Economics 2
Spring 2018

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Professor David Romer

LECTURE 13
LABOR AND WAGES
March 1, 2018

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
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   B. Substitution and income effects of a wage increase
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IV. LABOR MARKET EQUILIBRIUM

V. EXAMPLES OF LABOR MARKET ANALYSIS
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   C. A union negotiates a wage above the equilibrium level

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

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Announcements

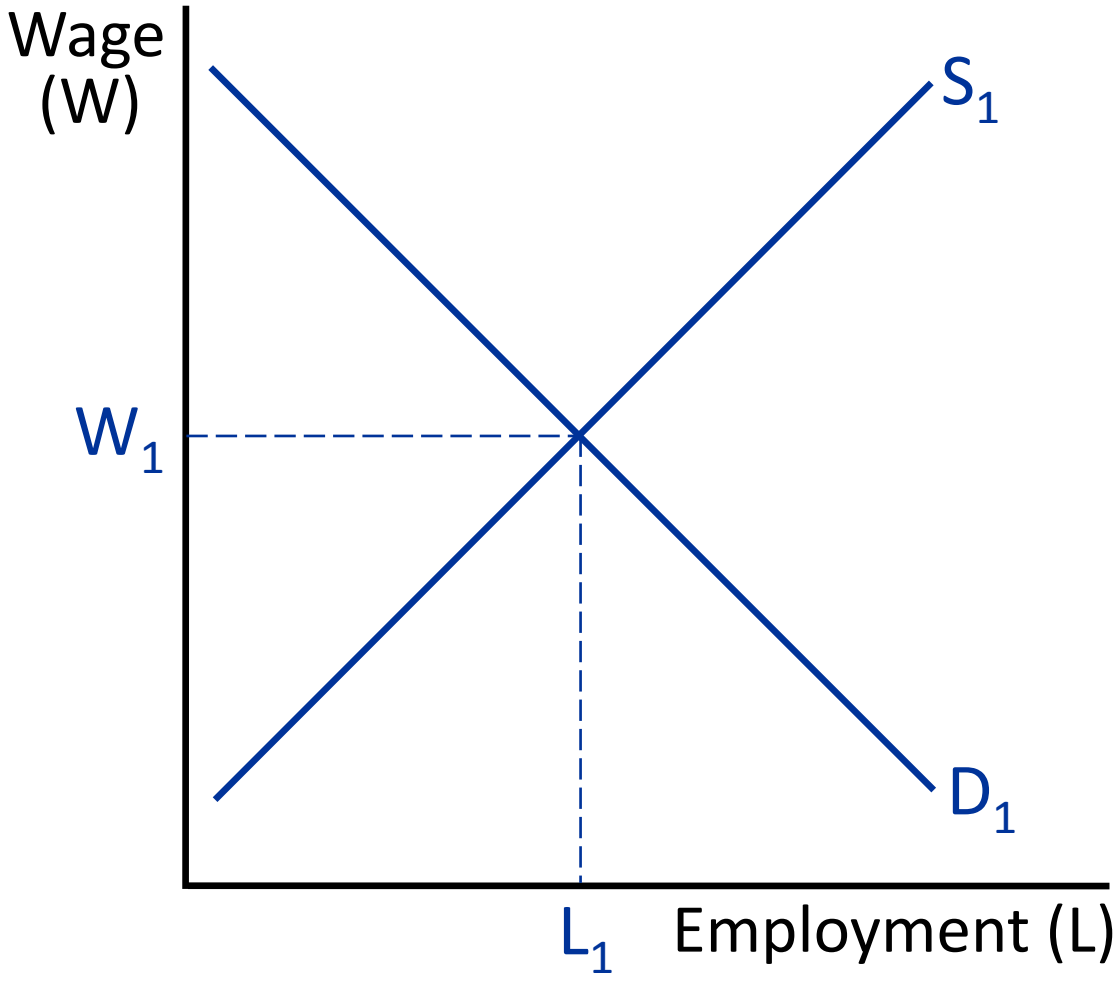
- Problem Set 3:
  - Due next Tuesday (March 6).
  - Problem set work session today (March 1), 4–6 p.m. in 648 Evans.
- Journal article reading for next time:
  - Thomas Piketty and Emmanuel Saez, "Income Inequality in the United States, 1913–1998."

I. Overview

The Market For Labor

- How much labor to use in the production process is another decision firms have to make.
- How much labor households want to supply to the market is another decision households have to make.
- What happens in labor markets has important implications for people's lives.

Market for Labor



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, older men, 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 (MRP_L)

- The extra revenue generated by one more worker.
- It is composed of two pieces:
  - Marginal product of labor (MP_L): The extra output produced by one more worker.
  - Marginal revenue (MR): The extra revenue from selling one more unit.
- $MRP_L = MP_L \bullet MR$

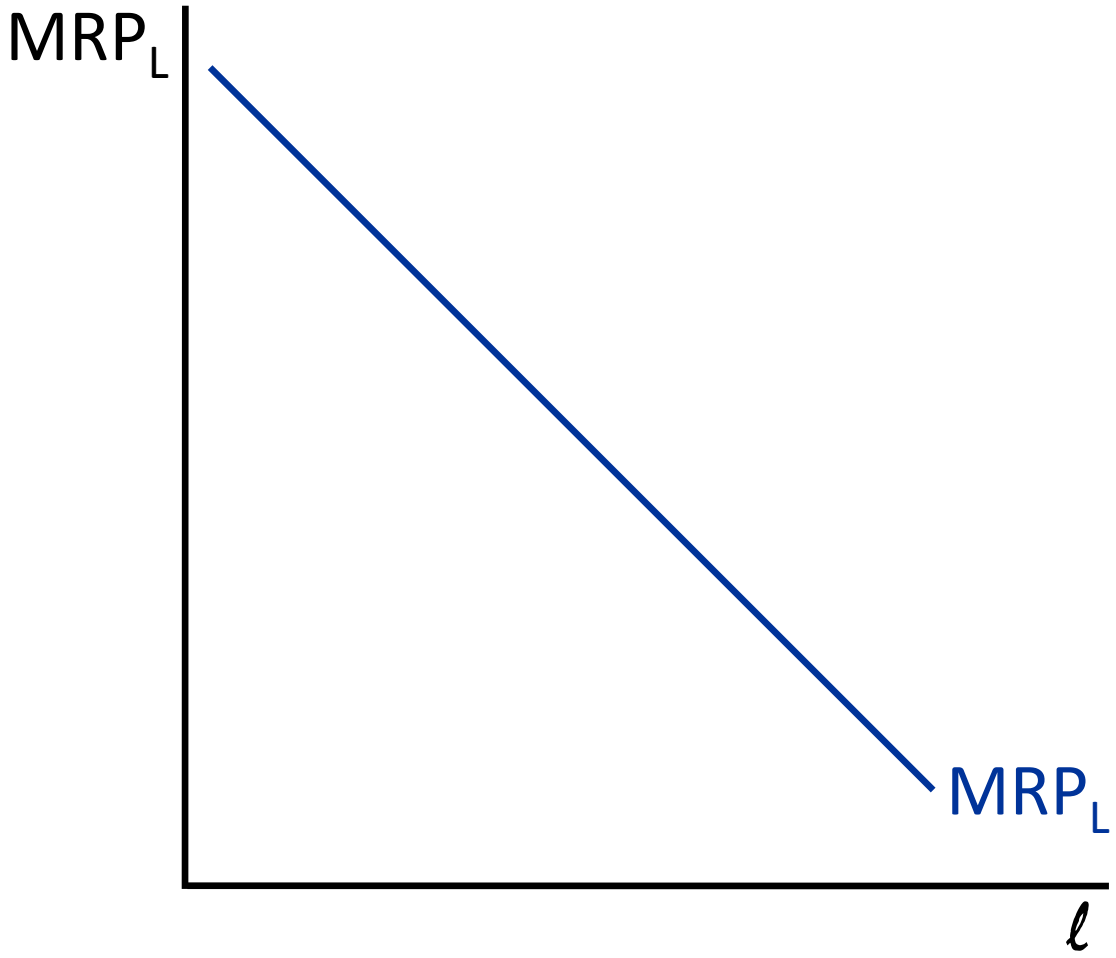
The Special Case of Perfect Competition:

- For competitive firms: MR = P.
- So for competitive firms: $MRP_L = MP_L \bullet P$.
- We call $MP_L \bullet P$ the value of the marginal product of labor (VMP_L).

MRP_L Declines as L Increases

- Recall: $MRP_L = MP_L \bullet P$.
- 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.

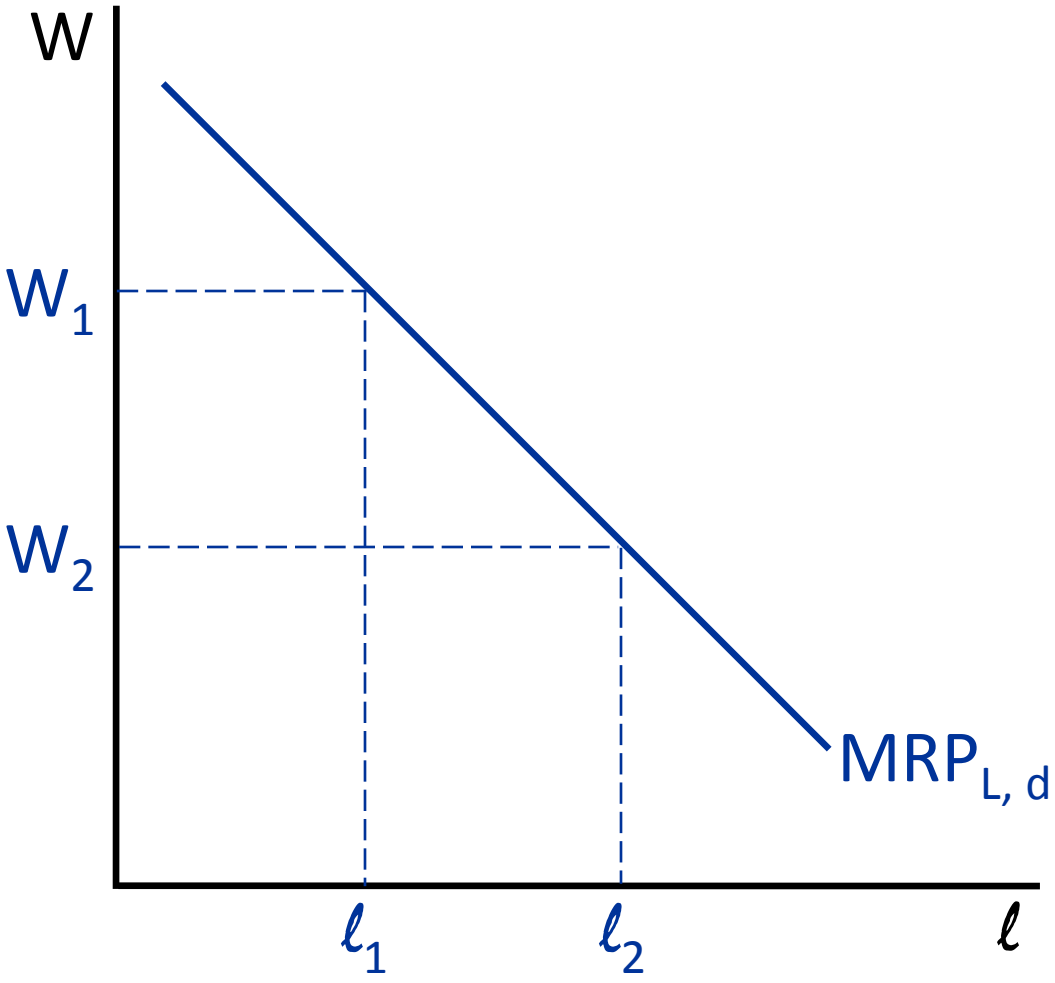
MRP_L for a Particular Firm



Profit Maximization Implies:

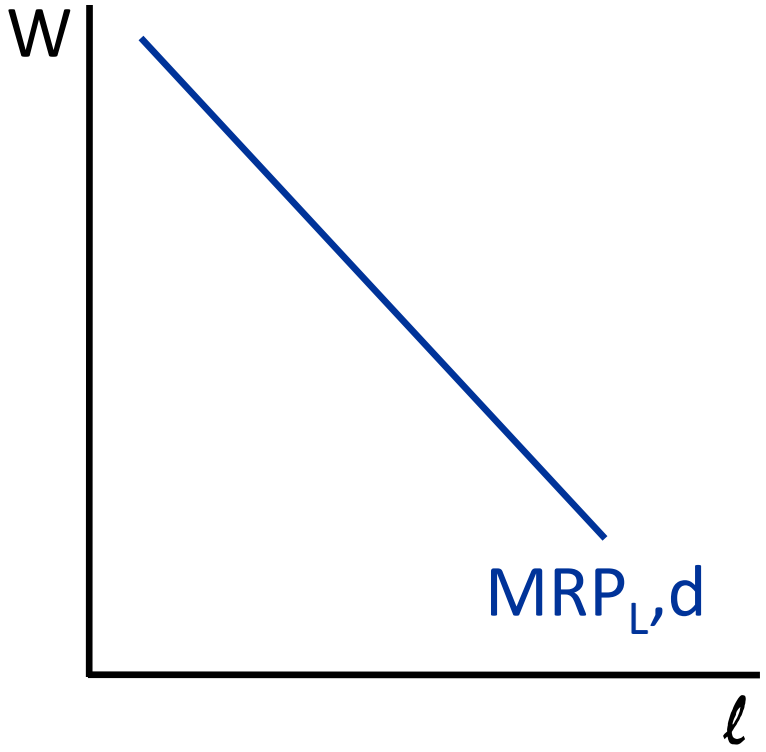
- Firms want to hire labor up to the point where: $MRP_L = W$.
- At each wage, a firm wants to hire whatever quantity of labor has a MRP_L equal to that wage.

