Theory of the Firm

1. Neoclassical Theory
2. Modern/Property Rights Theory

Neoclassical Theory of the Firm

In the eyes of this approach, the firm exists and produces output. It looks at the nature of the outputs and inputs and nothing in between.

INPUTS ----> BOX ----> OUTPUTS

It asks the questions:
1. How to produce?
2. How much to produce?
3. What price to sell it for?
4. And all other questions of this nature.

The firm is real, it exists and has an owner. It’s goal is to maximize value and profit.

The essential Building Block

. Production function: relates inputs and outputs indicating the highest output $Q$ that a firm can produce for every specified combination of inputs.

\[ Q = F(X_1, X_2, \ldots X_U) \]

where $Q$ is output
$X$ is input

In production, there are two scenarios.

1. All inputs are adjustable.
   . Making decisions subject to temporary constraints (plant managers)
2. Some inputs are not adjustable.
   Mostly there are strategic management decisions, made by “the suits.”

Let’s simplify the Production function (2 inputs)

\( Q = F (L, K) \), where \( K \) = “things” or machinery and \( L \) = people. If both \( K \) and \( L \) are adjustable, we are in the long run.

\[ \begin{align*}
U, \text{Capital} & \\
\text{Labor, } L & \\
Q_1 &= 55 \\
Q_2 &= 90 \\
Q_3 &= 160
\end{align*} \]

\( Q = F (K, L) \), where \( K \) = “things” or machinery and \( L \) = people if both \( K \) and \( L \) adjustable, we are in the long run.

~OR~

\( Q = F (L, K_0) \), where \( K_0 \) is constant (\( K_0 \) is fixed at \( K \)).

Let’s analyze short run production characteristics.

\( Q = F (L, K) \), where \( K \) is fixed.
Short Run Production Functions

\[ Q = F(L, \bar{U}) \]

Where would the optimum be?

Average and Marginal Products

Average product of labor (APL) is the output per unit of labor input. \[ \text{Average product of labor} = \frac{\text{total output}}{\text{total input}, L} = \frac{Q}{L} \]

Marginal product of labor (MPL) is the additional output produced as the labor input is increased by 1 unit. \[ \text{Marginal product of labor} = \frac{\Delta Q}{\Delta L} \]

The law of diminishing marginal returns states that as the use of an input increases in equal increments (holding other input fixed), a point will eventually be reached at which the resulting additions to output decrease. (when I am hungry I cannot work, however, there will be a piece of pizza that would make me sick and I will not work.)

MPL is slope of TPL
The marginal rate of technical substitution of labor for capital is the amount by which the input of capital can be reduced when one extra unit of labor is used, so the output remains constant.

\[ MRTS = \frac{-\Delta \text{incapital}}{\Delta \text{inlaborinput}} = -\frac{\Delta K}{\Delta L} \]  for fixed level of Q.