

LABOUR ECONOMICS

ECON207, UG-II, 2025: Semester IV

Ravikiran Naik
ravikiran.naik@flame.edu.in

Department of Economics

February 7, 2025

Notes

Labour Demand

"The laborer is worthy of his hire"
- *The Gospel of St. Luke*

2

Notes



3

Notes

Introduction

- Firms hire workers because consumers want to purchase a variety of goods and services.
- Demand for workers is derived from the wants and desires of consumers.
- Central questions: How many workers are hired and what are they paid?

4

Notes

Production Function: 3-1

The Firm's Production Function

- Describes the technology that the firm uses to produce goods and services.
- The firm's output can be produced by a variety of capital–labor combinations.
- The marginal product of labor (MPL) is the change in output resulting from hiring an additional worker, holding constant the quantities of other inputs.

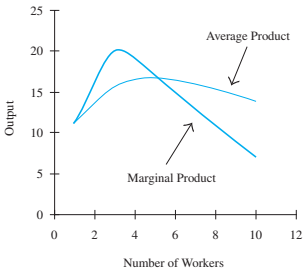
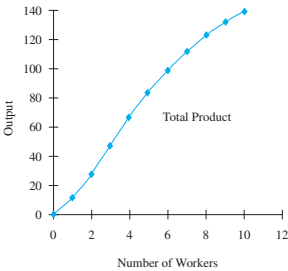
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Production Function: 3-1

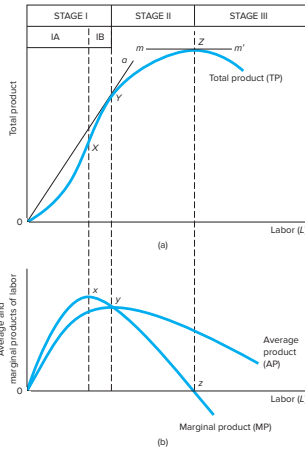
Product Curves

Notes



6

Zone of Production



7

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Zone of Production

		Total Product, TP_t		Marginal Product, MP_t	Average Product, AP_t
Zone of Production	Stage I	IA	Increasing at an increasing rate	Increasing and greater than AP	Increasing
		IB	Increasing at a decreasing rate	Declining but greater than AP	Increasing
	Stage II	Increasing at a decreasing rate		Declining and less than AP	Declining
		Stage III	Declining		Negative and less than AP

8

Notes

Profit Maximization

- Objective of the firm is to maximize profits.
- The profit function is: $\pi = pq - wE - rK$
 - Total Revenue = pq
 - Total Costs = $(wE + rK)$
- Perfectly competitive firms cannot influence prices of output or inputs.

9

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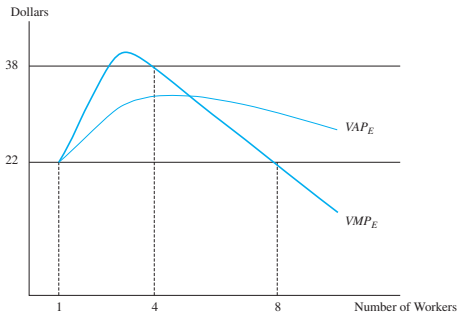
Short-Run Hiring Decision

- Value of Marginal Product of Employment (VMP_E) is the marginal product of labor times the dollar value of the output.
- (VMP_E) indicates the dollar benefit derived from hiring an additional worker, holding capital constant.
- Value of Average Product of Employment is the dollar value of output per worker.

10

Notes

The Firm's Hiring Decision in the Short Run



- A profit-maximizing firm hires workers up to the point where $w = MP_L$.
- If the wage is \$22, the firm hires eight workers.

