Lesson 10: Markets for Productive Resources
Reading: Chapter 24

In this lesson we will:
- Discuss how demand for labor and capital is derived from demand for goods
- Examine how firms decide which resources to employ and how to allocate them

Resource Markets:
- Households supply resources (inputs) in the resource markets and purchase them
- Resources can be classified into human and nonhuman resources (which include?)
- Resources grow through investment (what is investment in human capital?)
- Investment requires given up current production to decrease long-term cost

How do human and non-human resources differ from a firms’ perspective?

The demand for resources is derived from the demand for the goods that they produce.
- Some resources are employed in the production of multiple goods (e.g. steel)

There is an inverse relationship between the price of an input (what is the price of labor, human capital and capital) and the amount of the input demanded.

Substitution in Production: As the price of one input increases firms will switch to other inputs that can do the job (examples?).

Substitution in Consumption: As the price of the input increases production becomes more expensive. What will happen to MC, market supply and the price of the good?

Demand for Resources:
- The more elastic the demand for the product, the more … the demand for the input
- The elasticity for inputs increases over time because it takes time for firms to adjust their inputs composition and production process
- Increase (decrease) in the demand for the product will increase (decrease) demand for the resources that are used to produce it.
- An increase in the productivity of an input will increase demand for it. How will more capital affect the productivity of labor? Think of some examples
- Changes in the price of related resources. Example: petroleum and natural gas, etc.

Firms will continue to hire an input as long the Marginal Revenue Product exceeds the marginal cost of the product (what is the marginal cost of labor and capital?)
- As more of the resource is employed the marginal product of the resource will fall (why?) and so will the MRP, thus decreasing demand for the resource.
- In a competitive resource market, firms will pay the same price for a resource regardless of how much of the resource they demand (explain why).
- For a price-taking firm the MRP equals the Value of Marginal Product. But for a price searcher MRP < VMP because MR < price.

\[
\text{MRP} = \text{MP} \times MR \quad \text{(the total change in revenue due to employment of a resource)}
\]
\[
\text{VMP} = \text{MP} \times P \quad \text{(where P is the price of the product)}
\]
Firms will hire more of an input as long as its MRP > price input as shown in figure 10-1.

**Figure 10-1:**
Hiring Decision

<table>
<thead>
<tr>
<th>MRP</th>
<th>Factor Price</th>
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A firm in a competitive resource market will continue to hire a resource as long as the Marginal Revenue of Product from hiring an additional unit exceeds the factor price.

Thus, the firm in figure 10-1 will hire \( N' \) units of this factor, where \( N \) can be a quantity of number of work hours.

Firms maximize profit by minimizing per unit cost of production and can do so by selecting the optimal combination of inputs.

- When multiple resources are employed, the MRP of each factor should equal the factor price at the profit maximizing combination of inputs.
- Factors will be employed so that the marginal product per dollar spent on each factor is the same. *What if production per dollar was higher for one of the resources?*
- If a given resource is twice as productive in equilibrium it will get twice the wage. *Why did most firms opt to stay in the United States following NAFTA? How do firms find the optimal combination of inputs?*

\[
\frac{MP_{\text{skilled labor}}}{w_{\text{skilled labor}}} = \frac{MP_{\text{unskilled labor}}}{w_{\text{unskilled labor}}} = \frac{MP_{\text{machine A}}}{\text{rental}_A}
\]

Resource owners (including workers) will supply employment to those who offer them the best employment alternative.

- The owner will continue to supply the resource as long as wage exceeds his MC
- In the short-run the supply of a resource is determined by the resource mobility (its ability to move across industries) *Give a pair of industries with high mobility.*
- In the long run resources can adjust to new industries *(how do workers adjust?)*
- The resource price and quantity are determine by supply and demand (figure 10-2)

**Figure 10-2:**
Resource Market

<table>
<thead>
<tr>
<th>wage</th>
<th>Resource Market</th>
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An increase in demand for the product will increase demand for the resource driving up its employment to \( N_1 \) and its wage to \( w_1 \). With time more of the resource will join the market (such as new workers getting trained) titling the supply of the resource to \( S_{LR} \). This will reduce wages to \( w_2 \) while increasing employment to \( N_2 \).