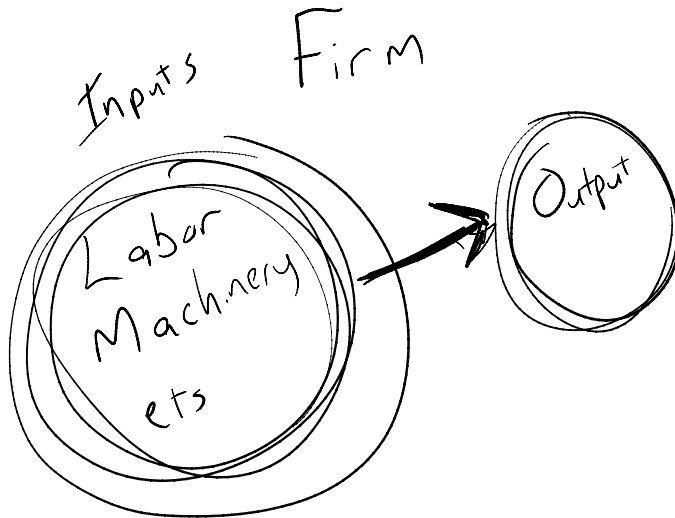


ECON 5303, Unit 5 Video 1  
Production Functions: The linear production function



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A production function is an equation that shows the relationship between the amount of inputs employed by a firm and the number of units of output of a firm's product that is produced.

*Factors  
of  
production*

To simplify, we can assume a firm employs only two categories of inputs

1. Labor, "L"; human talents
2. (Physical) Capital, "K"; machinery

"Q": the number of units of a firm's product that is produced.

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Example of a production function:

Linear Production Function

$$Q = \underline{20}K + \underline{40}L$$

If the fake firm above employed 8 units of capital and 17 workers then how much output would they produce?

$$20 \times \overset{K}{8} + 40 \times \overset{L}{17} = 840 \text{ units of output}$$

Marginal product of labor (MPL): Increase in units of output produced when one additional worker is employed.

Marginal product of capital (MPK): Increase in units of output produced when one additional unit of capital is employed.

It is easy to figure out MPL and MPK if we have a linear production function.

Example: Suppose

$$Q = 37K + 16L$$

*MPK is 37 units of output*

*MPL is 16 units of output*

Value of Marginal Product of Labor (VMPL):

Marginal product of labor x selling price per unit of the product

You are a tomato farmer. You hire one more farm worker this season causing your total tomato production to rise by 10 bushels. You sell each of these bushels for \$4 each.

$$\text{VMPL} = 10 \times \$4 = \$40.00$$

Value of Marginal Product of Capital (VMPK):

Marginal product of capital x selling price per unit of the product

If VMPL is bigger than the cost of employing an additional worker, then you should employ an additional worker because he/she will bring in more money than he/she costs to employ.

If VMPK is bigger than the cost of employing an additional unit of capital, then you should employ an additional unit of capital because it will bring in more money than it costs to employ.