11

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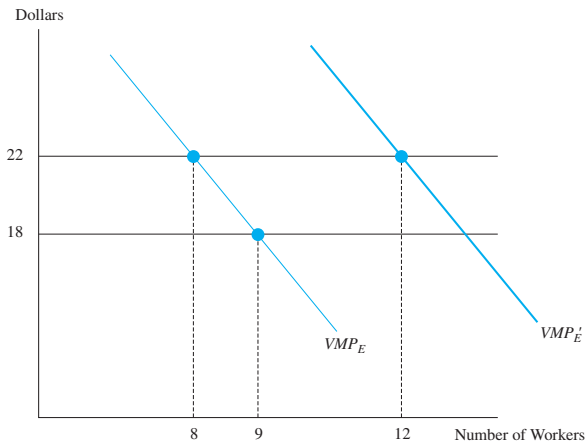
Labor Demand Curve

- The demand curve for labor indicates how many workers the firm hires for each possible wage, holding capital constant.
- The labor demand curve is downward sloping. This reflects the fact that additional workers are costly and alter average production due to the Law of Diminishing Returns.

12

Notes

The Short-Run Demand Curve for Labor



13

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The Short-Run Demand Curve for the Industry



14

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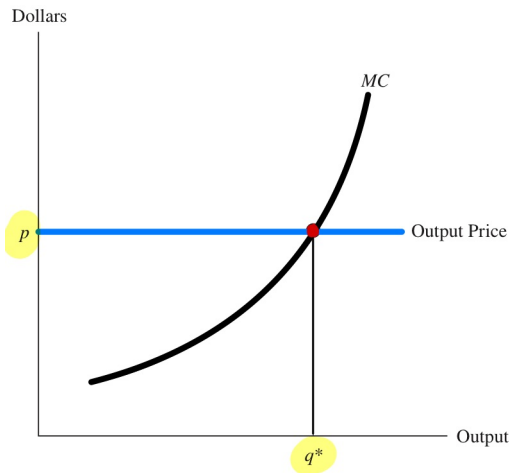
Maximizing Profits: Two Rules

- The profit-maximizing firm should produce up to the point where the cost of producing an additional unit of output (marginal cost) is equal to the revenue obtained from selling that output (marginal revenue).
- This is known as **Marginal Productivity Condition**.
- Alternative Interpretation of MP Condition:
- Hire labour up to the point where the value of the MP equals the added cost of hiring the worker (that is, the wage).
- Mathematically: $w = p \times MP_E$

15

Notes

The Firm's Output Decision



16

Notes

The Mathematics of Marginal Productivity Theory

- If 1 worker $\Rightarrow MP_E$ Units: 1 unit is produced by $\frac{1}{MP_E}$
- The cost of producing an extra unit of output: $MC = w \times \left(\frac{1}{MP_E}\right)$
- The condition: produce to the point where $MC = P$
- This can be written as : $w \times \left(\frac{1}{MP_E}\right) = p$
- By rearranging we obtain MP Condition: $w = p \times MP_E$ [Back](#)

17

Notes

Critiques of Marginal Productivity Theory

- A common criticism is that the theory bears little relation to the way that employers make hiring decisions.
- Another criticism is that the assumptions of the theory are not very realistic.
- However, employers act as if they know the implications of marginal productivity theory (hence, they try to make profits and remain in business).

18

Notes

Your Turn-1

Assume labor is the only variable input and that an additional unit of labor increases total output from 65 to 73 units.

1. If the product sells for \$4 per unit in a perfectly competitive market, what is the MRP of this additional worker?
2. Would the MRP be higher or lower than this amount if the firm were a monopolist and had to lower its price to sell all 73 units?

19

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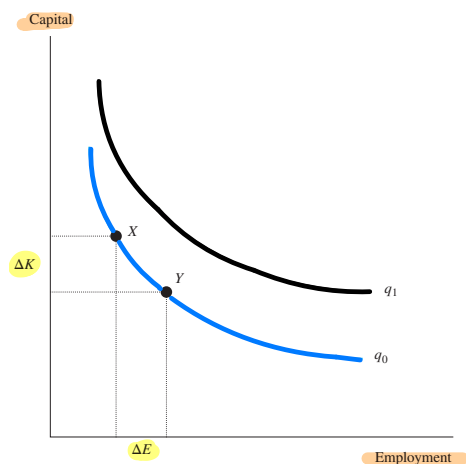
The Employment Decision in the Long Run

- In the long run, the firm maximizes profits by choosing how many workers to hire *and* how much plant and equipment to invest in.
- Isoquant curves describe the possible combinations of labor and capital that produce the same level of output.

