

### Calculating Fixed Costs is a 2 step process

- 1. Place value on the fixed asset and an estimate of its useful life
- 2. Calculate fixed costs over the life of the asset

### Calculating fixed costs...

- Multiply loss in value (original value minus salvage value) by CRF (capital recovery Factor) e.g., amortization factor.
- Add that to the interest on the Salvage Value
- Estimate annual costs for insurance, repairs and taxes (if applicable).

### Fixed Cost Example using CRF

- Original Value \$200,000
- Salvage Value \$ 20,000
- Loss in Value \$ 180,000
- Cap. Recovery Factor, 10%, 20 Yrs. 0.117  
 $\$180,000 \times 0.117 = \$21,060$
- 10% Int. Charge \* \$20,000 = 2,000
- Rep. Taxes & Ins. 2.5% \* \$200,000 = \$5,000
- Total Fixed Cost \$26,060

### Equimarginal Principle

- The equimarginal principle says that profits will be maximized when the last dollar spent for each of several uses makes equal contributions to returns

### Assume you have unlimited capital

- Where would you put your 1<sup>st</sup> \$200?
- Where would you put your 2<sup>nd</sup> \$200?
- What about your 10<sup>th</sup>?

Where would you put your 1st \$200?      •Where would you put your 2nd \$200?

Units of Capital (in \$200 units)	Added Returns from investing operating capital		
	Barley	Fattening Steers	Government Bonds
1	1400	490	218
2	900	470	218
3	700	460	218
4	400	425	218
5	300	410	218
6	200	370	218
7	100	315	218
8	-200	240	218

### Opportunity Cost

- Opportunity cost and the equimarginal principle are closely related.
- Opportunity cost means the value of a resources in its best alternative use. Opportunity cost is the value of a product *not* realized because resources were directed to an alternative use

### Substitution of Inputs

- Alternative production methods
- Input can substitute for each other
- Constant rate of substitution
- Diminishing rate of substitution

### Key Points

- Substitute one input for another as long as the cost of the added input is less than the replaced input.
- With a constant rate of substitution use all of one input or all of the other input.

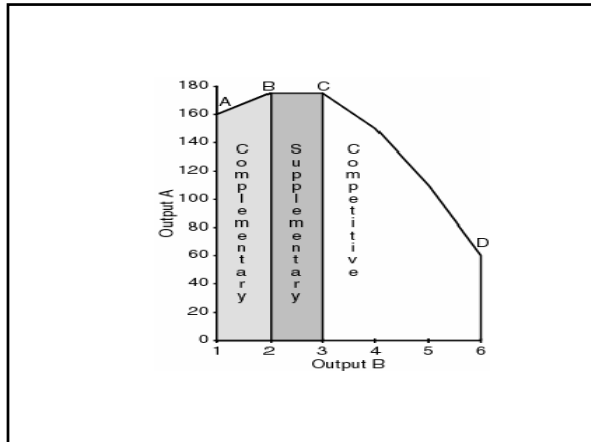
### Key Points

- Substitute one input for another as long as the cost of the added input is less than the replaced input
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- Substitute one resource for another as long as more is subtracted from total cost than is added or as long as the Marginal Rate of Substitution (MRS) is greater than price ratio
- When the Price of Input Added \* Units of Input Added = Price of Input Replaced \* Units of Input Replaced we are at the low cost point

### Substitution of Outputs

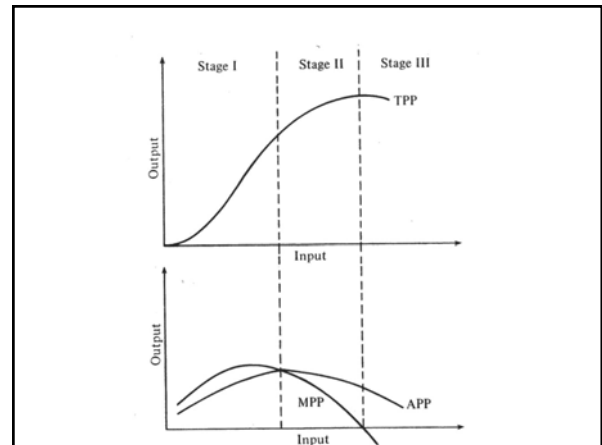
- Kinds of production enterprises
  - Complimentary (producing one also produces another)
  - Supplementary (producing one has no effect on the other)
  - Competitive (producing one reduces the another)



## Cost and Return Relationships

- Total physical product (TPP)
- Total fixed costs (TFC)
- Total variable costs TVC)
- Total costs (TC)
- Total revenue (TR)

- Average fixed cost (AFC)
- Average variable cost (AVC)
- Average total cost (ATC)
- Marginal cost (MC)
- Marginal revenue (MR)
- Total profit (TP)



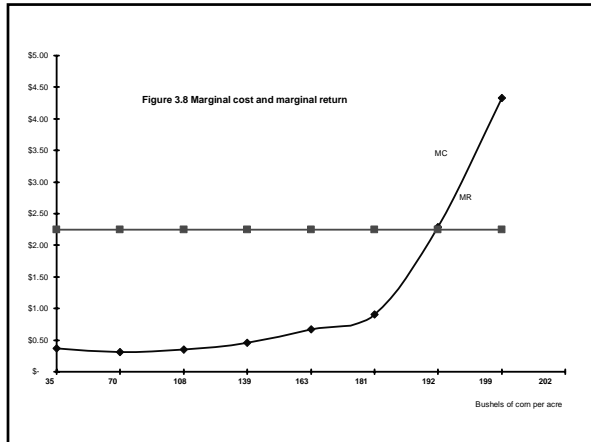
## Production Function Stages

- *Stage 1* Output increasing at an increasing rate
  - All rational decision makers would produce here
- *Stage 2* Output increasing at a decreasing rate
  - The decision making stage
- *Stage 3* Output decreasing
  - No rational decision makers would produce here

## Points to Remember

- High profit point is where  $MC = MR$
- In short run produce as long as the income is greater than the variable cost
- In long run producers must cover cost of production or go out of business





### Risk and Uncertainty

- Risk implies that one knows what the future outcomes could be and the probabilities associated with them
- Some risks are fire; flood; wind; hail; price changes; health; death; changes in technology, production methods, legal matters, marketing procedures, and tax rules;

- Methods of managing risk could include such things as insurance (a small sure loss to guard against a disastrous loss), marketing management, diversification of production, keeping excess capital around, being flexible, etc.
- Uncertainty implies that one may not be aware of different outcomes and thus cannot assign any probability to them

### Three Key Points

- Profits not necessarily highest when total output or TPP are the highest
- Profits not necessarily highest when physical efficiency or APP is the greatest
- Making profit depends on the prices of inputs and outputs and how they relate to physical productivity

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### **Points to Remember**

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- In short run produce as long as the income is greater than the variable cost
- In long run producers must cover all cost of production or go out of business