Economics 2
Spring 2020

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LECTURE 11
LABOR AND WAGES
February 27, 2020

I. OVERVIEW
   A. The market for labor
   B. Why labor market analysis is important

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

III. LABOR SUPPLY AND EQUILIBRIUM IN THE LABOR MARKET
   A. Utility maximization
   B. Substitution and income effects of a wage increase
   C. Labor supply curve
   D. Labor market equilibrium

IV. EXAMPLES OF LABOR MARKET ANALYSIS
   A. Decline in demand for the product workers produce
   B. An increase in capital or technological progress
   C. A union negotiates a wage above the equilibrium level

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

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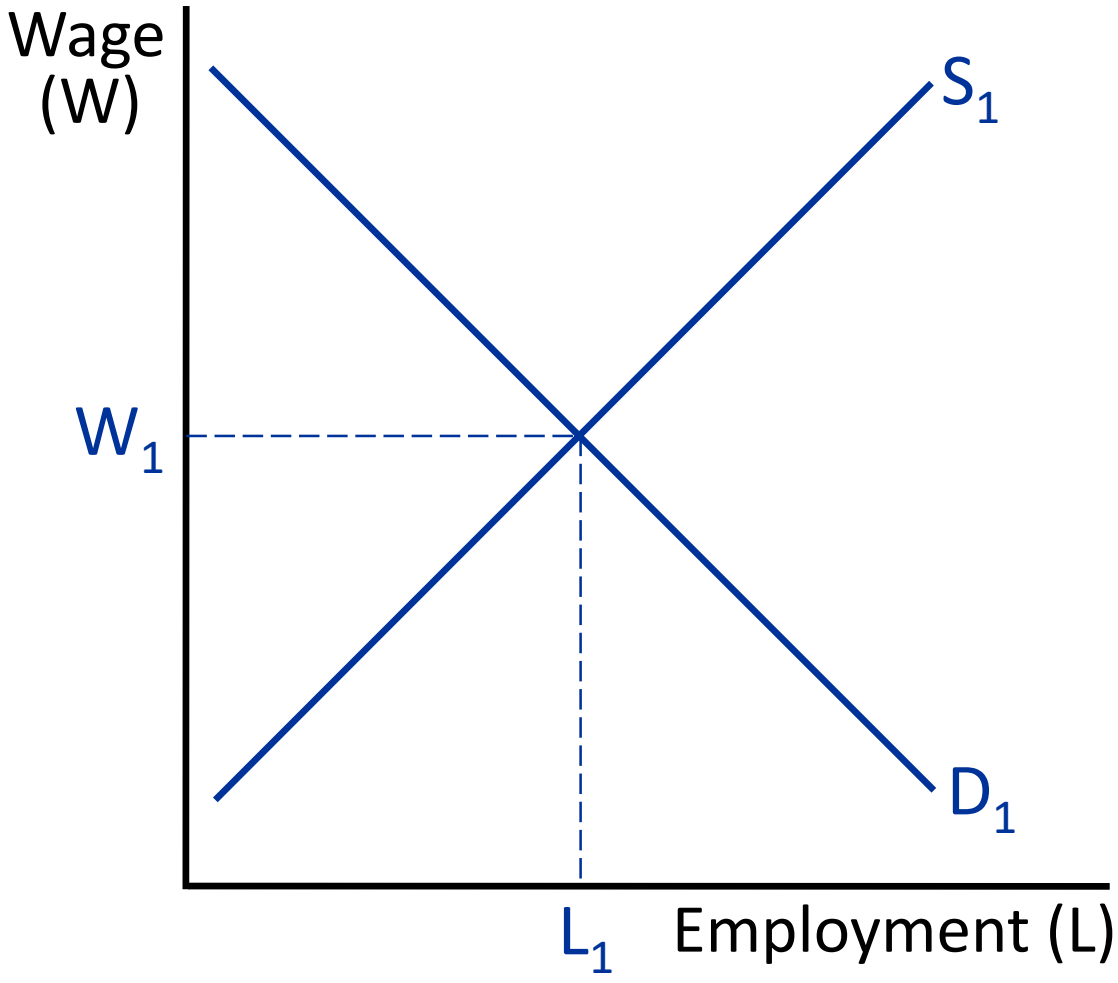
Announcements

- Journal article reading for next time:
    - Thomas Piketty and Emmanuel Saez, “Income Inequality in the United States, 1913–1998.”

I. Overview

Market for Labor



We can talk about the labor market at different levels:

- Market for labor for a particular occupation or industry (plumbers, computer programmers, construction workers).
- Market for workers with particular demographic characteristics (teenagers, older men, married women).
- Market for workers with particular skills (high-skilled and low-skilled).

The source of supply and demand are reversed from typical markets.

- The demand curve for labor comes from profit maximization on the part of firms.
- The supply curve for labor comes from utility maximization on the part of households.

Why is the market for labor important?

- Wages and employment are fundamental to peoples' lives and happiness.
- Labor market analysis can help us to understand how developments will affect wages and employment.
- It can also help explain rising inequality.

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.
- $MRP_L = MP_L \bullet MR$

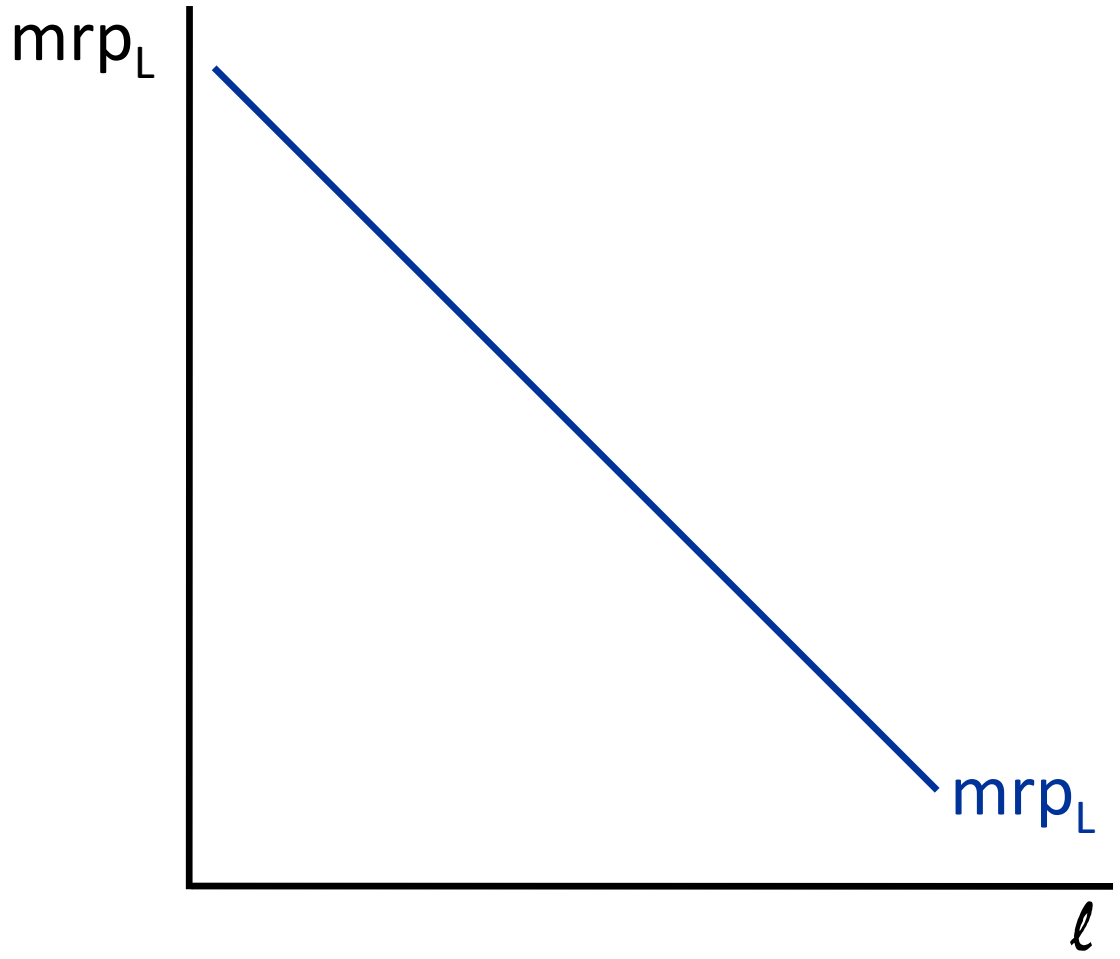
The Special Case of Perfect Competition:

