delta R / \% \Delta Mp$**
- When the elasticity of markup = -1.0, Then the optimal price for maximum markup is reached

- Use the Point Elasticity only if the percentage changes in the two variables are very, very, small.
- If the changes in the two variables are large use the Arc Elasticity based on the smallest of the two possible denominators.

- The Arc Elasticity of Markup is the ratio of the Impact due to the change revenue to the impact of the change in markup
- **Arc Elasticity of Markup = $\Delta R / \Delta Mp$**
- where
- $\Delta R = (\text{minimum Markup}) \times (\text{change in Revenue})$
- $\Delta Mp = (\text{minimum Revenue}) \times (\text{Change in Markup})$

Or

- The Arc Elasticity of Markup is the ratio of the $\% \Delta R_{\min} / \% \Delta Mp_{\min}$ where the minimums of the two values are used as the denominators for the percentage changes

What did we learn?

- 1) The elasticity of markup can be thought of as the elasticity of operating efficiency
- 2) Markup or Gross Return on Sales is increasing as the selling price increases.
- 3) An increase in markup or return on sales can be false indicator of increasing operational efficiency
- 4) When the elasticity of markup is equal to -1.0 , then the optimal price for maximizing gross profit has been reached.

- Any Questions on the Elasticity of Markup?