

# International Trade

## 5. Movement of Labor and Capital between Countries

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# Two background examples

1. From May-September 1980, boatloads of Cuban refugees arrived in Miami (Mariel boat-lift).
  - Expectation: less-skilled immigrant workers drive down wages.
  - However, this immigration does not appear to have decreased wages of other less-skilled workers in Miami.
2. From 1989, large-scale emigration of Russian Jews to Israel.
  - Immigrants more highly skilled than existing Israeli population.
  - However, relative wages of high-skilled workers in Israel actually rose during the 1990s.

# 1. Introduction

- In other large-scale immigrations, wages of domestic workers did fall.
- Short-run specific factors model to explain case where immigration leads to a fall in wages.
- Long-run Heckscher-Ohlin model to explain how an increase in labor will not lower the wages.
  - Long-run model gives industries more time to respond which allows the economy to absorb the new workers.
  - Important: domestic countries' ability to expand exports in areas that use the immigrants' skills.
- Similar discussion will apply to capital flows – FDI.

# 2. Movement of labor

In terms of our models:

- Migration is the movement of labor from the Foreign country to the Home country.
- Wages paid to labor and rentals paid to capital and land are determined by prices of goods purchased.
- Prices of goods are determined by world market for goods.
- Assume fixed prices of goods: how do the Home wage and rentals change as labor moves between countries?

# 2.1 Movement of labor - short run

## Effects of immigration in the short-run Specific-Factors Model:

- In the short run, only labor is mobile among Home industries: capital and land are fixed.
- Determining the Wage:
  - Total labor  $\bar{L}$  is the amount used in manufacturing,  $L_M$ , plus the amount used in agriculture,  $L_A$

$$\bar{L} = L_M + L_A$$

# 2.1 Movement of labor - short run

Effect of Immigration on the Wage in Home

- Use figure 5.2, similar to figure 3.5
- Assume that Foreign equilibrium wage  $W^*$  is lower than Home equilibrium wage  $W$ .
- Foreign workers will emigrate to Home, and Home workforce will increase by an amount  $\Delta L$ .
- The  $P_A \text{MPL}_A$  shifts right by  $\Delta L$ .
- Origin for manufacturing has not changed so  $P_M \text{MPL}_M$  does not change.

# 2.1 Movement of labor - short run

Effect of Immigration on the Wage in Home (cont'd)

- New equilibrium Home wage at B, at a lower wage.
  - The extra workers are shared between both industries since both industries have more workers, but fixed amounts of capital and land.
  - Wage declines due to the diminishing marginal product of labor.
- ➔ The specific-factors model predicts that an inflow of labor will lower wages in the Home country.

# 2.1 Movement of labor - short run

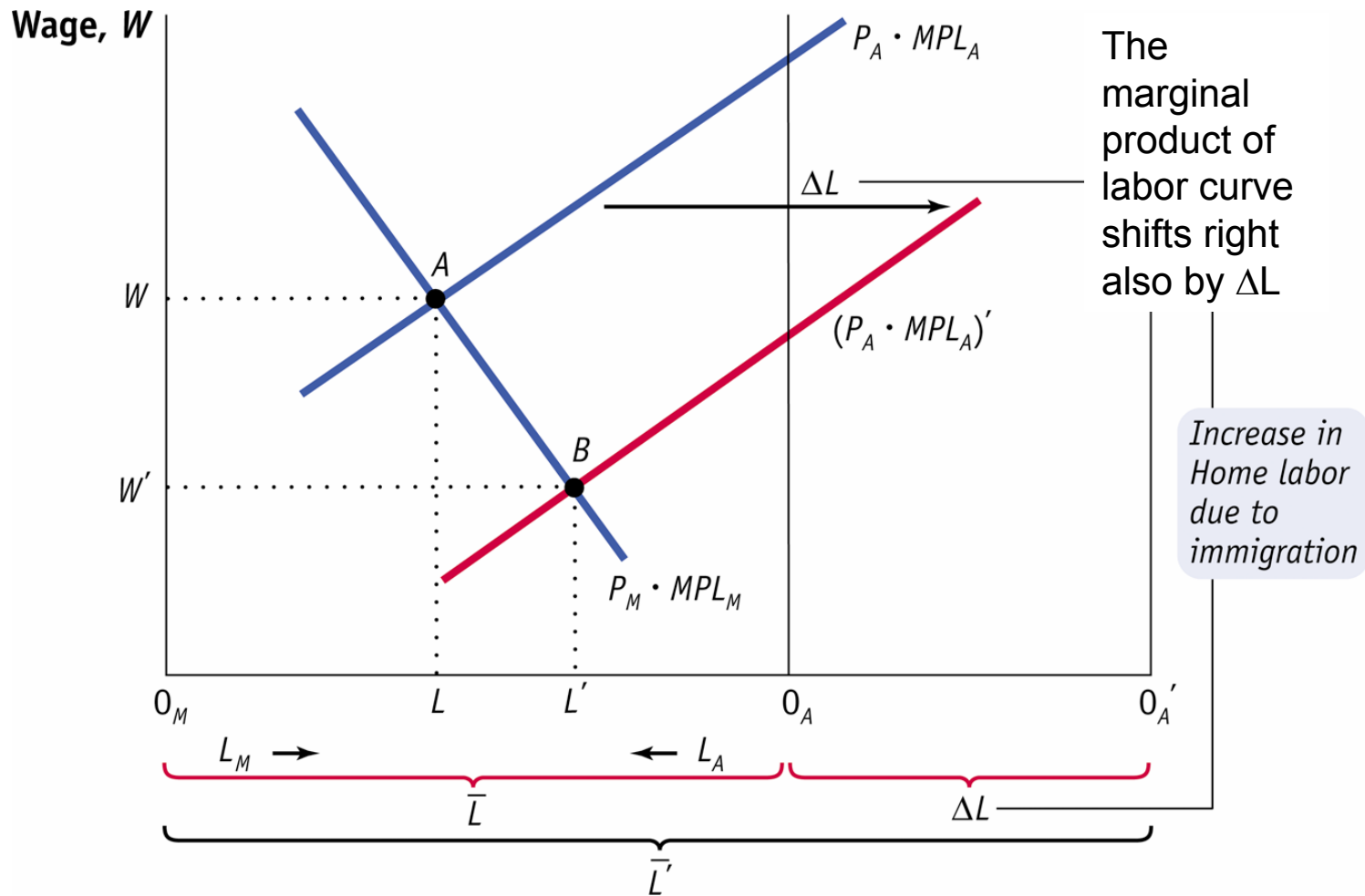


Figure 5.2  
Increase in  
Home labor

## 2.2 Movement of labor in the short run - empirics

- Between 1870 and 1913, 30 million Europeans left the “Old World” to emigrate to the “New World.”
- U.S. absorbed largest number of people; population increased by 17%.
- The New World had higher real wages (nearly 3x higher in 1870)
- Over time capital accumulated, so real wages in both locations grew, but at a slower rate in the New World.

# 2.2 Movement of labor in the short run - empirics

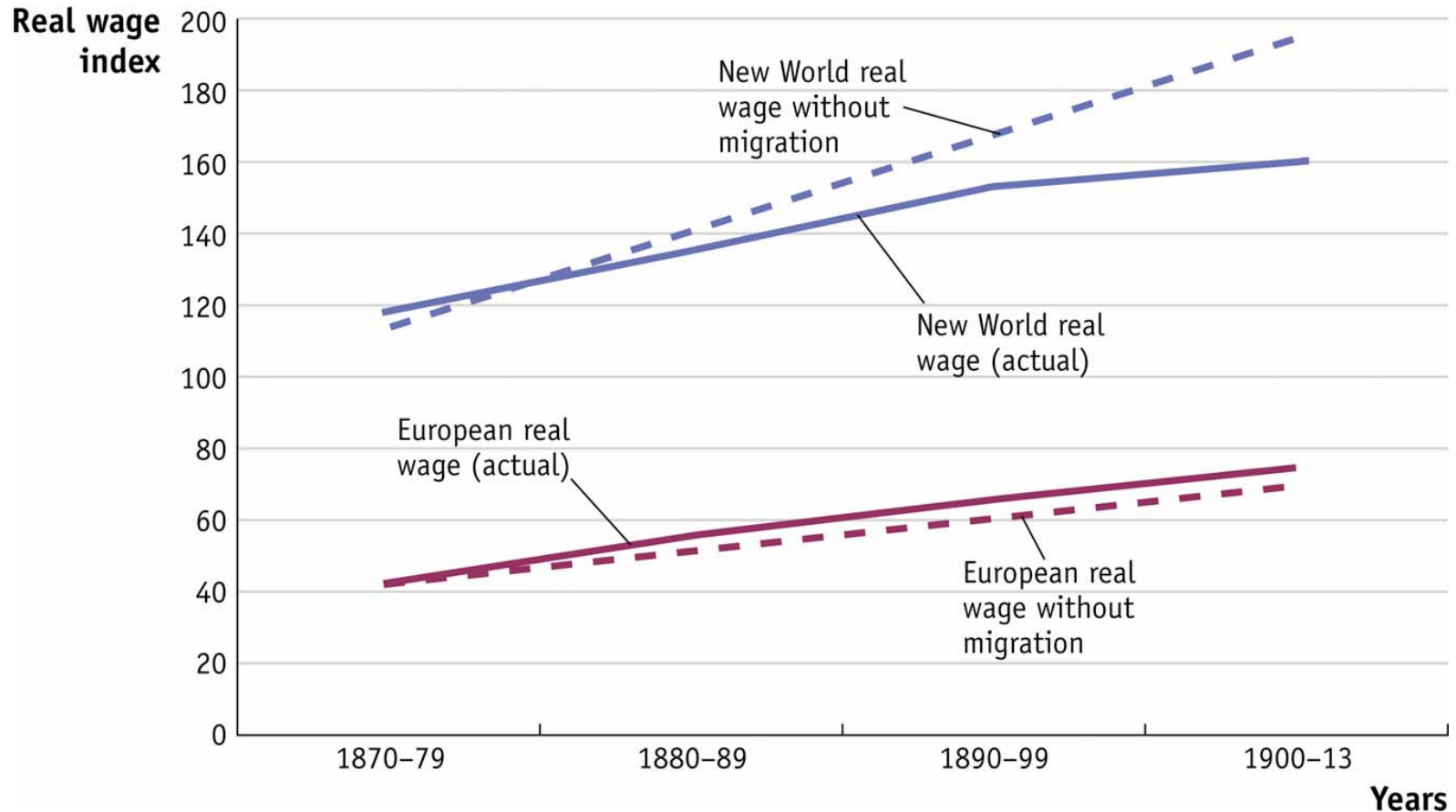


Figure 5.3 Wages in Europe and the New World

# 2.2 Movement of labor in the short run - empirics

- Large-scale migration contributed to “convergence” of real wages across the continents.
- Comparing actual real wages with no-migration estimates, growth of wages in the New World was slowed due to immigration.
- Wages in Europe grew slightly faster due to emigration.

