

# THE HOMA FILES

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## Breakeven Analysis

*Proprietary Material*

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# Breakeven Analysis

- A method for calibrating the uncertainty associated with a decision
- Isolates a key unknown variable, usually volume (quantity) and solves for the value which makes the decision a toss-up
- The 'answer' is then evaluated for likelihood of occurrence
  - ...By comparison to benchmarks & analogies
  - ...By computing implied market share
  - ...By projecting competitive responses
- If breakeven point is less than likely volume, proposal is financially attractive (i.e. better to proceed than not)
- But, an opportunity projected to be above the breakeven point is not necessarily the best available option since other opportunities may offer even more attractive financial returns ... only better than doing nothing

# Break-even Analysis

## *Typical Applications / Decisions*

- Whether to enter a market or launch a product
- Whether to increase production or add capacity
- Whether to increase or decrease price
- Whether to make a substantial capital outlay

# Breakeven Analysis

## *Key Financial Variables*

Revenue = Quantity x Price

Profit = Revenue – Total Cost

Total Cost = Fixed Cost + Variable Cost

Variable Cost =  $f(\text{Quantity})$

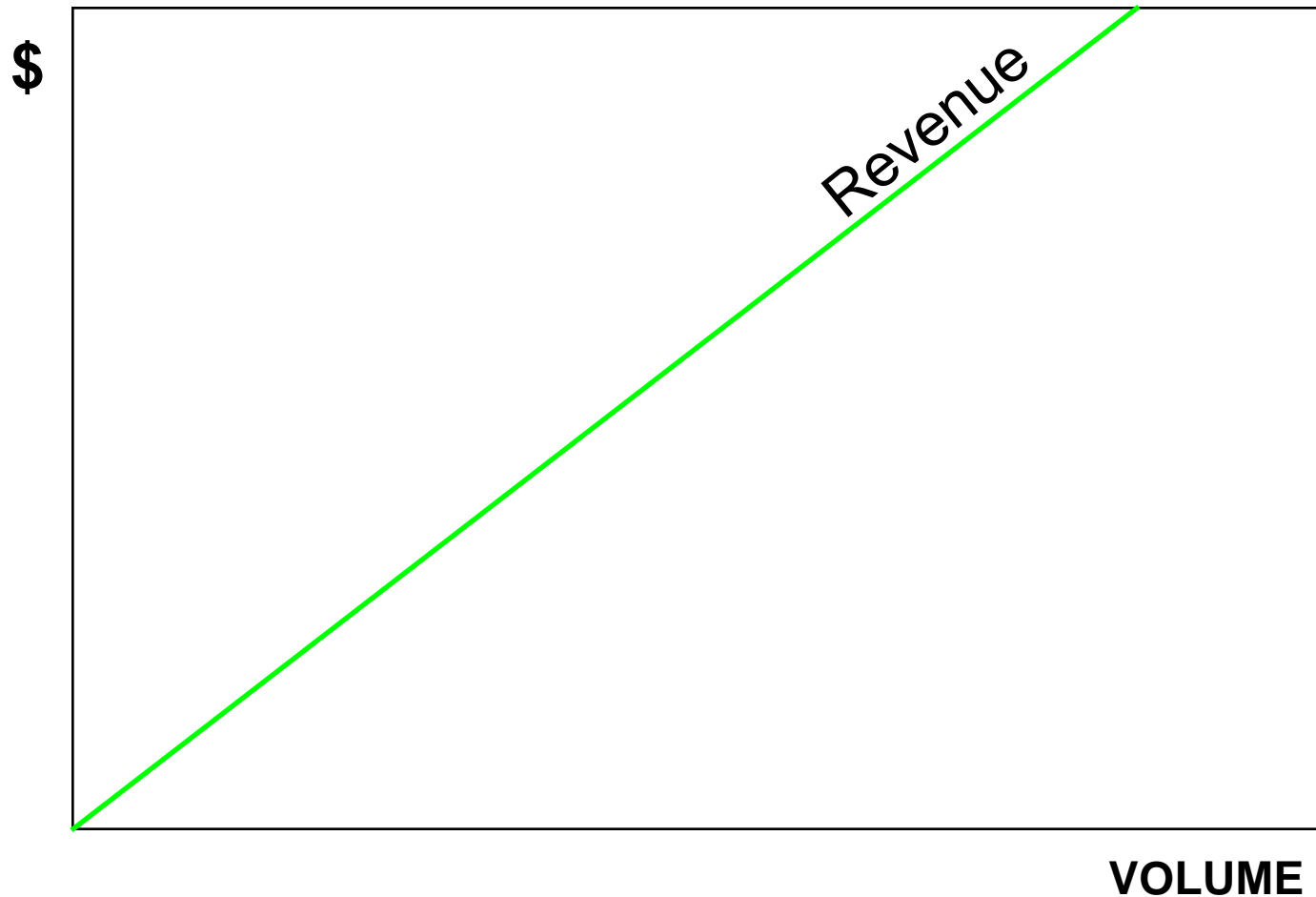
Contribution = Revenue – Variable Cost

Breakeven Point = Fixed Cost / Contribution  
*(Quantity)*                      *(Total)*                      *(Per Unit)*