- 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: $MRP_L = MP_L \bullet MR$.
- 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.

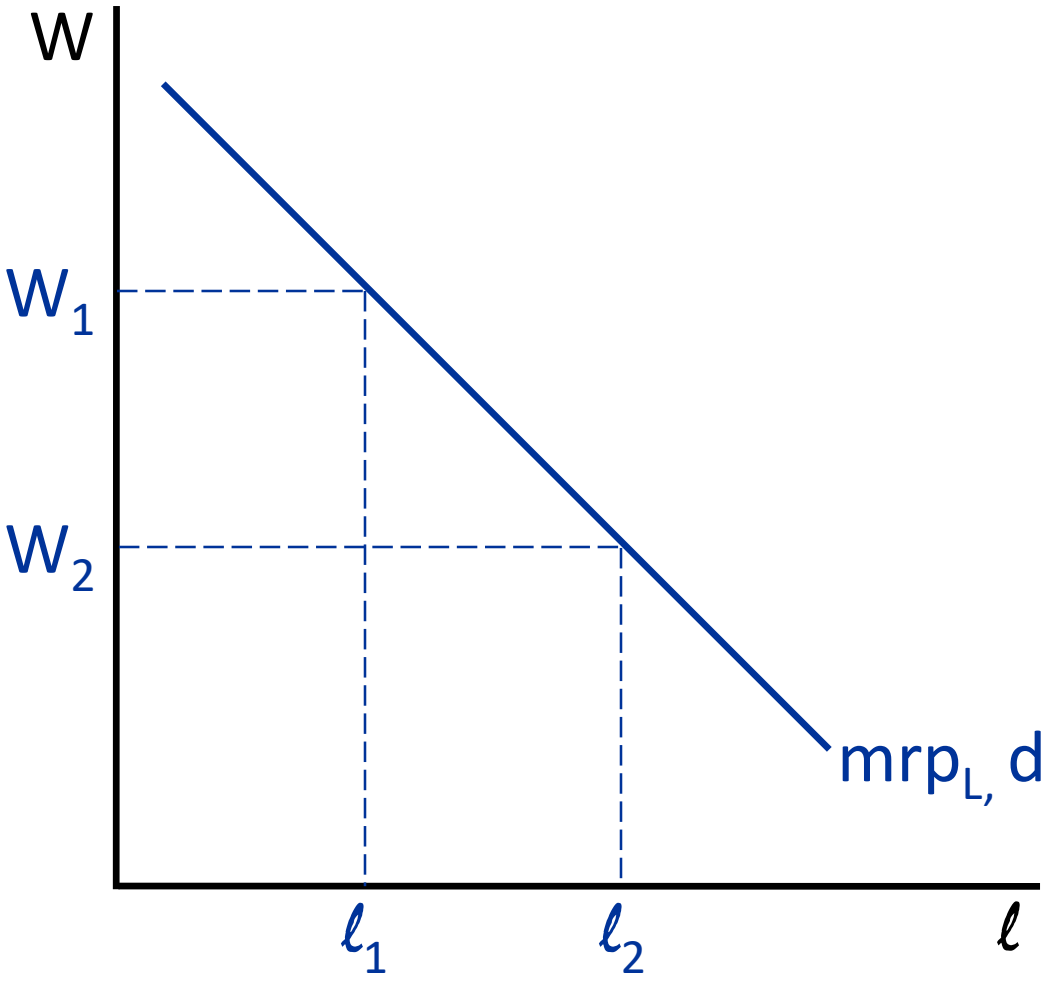
MRP_L for a Particular Firm



Profit Maximization Implies:

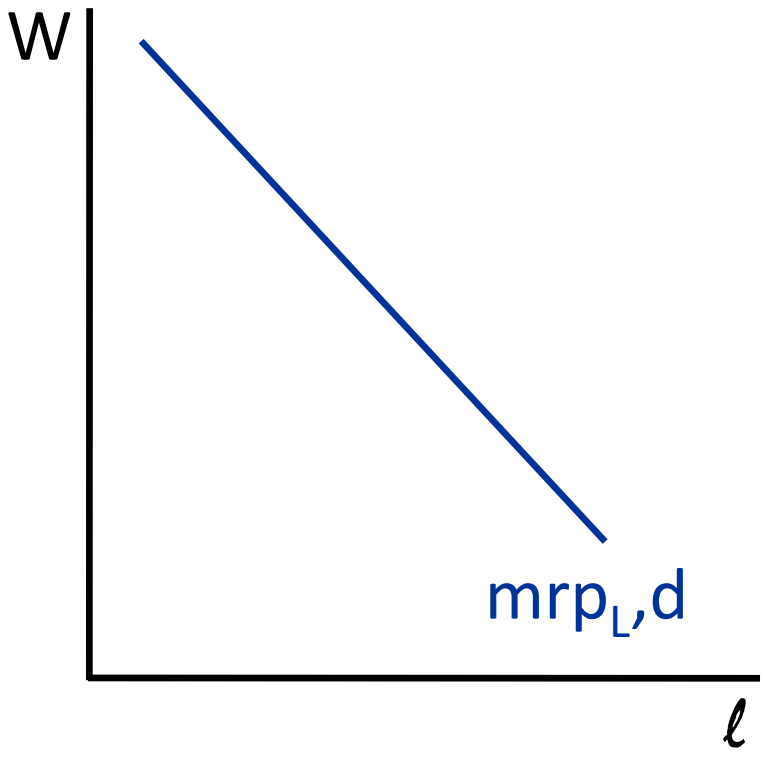
- Firms want to hire labor up to the point where: $MRP_L = W$.
- At each wage, a firm wants to hire whatever quantity of labor has a MRP_L equal to that wage.