Labor Demand Curve for an Individual Firm

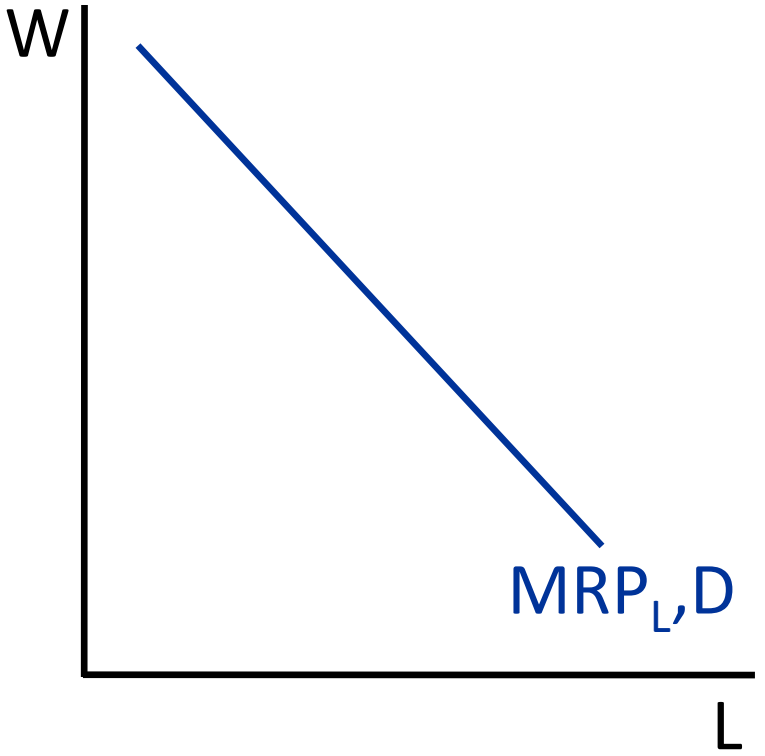


Labor Demand Curves

Individual Firm



Market



III. Labor Supply

Labor supply behavior comes from utility maximization on the part of households

- Households not only like goods and services, they like leisure.
- The $MU_{Leisure}$ declines as the quantity of leisure increases.
- $P_{Leisure}$ is the wage.
- Think of a household choosing between leisure and everything else.

Condition for Utility Maximization

$$\frac{MU_{Leisure}}{P_{Leisure}} = \frac{MU_{Everything\ Else}}{P_{Everything\ Else}}$$

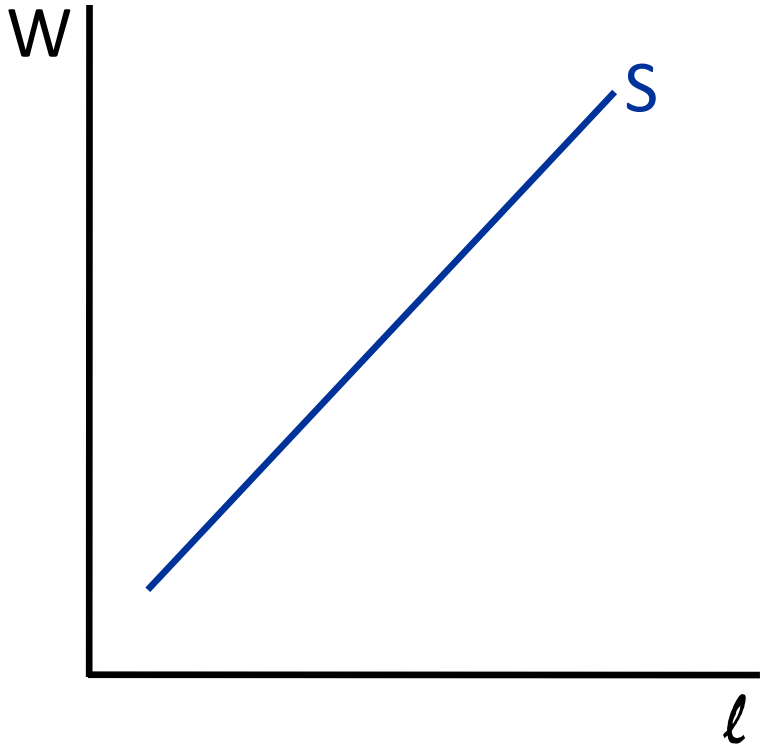
Effect of an Increase in the Wage

$$\frac{MU_{Leisure}}{P_{Leisure}} < \frac{MU_{Everything\ Else}}{P_{Everything\ Else}}$$

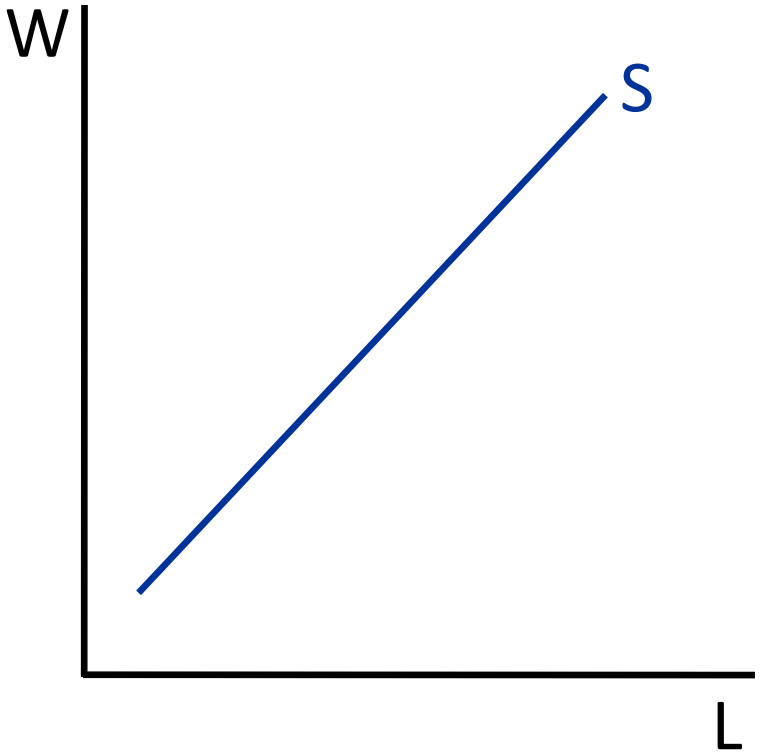
- Substitution Effect: When the wage rises, the consumer wants to substitute away from leisure (so work more).
- Income Effect: When the wage rises, the consumer is richer and wants more leisure (so work less).
- Which effect dominates is an empirical matter.