# Revenues

- A function of volume (quantity) and price
- For simplicity, price is typically assumed to be constant across the relevant range of volume
- So, revenue curve is portrayed as linear with a slope equal to the constant price

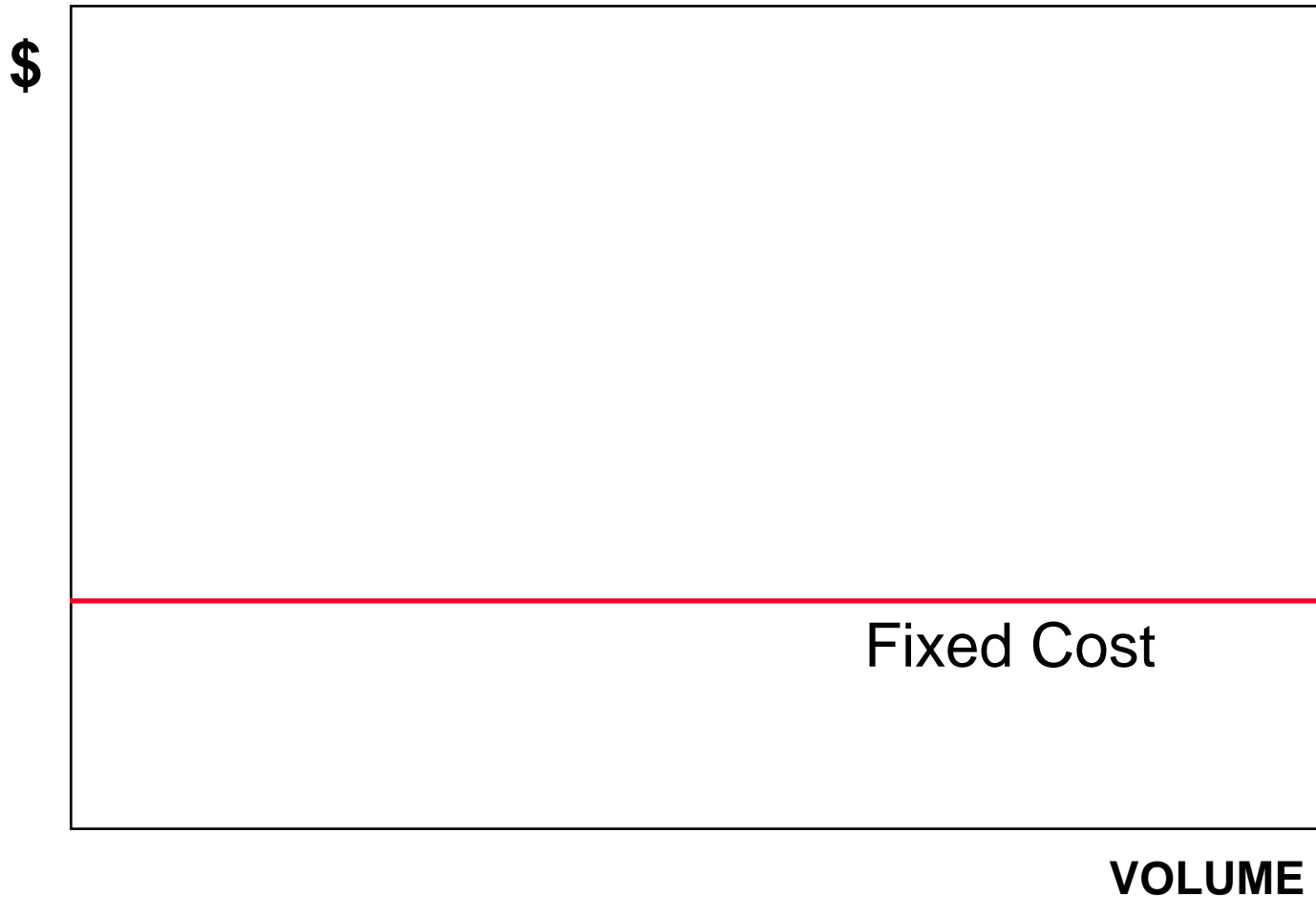
# Breakeven Analysis



# Fixed Costs

- For simplicity, typically