## 2.2 Movement of labor in the short run - empirics

- Today, migration from developing countries to wealthier countries is more common.
  - Immigration often includes mix of low-skilled and high-skilled workers.
- Low-skilled workers welcomed in some European countries in 1960s-1970s to fill shortages (e.g. Germany, Switzerland welcomed many Italian workers).
  - Today, European policies welcome more high-skilled labor to deal with declining workforce.

# 2.2 Movement of labor in the short run - empirics

- Illegal immigration debate in U.S.:
  - Around 12 million illegal immigrants in the U.S., (although majority of immigrants in fact legal).
- Combination of legal and illegal immigrants in U.S. creates a U-shaped pattern between the number of immigrants and their educational level.

# 2.2 Movement of labor in the short run - empirics

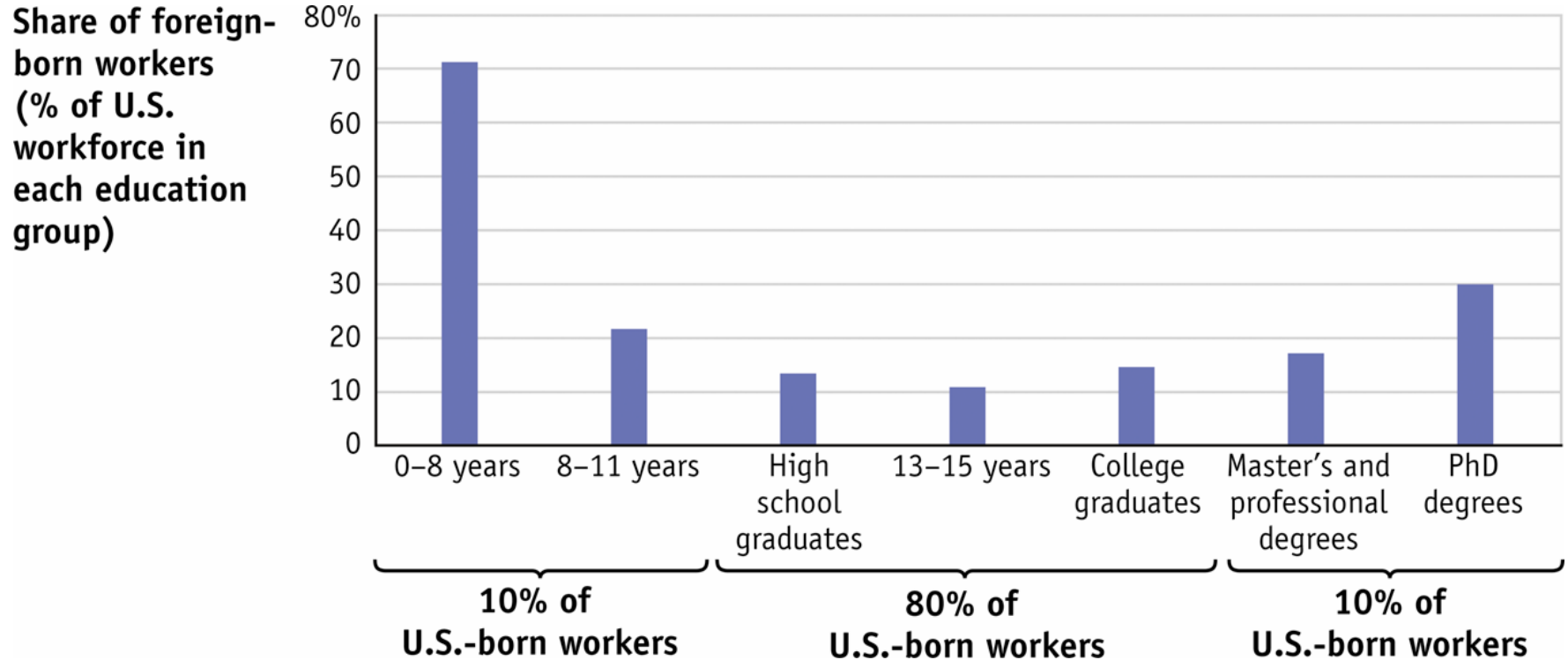


Figure 5.4 Share of foreign-born workers in U.S. workforce, 2004

## 2.2 Movement of labor in the short run - empirics

- Workers without high school degree have largest percentage of foreign-born workers.
- Workers with Ph.D.s have next largest percentage of foreign-born workers.
- Middle educational levels (about 80% of the U.S. labor force) have lowest percentage of foreign-born workers.
- Illegal immigrants into the U.S. compete primarily with lowest-educated workers.
- Legal immigrants compete with workers at the highest educational levels.

# 2.2 Movement of labor in the short run - empirics

- Under specific-factors model, the greatest impact on labor will be for the lowest and highest educated workers.
  - This is supported by the data.
- Negative impact of immigration on wages is fairly modest for most workers and is offset with capital moves between industries as discussed later.

## 2.3 Movement of labor – other short-run effects

### Other Effects of Immigration in the Short Run

- U.S. and Europe have both welcomed foreign workers in specific industries: agriculture and high-tech.
- They do this even though those foreign workers compete with domestic workers in those industries.
- ➔ There must be benefits to the industries.
- We can measure these potential benefits by the payments to capital and land (rentals, see chapter 3).

## 2.3 Movement of labor – other short-run effects

### Rentals on Land and Capital

- Two ways to compute rentals:
  - As the earnings left over in the industry after paying labor.
  - As the marginal product of capital or land times the price of the good produced in each industry.
- Under either calculation, immigration increases rentals on capital and land.
- Owners of capital and land often support more open borders.

## 2.3 Movement of labor – other short-run effects

### Rentals on Capital and Land (cont'd)

- Restriction on immigration should be seen as a compromise between:
  - Entrepreneurs and land-owners who might welcome foreign labor.
  - Local unions and workers who view migrants as potential source of competition leading to lower wages.
  - The immigrant groups themselves who might also have the ability to influence the political outcome of immigration policy.

## 2.3 Movement of labor – other short-run effects

### Effect of Immigration on Industry Output

- Immigration leads to increased labor force in each industry.
- With more workers and the same amount of capital and land, output rises in both industries.
- Immigration leads to outward shift in PPF.
- With constant prices of goods, output rises - from point A to point B in Figure 5.5.
- This result depends on short-run nature of the specific-factors model.
  - If land and capital are not fixed, as in the long run, one industry's output will rise while the other will fall.

## 2.3 Movement of labor – other short-run effects

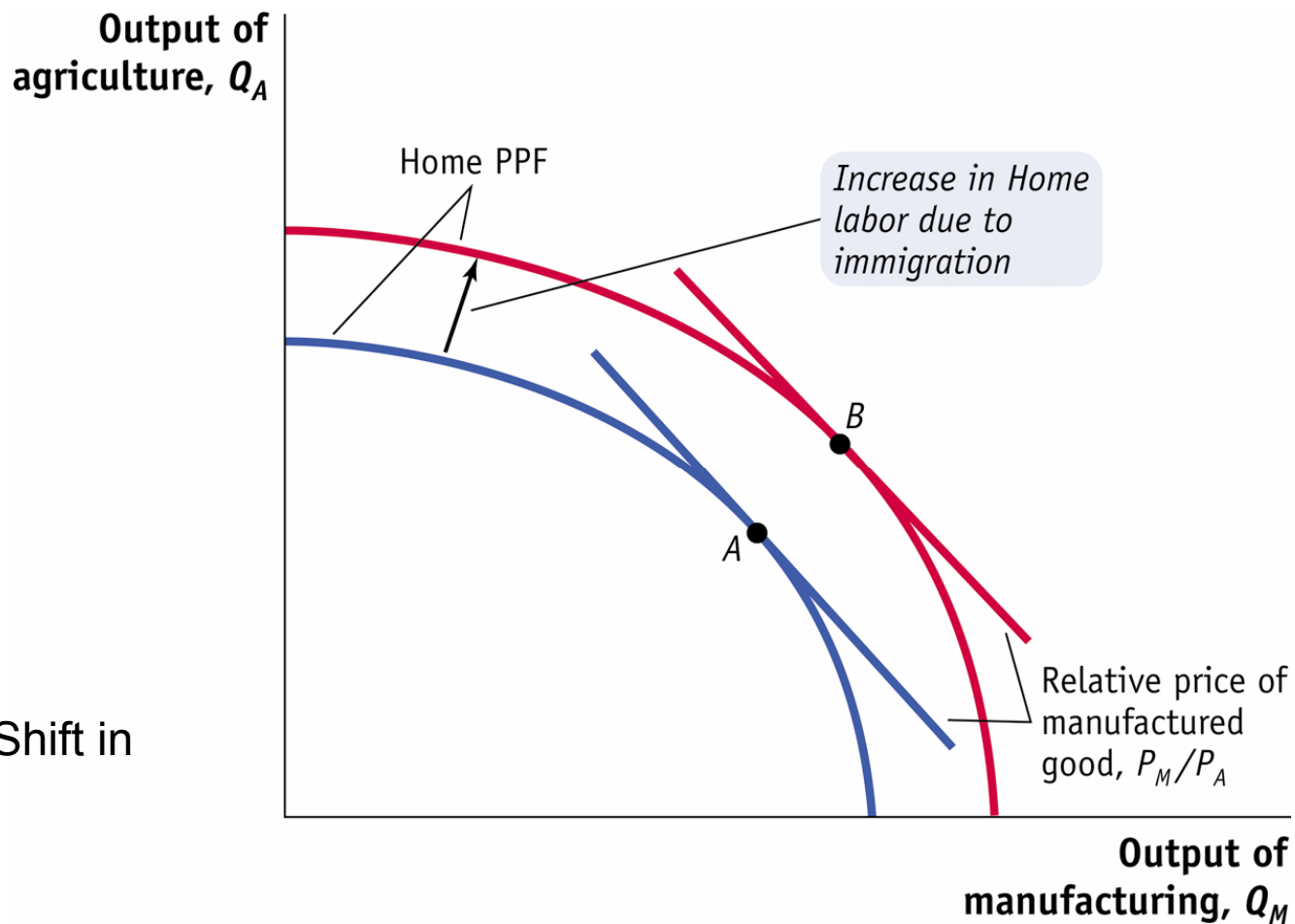


Figure 5.5 Shift in Home PPF

# 2.4 Movement of labor – long run

## Effects of immigration in the long-run Heckscher-Ohlin Model

- In the long run, all factors are free to move between industries (remember: no land in HO).
- Only capital and labor used to produce shoes and computers.
- Similar to simple Heckscher-Ohlin model, but labor can move between countries.

