

# Economics 101 – Section 5

Lecture #17 – March 23, 2004

Chapter 7  
 -The Firms long-run decisions  
 -The Principal-Agent problem

Chapter 8  
 -Perfect Competition  
 -Competition in the Short-Run

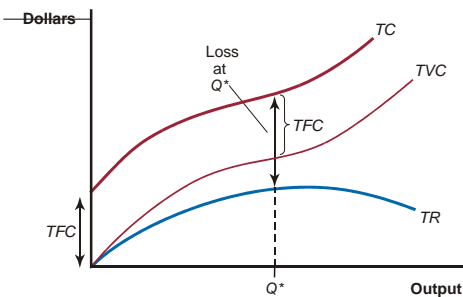
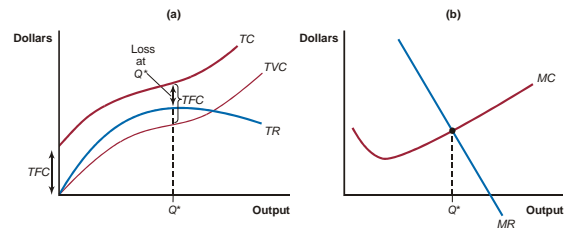
## Lecture Outline

- Recap from last day
  - The decision to shut down in the long-run
- The principal – Agent Problem
- Chapter 8
  - Perfect Competition
  - The perfectly competitive firm
  - Finding the profit maximizing level of output revisited

## From last lecture - When to shut down

- What happens if you are losing money in the short run?
  - Should you always shut down?
    - Answer depends on how much you are losing.
- The shut down rule in the short run (SR) is to stop production if it cannot cover its variable costs
  - If it can cover all its variable costs but not all the fixed costs, then it should still keep producing in the SR

Figure 5 Loss Minimization



## From last lecture - When to shut down in the SR

- If we are already at the output level where  $Q^*$  is the point where  $MR=MC$  then:
  - If  $TR > TVC$  at  $Q^*$ , the firm should keep producing
  - If  $TR < TVC$  at  $Q^*$ , then the firm should shut down
  - If  $TR = TVC$  at  $Q^*$ , then the firm does not care if it shuts down or not

## From last lecture - What happens in the LR?

- In the LR all inputs are variable so the firm would shut down or exit the industry if there is any loss at all
  - No matter how small the loss is, in the LR the firm should exit

## Example

- 1960's airlines had a simple rule – Offer the flight if 65% of the seats could be filled
  - $ATC/Q = \$4,000$  ---> 65% of seats needed to be filled
- Continental had a different rule – Offer the flight if only 50% of the seats could be filled
  - Shareholders were annoyed at this rule since this meant not all costs were being covered

## Example

- Continental asked what were the extra costs incurred to offer a flight
  - These costs were for variable costs such as fuel, ground crew, flight crew, meals, etc.
  - For a typical flight this was found to be \$2,000
  - So  $MC = 2,000$
- The marginal revenue from a 65% full flight was  $MR = 4,000$
- Since  $MR > MC$  then output should be increased

## Example

- Using this marginal approach Continental was able to outperform its competitors using the marginal approach to profit

## The principal-agent problem

- Do the firm's manager(s) and the workers have the same objectives?
  - Usually not!
  - Firms want to make profits and earn \$ for the shareholders
  - Workers usually want to maximize their benefit from working (i.e. their wage less the time and effort required to get that wage)

## The principal-agent problem

- The difference between the firm managers' goals and those of the workers or employees creates what is called a **principal-agent problem**
- To get around this problem need to specify some type of contract or some other method to make the

## The principal-agent problem

- Two conditions need to be satisfied for an effective one-shot contract
  - 1) incentive compatible – That is, the worker must want to take the job given all of their other alternatives
  - 2) effort revealing – The contract must be designed so that it is in the best interests of the worker to exert a high level of effort on the job

- In a repeated game (i.e. the worker is hired every year for the same position, or hired for a permanent position with yearly reviews), reputation and past performance can be used to measure a workers level of output
  - University instructor or professor, lawyer, doctor
- In a one-period game (i.e. one period scenario) then you need to be able to specify the contract and incentive structure appropriately
  - An example – A chemical company wishes to hire a temporary sales assistant to cover for an employee on maternity leave for a period of 12 months