assumed to be constant across broad volume ranges

# Breakeven Analysis



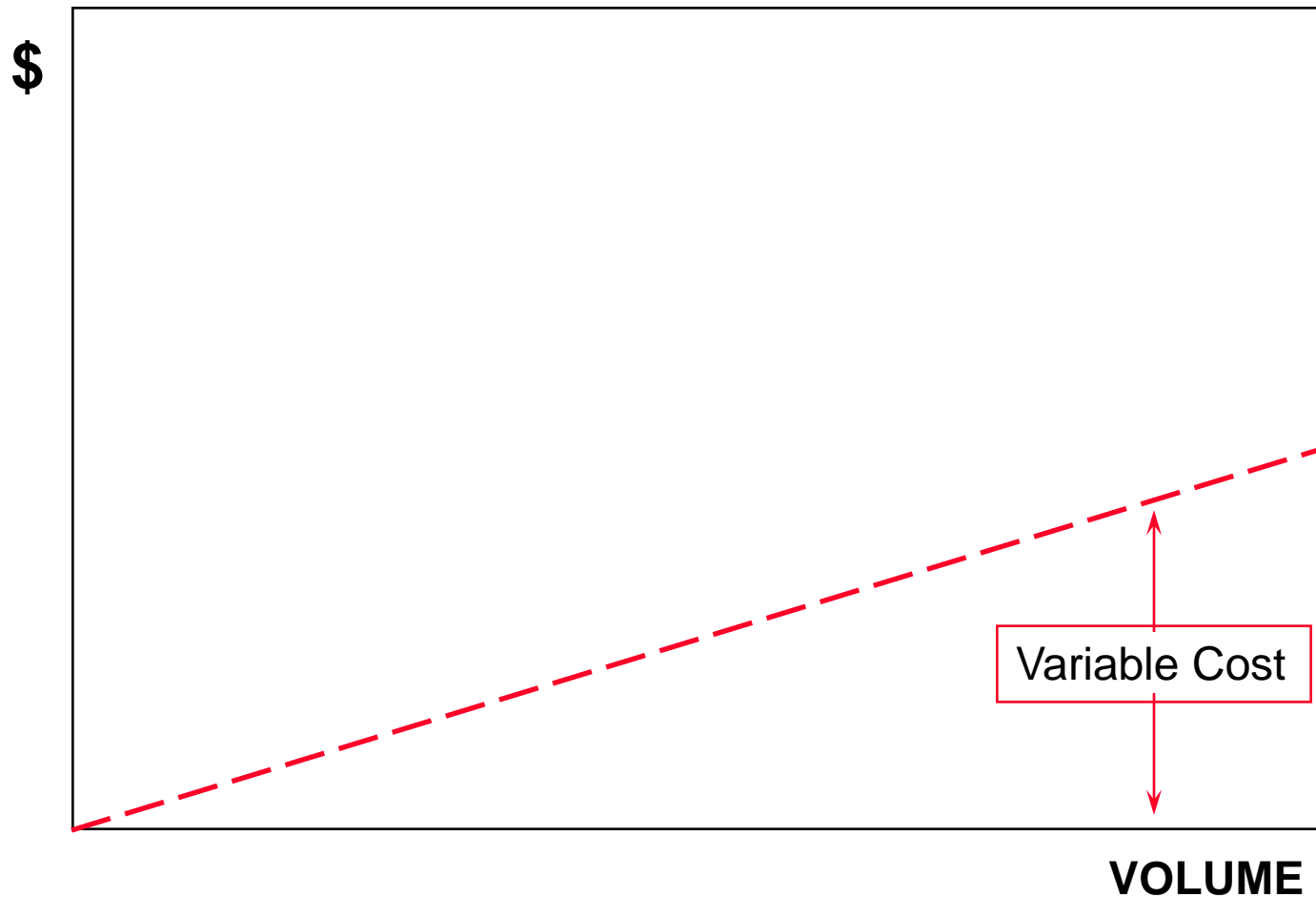


# Variable Costs

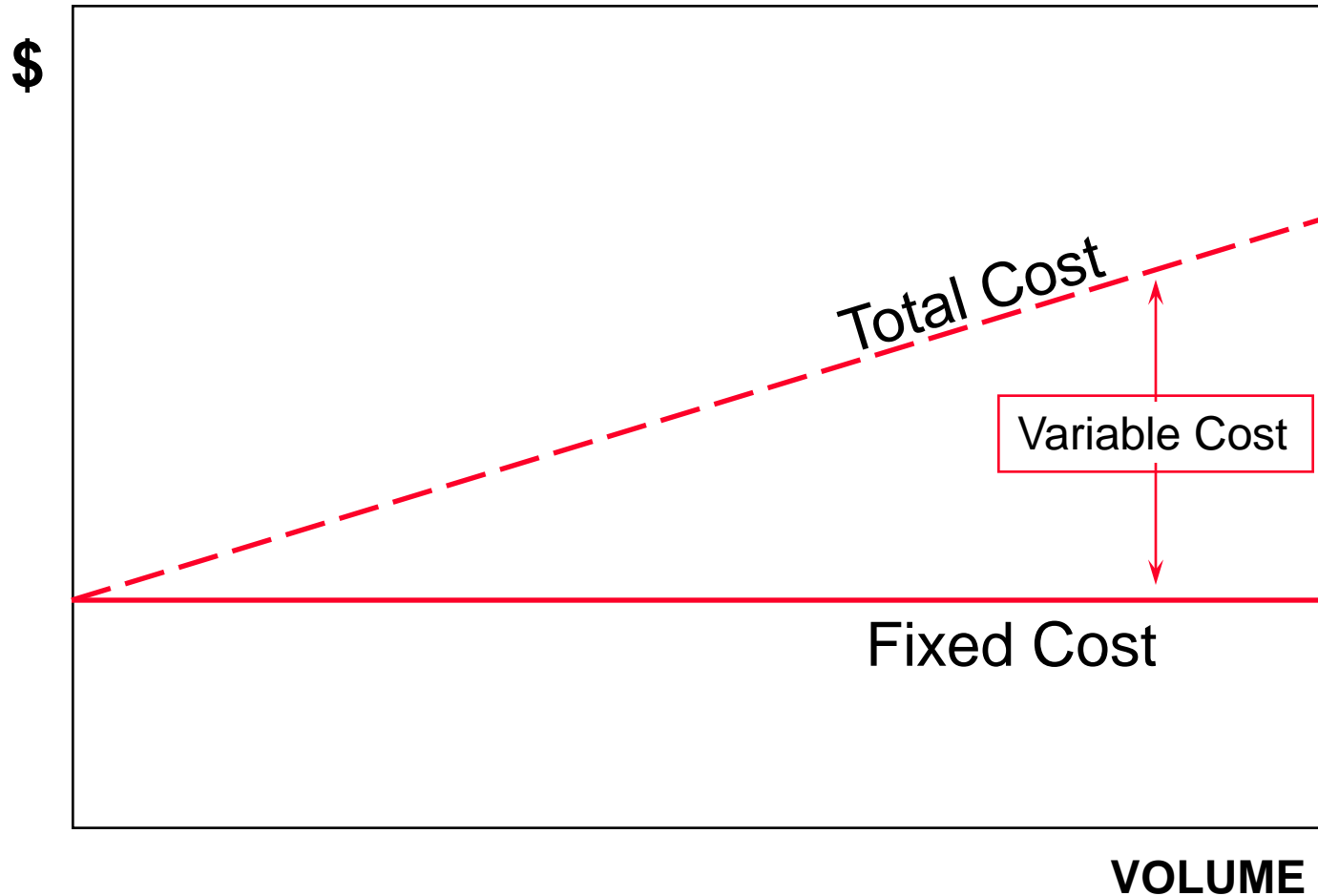
- For simplicity, typically assumed to be constant on a per unit basis

So, the variable cost curve is linear with slope equal to the variable cost per unit