20

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Isoquant Curves



21

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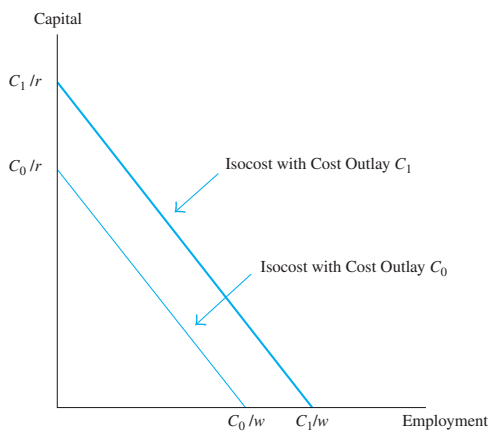
Isocost Lines

- The isocost line indicates all labor–capital bundles that exhaust a specified budget for the firm.
- Isocost lines indicate equally costly combinations of inputs.
- Higher isocost lines indicate higher costs.

22

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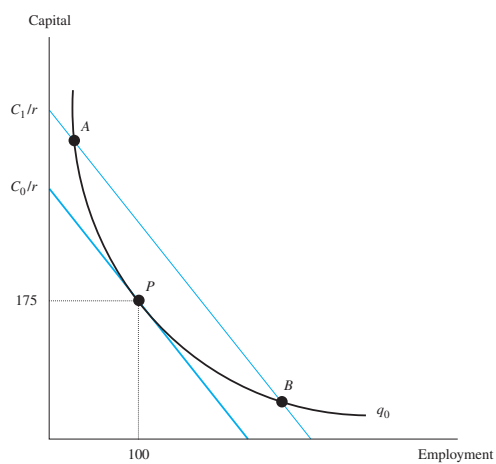
Isocost Lines-2



23

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The Firm's Optimal Combination of Inputs



24

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Cost Minimization

- π maximization implies cost minimization.
- The firm chooses the least-cost combination of capital and labor.
- This least-cost choice is where the isocost line is tangent to the isoquant.
- Marginal rate of substitution equals the ratio of input prices, w/r , at the least-cost choice.

25

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Long-Run Demand for Labor

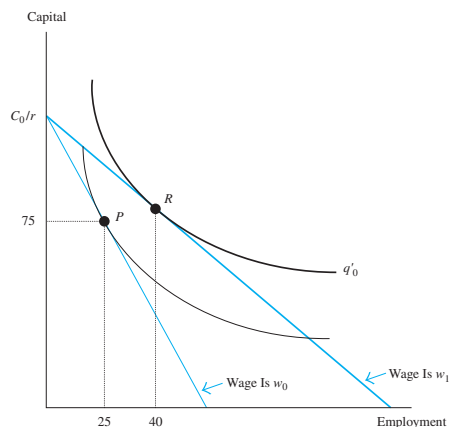
When the wage drops, two effects arise.

- The firm takes advantage of the lower price of labor by expanding production (the scale effect).
- The firm takes advantage of the wage change by rearranging its mix of inputs, by employing more labor and less of other inputs, even if holding output constant (the substitution effect).

26

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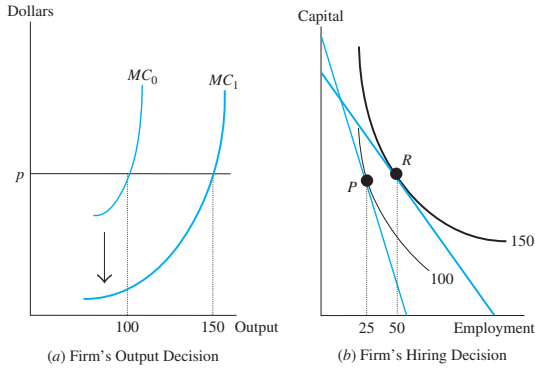
The Impact of a Wage Reduction Holding Costs Constant



