

# Economics 101 – Section 5

Lecture #15 – March 4, 2004

Chapter 7  
How firms make decisions  
- profit maximization

## Profit maximization

- Question – What is the firm's objective?
  - Usually want to make as much profit as possible
- Interpret the firm as a single economic decision maker whose goal is to maximize the owner's profit
- What is profit? – Two definitions
  - Accounting profit
    - = Total Revenue – Accounting costs

## Overview

- Exam next class – March 9<sup>th</sup> 11-12:10
- Assignment #6 due today
  - Hand in after class
  - (by Midnight in folder on wall outside my office)
- Extra study session
  - – 8-10PM Thursday
  - 2432 food science
- Today start on problem of the firm
  - Profit maximization

## Profit maximization

- Economic profit
  - = Total Revenue – All costs of production
  - = Total revenue – (explicit costs + implicit costs)
- What is the difference between these two?

## Profit maximization – overview

- What is profit maximization
  - Accounting vs. economic profit
- The firm's constraints
- Profit maximizing level of output
- Role of marginal decision making
- Dealing with loss – short-run and long-run actions

## Profit maximization

- Accounting profit

Total Revenue from Selling T-shirts	\$300,000
Cost of raw materials	\$ 80,000
Wages and salaries	150,000
Electricity and phone	20,000
Advertising cost	40,000
<b>Total Explicit Cost</b>	<b>290,000</b>
Accounting Profit	\$ 10,000

## Profit maximization

### □ Economic Profit

Total Revenue from Selling T-shirts	\$300,000
Cost of raw materials	\$ 80,000
Wages and salaries	150,000
Electricity and phone	20,000
Advertising cost	40,000
<b>Total Explicit Costs</b>	<b>\$290,000</b>
Investment income foregone	\$ 6,000
Rent foregone	4,000
Salary foregone	40,000
<b>Total Implicit Costs</b>	<b>\$ 50,000</b>
<b>Total Costs</b>	<b>\$340,000</b>
<b>Economic Profit</b>	<b>-\$ 40,000</b>

## Profit Maximization

### □ The firms constraints

- Recall with the LRATC discussion from last day the graph gave us the lowest average cost possible to produce a given level of output
  - However, the PRATC curve could not tell us anything about how much should be produced
- How much the firm should produce is going to depend on what will maximize their profit levels, the firm will face constraints which will limit the amount they would like to produce

## Profit Maximization

- In this class we will be using the concept of economic profit
- The proper measure of profit for understanding and predicting the behavior of firms is economic profit.
- Unlike accounting profit, economic profit recognizes all the opportunity costs of production – both explicit and implicit

## Profit Maximization

- One constraint is the demand curve facing the firm
  - This is the demand curve for the product produced by the firm
  - This demand curve is built upon the consumer theory – do not confuse the demand with supply here
  - The demand curve facing the firm tells use, for different prices, the quantity of output that customers will choose to purchase from that firm.

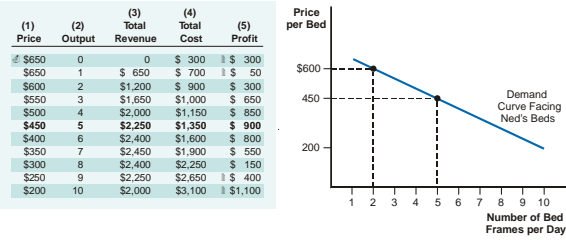
## Profit Maximization

- A note on firms
  - Firms need not refer to only those organizations which sell goods and services
  - We could also include non-profit organizations as well (UNICEF, NRA, etc.)
    - We would just need to use a broader definition of total revenue to accomplish this
    - i.e. putting value on helping people, improving living conditions, etc.
  - The principles we use here could be applied to pretty much any organization

## Profit Maximization

- The demand curve facing the firm shows us the maximum price the firm can charge to sell any given amount of output.

**Figure 1 The Demand Curve Facing the Firm**



## Profit Maximization

- In summation:
  - Firms face constraints that limit its ability to earn profit
  - The demand curve constrains how much can be changed for a certain level of output
  - The cost of production is constrained by the firms technology which is used to determine the firms “least cost method” of production

## Profit Maximization

- Total revenue
  - - is the total inflow of receipts from selling a given amount of output
  - This is computed as the quantity sold multiplied by the accompanying price on the demand curve

## The profit-maximizing level of output

- We can use 2 methods to determine what is the profit maximizing level of output
  - 1) the total revenue and total cost approach
  - 2) The marginal revenue and marginal cost approach
- Both methods will give exactly the same result

## Profit Maximization

- The cost constraint
  - For each level of production the firm must determine the cheapest method to produce that quantity – i.e. determine the least cost method
  - At any level of output the firm may produce at it must incur the cost associated with “least cost method”
  - This is largely determined by the firms production technology
    - How many inputs are used to produce any given level of output

## The profit-maximizing level of output

- The total revenue and total cost approach
  - This method is the easiest to understand
  - Under this approach the firm calculates:
    - Profit = TR – TC for each level of output
    - The firm then selects the level of output with the highest amount of profit
  - This is what is done is the last column of fig#1

## The profit-maximizing level of output

(1) Price	(2) Output	(3) Total Revenue	(4) Total Cost	(5) Profit
\$650	0	0	\$ 300	\$ 300
\$650	1	\$ 650	\$ 700	\$ 50
\$600	2	\$1,200	\$ 900	\$ 300
\$550	3	\$1,650	\$1,000	\$ 650
\$500	4	\$2,000	\$1,150	\$ 850
\$450	5	\$2,250	\$1,350	\$ 900
\$400	6	\$2,400	\$1,600	\$ 800
\$350	7	\$2,450	\$1,900	\$ 550
\$300	8	\$2,400	\$2,250	\$ 150
\$250	9	\$2,250	\$2,650	\$ 400
\$200	10	\$2,000	\$3,100	\$1,100

## The profit-maximizing level of output

- Marginal revenue (MR)
  - Is the change in total revenue (TR) from producing on more unit of output (Q).

$$MR = \frac{\Delta TR}{\Delta Q}$$

## The profit-maximizing level of output

- Note: Notice that maximizing profit is not the same as maximizing revenue

## The profit-maximizing level of output

- Recall the definition of marginal cost from previous lectures
- Marginal cost
  - Is the increase in total cost from producing one more unit of output

$$MC = \frac{\Delta TC}{\Delta Q}$$

## The profit-maximizing level of output

- The marginal revenue and marginal cost approach
  - This method may seem less intuitive but gives much more insight into the firms and managers decision making process
  - In other economics courses this is the primary method used since it is much more insightful in understanding behavior

Output	Total Revenue	Marginal Revenue	Total Cost	Marginal Cost	Profit
0	0		\$ 300		-\$ 300
1	\$ 650	\$650	\$ 700	\$400	-\$ 50
2	\$1,200	\$450	\$ 900	\$200	\$ 300
3	\$1,650	\$350	\$1,000	\$100	\$ 650
4	\$2,000	\$350	\$1,150	\$150	\$ 850
5	\$2,250	\$150	\$1,350	\$200	\$ 900
6	\$2,400	\$ 50	\$1,600	\$250	\$ 800
7	\$2,450	-\$ 50	\$1,900	\$300	\$ 550
8	\$2,400	-\$150	\$2,250	\$350	\$ 150
9	\$2,250	-\$250	\$2,650	\$400	-\$ 400
10	\$2,000		\$3,100	\$450	-\$1,100