## 2.4 Movement of labor – long run

- Total capital:  $\bar{K} = K_C + K_S$  earning rental R.
- Total labor:  $\bar{L} = L_C + L_S$  earning wage W.
- Computers are capital-intensive and shoes are labor-intensive ( $L_S/K_S > L_C/K_C$ ,  $K_C/L_C > K_S/L_S$ )
- Equilibrium output at point A on PPF in figure 5.9.

## 2.4 Movement of labor – long run

### Edgeworth-Bowley Box Diagram

- Figure 5.7 shows box diagram for initial equilibrium
- Length is total amount of labor at Home,  $L$ .
- The vertical axes measure the total amount of capital  $K$  at home, in each industry.
- $O_S A$  shows amount of labor and capital used in shoes and  $O_C A$  in computers.
- The capital-labor ratio in each industry is the slope of the respective industry line.
  - $O_S A$  is flatter, so capital-labor ratio in shoes is less than in computers.

# 2.3 Movement of labor – long run

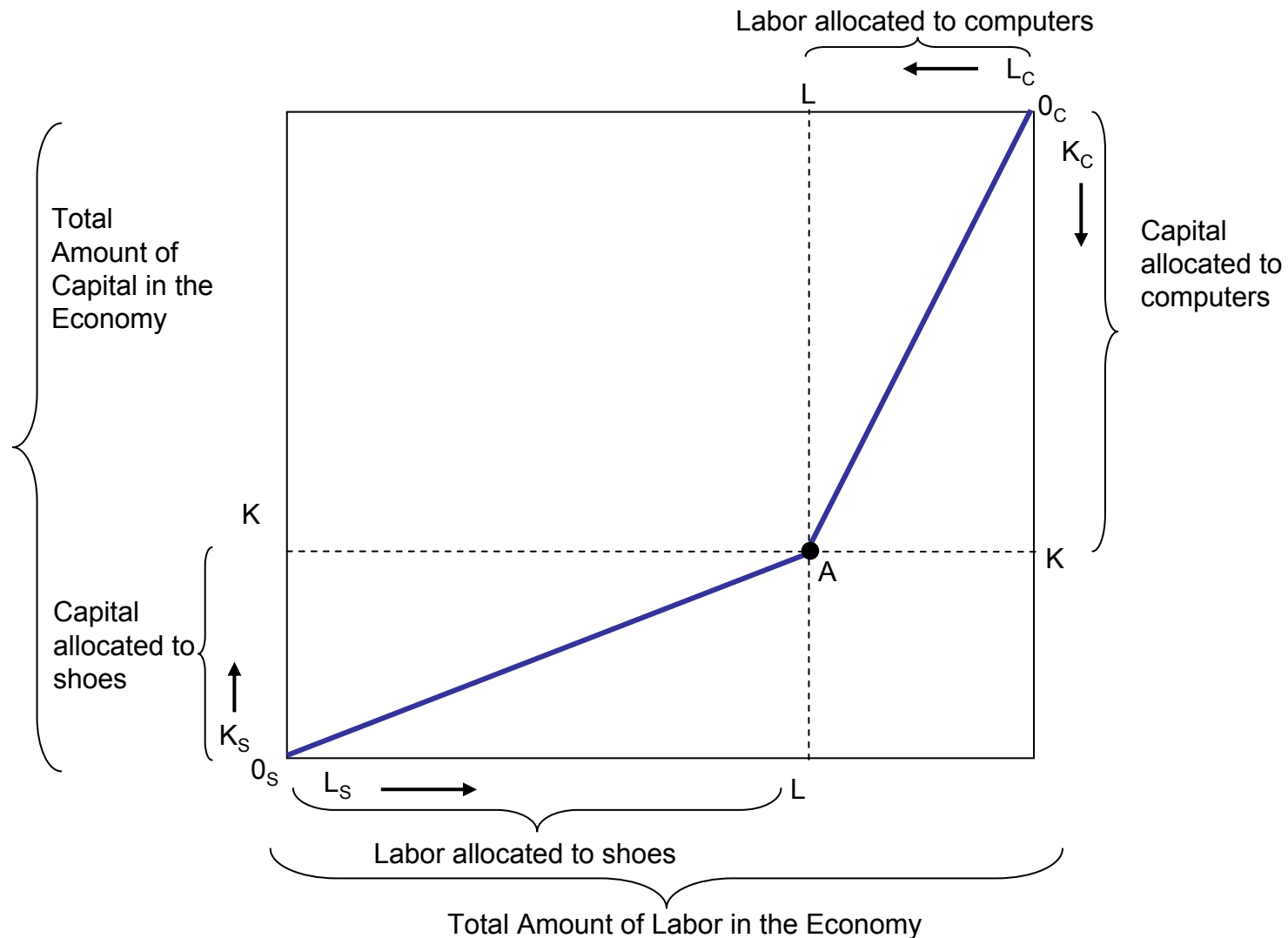


Figure 5.7  
Allocation of  
labor and  
capital in a  
box diagram

## 2.4 Movement of labor – long run

### Determination of the Real Wage and Real Rental

- Wages and rentals are determined by marginal products of labor and capital.
- Marginal products are determined by capital-labor ratio in each industry.
- If capital-labor ratio increases, then by law of diminishing returns, the marginal product of capital and real rental must decrease and the marginal product of labor and real wage must increase. The opposite holds for a higher L/K ratio.
- Each line in the box diagram is a particular capital-labor ratio, and so also a particular wage and rental.

## 2.4 Movement of labor – long run

Increase in amount of Home labor

- Immigration increases amount of Home labor to  $L' = L + \Delta L$ .
- Axes in box diagram expand: figure 5.8.
- Extra labor is allocated to shoes—the *labor*-intensive industry.
- Some capital moves from computers to shoes.
- To maintain capital-labor ratio in computers, some labor also leaves computers for shoes.

## 2.4 Movement of labor – long run

Increase in amount of Home labor (cont'd)

- Both labor and capital increase in shoes, so capital-labor ratio is unchanged.
- $\Delta L$  in the economy is fully employed.
- New origin for shoes  $O'_S$  due to increase in labor  $\Delta L$ .
- New possible equilibrium at point B.
- Slopes of the lines (capital-labor ratio) have not changed  
→ marginal products have not changed → wages and rentals have not changed.

*When capital can move freely between industries, immigration in the long run has no impact on the wage and rental rates.*

# 2.4 Movement of labor – long run

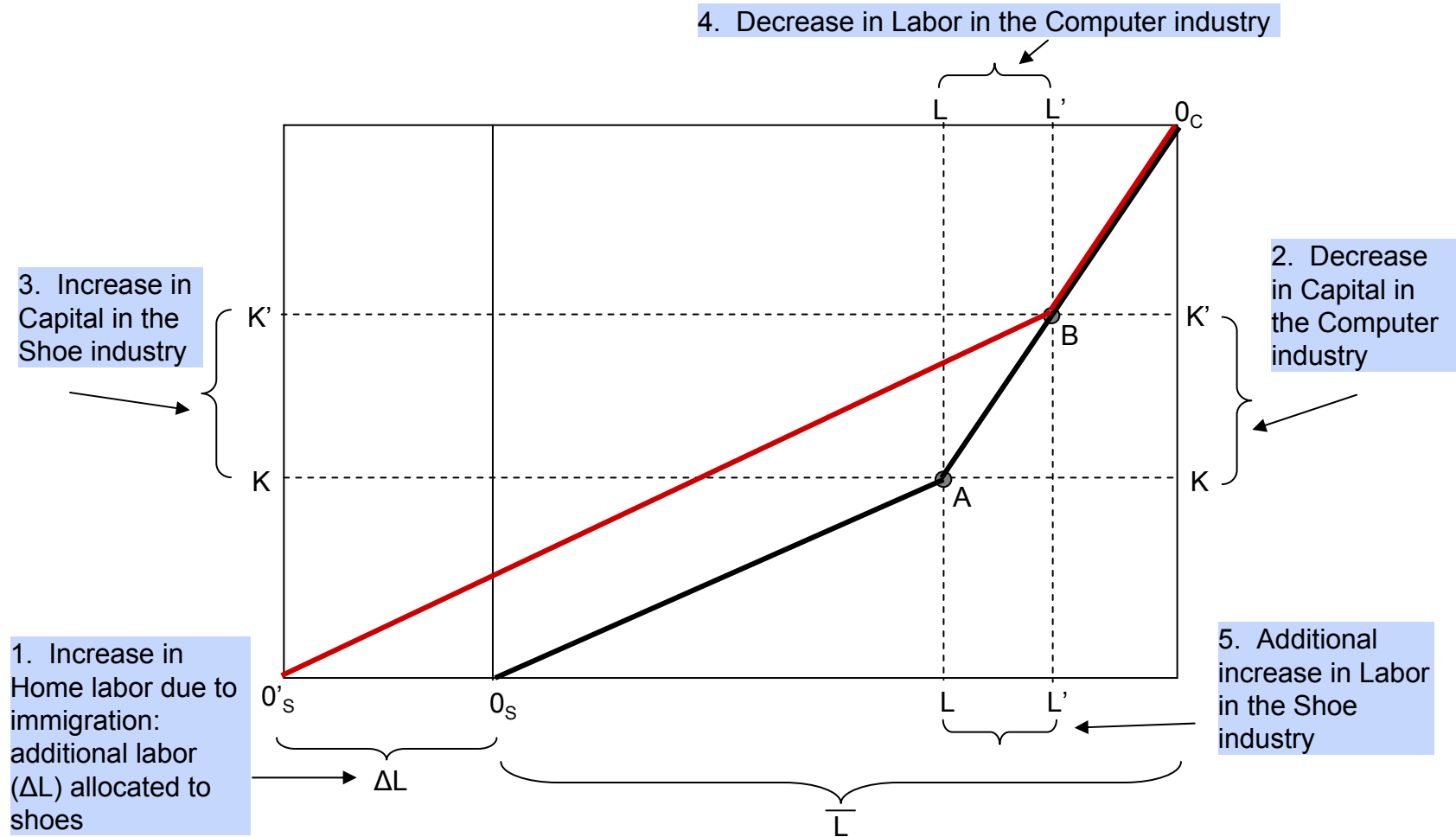


Figure 5.8 Increase in Home labor

## 2.4 Movement of labor – long run

Effect of Immigration on Industry Outputs (figure 5.9)

- Factors of production both increase or decrease, so output will follow the same trend.
  - Since labor and capital moved to shoes, shoe output expands and computer production contracts.
- PPF shifts out more in the direction of shoes with  $\Delta L$ .
- Prices are unchanged, so economy moves to equilibrium at point B.