Labor Supply Curves

Individual Household

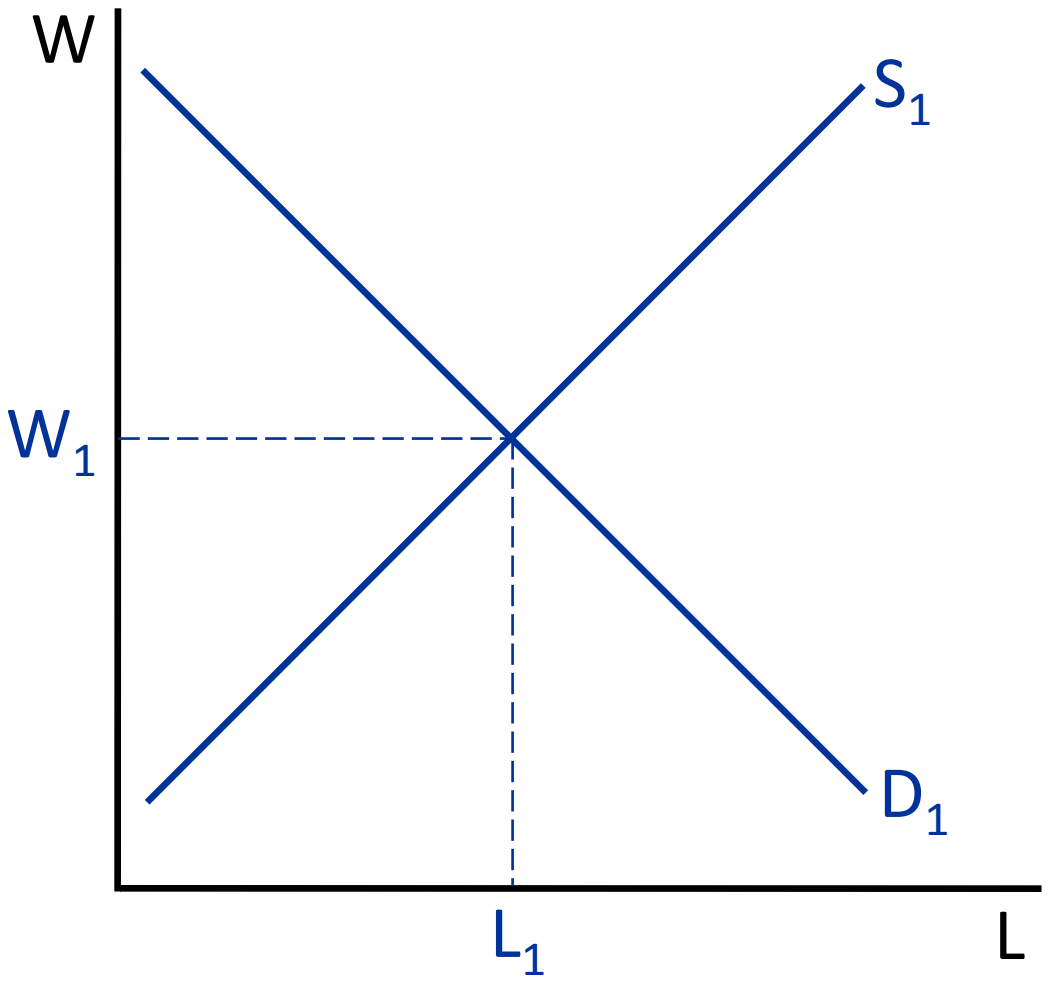


Market



IV. Labor Market Equilibrium

Market for Construction Workers



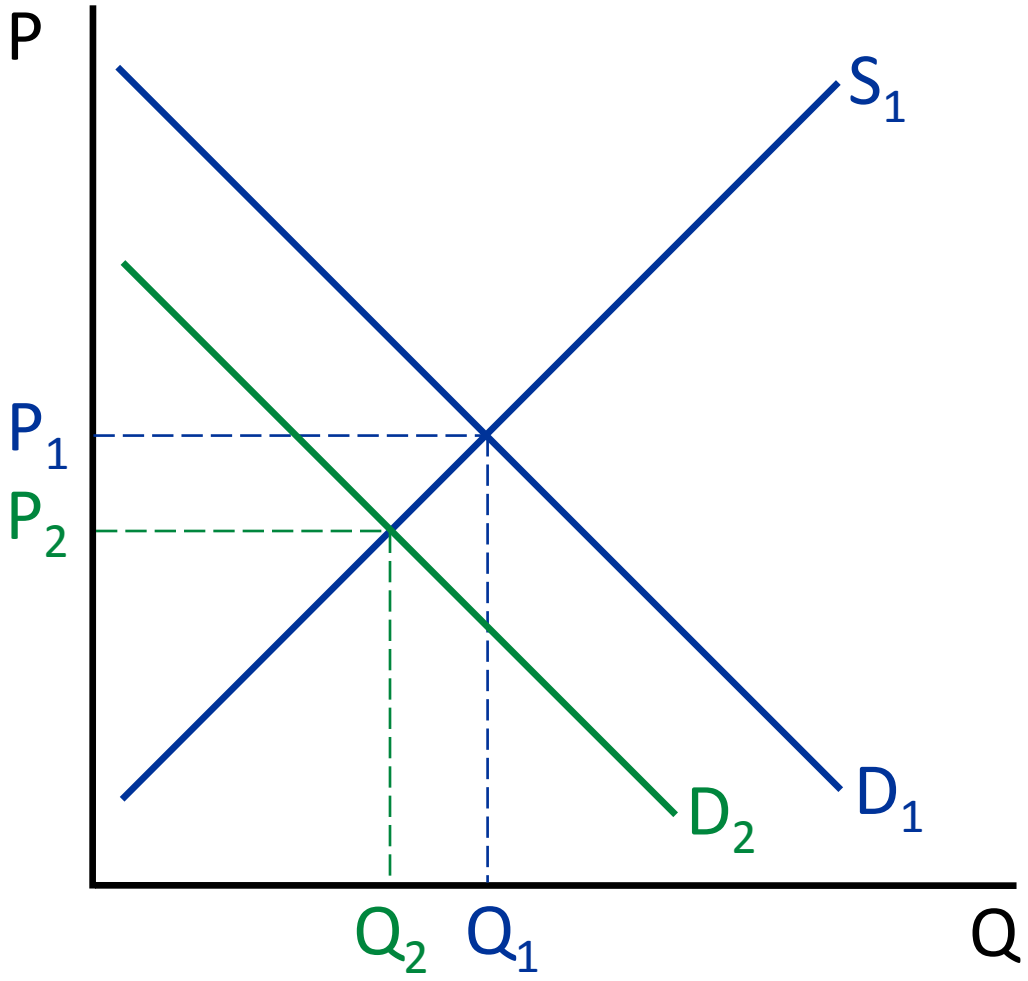
V. Examples of Labor Market Analysis

Example 1: Decrease in the Demand for the Product

- Consider the market for construction workers.
- The bursting of the housing bubble in 2008 led to a large decline in the demand for construction services
- What would you expect this to do to the employment and wages of construction workers?

