INDUSTRIAL ENGINEERING

Lesson 10
Aggregate Planning

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Synopsis

This chapter highlights the concept and strategies of aggregate planning. Methods for aggregate planning (i.e., graphical and mathematical methods) are explained.

Expected Outcome

1. Understand the general concept and strategies of aggregate planning.
2. Apply the graphical and mathematical methods to develop aggregate planning.

What is Aggregate Planning?

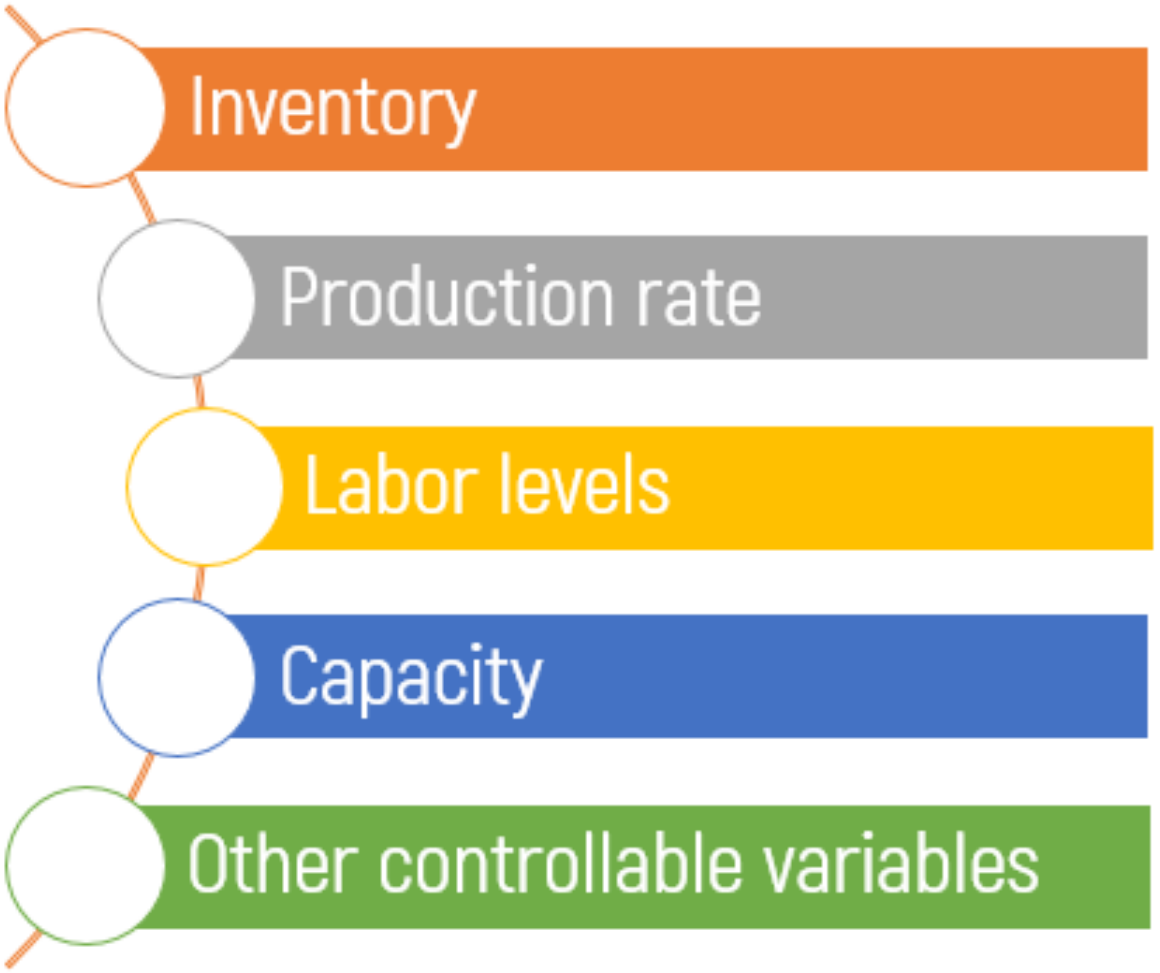
Determining the resources and timing required to meet demand.

Objectives of Aggregate Planning

Objective is to minimize cost over the planning period by adjusting…

- ✓ Production rates.
- ✓ Labor levels.
- ✓ Inventory levels.
- ✓ Overtime work.
- ✓ Subcontracting rates.
- ✓ Other controllable variables.

Strategies of Aggregate Planning are manipulating...



3 Common Strategies of Aggregate Planning

Capacity options

Absorb demand fluctuations, without trying to change demand

Demand options

Smooth out fluctuations in demand pattern.

Mixing options

Combination of capacity & demand options.