# 2.4 Movement of labor – long run

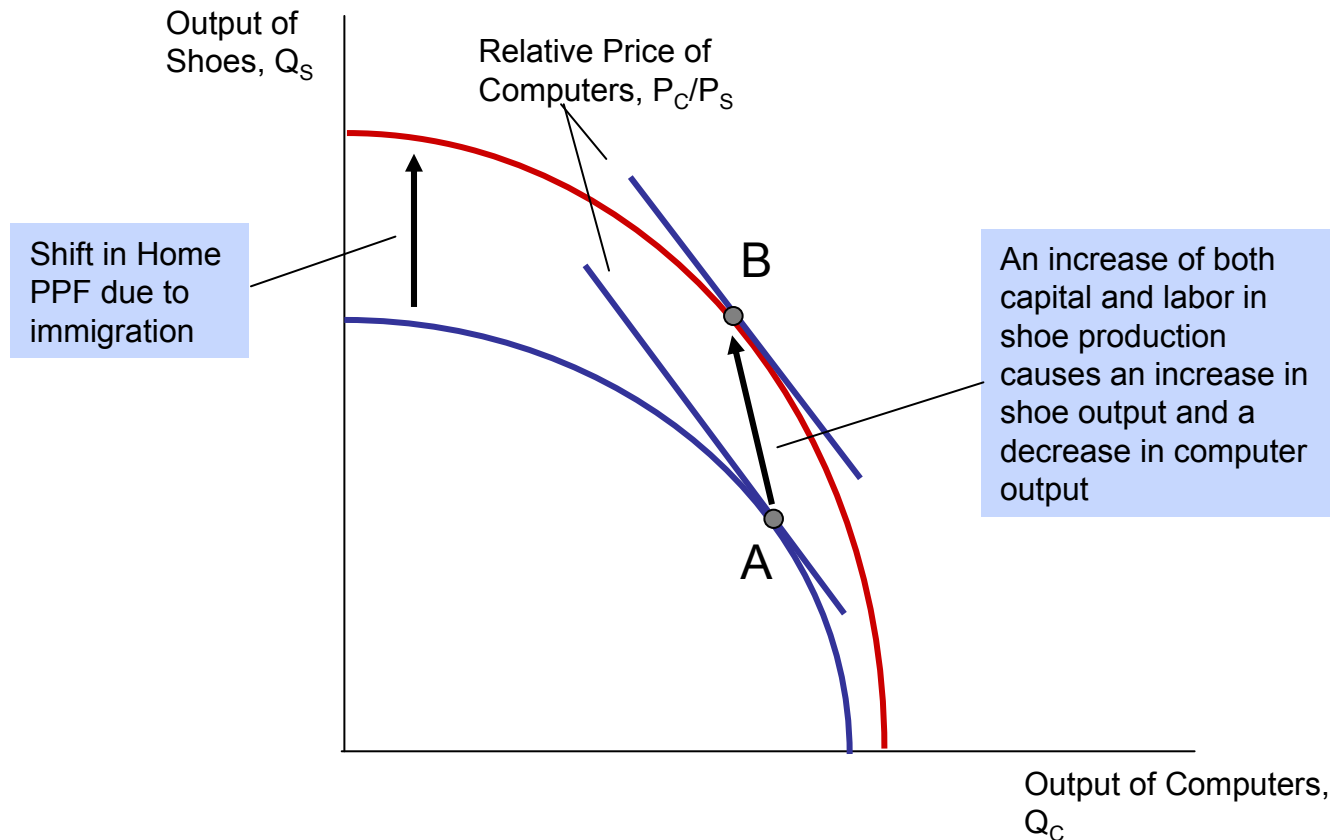


Figure 5.9 The long-run effect on industry outputs of an increase in Home labor

## 2.4 Movement of labor – long run

- This long-run result is named after Polish economist Tadeusz Rybczynski (1923-1998), who first discovered it.
- **Rybczynski Theorem:**  
*In the Heckscher-Ohlin model with two goods and two factors, an increase in the amount of a factor found in an economy will increase the output of the industry using that factor intensively and decrease the output of the other industry.*

# 2.4 Movement of labor – long run

## Effect of Immigration on Factor Prices

- The change in outputs in the Rybczynski Theorem goes hand-in-hand with the finding that the wage and rental will not change due to the increase in labor (or capital).
- Economy can absorb extra amount of labor by changing output.

## Factor Price Insensitivity:

*In the Heckscher-Ohlin model with two goods and two factors, an increase in the amount of a factor found in an economy can be absorbed by changing the outputs of the industries, without any change in the factor prices.*

# 2.5 Movement of labor in the long run – empirics

## The effects of the Mariel boat lift on industry output in Miami

- Figure 5.10 panel (a) shows real value added in Miami apparel industry and average of comparison cities.
- Real value added measures payments to labor and capital in an industry, corrected for inflation.
  - Way to measure industry output.
  - Adjusted for city size – value added per capita.
- Industry decline in Miami slightly slower than in comparison cities after 1980.
  - Some evidence of Rybczynski Theorem.

# 2.5 Movement of labor in the long run – empirics

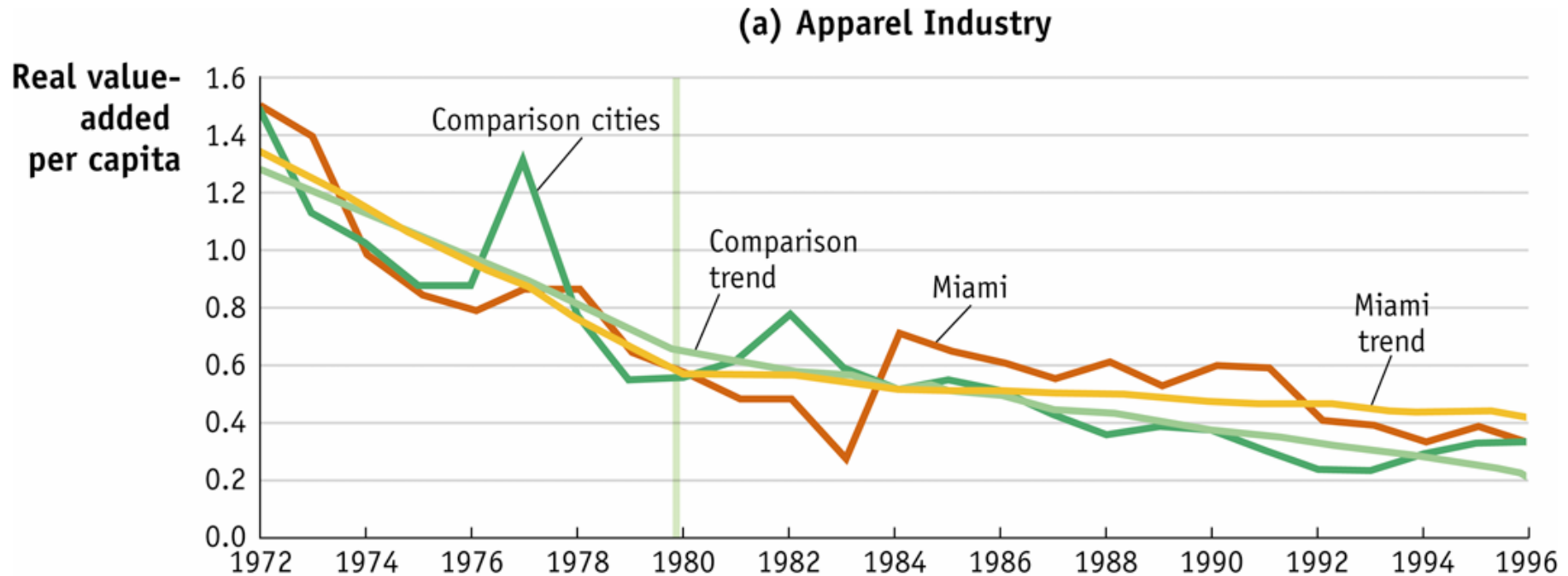


Figure 5.10 (a) Apparel industry value-added

# 2.5 Movement of labor in the long run – empirics

- Figure 5.10 (b) shows output of group of skill-intensive industries.
- These industries fell more rapidly in Miami after 1980.
- Could also be evidence of the Rybczynski Theorem, although there was also decline in population of some more skilled workers at that point.