Effect of a Decrease in Demand for the Product

Market for Construction Services

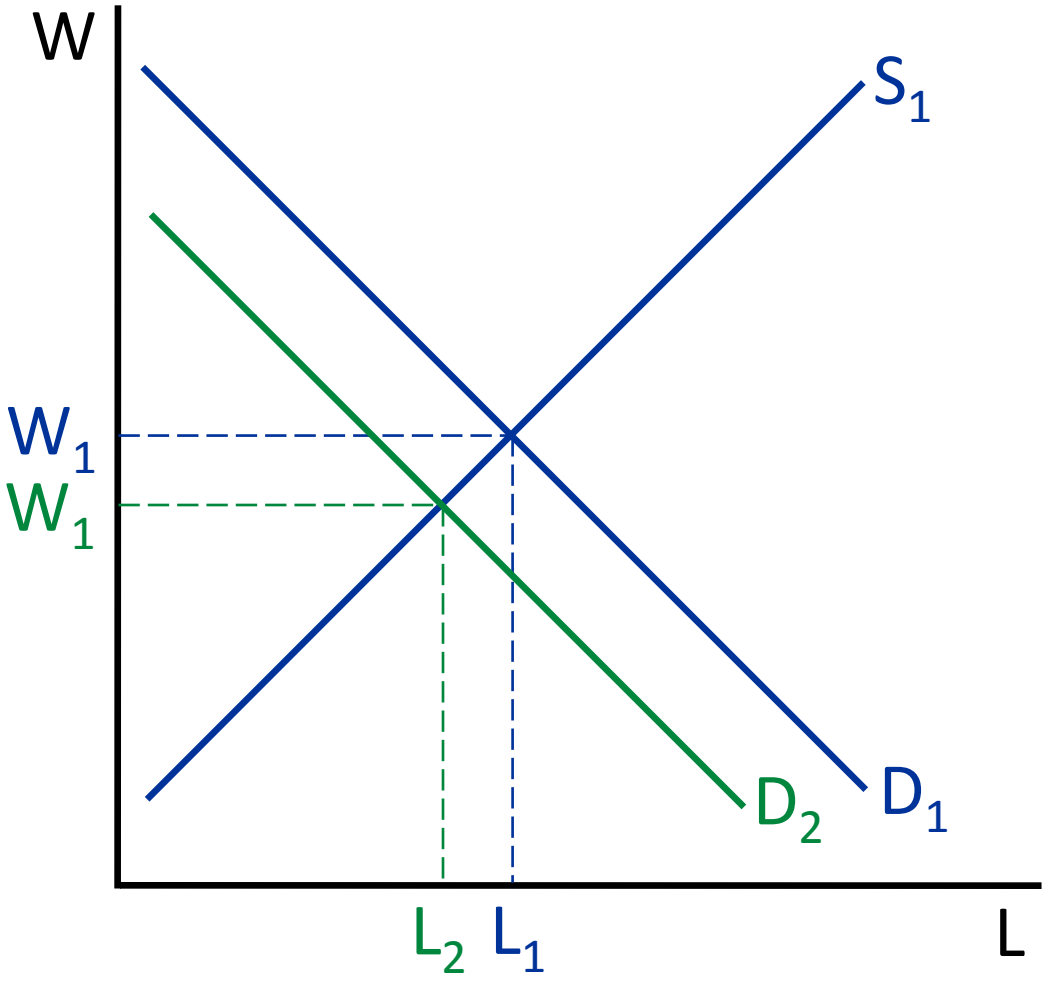


Example 1: Decrease in the Demand for the Product (continued)

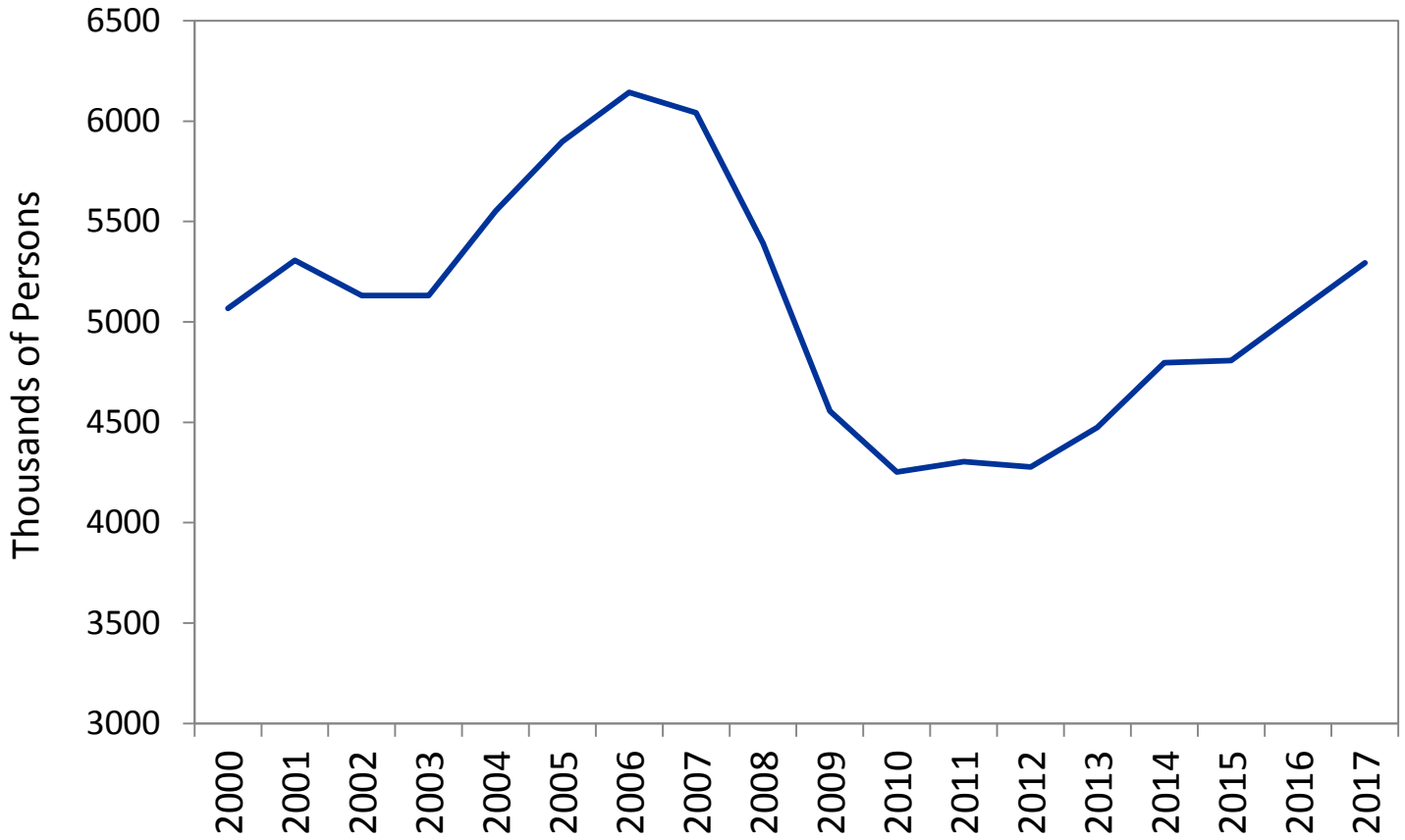
- The fall in the price of the output lowers the MRP_L at each level of employment.
- The labor demand curve shifts back.
- Wages and employment of construction workers both fall.