Capacity Options: Advantages & Disadvantages

Option	Advantages	Disadvantages	Some Comments
1. Changing inventory levels	Changes in human resources are gradual or none; no abrupt production changes.	Inventory holding cost may increase. Shortages may result in lost sales.	Applies mainly to production, not service, operations.
2. Varying workforce size by hiring or layoffs	Avoids the costs of other alternatives.	Hiring, layoff, & training costs may be significant.	Used where size of labor pool is large.
3. Varying production rates through overtime or idle time	Matches seasonal fluctuations without hiring/ training costs.	Overtime premiums; tired workers; may not meet demand.	Allows flexibility within the aggregate plan.
4. Sub-contracting	Permits flexibility & smoothing of the firm's output.	Loss of quality control; reduced profits; loss of future business.	Applies mainly in production settings.
5. Using part-time workers	Is less costly & more flexible than full-time workers.	High turnover/ training costs; quality suffers; scheduling difficult.	Good for unskilled jobs in areas with large temporary labor pools.

Source: Heizer & Render (2014)

Demand Options: Advantages & Disadvantages

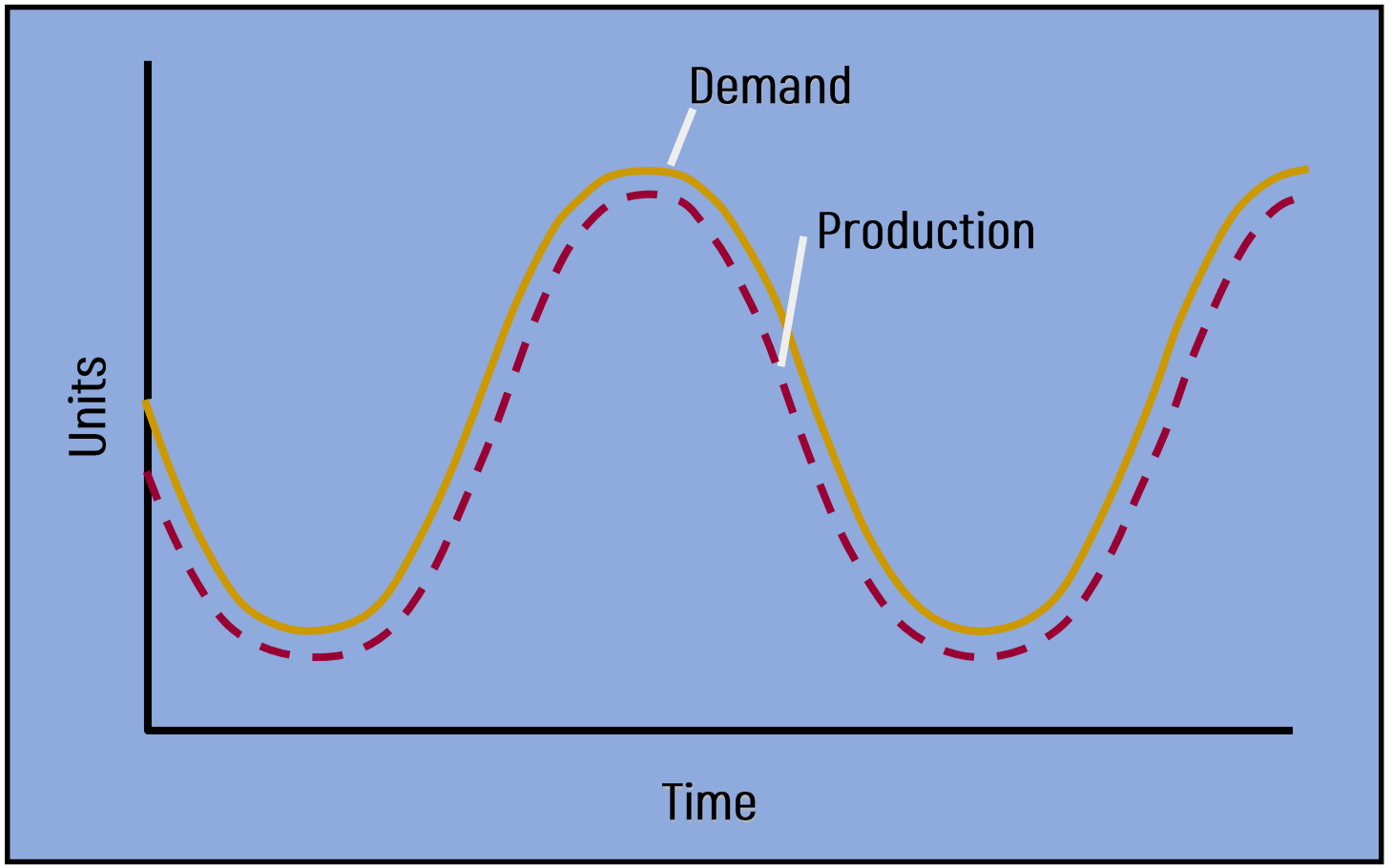
Option	Advantages	Disadvantages	Some Comments
1. Influencing demand	Tries to use excess capacity. Discounts draw new customers.	Uncertainty in demand. Hard to match demand to supply exactly.	Creates marketing ideas. Overbooking used in some businesses.
2. Back ordering during high-demand periods	May avoid overtime. Keeps capacity constant.	Customer must be willing to wait, but goodwill is lost.	Many companies back order.
3. Counter-seasonal product & service mixing	Fully utilizes resources; allows stable workforce.	May require skills or equipment outside the firm's areas of expertise.	Risky finding products or services with opposite demand patterns.