Labor Demand Curve for an Individual Firm

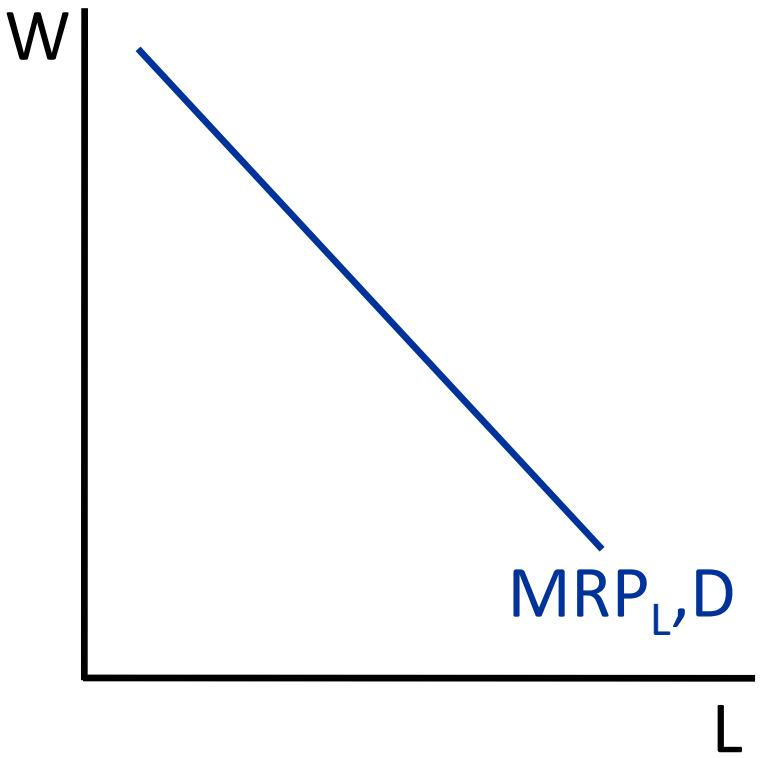


Labor Demand Curves

Individual Firm



Market



III. Labor Supply and Equilibrium in the Labor Market

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

- Households not only like goods and services, they like leisure (time at home).
- 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

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

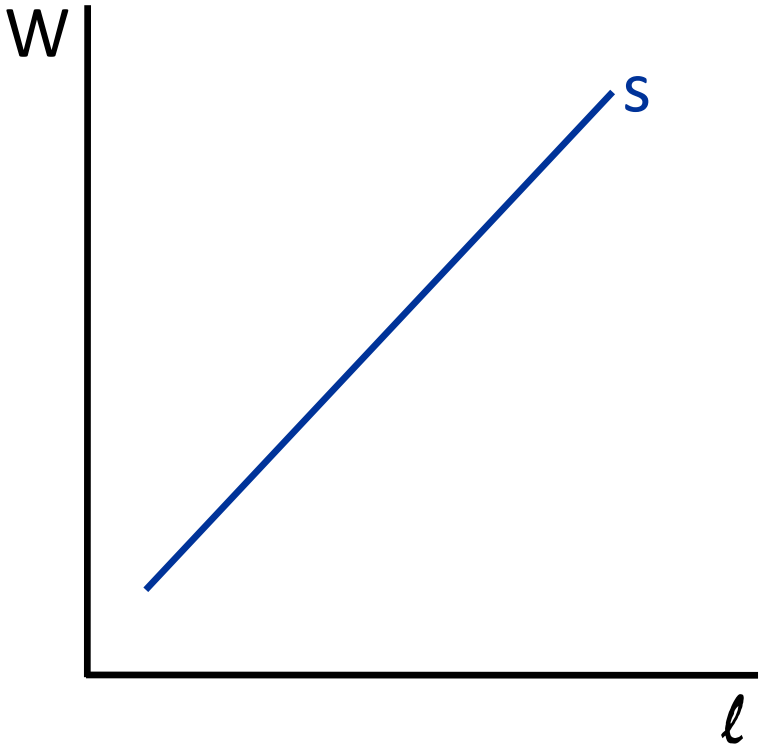
Effect of an Increase in the Wage

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

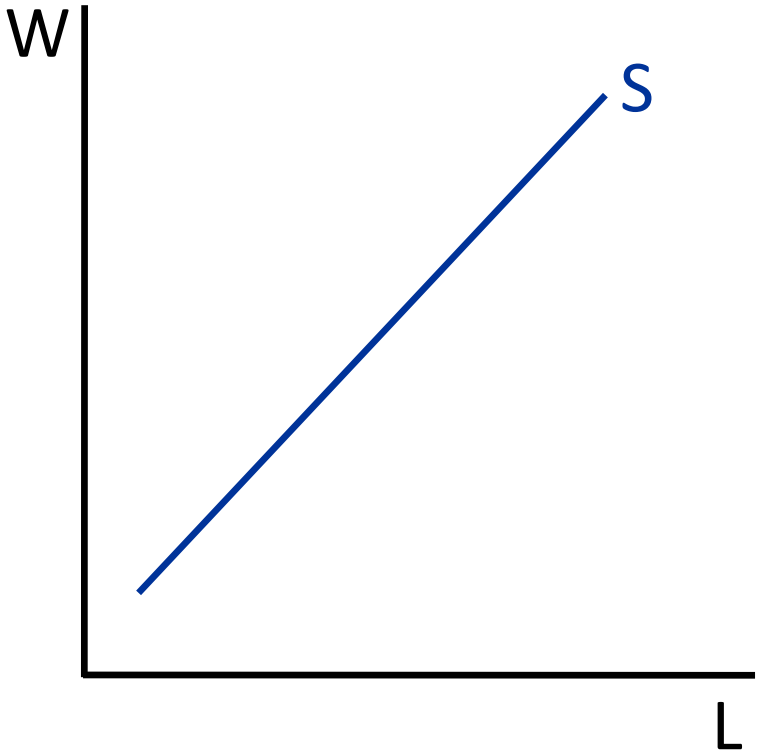
- Substitution Effect: When the wage rises, the consumer wants to substitute away from leisure (so work more).
- Income Effect: When the wage rises, the consumer is richer and wants more leisure (so work less).
- Which effect dominates is an empirical matter.