# Breakeven Analysis



# Breakeven Analysis

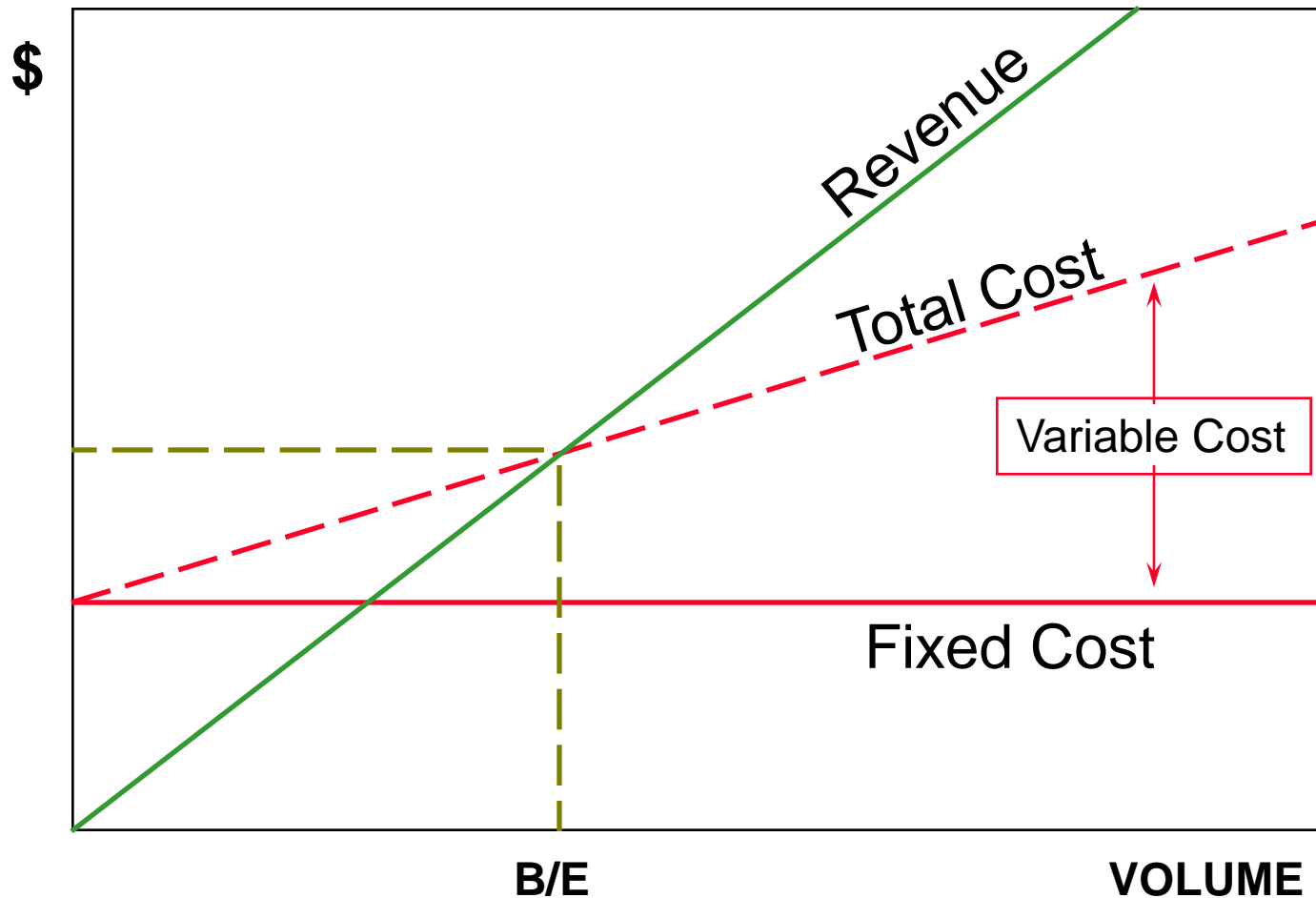


# Breakeven Point

- The quantity at which revenue equals total cost

Also, the point at which contribution equals fixed costs

