The Anatomy of Factor Markets

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Four factors of production are

- Labor
- Capital
- Land (natural resources)
- Entrepreneurship

Market for Labor Services

Labor services are the physical and mental work effort that people supply to produce goods and services.

A labor market is a collection of people and firms who trade labor services.

The price of labor services is the *wage rate*.

Most labor markets have many buyers and many sellers and are competitive. In these labor markets, the wage rate is determined by supply and demand.

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The Anatomy of Factor Markets

Market for Capital Services - *Capital* consists of the tools, instruments, machines, buildings, and other constructions that have been produced in the past and that businesses now use to produce goods and services.

A market for *capital services* is a *rental market*—a market in which the services of capital are hired.

Markets for Land Services and Natural Resources - *Land* consists of all the gifts of nature—natural resources. The market for land as a factor of production is the market for the *services of land*—the use of land.

The price of the services of land is a *rental rate*.

Nonrenewable natural resources are resources that can be used only once, such as oil, natural gas, and coal.

Entrepreneurship - Entrepreneurship services are not traded in markets.

Entrepreneurs receive the profit or bear the loss that results from their business decisions

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The Demand for a Factor of Production

- The demand for a factor of production is a derived demand—it is derived from the demand for the goods that it is used to produce.
- The quantities of factors of production demanded are a consequence of firms' output decisions.
- A firm hires the quantities of factors of production that maximize its profit.
- The value to the firm of hiring one more unit of a factor of production is called the **value of marginal product.**
- Value of marginal product of a factor = Price of a unit of output × Marginal product of the factor.
- *VMP* equals marginal product of labor multiplied by the market price of the good produced.
- We are assuming the firm is a price taker.

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Value of Marginal Product at Angelo's Bakery

	Quantity of labor (*L*) (workers)	Total product (*TP*) (loaves per hour)	Marginal product ($MP = \Delta TP/\Delta L$) (loaves per worker)	Value of marginal product ($VMP = MP \times P$) (dollars per worker)
A	0	0	7	14
B	1	7	6	12
C	2	13	5	10
D	3	18	4	8
E	4	22	3	6
F	5	25		

The value of the marginal product of labor equals the price of the product multiplied by marginal product of labor. If Angelo's hires 2 workers, the marginal product of the second worker is 6 loaves an hour (in the third column). The price of a loaf is $2, so the value of the marginal product of the second worker is $2 a loaf multiplied by 6 loaves an hour, which is $12 an hour (in fourth column).

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The Demand for a Factor of Production

The Firm's Demand for Labor

- The value of the marginal product of labor (*VMP*) tells us what an additional worker is worth to a firm or the revenue that the firm earns by hiring one more worker.
- The wage rate tells us what an additional worker costs a firm.
- *VMP* and the wage rate together determine the quantity of labor demanded by a firm.
- The firm maximizes its profit by hiring the quantity of labor at which

VMP = the wage rate or W = MPL x P

- If *VMP exceeds* the wage rate, the firm can increase profit by employing one more worker.
- If *VMP* is *less* than the wage rate, the firm can increase profit by firing one worker.
- Only if *VMP equals* the wage rate is the firm maximizing profit.

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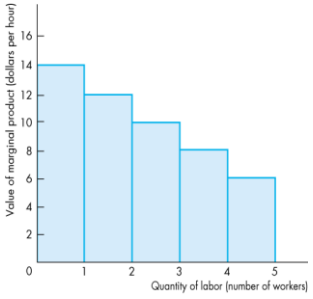
The Demand for a Factor of Production

The figure shows the relationship between a firm's value of marginal product and its demand for labor.

The bars show the value of marginal product, which diminishes as the quantity of labor employed increases.



(a) Value of marginal product

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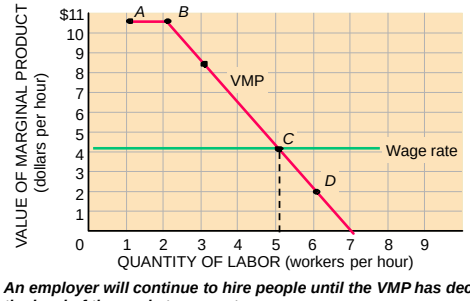
VMP = Firm's Labor Demand

We assume we know the wage rate or W. The firm will hire workers such that VMP = W or $MP_L * P = W$.



An employer will continue to hire people until the VMP has declined to the level of the market wage rate.

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Demand for Capital and Land

Using similar logic to that for labor markets, we can show that:

- ***VMPK* (MPK x P) = R_K (the rental cost of capital)**

  R_K = MPK x P

- ***VMPT* (MPT x P) = R_T (the rental cost of land)**

  R_T = MPT x P

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