Labor Supply Curves

Individual Household

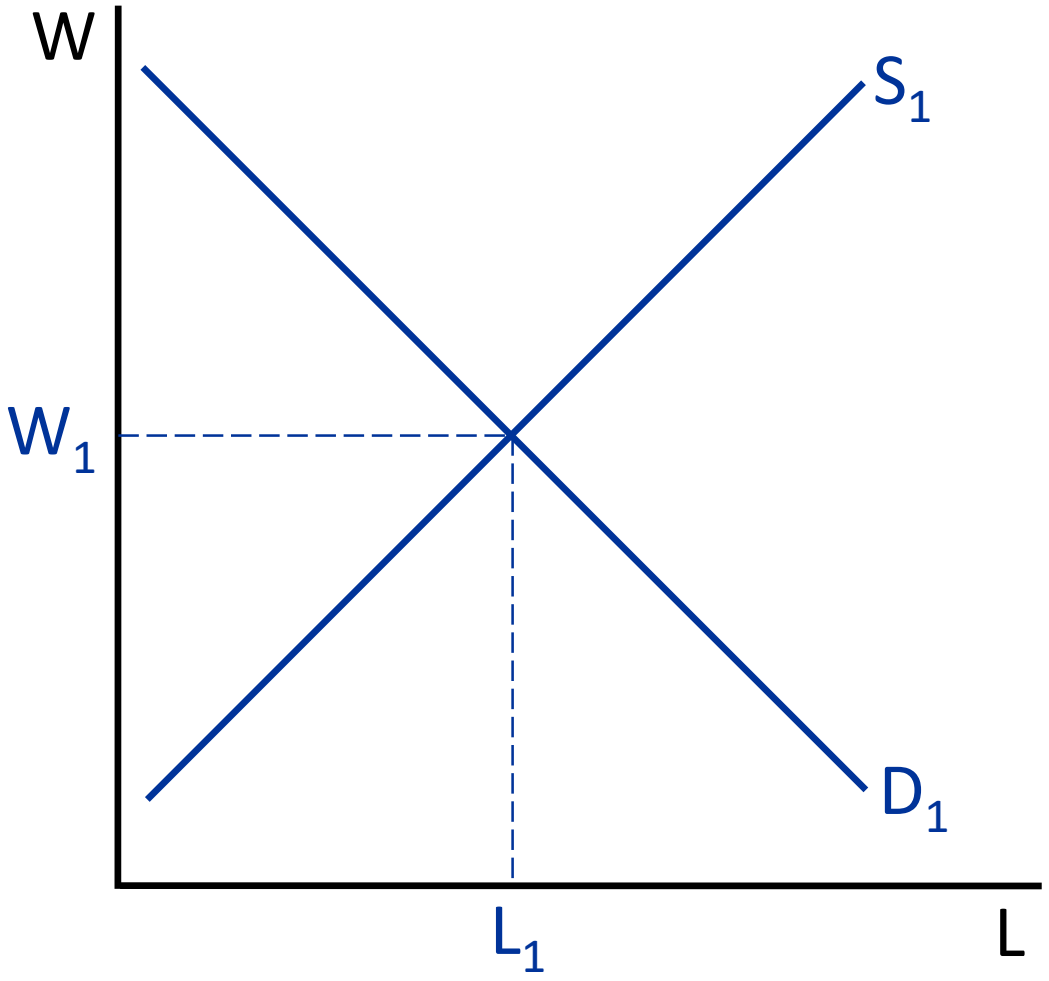


Market



Equilibrium in the Labor Market

Market for Construction Workers



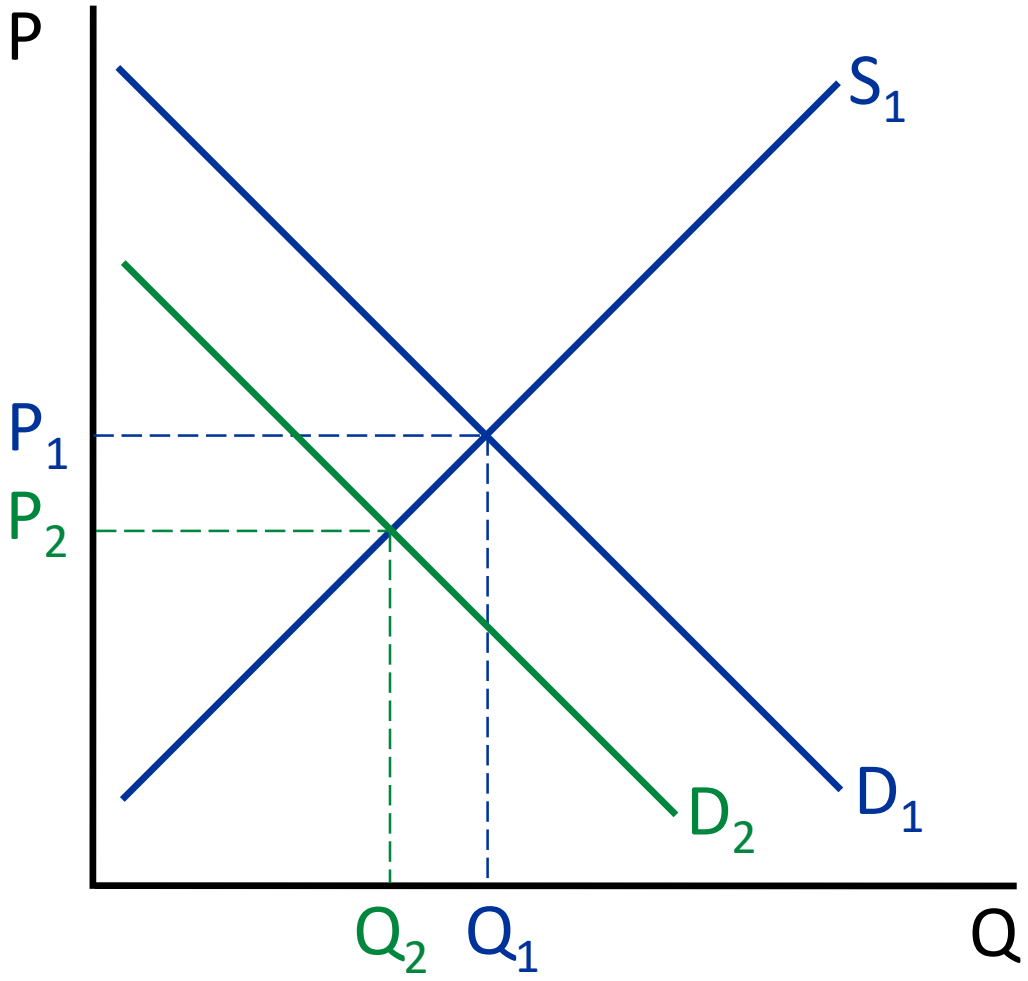
IV. Examples of Labor Market Analysis

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