27

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The Impact of a Wage Reduction on the Output and Employment of a π -Maximizing Firm

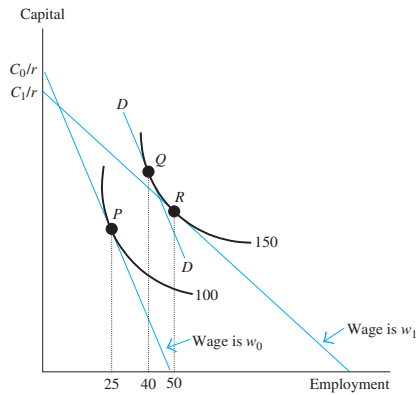


28

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Substitution and Scale Effects

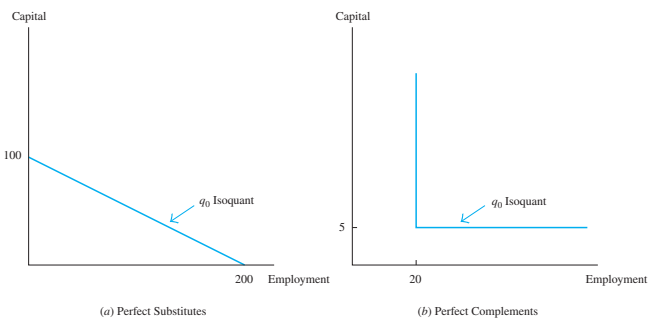
A wage cut generates substitution and scale effects.



29

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Two Special Cases of Isoquants



30

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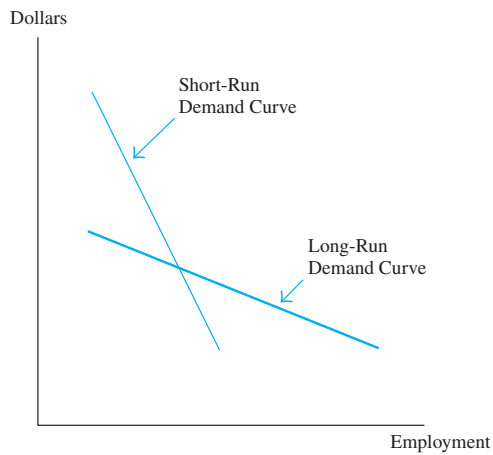
Elasticity of Substitution

- The elasticity of substitution is the percentage change in the capital-to-labor ratio given a percentage change in the price ratio (wages to real interest).
- Formula: $\frac{\% \Delta (K/L)}{\% \Delta (w/r)}$.
- Interpret a particular elasticity of substitution number as the percentage change in the capital-labor ratio given a 1% change in the relative price of labor to capital.

31

Notes

The Short- and Long-Term Demand Curves for Labor



32

Notes

Your Turn-2

Suppose the price of capital falls relative to the wage rate and, as a result, the demand for labor increases.

- Are these inputs gross substitutes, or are they gross complements?
- What can you infer about the relative strengths of the output and substitution effects?

33

Notes

Marshall's Rules

Labor Demand is more elastic when:

- The elasticity of substitution is greater.
- The elasticity of demand for the firm's output is greater.
- Labor's share in total costs of production is greater.
- The elasticity of supply of other factors of production such as capital is greater.

34

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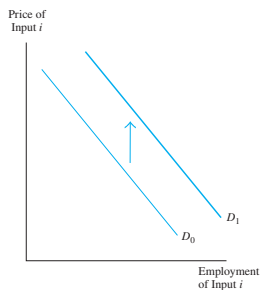
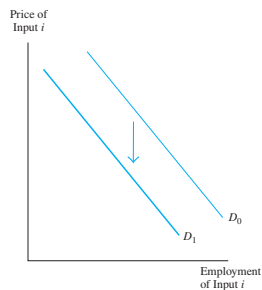
Factor Demands When There Are Several Inputs

- There are many different inputs.
 - Skilled and unskilled labor
 - Old and young
 - Old and new machines
- Cross-elasticity of factor demand.
 - $\text{Percent change in } x_{ij} \div \text{Percent change in } w$
- If cross-elasticity is positive, the two inputs are said to be substitutes in production.