## The principal-agent problem

- Some background on this position
  - Non-renewable after 12 months
  - Salary of \$45,000
    - Possible bonus of 8% if the individual does not terminate the contract before the 12 months are up
      - This is because it is very costly to hire another individual for only a few months later on
  - There is **no** performance bonus

## The principal-agent problem

- The individual hired has no desire to work for a related company in the future – is planning on taking up a completely different occupation at the end of the contract
- How good is this set up?
  - Incentive compatible? – Yes, the individual has no better alternatives to the current job
  - Effort revealing? – No! There is no incentive for this individual to exert any more effort than is required to not get fired

## The principal-agent problem

- What are some possible solutions to the principal-agent problem?
  - Reputation and past history
    - Only works for a repeated game
    - What about the very last period in the game?
  - Contracts
    - Try to specify as much as possible in the contract before work begins
    - But it is very difficult to specify everything in the contract ex ante (i.e. at the start)
  - Incentive based solutions
    - Reward the employee for only the amount of output produced
    - A problem if there is uncertainty – i.e. if wage is fixed to performance and there is a bad year in chemical sales
    - Could potentially turn off customers – i.e. annoying sales personnel

## The principal-agent problem

- For one-shot games the best solution is usually a combination of a fixed wage and some performance based incentive

## Perfect Competition – Chapter 8

- In earlier lectures we talked about the inability of one supplier or consumer to influence prices alone
  - This is a characteristic of the market structure
- Market structure – the characteristics of a market that influence the behavior of buyers and sellers when they come together to trade

## Perfect Competition

- Perfect competition has 3 important characteristics associated with its market structure
  - 1) There are a large number of buyers and sellers – each buys or sells only a very small portion of the total quantity in the market
  - 2) Sellers offer a standardized product
  - 3) sellers can easily enter or exit the market – no restrictions to entry or exit

## Perfect Competition

- What markets are perfectly competitive?
  - Usually agricultural markets
  - Many financial markets
  - Some markets for consumer goods and services
- What markets are not perfectly competitive?
  - Cellular phones
  - Automobiles
  - Diamonds

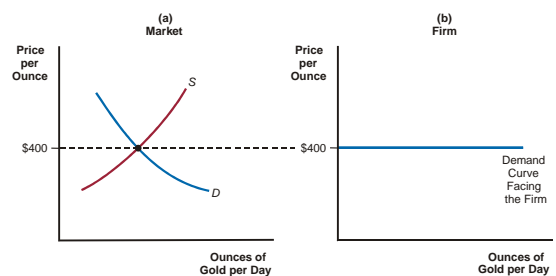
## The perfectly competitive firm

- The goal of a perfectly competitive firm is still to maximize their profit
- For example – think of a single farmer in ND growing wheat
  - This individual will face a cost constraint and will not be able to influence the market price they are able to receive by increasing or decreasing their output

## The perfectly competitive firm

- The perfectly competitive firm faces a cost constraint like any other firm
  - The cost of producing any given level of output depends on the firms production technology and the prices it must pay for inputs

Figure 1 The Competitive Industry and Firm



## The perfectly competitive firm

- In perfect competition the firm is a **price taker**
  - It treats the price of its output as given

**Table 1** Cost and Revenue Data for Small Time Gold Mines

(1) Output (Troy Ounces of Gold per Day)	(2) Price (per Troy Ounce)	(3) Total Revenue	(4) Marginal Revenue	(5) Total Cost	(6) Marginal Cost	(7) Profit
0	\$400	\$ 0		\$ 550		-\$550
1	\$400	\$ 400	\$400	\$1,000	\$400	-\$600
2	\$400	\$ 800	\$400	\$1,300	\$ 50	-\$400
3	\$400	\$1,200	\$400	\$1,250	\$ 100	-\$ 50
4	\$400	\$1,600	\$400	\$1,300	\$150	\$250
5	\$400	\$2,000	\$400	\$1,000	\$250	\$900
6	\$400	\$2,400	\$400	\$1,750	\$350	\$650
7	\$400	\$2,800	\$400	\$2,100	\$450	\$700
8	\$400	\$3,200	\$400	\$2,600	\$550	\$600
9	\$400	\$3,600	\$400	\$3,100	\$650	\$500
10	\$400	\$4,000	\$400	\$3,750	\$650	\$250

**Figure 2**  
Profit Maximization  
in Perfect  
Competition