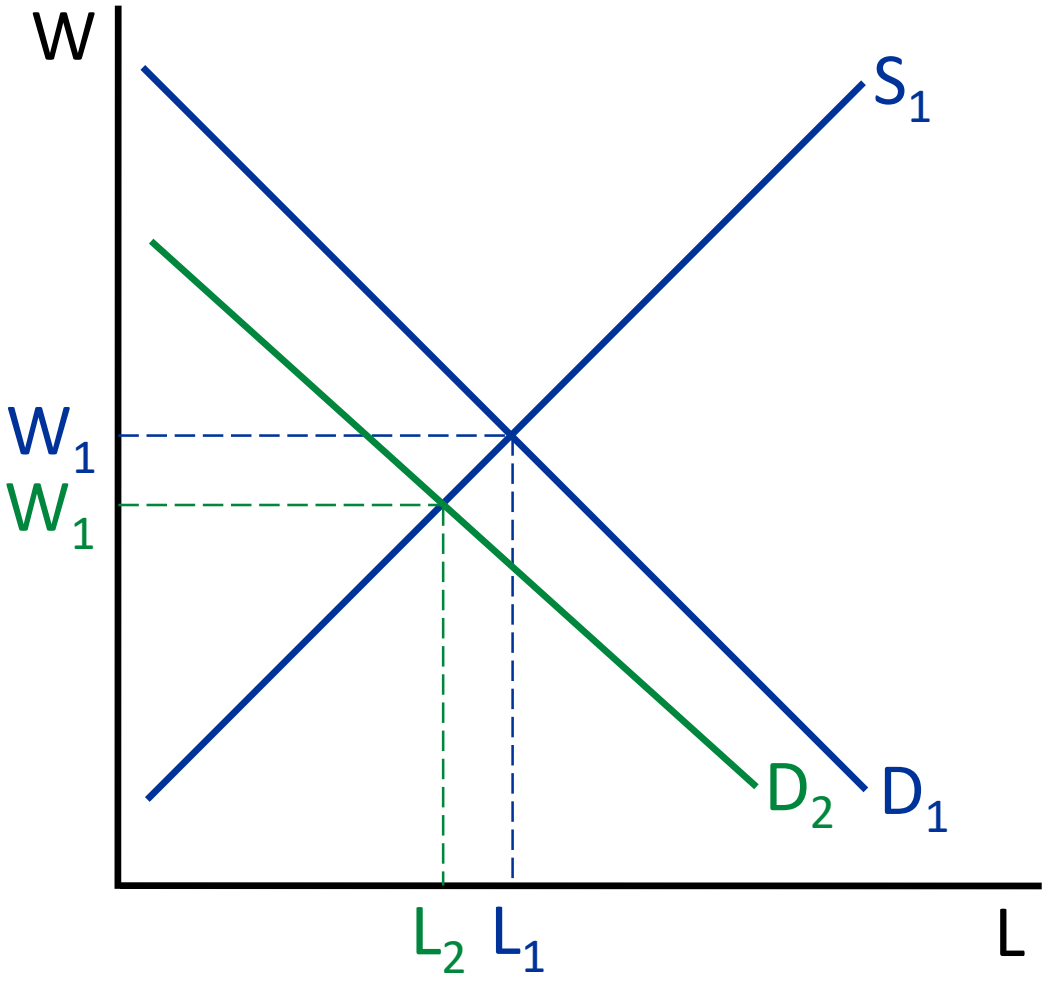


Example 1: Decrease in the Demand for the Product (continued)

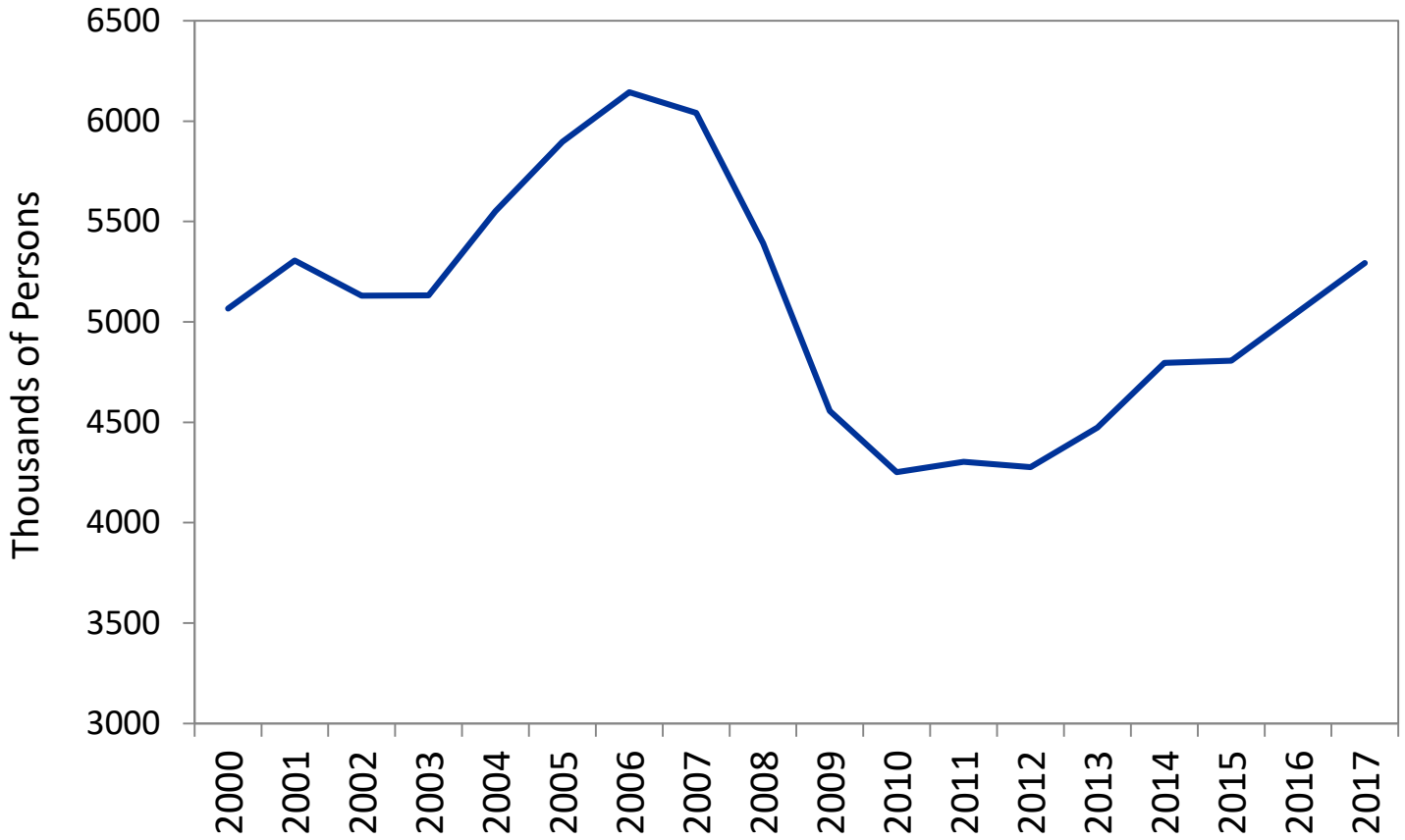
- The fall in the price of the output lowers the MRP_L at each level of employment.
- The labor demand curve shifts back.
- Wages and employment of construction workers both fall.

