Chapter 4

Inventory Control Subject to Deterministic Demand

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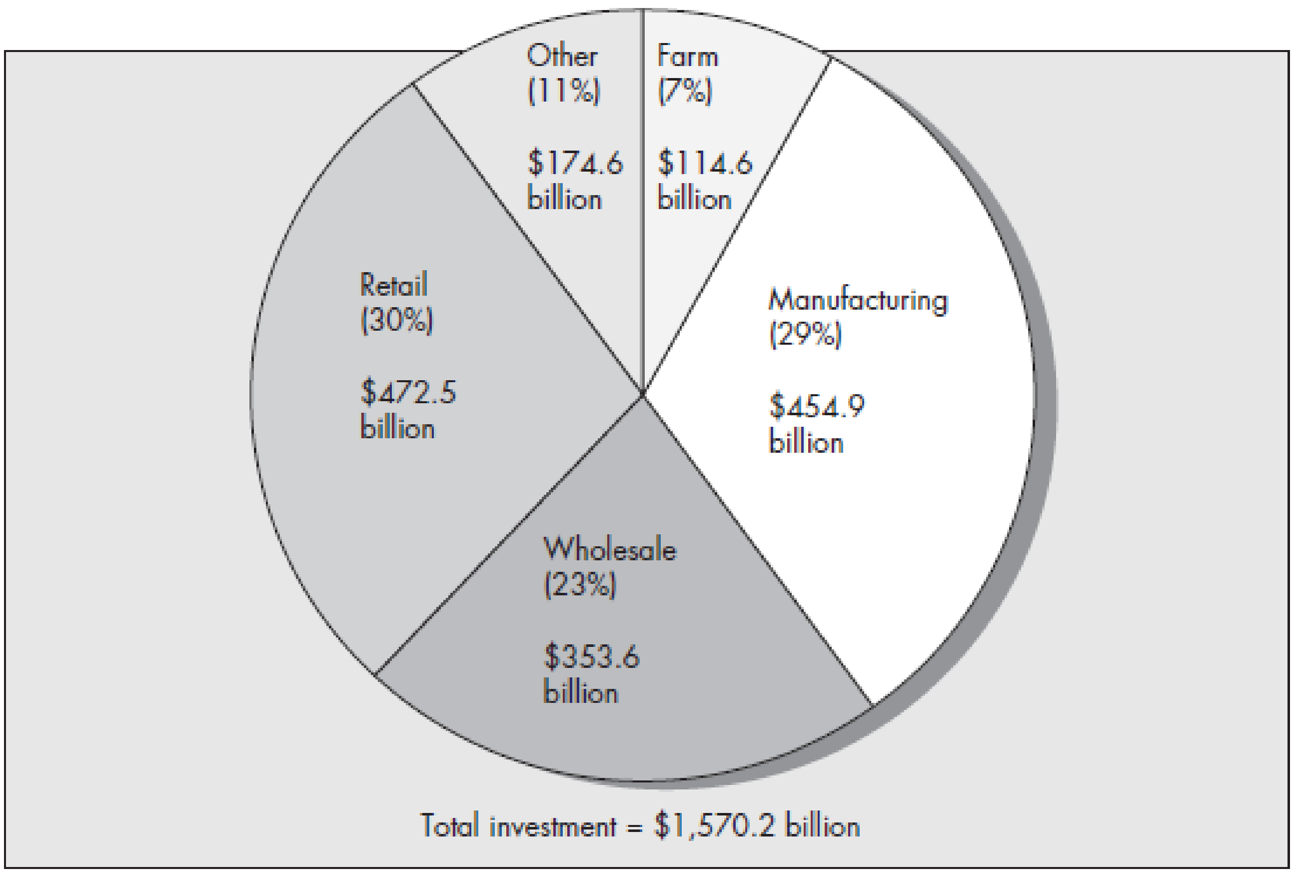
Nesim K. Erkip

Breakdown of the Total Investment in Inventories in the U.S. Economy (2007)



[1] *Survey of Current Business* (July 2007).