# 2.5 Movement of labor in the long run – empirics

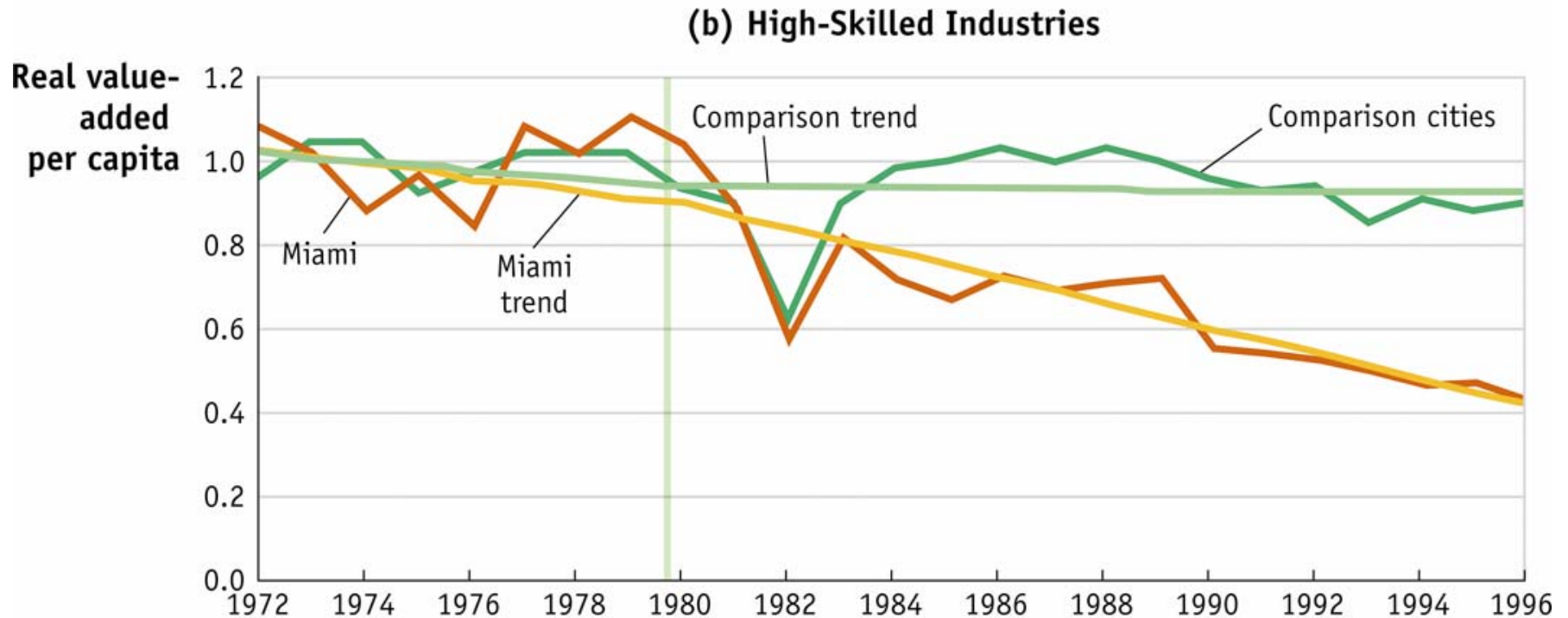


Figure 5.10 (b) High-skilled industries value-added

# 2.5 Movement of labor in the long run – empirics

- Wages unchanged – also from Rybczynski Theorem/ Factor Price Insensitivity?
- During this time, computer use in manufacturing was increasing significantly.
- Increase much slower in Miami than in similar cities.
- One explanation: firms employed Mariel refugees and other low-skilled workers rather than switching to computer technologies.
- Example of how refugees could be absorbed across many industries.

# 2.5 Movement of labor in the long run – empirics

## Immigration and U.S. wages 1990-2004

- There has been slightly more than a doubling of foreign-born persons in the U.S. in 25 years.
- Part A of Table 5.1 reports estimated impact of immigration over 1990-2004 on wages of various workers, distinguished by education level.
- First row in part A is from specific-factors model
  - Greatest impact on workers with less than 12 years of education.
  - Average impact on U.S. wages is -3.2%

# 2.5 Movement of labor in the long run – empirics

- Second row in part A allows capital to grow in each industry to accommodate the inflow of immigrants (similar to long-run model, plus skill levels and changing good prices and wages).
- Total U.S. immigration has a negative impact on only the lowest and highest-educated workers.
- Positive impact on other workers.
- The overall wage rises by 0.3%
- Part B looks at illegal immigration only.
  - Only wages of lowest-educated persons are negatively affected; all other groups gain.

# 2.5 Movement of labor in the long run – empirics

## PERCENTAGE CHANGE IN THE WAGE OF WORKERS WITH EDUCATIONAL LEVEL:

	Less Than 12 Years	12 Years	13–15 Years	16 Years or More	Overall Average
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### Part A: Effect of Total Immigration, 1990–2004

*Method:*

Capital and land fixed	-9.0%	-2.4%	-0.8%	-5.0%	-3.2%
Real return to capital fixed	-4.4	1.0	2.2	-0.2	0.3

### Part B: Effect of Illegal Immigration, 1990–2004

*Method:*

Real return to capital fixed	-7.9	0.8	0.8	0.8	0.1
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Table 5.1 Immigration and wages in the U.S.

# 2.5 Movement of labor in the long run – empirics

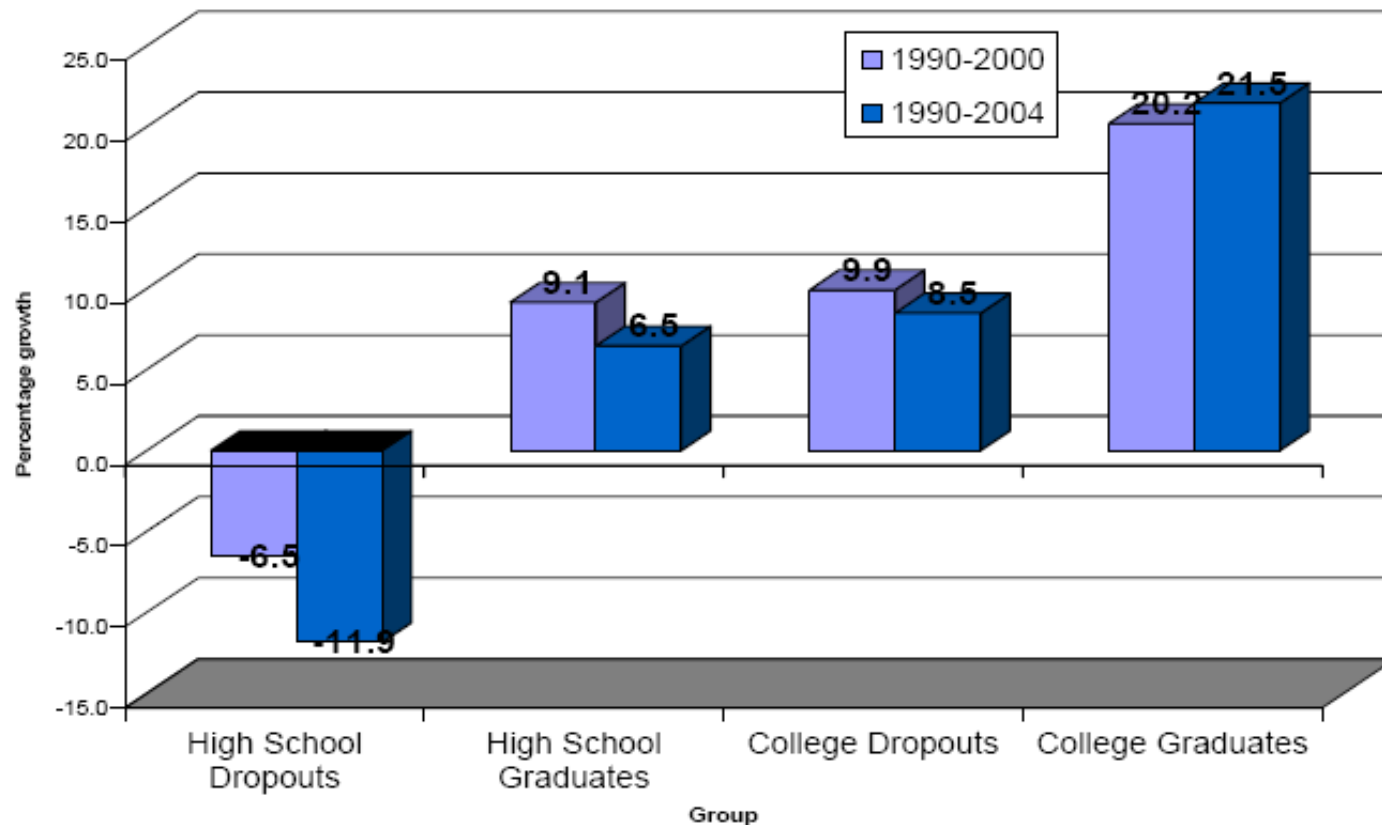


Figure 5.10(z) Growth of Real Yearly Wages of US Natives: 1990-2004  
(Source: Ottaviano & Peri 2006, NBER)

# 3. Movement of capital – FDI

- Capital moves from one country to another through foreign direct investment (FDI).
- U.S. Department of commerce uses 10% rule for FDI.
  - If a foreign country acquires 10% or more of a U.S. firm, that is FDI inflow to the U.S.
  - If a U.S. company acquires 10% or more of a foreign firm then that is FDI outflow from the U.S.
- Greenfield FDI: company builds plant in foreign country.
- Acquisition (brownfield) FDI: firm buys existing foreign plant.
- Capital moving from high-wage to low-wage countries to earn higher rental is traditional view of FDI used here.
  - Focus on greenfield investment/FDI.

