

# 1 Theory of the firm in a nutshell

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## A look at and past pure competition

Like the consumer, the firm wants to do the best it can subject to the constraints it faces.

- What does "best" mean?

We often assume that the firm wants to maximize its profits but other goals are possible.

If profit maximization is the goal, in a one-period world the firm maximizes one-period profits.

In a multiple-period world, maximizing profits generalizes to maximizing the present value of the firm's profit stream.

- All firms are constrained by the state of technical knowledge for producing the commodity(s) that they produce and sell

There are many ways to express this constraint mathematically. Two of the ways are production functions and cost functions.

A production function identifies the maximum output associated with any combination of inputs. E.g.  $x = f(l, k)$ , where  $x$  is the output level,  $l$  is the amount of labor used, and  $k$  is the amount of capital used.

A cost function,  $c = c(x)$ , identifies minimum cost, in \$, as a function of the number of units of output produced.

- All firms are constrained in terms of what they can sell at what price.

For the competitive firm this constraint is represented by the exogenous  $p$ . The firm can sell as much as it wants at  $p$ . Demand curve for the competitive firm's output is the horizontal price line ( $p$  on the vertical axis)

For the monopolistic firm this constraint is represented by the market demand function  $x = x(p)$ .

For the oligopolist, things are more complicated.

- All firms are constrained by the supply of inputs.

The firm that is competitive in input markets can buy as many inputs as desired at their competitive market prices. Input prices are exogenous for the competitive firm

In contrast, a monopsonistic firm faces an upward sloping supply curve for inputs: it has to pay more per unit if it want to hire more.

- The solution to the firm's optimization problem can be expressed in **numerous** ways.

In terms of the best quantity,  $x^*$  to produce.

In terms of the best price,  $p^*$  to charge (only for non-competitive firms)

How much of each input to hire,  $l^*$  and  $k^*$

What price to pay for inputs,  $w^*$  and  $r^*$  (only for firms that are not competitive in input markets, e.g. monopsonists)

Exercises for later:

Draw "supply" and "demand" curves for a competitive firm producing product  $x$ , relate the the marginal cost curve.

Draw a "supply" and "demand" curves for a monopolistic producer of product  $x$

Draw the market supply curve for product  $x$  assuming  $x$  is produced by a large number of competitive firms, relating it to the marginal cost curves.

Draw the market supply and demand curves for product  $x$  assuming  $x$  is produced by competitive firms.

Draw the market supply curve for product  $x$  assuming  $x$  is produced by a monopolist

Draw the market supply and demand curves for product  $x$  assuming  $x$  is produced by a monopolist, include after the marginal revenue curve.

Show the profit maximizing output level for a monopolist