Effect of a Decrease in Demand for the Product

Market for Construction Workers



Employment of Workers Paid Hourly Rates in Construction



Source: FRED, Federal Reserve Bank of St. Louis

Example 2: Increase in Machines or Technological Progress

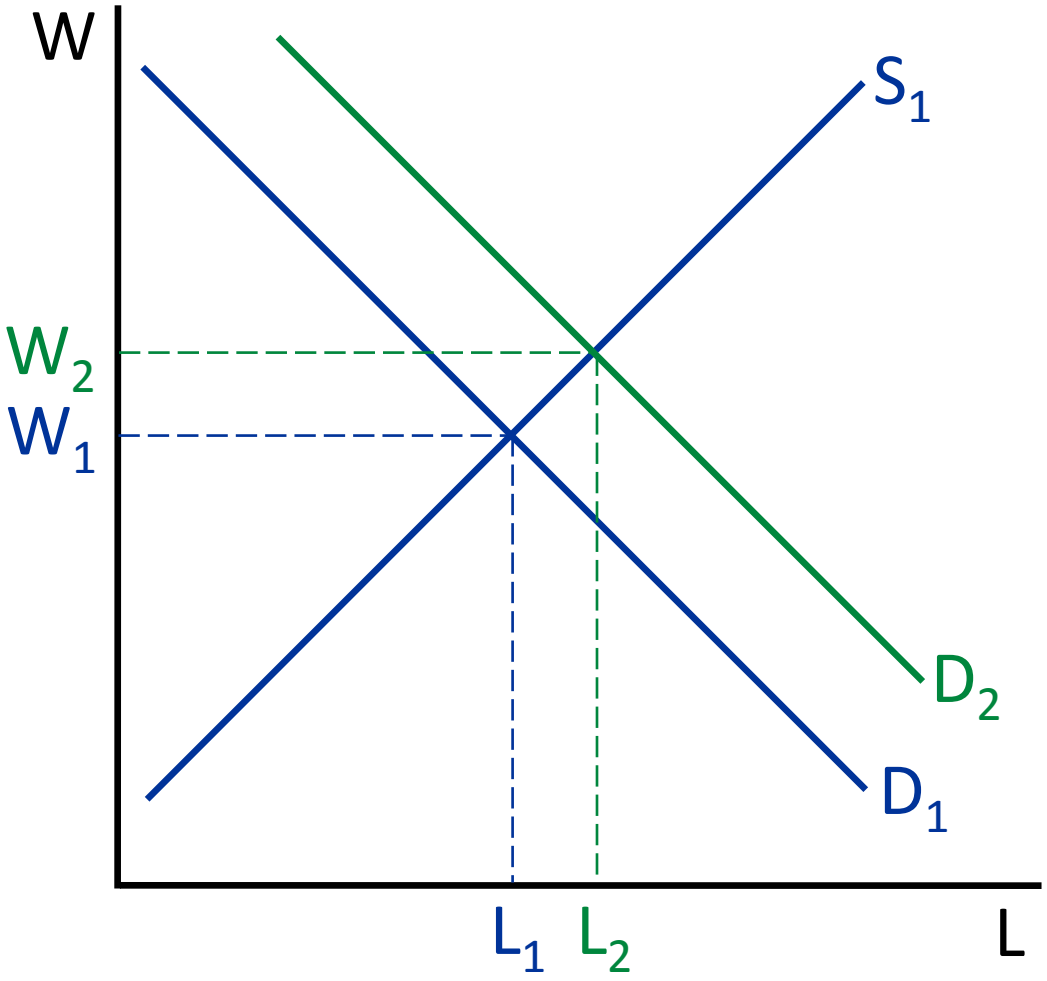
- Consider the market for high-skilled workers.
- Computer technology spread rapidly across many industries in the late 1980s and 1990s.
- What would you expect this to do to the employment and wages of high-skilled workers whose jobs use computers (such as architects, engineers, and professors)?

Example 2: Increase in Machines or Technological Progress (continued)

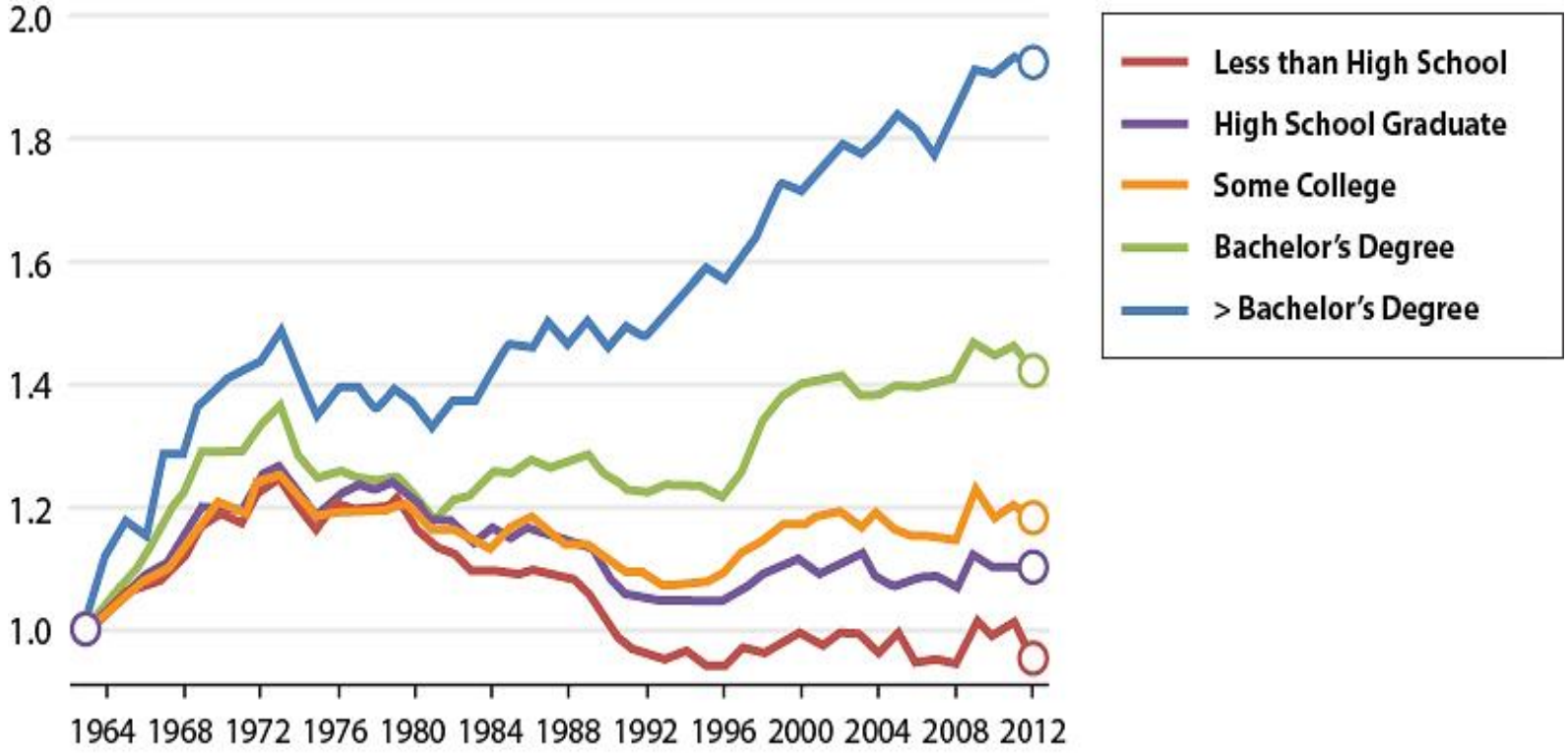
- The addition of machines or technological progress (or, often, both together) will increase the MP_L.
- In most circumstances, this will increase the MRP_L.
- This implies that the labor demand curve shifts out.
- Wages and employment of workers using the machines will rise.