Classification of Inventories

- *Raw materials*. These are resources required for production or processing.
- *Components*. These could be raw materials or subassemblies that will later be included into a final product.
- *Work-in-process (WIP).* These are inventories that are in the plant waiting for processing.
- *Finished goods*. These are items that have completed the production process and are waiting to be shipped out.

Reasons for Holding Inventories

- Economies of scale
- Uncertainties
- Speculation. Changing Costs Over Time
- Transportation
- Smoothing
- Logistics
- Control costs

Characteristics of Inventory Systems

- Demand
  - *May Be Known or Uncertain*
  - *May be Changing or Unchanging in Time*
- Lead Times - time that elapses from placement of order until it’s arrival. Can assume known or unknown.
- Review Time. Is system reviewed periodically or is system state known at all times?
- Treatment of Excess Demand.
  - *Backorder all Excess Demand*
  - *Lose all excess demand*
  - *Backorder some and lose some*
- Inventory that changes over time
  - *perishability*
  - *obsolescence*

Relevant Costs

- Holding Costs - Costs proportional to the quantity of inventory held
- Includes:

a) Physical cost of space

b) Taxes and insurance

c) Breakage spoilage and deterioration

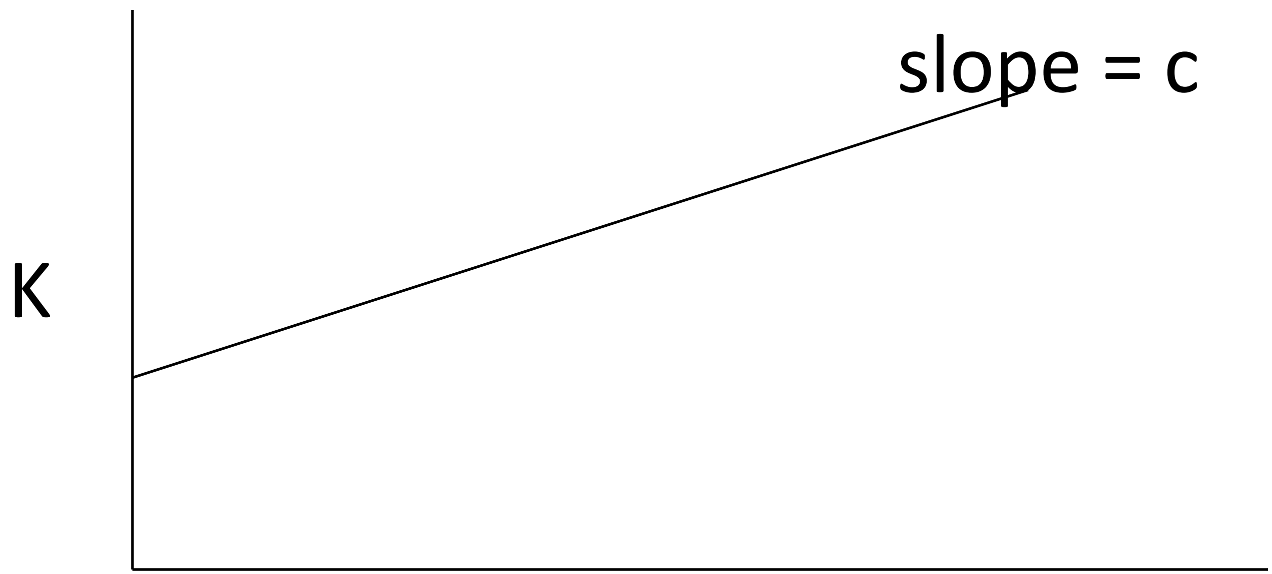
d) Opportunity cost of alternative investment

The last is often the most significant

Relevant Costs (continued)

- Ordering Cost (or Production Cost)

  Includes both fixed and variable components.



$C(x) = K + cx$ for $x > 0$ and $=0$ for $x = 0$