# Breakeven Analysis

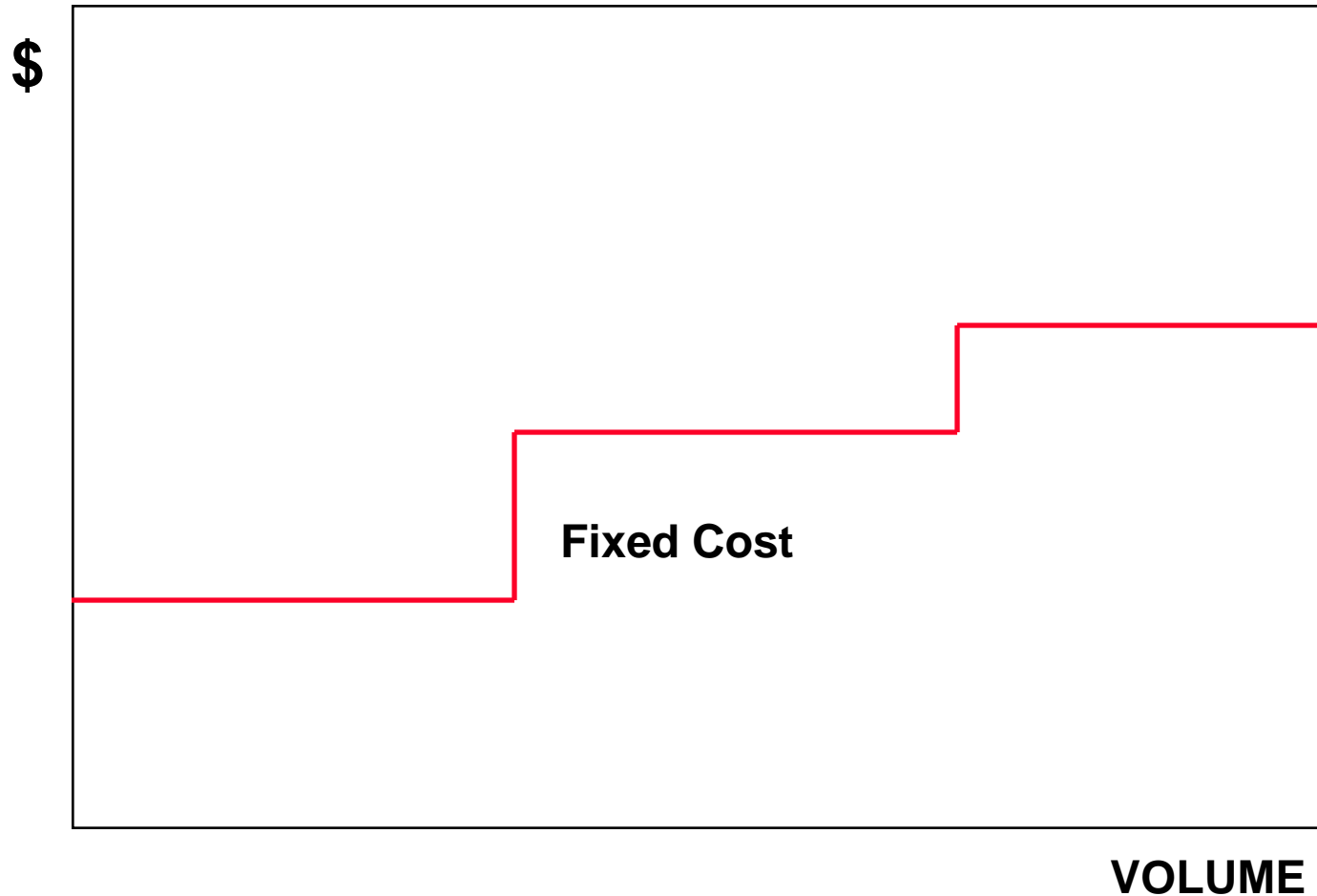


*Adding some complexity ...*

# Fixed Costs

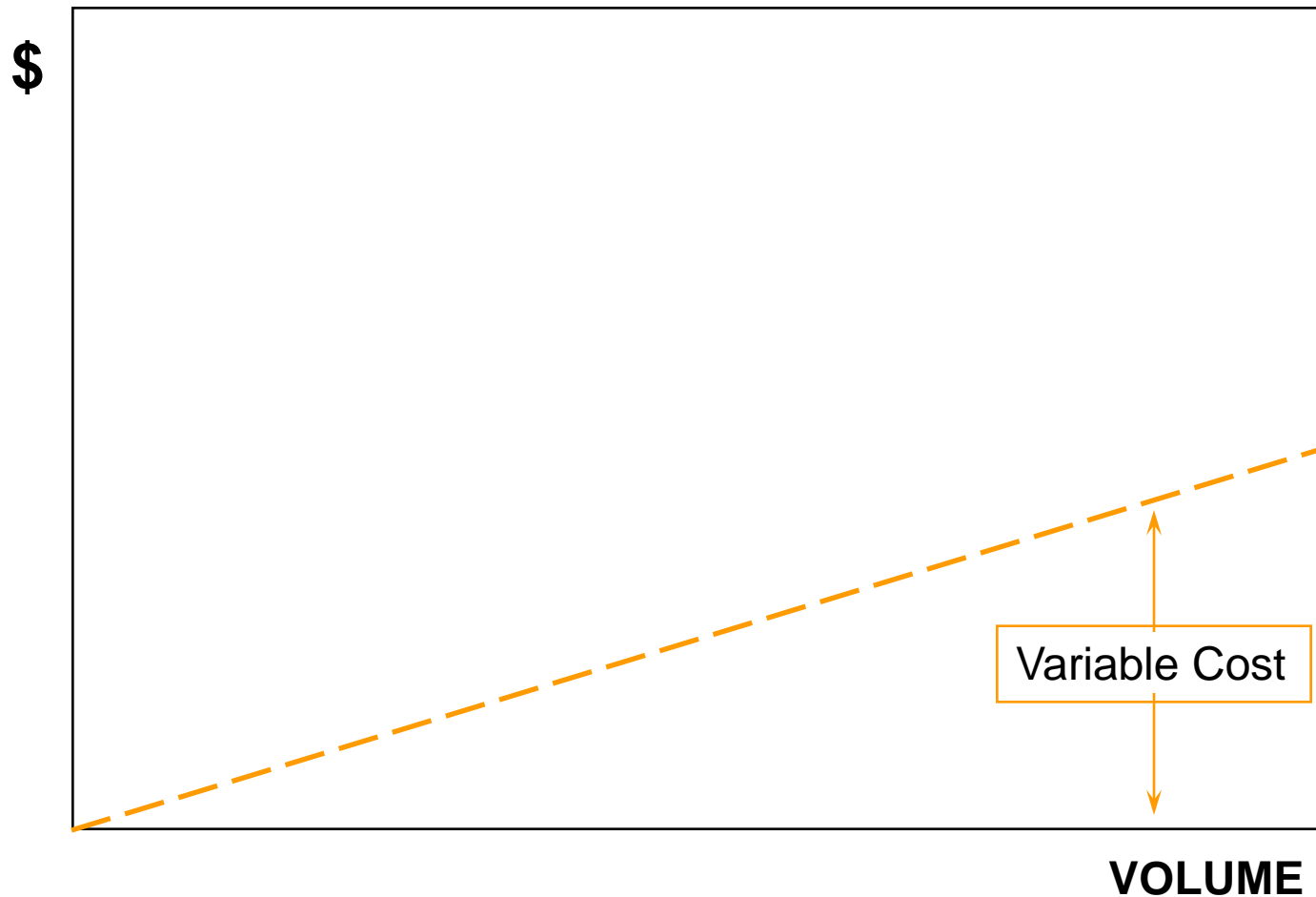
- For simplicity, typically assumed to be constant across broad volume ranges
- May vary as a function of things other than the quantity (volume)
  - ...Number of customers, markets, etc.
- Only fixed with respect to quantities within a relevant range
  - ...Example: if quantity exceeds current capacity, the next increment of capacity typically requires additional fixed costs