# 3. FDI flows: some examples

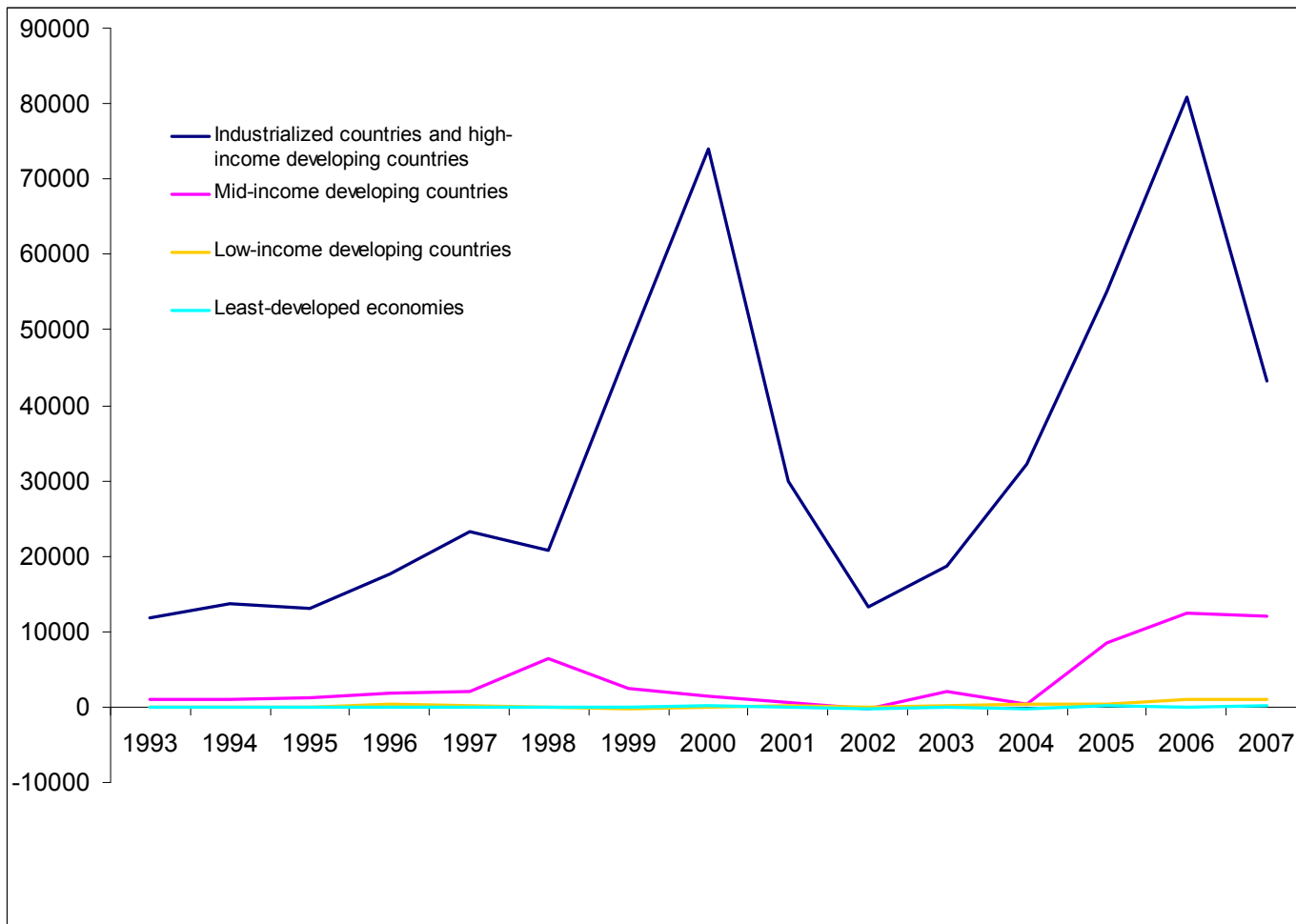


Figure 5.16  
Swiss FDI  
outflows in  
million CHF

# 3. FDI flows: some examples

FDI<sup>a</sup> into the Czech Republic by Country, 2003–2005

	2003		2004		2005	
	\$	%	\$	%	\$	%
<b>WORLD</b>	<b>2101.2</b>	<b>100.0</b>	<b>4974.5</b>	<b>100.0</b>	<b>10989.8</b>	<b>100.0</b>
Europe	1200.4	57.1	4353.3	87.5	10665.3	97.0
EU 15	837.3	39.8	3675.0	73.9	9561.5	87.0
Belgium	-252.9	-12.0	-51.5	-1.0	184.5	1.7
France	679.8	32.4	-175.7	-3.5	219.9	2.0
Italy	72.6	3.5	51.0	1.0	29.1	0.3
Germany	162.7	7.7	757.7	15.2	1114.5	10.1
The Netherlands	-1056.0	-50.3	2002.0	40.2	1984.7	18.1
Austria	484.0	23.0	439.1	8.8	459.4	4.2
United Kingdom	635.4	30.2	18.8	0.4	231.1	2.1
Sweden	-49.2	-2.3	-32.1	-0.6	290.8	2.6
EFTA	259.5	12.4	239.5	4.8	285.5	2.6
Switzerland	136.2	6.5	184.2	3.7	257.6	2.3
Asia	339.5	4.9	69.1	1.4	166.3	1.5
Japan	328.0	15.6	38.9	0.8	138.1	1.3
America	552.5	26.3	501.5	10.1	154.5	1.4
Canada	131.1	6.2	-123.5	-2.5	-0.5	0.0
United States	153.6	7.3	505.3	10.2	106.8	1.0

<sup>a</sup>In millions, U.S. dollars.

Source: Czech National Bank, <http://www.czso.cz/eng/redakce.nsf/i/yearbooks>

Table 5.6 FDI into Czech Republic by country

# 3. FDI flows: some examples

FDI<sup>a</sup> into the Czech Republic by Sector, 2003–2005

Sectors	2003		2004		2005	
	\$	%	\$	%	\$	%
<b>Total</b>	<b>2101.2</b>	<b>100.0</b>	<b>4974.5</b>	<b>100.0</b>	<b>10989.8</b>	<b>100.0</b>
Agriculture, hunting and forestry, fishing	1.9	0.1	83.4	1.7	5.0	0.0
Mining and quarrying	31.0	1.5	132.0	2.7	52.5	0.5
Manufacturing	2615.1	124.5	1011.7	20.3	1848.0	16.8
Electricity, gas, and water	249.3	11.9	289.5	5.8	147.0	1.3
Construction	153.1	7.3	11.9	0.2	92.7	0.8
Wholesale and retail trade	550.1	26.2	804.5	16.2	630.8	5.7
Hotels and restaurants	103.4	4.9	−65.1	−1.3	−57.2	−0.5
Transportation, storage, and communication	−2911.0	−138.5	269.8	5.4	4961.4	45.1
Financial intermediation	891.0	42.4	764.0	15.4	1301.9	11.8
Real estate	439.6	20.9	1643.7	33.0	1942.0	17.7

<sup>a</sup>In millions, U.S. dollars.

Source: Czech National Bank, <http://www.czso.cz/eng/redakce.nsf/i/yearbooks>

Table 5.7 FDI into Czech Republic by sector

# 3.1 Movement of capital – FDI in the short run

## FDI in the short run: Specific-Factors Model

- Manufacturing uses capital and labor.
- Agriculture uses land and labor.
- As capital moves into the economy, it will be used in manufacturing.
- Additional capital will raise the marginal product of labor in manufacturing.
  - Therefore it will shift out the curve  $P_M MPL_M$  in Figure 5.11a.

# 3.1 Movement of capital – FDI in the short run

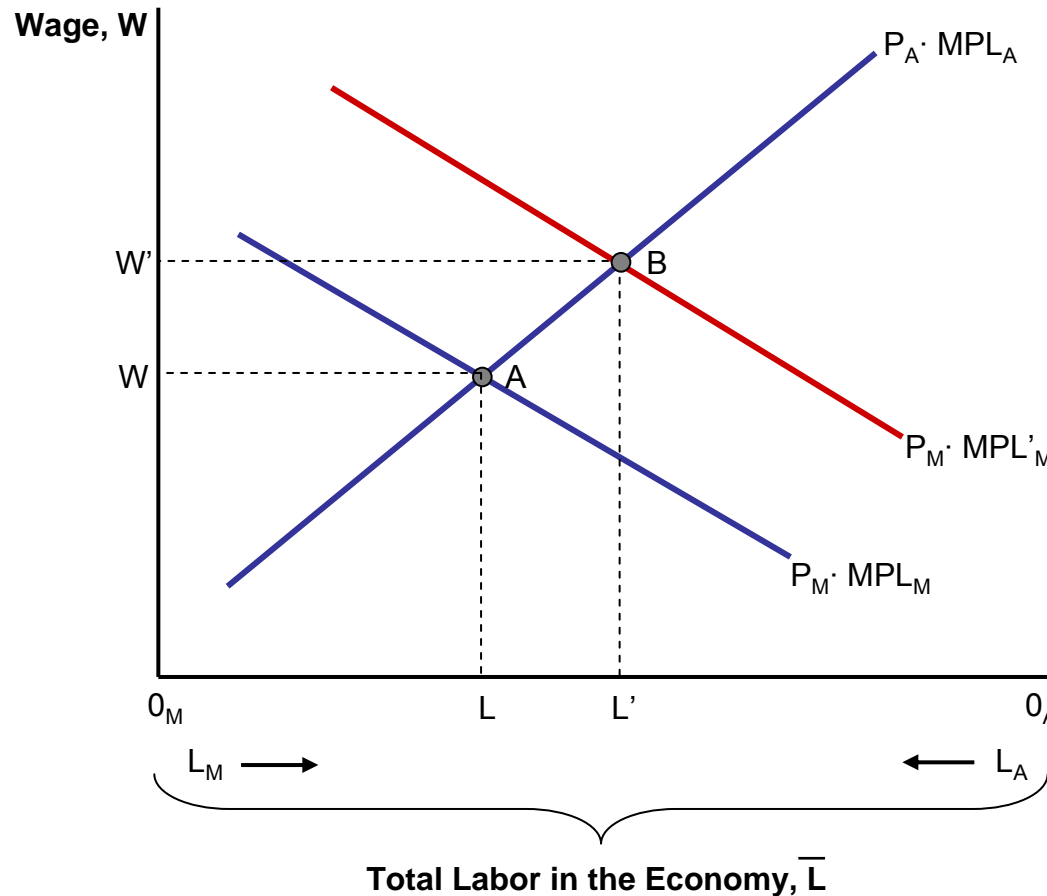


Figure 5.11(a) Increase of capital stock in the short run – effect on labor allocation and wage

# 3.1 Movement of capital – FDI in the short run

## Effect of FDI on Wage

- Equilibrium wage increases from  $W$  to  $W'$ .
- More workers are drawn into manufacturing.
- Labor in agriculture shrinks.

## Effect of FDI on the industry outputs (Figure 5.11(b))

- Land unchanged, so output of agriculture must fall.
- Since labor and capital increase in manufacturing, output must increase.
- No change in prices of goods.
- As PPF increases, equilibrium shifts to B.