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

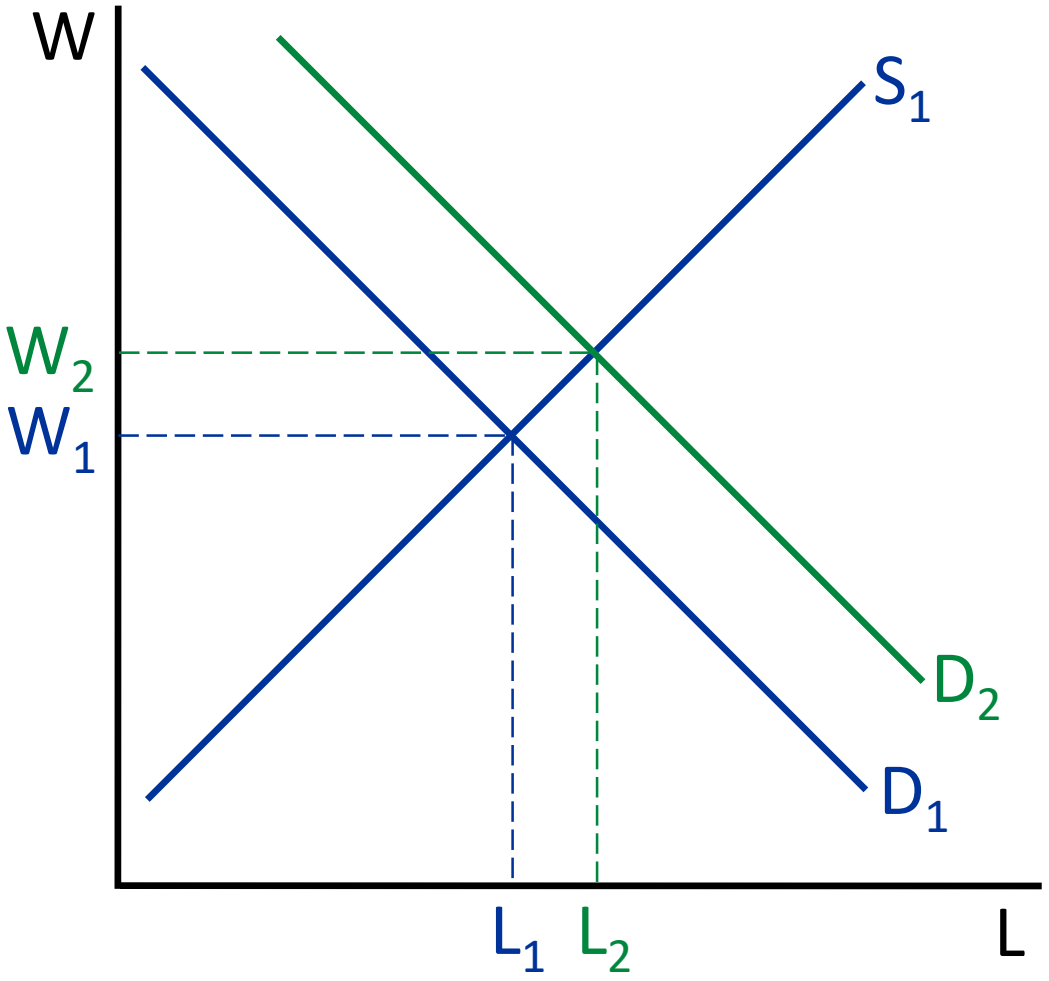
- Consider the market for high-skilled workers.
- Computer technology spread rapidly across many industries in the late 1980s and 1990s.
- What would you expect this to do to the employment and wages of high-skilled workers whose jobs use computers (such as architects, engineers, and professors)?

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

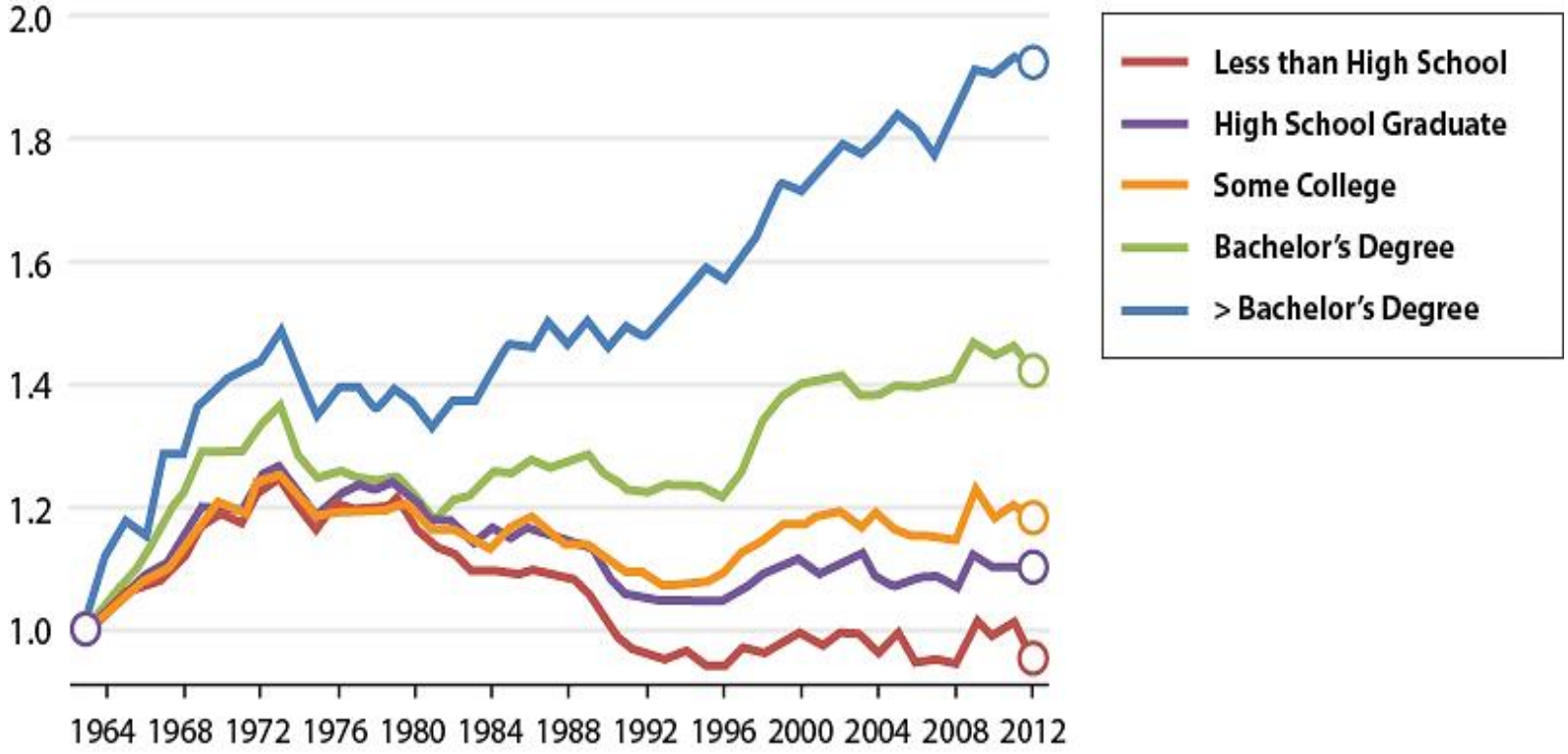
- The addition of machines or technological progress (or, often, both together) will increase the MP_L.
- In most circumstances, this will increase the MRP_L.
- This implies that the labor demand curve shifts out.
- Wages and employment of workers using the machines will rise.

