ABC Analysis

• Gives the Big Picture: a simple, but key idea
• [Not related to Activity Based Costing!]
• Real inventory systems have 1000’s of items
• Can’t exert same effort to control all of them
• So, classify items as either A, B, or C
• Based on the “80-20 (or 90-10) Rule”
The 80-20 Rule

- 80% of total value (wealth) comes from 20% of items (individuals)
- Applies roughly to many situations:
  - 80% of beer is drunk by 20% of people
  - 80% of fundraising comes from 20% of alumni
- Top group = Class A items
- Lower groups = Class B & Class C items
EX: A Bay Area software firm
(60 weeks ending 4/4/98)

<table>
<thead>
<tr>
<th></th>
<th># of SKUs</th>
<th>% of SKUs</th>
<th>Units Demanded</th>
<th>% of Units Demanded</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:</td>
<td>600</td>
<td>5.1%</td>
<td>1,712,452</td>
<td>87.4%</td>
</tr>
<tr>
<td>B:</td>
<td>1,710</td>
<td>14.5%</td>
<td>226,524</td>
<td>11.6%</td>
</tr>
<tr>
<td>C:</td>
<td>9,465</td>
<td>80.4%</td>
<td>20,509</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td>11,775</td>
<td>100.0%</td>
<td>1,959,485</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Class A Items

• Combined importance: ~70-90% (highest)
• Combined % of all items: ~5-20%
• Greatest effort & control:
  – Careful physical control, *e.g.*, diamonds in jewelry store
  – Very reliable supplier
  – Place closest to where they’re needed or assembled
  – Make small, frequent orders
  – Very high record accuracy: 99.8% is recommended
  – Audit frequently; Personal attention
Class B Items

• Combined importance: 10-25% (moderate)
• Combined % of all items: Perhaps 30-40%
• Moderate control:
  – Maybe computer-based control
  – Use EOQ model possibly
  – Recommended record accuracy: 99%
Class C Items

- Combined importance: A few % (lowest)
- Combined % of all items: At least 50%
- Minimal control:
  - Simple control rules, *e.g.*, wait till complaint
  - Larger, infrequent orders
  - Recommended record accuracy: 95%
Measures of Importance

- Annual Demand: # of units sold per year
- Annual $ Volume: Demand x Unit cost
- Annual Profit: Demand x Unit profit
- Pick one of these – or make up your own
How To Do ABC Analysis

• Rank items in descending order of importance
• Convert absolute to % importance
• Calculate the cumulative % importance
• Separate items into 3 classes:
  – Look for natural breaks in the data
• Adjust class of individual items, if desired
## Small Example

<table>
<thead>
<tr>
<th>SKU</th>
<th>% Importance</th>
<th>Cumulative % Importance</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>25</td>
<td>25</td>
<td>A</td>
</tr>
<tr>
<td>02</td>
<td>20</td>
<td>45</td>
<td>A</td>
</tr>
<tr>
<td>03</td>
<td>18</td>
<td>63</td>
<td>A</td>
</tr>
<tr>
<td>04</td>
<td>11</td>
<td>74</td>
<td>A</td>
</tr>
<tr>
<td>05</td>
<td>8</td>
<td>82</td>
<td>A</td>
</tr>
<tr>
<td>06</td>
<td>5</td>
<td>87</td>
<td>B</td>
</tr>
<tr>
<td>07</td>
<td>4</td>
<td>91</td>
<td>B</td>
</tr>
<tr>
<td>08</td>
<td>4</td>
<td>95</td>
<td>B</td>
</tr>
<tr>
<td>09</td>
<td>2</td>
<td>97</td>
<td>B</td>
</tr>
<tr>
<td>10</td>
<td>0.5</td>
<td>97.5</td>
<td>C</td>
</tr>
<tr>
<td>:</td>
<td>:</td>
<td>:</td>
<td>:</td>
</tr>
<tr>
<td>50</td>
<td>0.1</td>
<td>100.0</td>
<td>C</td>
</tr>
</tbody>
</table>
Benefits of ABC Analysis

• Reduces holding costs
• Lowers order time delays for key items
• Fewer stock-outs of key items
• Less time managing inventory
• Easy but powerful
• Essential for any large inventory system
Recap of Key Ideas in Inventory

• EOQ Model: \((Q^*, R^*)\) policy for *purchasers*
• POQ Model: \((Q^*, R^*)\) policy for *producers*
• EOQ with Quantity Discounts:
  – Compare \(TC(Q^*)\) vs. \(TC(\text{price break Q’s > } Q^*)\)
• EOQ with Variable (Probabilistic) Demand
  – Safety Stock used to meet desired Service Level
• ABC Analysis: Organizing a big system