# Breakeven Analysis

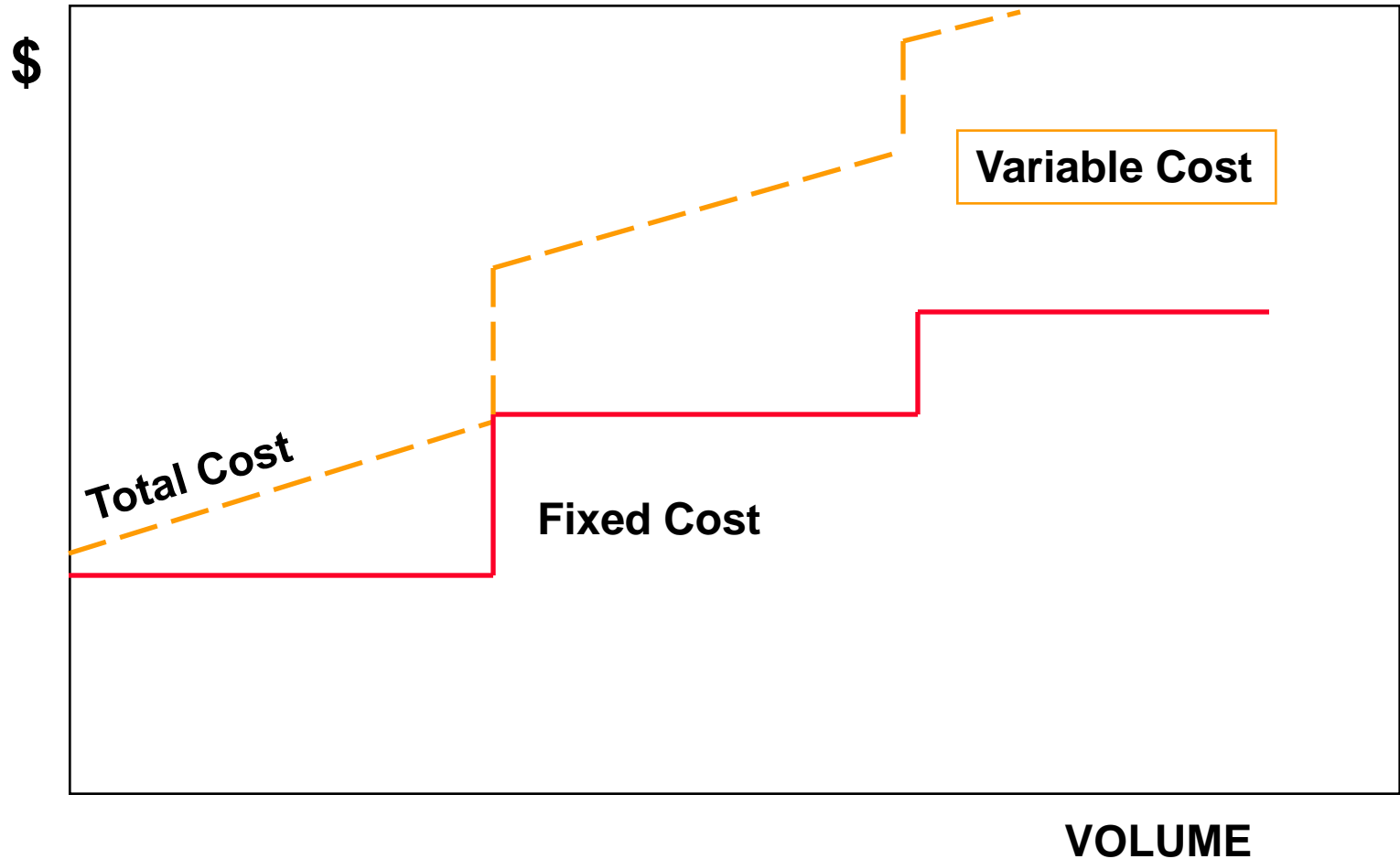




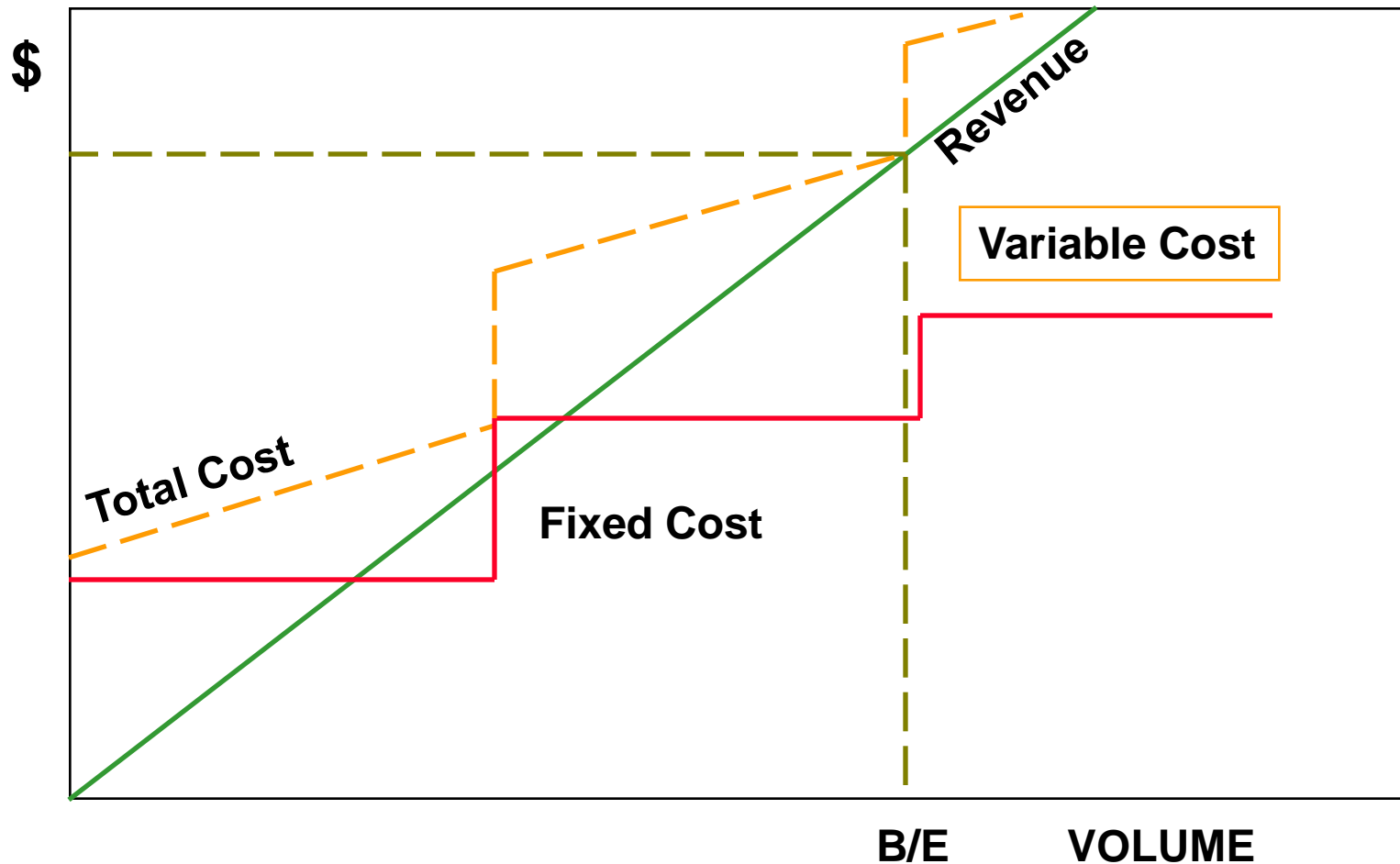
# Breakeven Analysis



# Breakeven Analysis



# Breakeven Analysis



# Breakeven Point

- The quantity at which revenue equals total cost

Also, the point at which contribution equals fixed costs

- Note: possible for a company to lose money at a quantity higher than a breakeven point. How?

If breaking even near full capacity and higher output requires additional capacity with associated fixed costs

*Adding more complexity ...*

# Revenues

- A function of volume (quantity) and price
- For simplicity, price is typically assumed to be constant across the relevant range of volume
- So, revenue curve is linear with a slope equal to the constant price
- But, keep in mind:

***Price often decreases as volume increases***

...Basic principle of supply & demand in  
imperfect, non-commodity markets

# Variable Costs

- For simplicity, typically assumed to be constant on a per unit basis
- But keep in mind:

***Variable costs may decrease as volume increases due to scale & experience efficiencies,***

***... or may increase at some point due to structural effects or scale inefficiencies***

...Example: Higher volume requires premium overtime, use of less efficient labor, or secondary supply sources

# Profitability

- Merely “breaking even” is not a satisfactory financial objective