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.

Effect of an Increase in the Supply of the Product

Good with Highly Inelastic Demand

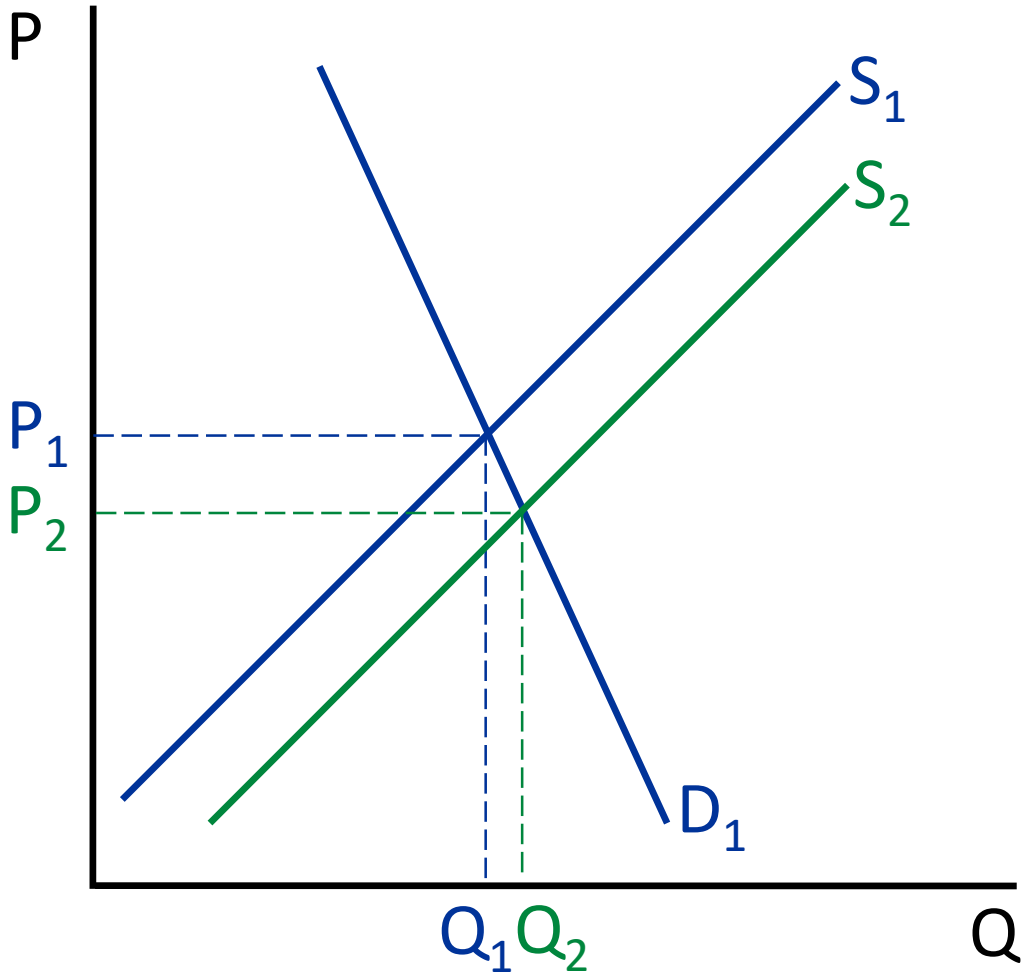
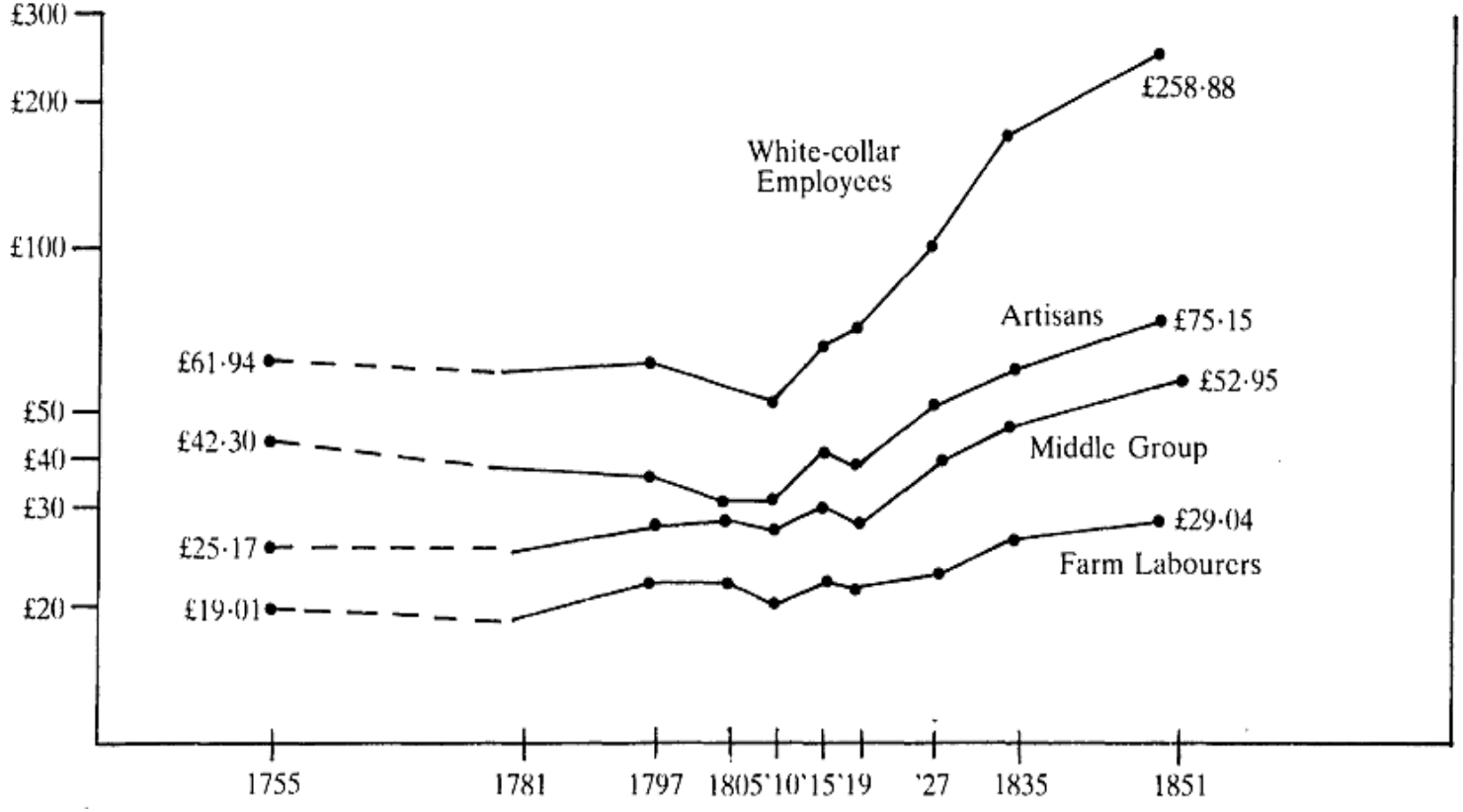