# 3.1 Movement of capital – FDI in the short run

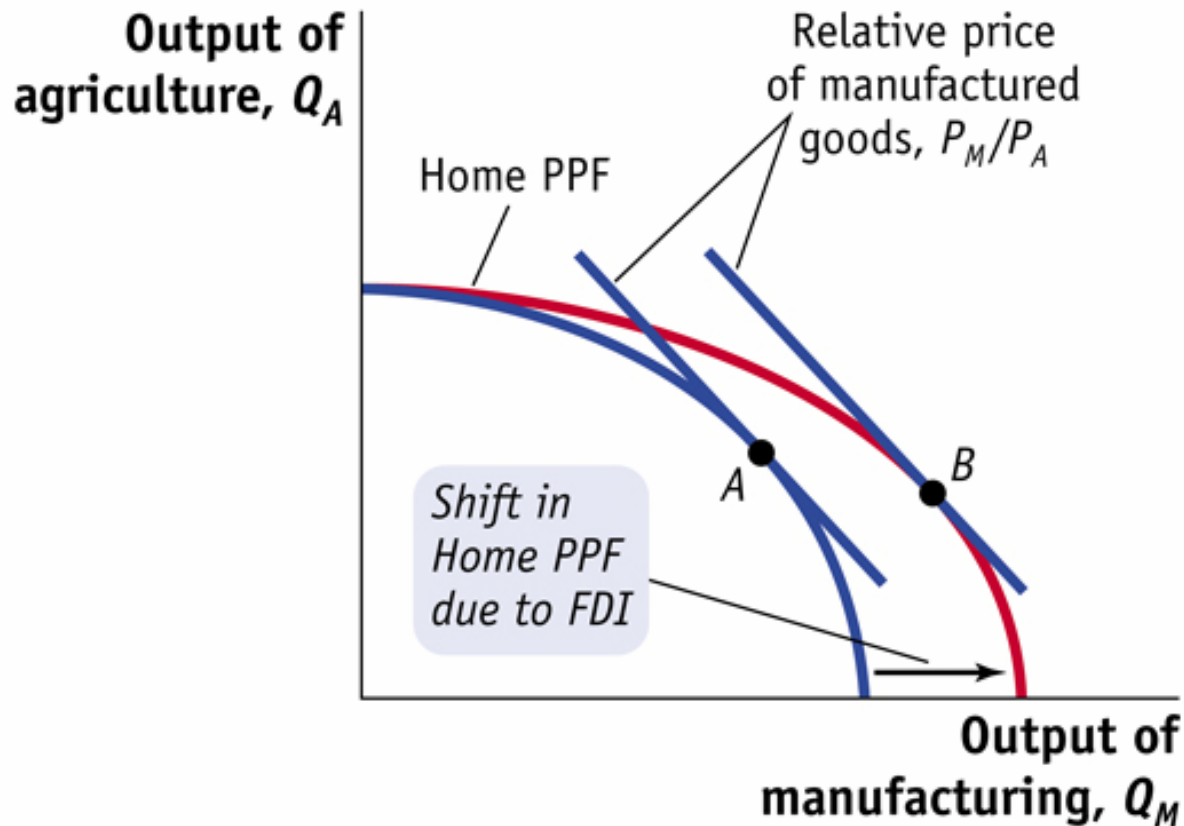


Figure 5.11(b) Increase in the capital stock in the short run – effect on industry outputs

# 3.1 Movement of capital – FDI in the short run

## Effect of FDI on rentals

- Fewer workers employed in agriculture, each acre of land cannot be used as intensively.
  - Marginal product of land must fall.
  - Rental on land,  $R_T = P_A MPT_A$
  - If  $MPT_A$  falls and  $P_A$  is unchanged,  $R_T$  must fall.
- More capital and labor used in manufacturing
  - $R_K = P_M MPK_M$
  - $MPK_M$  falls due to diminishing returns –  $R_K$  falls.
  - As labor increases  $MPK_M$  rises –  $R_K$  increases
  - Unknown which effect is greater.

# 3.1 Movement of capital – FDI in the short run

## Effect of FDI on rentals (cont'd)

- Use another method for calculating rental on capital.
  - Revenue earned in manufacturing minus payments to labor.
  - If wages are higher, and all else is the same, there must be reduced amount of funds left over as earnings of capital, so rental is lower.
  - Start at original equilibrium point A in Figure 5.12.
    - Assume capital stock expands from FDI.
    - Wages are held constant.
    - Labor used in manufacturing expands to point C.
    - The only way MPL can be constant is if each worker has same amount of capital to work with.
    - Capital-labor ratio for manufacturing identical at A and C— therefore  $MPK_M$  must also be equal
    - Rental on capital is also equal at A and C.

# 3.1 Movement of capital – FDI in the short run

- What happens when manufacturing wage increases while capital is constant in that sector?
  - Move from C to B.
  - As wage rises, less labor is used in manufacturing.
  - With less labor on each machine, MPK and  $R_K$  must fall.
  - Because rental on capital is same at A and C but lower at B than C, overall short-run effect of FDI inflow is to reduce rental on capital.
  - Since FDI inflow also reduces rental on land, both rentals fall.

# 3.1 Movement of capital – FDI in the short run

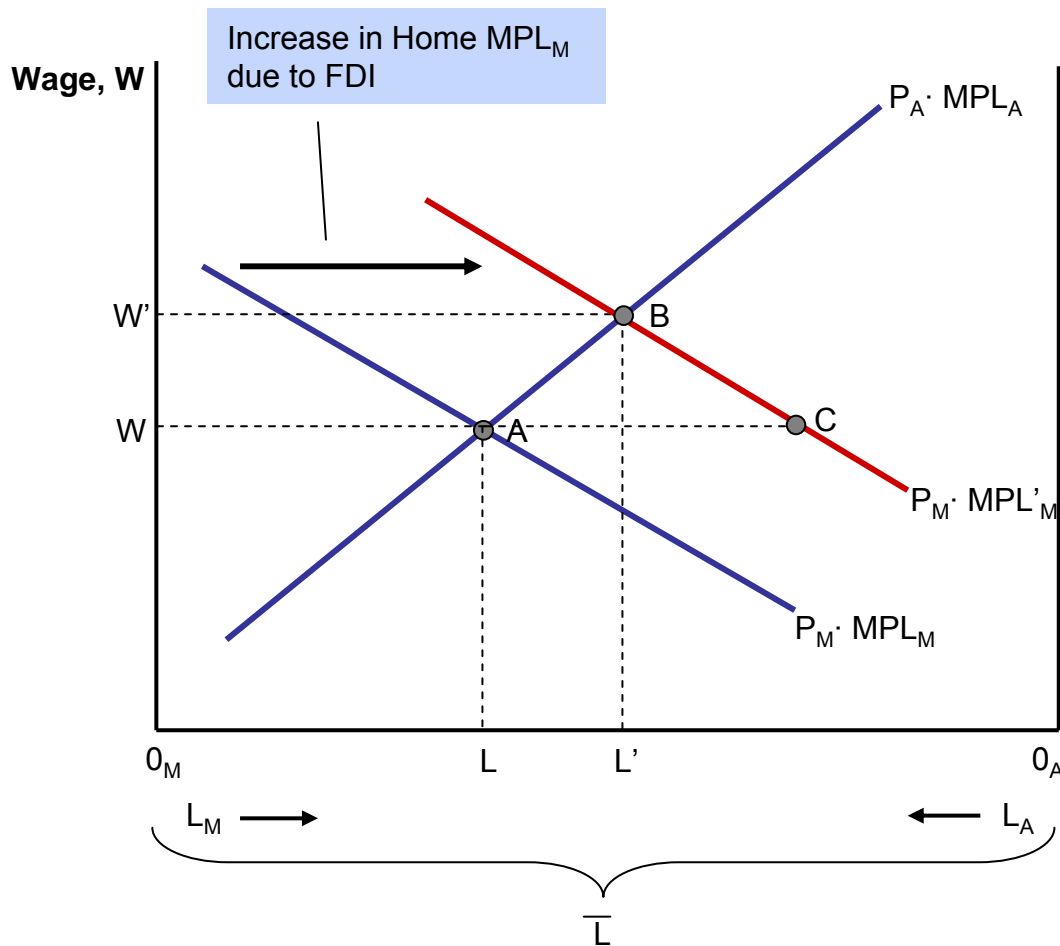


Figure 5.12 Effect of increase in capital stock on rental on capital

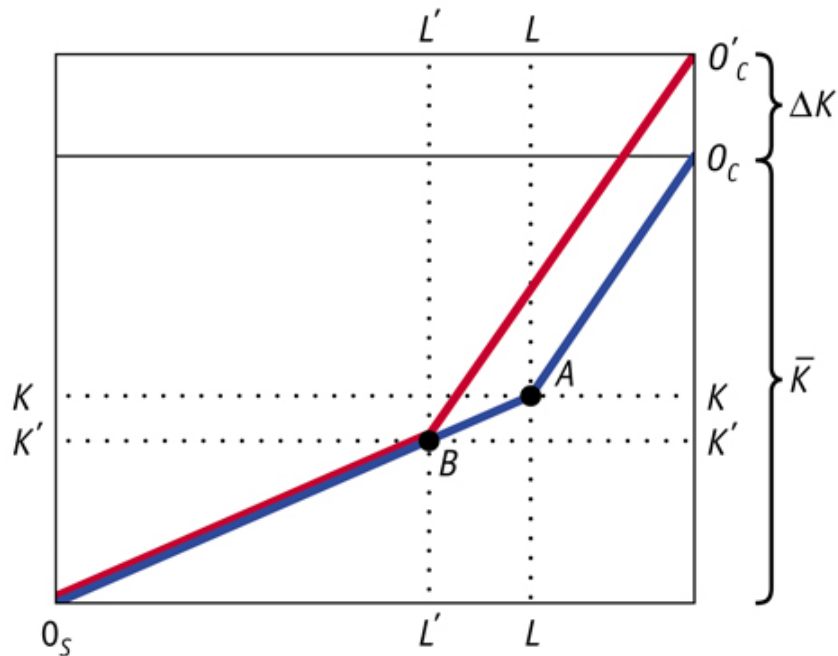
# 3.2 Movement of capital – FDI in the long run

## FDI in the long run: expanded HO Model

- Same assumptions as before.
  - Two industries, computers and shoes, with two factors, labor and capital.
  - Computers are capital intensive and shoes are labor intensive.
  - Figure 5.13(a) shows initial allocation of labor and capital at point A.
  - Amount of labor and capital used in each industry produces output of shoes and computers shown by point A on PPF in Figure 5.13(b).