Source: Heizer & Render (2014)

Mixing Options

Chase strategy

- ✓ Equalize output to demand forecast for a particular period.
- ✓ Adjust workforce or production level.

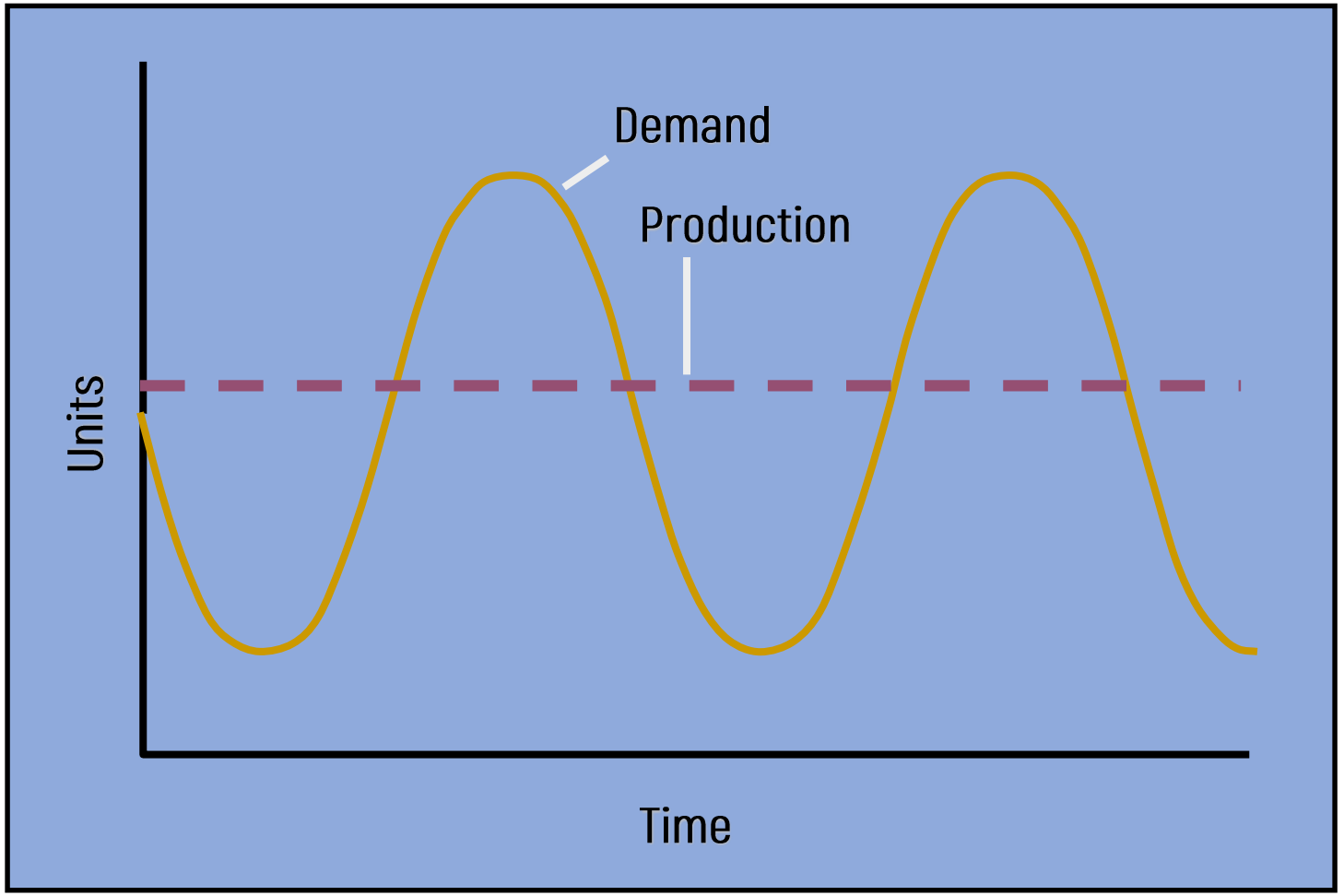


Source: Heizer & Render (2014)

Mixing Options

Level strategy/level scheduling

- ✓ Uniform production level from time to time.
- ✓ Stable production leads to better quality & productivity.



Source: Heizer & Render (2014)

Methods for Aggregate Planning

Graphical methods

Mathematical methods

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