Effect of an Increase in Capital (Computers)

Market for High-Skilled Workers



Real Wages of Full-Time Male Workers by Educational Level



Source: David Autor, "Skills, Education, and the Rise of Earnings Inequality among the "Other 99 Percent".

Example 2: Increase in Machines or Technological Progress (continued)

- A possible complication involves the price of the output.
- Increased labor productivity will shift out the supply curve for the product and reduce its price.
- If the fall in the price is large, the increase in labor productivity could conceivably reduce MRP_L.
- This is not the normal outcome. Over history, capital accumulation and technological progress has been good for workers' wages.

Real Wages in the U.K. over the Very Long Run

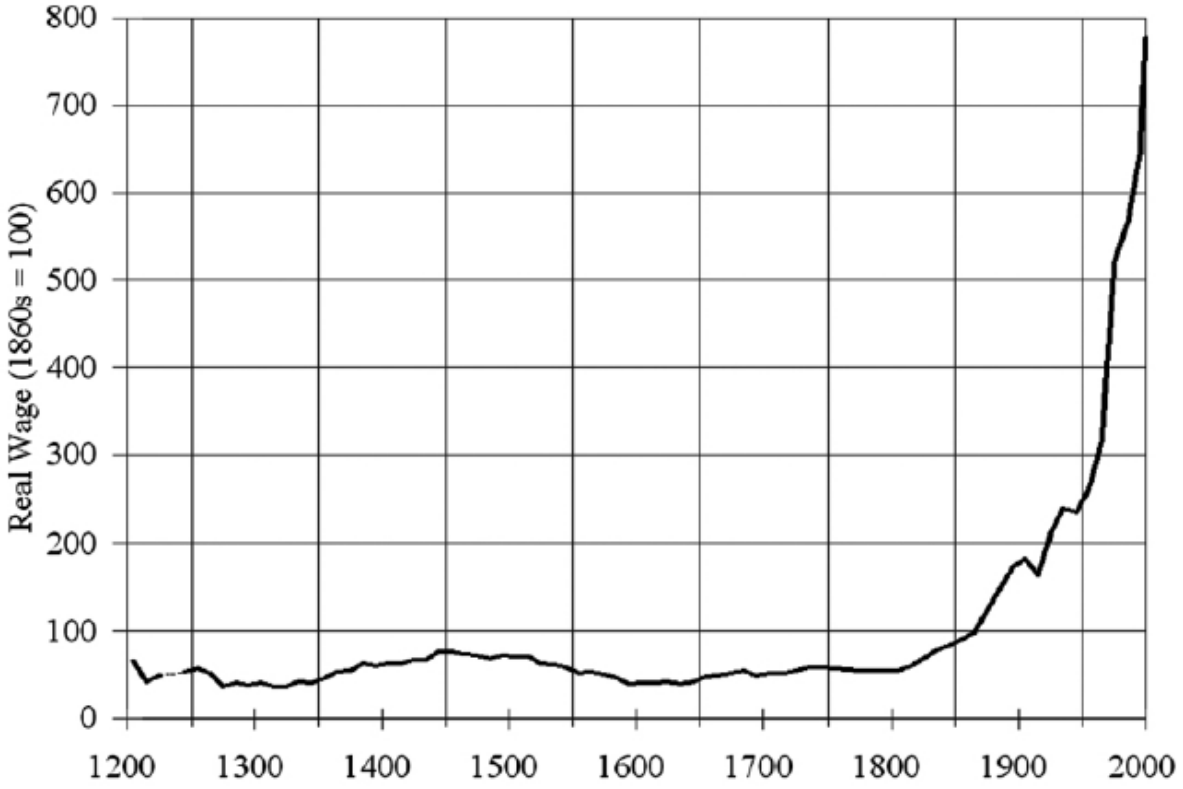


FIG. 1.—Builders' real day wages, 1209–2004 (source: table A2)

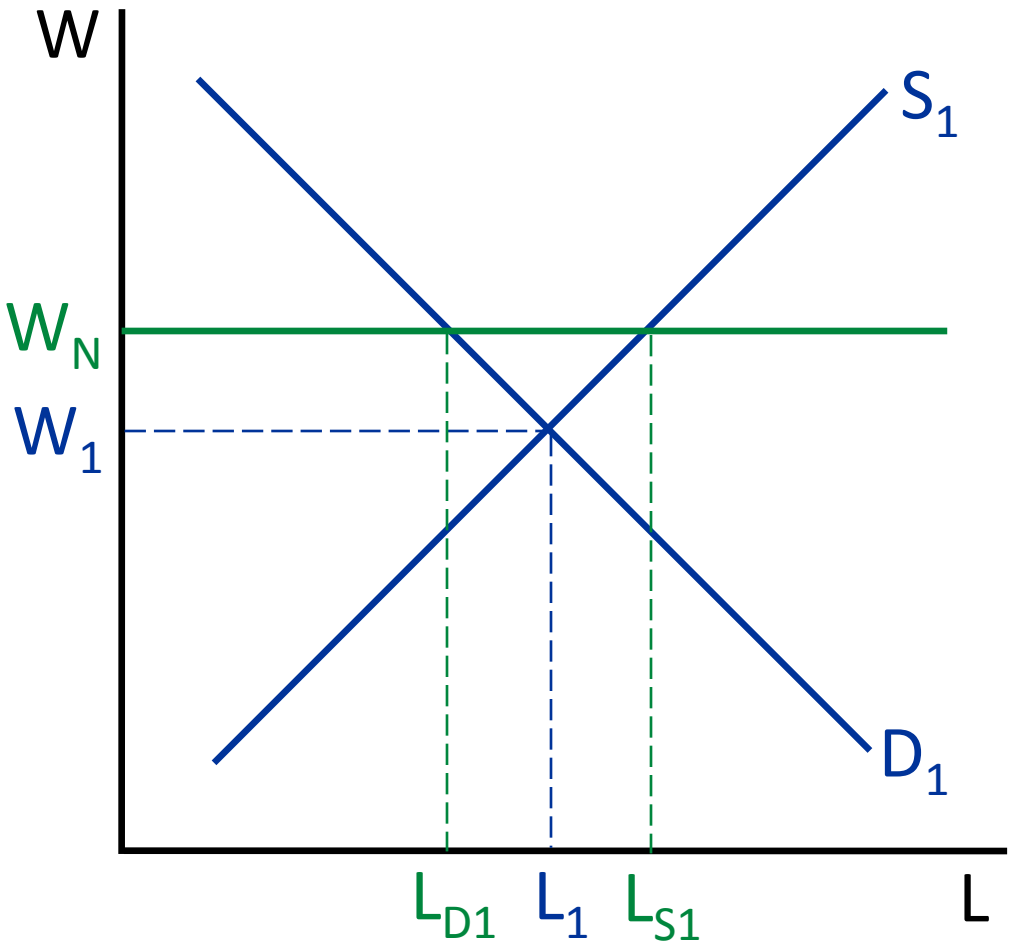
Source: Gregory Clark, "The Condition of the Working Class in England, 1209-2004".