Figure 1. *Adult Male Average Full-Time Earnings for Selected Groups of Workers, 1755-1851, at Constant Prices*



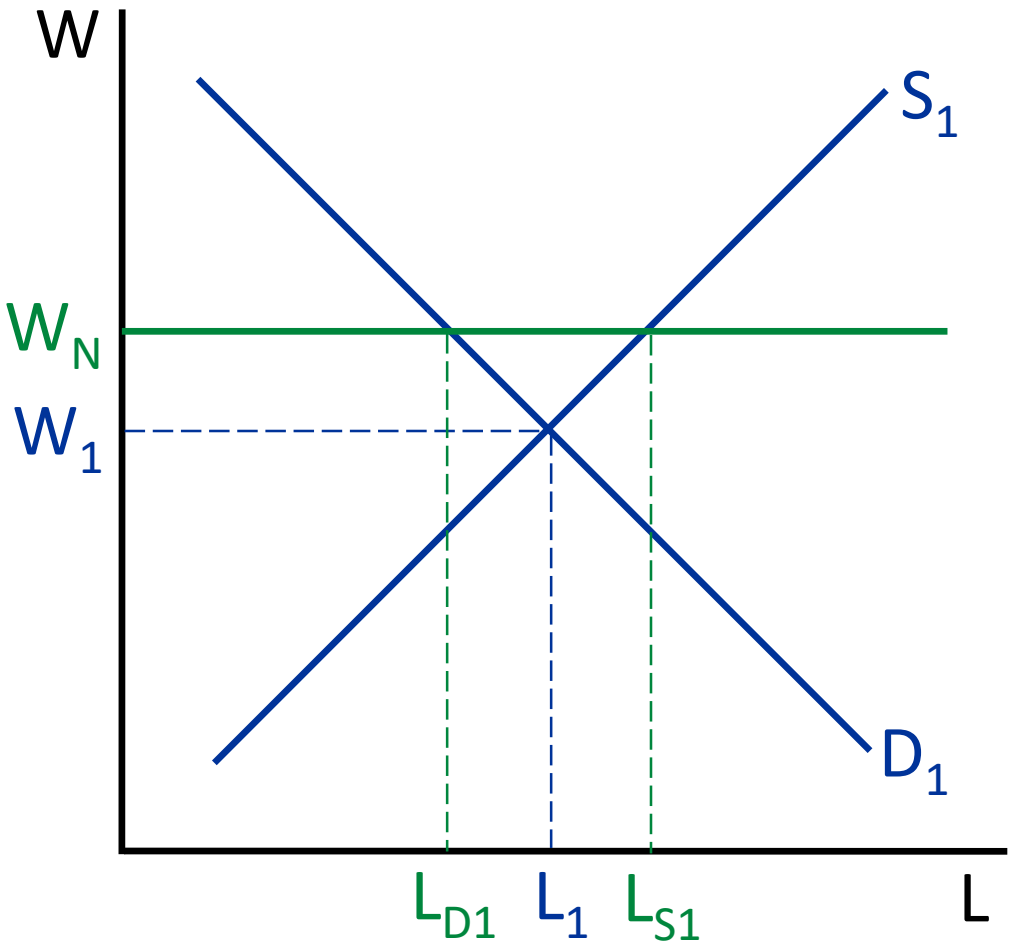
Source: Lindert and Williamson, "English Workers' Living Standards during the Industrial Revolution: A New Look."

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.

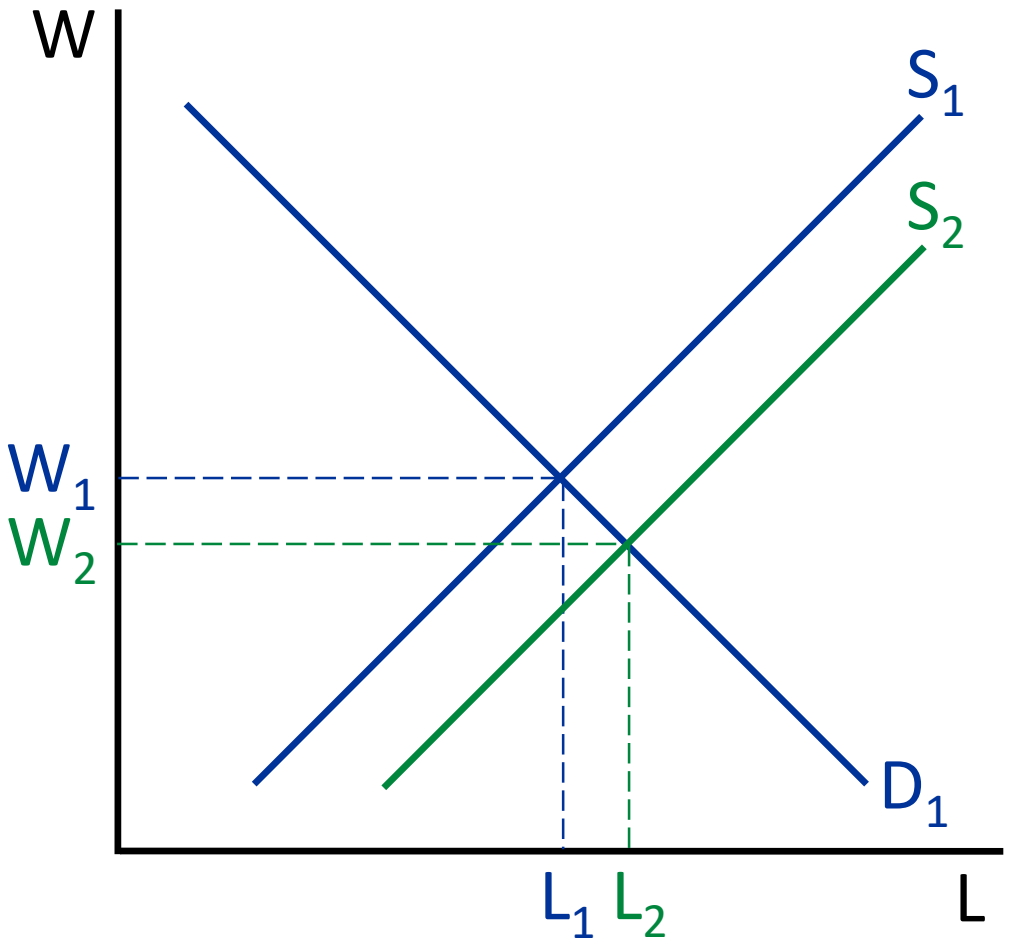
V. Effects of Increased Immigration

Example 4: Increased Immigration 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 of Low-Skilled Workers

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 demand and labor supply changes.
  - Sometimes immigrants came to a city because labor demand was expanding, and sometimes for family or political reasons
  - 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.