- So, profit objectives can / should be incorporated into the analysis
  - ...Estimate investment, apply target ROI, and add to fixed costs
  - ...or add a per unit margin to variable cost
  - ...either way, BEP increases



## If $BEP(1) < BEP(2)$

- Indicates  $BEP(1)$  is less risky than  $BEP(2)$   
...Cost structure more variable
- But, does not necessarily indicate that  $BEP(1)$  is a preferable option  
...Key is profitability at most likely volume  
...or within the range of likely volumes

# Generalizing the technique ...

- Example: if quantity is known, can solve for another uncertain variable
  - ... How long until breakeven is reached?
  - ... What return meets ROI hurdle?
  - ... Etc.
- More broadly, when facing a tough to forecast variable, calc the breakeven value and draw an reasoned inference

# Generalizing the technique ...

If more than 1 variable is uncertain ...

1. Create a limited number of discrete scenarios for 1 of the variables
2. Calc the breakeven for the other variable
3. Draw reasoned inferences regarding the scenario / breakeven combinations

# Breakeven Analysis

*Key: Proper Classification of Costs*

- Fixed costs
  - ...Corporate, regional, operation
- Semi-fixed
  - ...Constant over a range of volume
- Variable
  - ...Dependency relationships  
(not always sales volume !)

Calibrates uncertainty & tightens bounds,  
But not a substitute for decision-making