LECTURE 14
LABOR AND WAGES
March 8, 2016

I. OVERVIEW
   A. Another firm decision: How to produce the desired quantity
   B. The market for labor

II. LABOR DEMAND
   A. Marginal revenue product of labor
   B. Profit maximization
   C. Labor demand curve

III. LABOR SUPPLY
   A. Utility maximization
   B. Substitution and income effects of a wage increase
   C. Labor supply curve

IV. LABOR MARKET EQUILIBRIUM
   A. Equilibrium
   B. Example of a shift in labor demand: More machines

V. THE EFFECTS OF RAISING THE MINIMUM WAGE
   A. Facts about the U.S. minimum wage
   B. Theoretical impact of an increase in the minimum wage
   C. Empirical evidence
   D. Reconciling theory and empirical evidence
   E. Another way to help low-income workers: the earned-income tax credit

VI. THE EFFECTS OF INCREASED IMMIGRATION
   A. Theoretical impact of increased immigration
   B. Empirical evidence (Paper by David Card on the Mariel Boatlift)
Lecture 14
Labor and Wages

March 8, 2016
I. Overview
Three Decisions of a Firm

• How much to produce in the short run.

• Whether to enter or exit in the long run.

• How to produce the desired quantity.
  • How much of different inputs to use in the production process.
We can talk about the labor market at different levels:

• Market for labor in the whole economy.

• Market for labor for a particular occupation or industry (plumbers, computer programmers, construction workers).

• Market for workers with particular characteristics (teenagers, married women, low-skilled workers).
II. LABOR DEMAND
Labor Demand Comes from Profit Maximization

• What factors affect a firm’s demand for labor?
  • Demand for the product it produces
  • Productivity of labor
  • The wage and other labor costs

• Profits are maximized where MR = MC.

• Extension of this basic condition: Firms want to hire labor up to the point where the extra revenue generated by another worker is just equal to the extra cost.
Marginal Revenue Product of Labor (MRPₐ)

• The extra revenue generated by one more worker.

• It is composed of two pieces:
  • Marginal product of labor (MPₐ): The extra output produced by one more worker.
  • Marginal revenue (MR): The extra revenue from selling one more unit.

• $MRPₐ = MPₐ \times MR$
The Special Case of Perfect Competition:

• For competitive firms: $MR = P$.

• So for competitive firms: $MRP_L = MP_L \cdot P$.

• We call $MP_L \cdot P$ the value of the marginal product of labor ($VMP_L$).
MRP_L Declines as L Increases

• MP_L declines because of diminishing returns.

• MR is either constant (for a competitive firm) or declining (for an imperfectly competitive firm).

• So MRP_L is declining.
MRP_L for a Particular Firm

\[ \text{MRP}_L \]

\[ \ell \]
Profit Maximization Implies:

• Firms want to hire labor up to the point where: $\text{MRP}_L = W$.

• At each wage, a firm wants to hire whatever quantity of labor has a $\text{MRP}_L$ equal to that wage.
Labor Demand Curve for an Individual Firm

Firm’s Labor Demand Curve

\[ W_1 \]

\[ W_2 \]

\[ l_1 \]

\[ l_2 \]

\[ MRP_L \]
Labor Demand Curves

**Individual Firm**

\[ W \]

\[ \text{MRP}_{L,d} \]

\[ \ell \]

**Market**

\[ W \]

\[ \text{MRP}_{L,D} \]

\[ L \]
III. LABOR SUPPLY
Labor supply behavior comes from utility maximization on the part of household

- Think of a household choosing between leisure and everything else that it likes.

- $P_{\text{Leisure}}$ is the wage

- Condition for utility maximization:

\[
\frac{\text{MU}_{\text{Leisure}}}{P_{\text{Leisure}}} = \frac{\text{MU}_{\text{Everything Else}}}{P_{\text{Everything Else}}}
\]
\[
\frac{\text{MU}_{\text{Leisure}}}{\text{P}_{\text{Leisure}}} = \frac{\text{MU}_{\text{Everything Else}}}{\text{P}_{\text{Everything Else}}}
\]

- **Substitution Effect**: When the wage rises, the consumer wants to substitute away from leisure (so work more).