35

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The Demand Curve for a Factor of Production Affected by the Prices of Other Inputs

(a) inputs are i and j are substitutes(b) inputs i and j are complements

36

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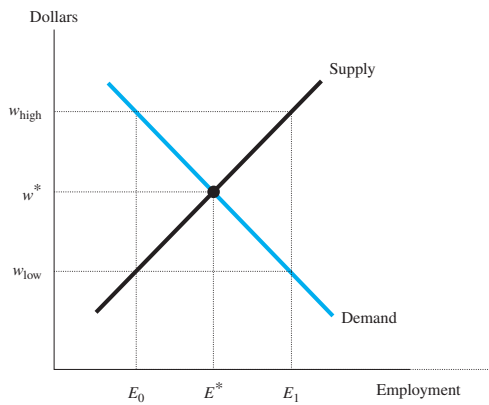
Your Turn-3

In 2009, the United Automobile Workers reduced wage rates in the American auto industry. Referring to the output and substitution effects, explain how these lower wages might have contributed to the rebound in auto employment experienced by General Motors, Ford, and Chrysler since 2010.

37

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Labor Market Equilibrium



38

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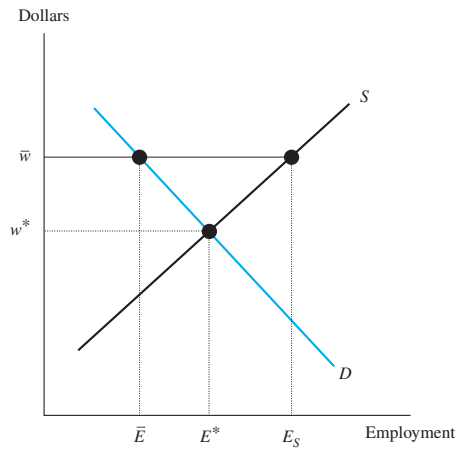
The Employment Effects of Minimum Wages

- The unemployment rate is higher the higher the minimum wage and the more elastic are the labor supply and demand curves.
- The benefits of the minimum wage accrue mostly to workers who are not at the bottom of the distribution of permanent income.

39

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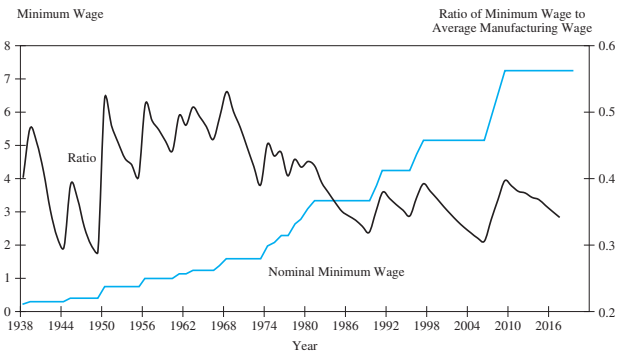
The Impact of the Minimum Wage on Employment



40

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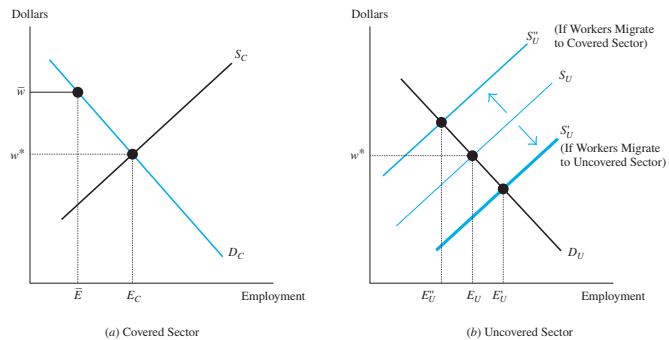
Minimum Wages in the United States, 1938 to 2011



41

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Min. Wages Effect: Covered & Uncovered Sectors



42

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