Example 3: A Union Negotiates a Wage above the Equilibrium Level

- Consider the market for autoworkers.
- Suppose that the autoworkers union negotiates a wage that is above the equilibrium level in this industry.
- What would you expect this to do to the employment and wages of autoworkers?

Effect of a Negotiated Wage

Market for Autoworkers



Example 3: A Union Negotiates a Wage about the Equilibrium Level (continued)

- The negotiated wage is like a price floor.
- It will raise the wage of workers who remain employed.
- But, profit-maximizing firms won't pay workers more than the MRP_L of the last worker hired. Instead, they will cut back employment to L_{D1}.
- We would expect increased unemployment among autoworkers.

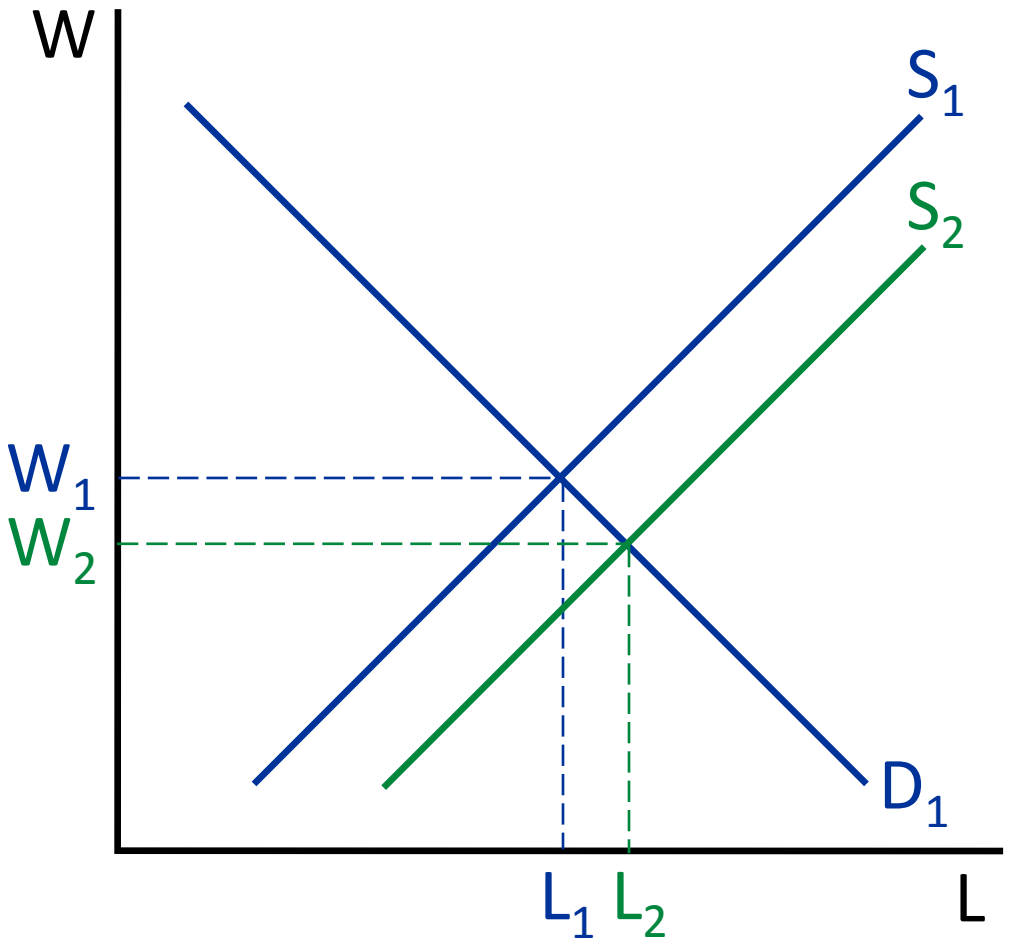
VI. Effects of Increased Immigration

Example 4: Increased Immigration Raises the Supply of Low-Skilled Workers

- Suppose that immigration of low-skilled workers increases.
- What would you expect this to do to the wages and employment of low-skilled workers?

Effect of Increased Immigration

Market for Low-Skilled Workers



Empirical Evidence on the Impact of Immigration

- Problems with previous studies:
  - Many looked at wages and the number of immigrants by city.
  - But, perhaps there were both labor supply and labor demand changes.
  - Sometimes immigrants came to a city because labor demand was expanding and pushing up wages.
  - Could find no correlation between immigration and wages, even if the supply effects were as theory predicts.

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

Table 3. Logarithms of Real Hourly Earnings of Workers Age 16–61 in Miami and Four Comparison Cities, 1979–85.

Group	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*
Miami:							
Whites	1.85	1.83	1.85	1.82	1.82	1.82	1.82
	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.05)
Blacks	1.59	1.55	1.61	1.48	1.48	1.57	1.60
	(.03)	(.02)	(.03)	(.03)	(.03)	(.03)	(.04)
Cubans	1.58	1.54	1.51	1.49	1.49	1.53	1.49
	(.02)	(.02)	(.02)	(.02)	(.02)	(.03)	(.04)
Hispanics	1.52	1.54	1.54	1.53	1.48	1.59	1.54
	(.04)	(.04)	(.05)	(.05)	(.04)	(.04)	(.06)
Comparison Cities:							
Whites	1.93	1.90	1.91	1.91	1.90	1.91	1.92
	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
Blacks	1.74	1.70	1.72	1.71	1.69	1.67	1.65
	(.01)	(.02)	(.02)	(.01)	(.02)	(.02)	(.03)
Hispanics	1.65	1.63	1.61	1.61	1.58	1.60	1.58
	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.02)

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)

	Mean of Log Wage by Quartile of Predicted Wage				*Difference of Means: 4th − 1st*
Year	*1st Quart.*	*2nd Quart.*	*3rd Quart.*	*4th Quart.*	
1979	1.31	1.61	1.71	2.15	.84
	(.03)	(.03)	(.03)	(.04)	(.05)
1980	1.31	1.52	1.74	2.09	.77
	(.03)	(.03)	(.03)	(.04)	(.05)
1981	1.40	1.57	1.79	2.06	.66
	(.03)	(.03)	(.03)	(.04)	(.05)
1982	1.24	1.57	1.77	2.04	.80
	(.03)	(.03)	(.03)	(.04)	(.05)
1983	1.27	1.53	1.76	2.11	.84
	(.03)	(.04)	(.03)	(.05)	(.06)
1984	1.33	1.59	1.80	2.12	.79
	(.03)	(.04)	(.04)	(.04)	(.05)
1985	1.27	1.57	1.81	2.14	.87
	(.04)	(.04)	(.04)	(.05)	(.06)

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.