- **Income Effect**: When the wage rises, the consumer is richer and wants more leisure (so work less).

- Which effect dominates is an empirical matter.
Labor Supply Curves

Individual Household

Market

W

S

W

S

L

L
IV. LABOR MARKET EQUILIBRIUM
Market for High-Skilled Workers
Effect of an Increase in Capital (Computers) Market for High-Skilled Workers
V. **Effects of Raising the Minimum Wage**
% of Hourly Workers Earning the Minimum Wage

Effect of a Binding Minimum Wage Market for Low-Skilled Workers
Effect of Raising the Minimum Wage Market for Low-Skilled Workers
Effects on Teenage Employment of an Increase in the Minimum Wage from 1000 Studies

Source: Doucouliagos and Stanley, 2009.
About the Empirical Evidence

- Most studies have examined fairly small changes in the minimum wage.

- Most also look at fairly short-run impacts on employment; it is possible that the effects are larger when firms have more time to adjust.
Reconciling Theory and Empirical Evidence

• Raising the minimum wage lowers labor turnover.

• This reduces hiring and training costs.

• It is possible that this counterbalances the effect of the higher minimum wage on the cost of labor.

• If the cost of a worker hasn’t risen much, then the quantity of labor demanded won’t fall much.
Effect of an Earned-Income Tax Credit Market for Low-Income Workers

\[ W_2 + \text{EITC} \]

\[ W_1 \]

\[ W_2 \]

\[ L_1 \]

\[ L_2 \]
VI. Effects of Increased Immigration
Effect of Increased Immigration
Market for Low-Skilled Workers

The graph illustrates the impact of increased immigration on the market for low-skilled workers. The supply curve $S_1$ represents the pre-immigration scenario, while the supply curve $S_2$ shows the post-immigration scenario. The demand curve $D_1$ remains unchanged. The equilibrium wage decreases from $W_1$ to $W_2$, indicating a surplus of low-skilled workers due to immigration.
Empirical Evidence on the Impact of Immigration

- Problems with previous studies:
  - Many looked at wages and immigration by city.
  - But, perhaps people chose to go to cities where labor demand was expanding.
  - Immigration could still be reducing wages of native workers relative to what they otherwise would have been.
Simultaneous Changes in Supply and Demand Market for Low-Skilled Workers
Empirical Evidence on the Impact of Immigration

- David Card paper uses a natural experiment:
  - Mariel Boatlift (May-September 1980).
  - 125,000 Cubans migrated to the U.S.
  - Almost all went to Miami.
  - No issue of immigrants choosing to go where the labor market was expanding.
  - Excellent data on wages and employment before and after the influx of immigrants.
Card Paper on the Effects of the Mariel Boatlift

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Source: David Card, "The Impact of the Mariel Boatlift on the Miami Labor Market"
# Card Paper on the Effects of the Mariel Boatlift

**Table 5. Means of Log Wages of Non-Cubans in Miami by Quartile of Predicted Wages, 1979–85.**  
(Standard Errors in Parentheses)

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<th>Year</th>
<th>1st Quart.</th>
<th>2nd Quart.</th>
<th>3rd Quart.</th>
<th>4th Quart.</th>
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<td>1980</td>
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<td>1985</td>
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*Note:* Predicted wage is based on a linear prediction equation for the log wage fitted to individuals in four comparison cities; see text. The sample consists of non-Cubans (male and female, white, black, and Hispanic) between the ages of 16 and 61 with valid wage data in the earnings supplement of the Current Population Survey. Wages are deflated by the Consumer Price Index (1980 = 100).

*Source: David Card, “The Impact of the Mariel Boatlift on the Miami Labor Market”*
Card’s Explanation for Why Wages Didn’t Fall

• Some migration to Miami that otherwise would have occurred didn’t because of the boatlift.

• Labor demand may have been quite elastic.
  • Miami had a number of industries that used low-skilled workers and could expand easily.