# 3.2 Movement of capital – FDI in the long run

(a) Effect on the Allocation of Labor and Capital



(b) Effect on Industry Outputs

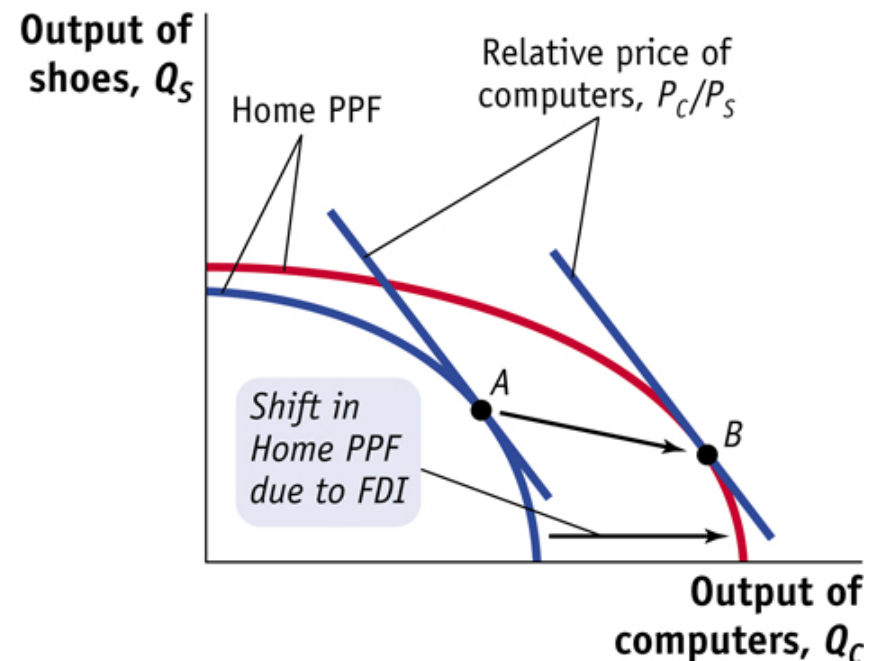


Figure 5.13 Increase in the capital stock in the long run

# 3.2 Movement of capital – FDI in the long run

Effect of FDI on outputs and factor prices

- Capital increase due to FDI.
- Box panel sides expand with new origin at  $O'_C$
- $O_S B$  is shorter than  $O_S A$ : less labor and capital used in production of shoes, output falls.
- $O_C B$  is longer than  $O_C A$ : more labor and capital used, output of computers rises.
- Change in output is from point A to B in panel (b).

## 3.2 Movement of capital – FDI in the long run

- Rybczynski Theorem: increase in capital through FDI increased output of capital-intensive industry, reduced output of labor-intensive industry.
- Change in output achieved with no change in the capital labor ratios in either industries
  - $O_C'B$  and  $O_S'B$  same slopes as  $O_C'A$  and  $O_S'A$ .
- Because capital-labor ratios are unchanged, wage and rental on capital also unchanged.
- In long-run model, an inflow of *either* factor of production will leave factor prices unchanged.

# 3.3 Movement of capital – empirics for FDI in the long run

- For immigration, there are actual cases where wages were reduced (short run) and where wages were constant (long run). Fewer studies for FDI.

## Effect of FDI on wages and rentals in Singapore

- Singapore has encouraged foreign firms to establish subsidiaries within its borders, especially in the electronics industry.
- Singapore has fourth-largest amount of FDI in the world.
- As capital in Singapore has grown, what has happened to the rental and the wage?

# 3.3 Movement of capital – empirics for FDI in the long run

- Table 5.2, part A, shows real rental and wages with MP.
  - MPK has fallen due to diminishing returns.
  - Each worker has more capital, so MPL increases.
  - These are consistent with specific-factors model.
- 2nd approach to calculating rental on capital (panel B).
  - If capital were rented instead of purchased, what would the rental be?
  - Rental agency makes same rate of return on renting capital equipment as investing elsewhere.
  - If it invests  $P_K$  at interest rate  $i$ , could expect  $P_K i$
  - Also consider depreciation on capital  $d$ .
  - Real rental is:

$$\frac{R}{P} = \frac{P_K}{P} (i + d)$$

# 3.3 Movement of capital – empirics for FDI in the long run

- Table 5.2(b) with real wage computed from actual wages paid in Singapore.
  - Real wages grow over time; not expected from long-run model.
- This is an indication of productivity growth
  - Leads to increase in the MPL and in the real wage.
- In (b) productivity growth positive, but in (a) negative.
  - Average growth in real wage and real rental rising in part B.
  - In part A average growth in real wage and real rental zero or negative—no productivity growth.

# 3.3 Movement of capital – empirics for FDI in the long run

	ANNUAL GROWTH RATE (%)		
	Real Rental	Real Wages	Implied Productivity
<b>Part A: Using Production Function and Marginal Products</b>			
<i>Time Period:</i>			
1970–1980	-5.0%	2.6%	-1.5%
1980–1990	-1.9	0.5	-0.7
1970–1990	-3.4	1.6	-1.1
<b>Part B: Using Calculated Rental and Actual Wages</b>			
<i>Interest Rate Used and Time Period:</i>			
Bank lending rate (1968–1990)	1.6	2.7	2.2
Return on equity (1971–1990)	-0.2	3.2	1.5
Earnings-price ratio (1973–1990)	-0.5	3.6	1.6

Table 5.2 Real rental and wages in Singapore

# 3.3 Movement of capital – empirics for FDI in the long run

- Idea that Singapore might have no productivity growth contradicts what many believe about its economy and that of other fast-growing Asian countries.
- If no productivity growth then all growth due to capital accumulation; FDI has no spillover benefits.
- Positive productivity growth indicates that free-market policies pursued by Singapore stimulated innovations.
  - Higher productivity and lower costs.
- Most believe that productivity increased; challenged by part A.
- Which scenario is correct is a source of debate for economists.

# 4. Gains from labor and capital flows

- Foreign investment and immigration are both controversial policy issues.
- Most countries controlled FDI at some point.
- Almost all countries (still) impose limits on immigration.
  - Ex. U.S. immigration controls since Quota Law of 1921; EU limits on immigration from new members; Swiss immigration quotas for non-EU citizens, etc.
- Why is immigration so controversial?
  - Some groups oppose spending of public funds on immigration.
  - Other groups fear the competition for jobs created by an inflow of workers.

# 4. Gains from labor and capital flows

- Does immigration provide overall gain to host country, not including gains to immigrants themselves?
- Are there overall gains to the destination country, in the same way as overall gains from trade?
- Immigration benefits host country in specific-factors model.
- If immigrant earnings with Foreign income are included then emigration benefits the Foreign country, too.
- Inflow of capital benefits the host country, not including extra earning of foreign capital.
- If we count those extra earnings, then FDI also benefits the source country for the capital.

# 4.1 Gains from immigration

- Use specific-factors model to measure gains from immigration.
- Look at total world labor with the Home and Foreign labor together:  $\bar{L} + \bar{L}^*$
- Figure 5.14: Home workers measured from left and Foreign workers from right on horizontal axis.

## Wages at Home and Abroad

- As immigrants enter Home country, wage falls.
- Downward-sloping line—Home wage:  $W$  at point A.
- Foreign workers enter and labor force grows—Home wage reduced to  $W'$  at B.

# 4.1 Gains from immigration

## Wages at Home and Abroad (cont'd)

- Same for Foreign: wage at  $W^*$  at point  $A^*$ .
- Labor force in Foreign shrinks and wage rises:  $W'$  at point B.
- Point B is equilibrium with full migration.
- Wages are equalized at  $W'$ .
- Equilibrium with full migration reached only in very long run.
- Has this migration benefited the workers (not including the immigrants) in the Home country?
- Has migration benefited the Foreign country, including the migrants?

# 4.1 Gains from immigration

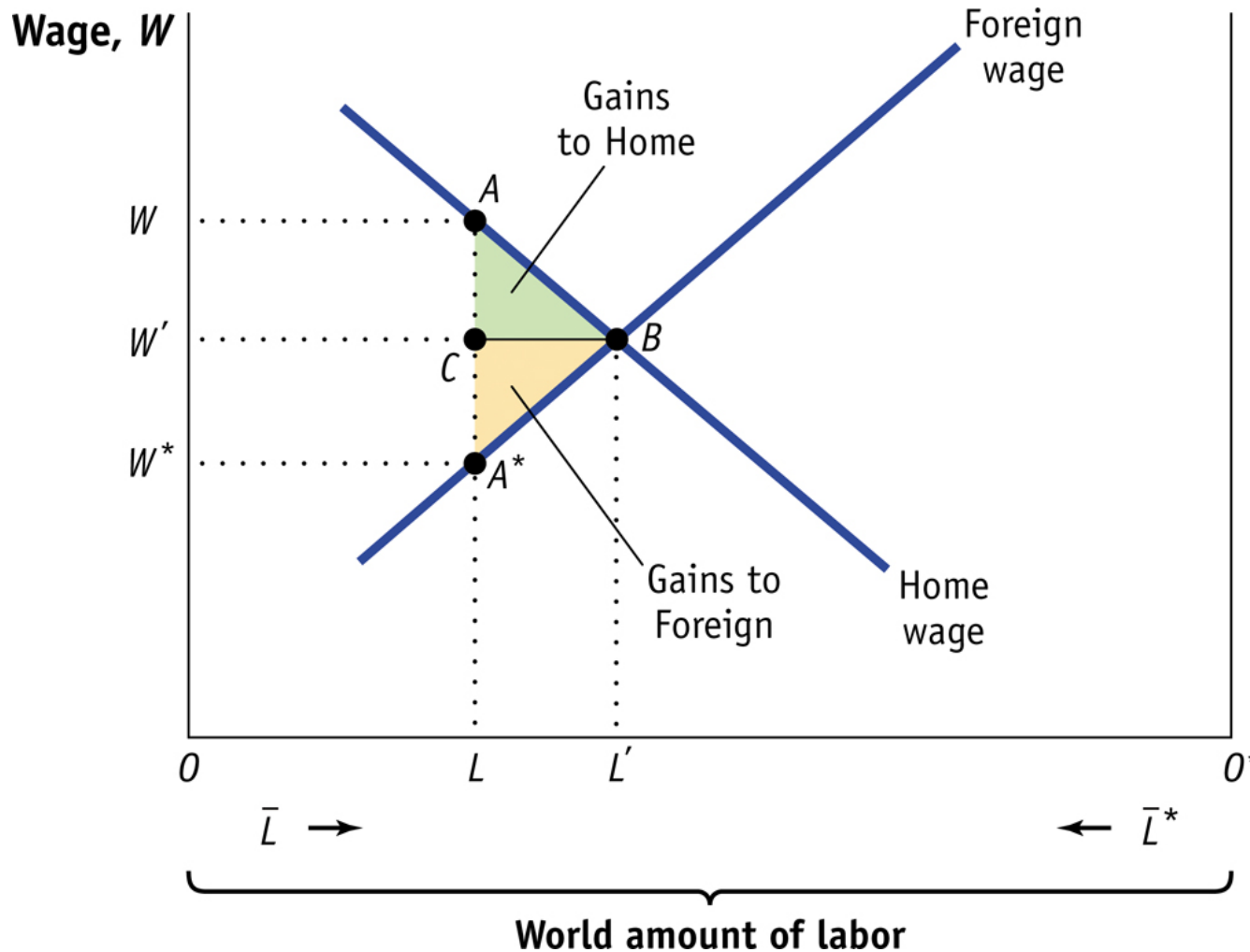


Figure 5.14  
World labor  
market

# 4.1 Gains from immigration

## Gains for the Home Country

- Measure the contribution of each Foreign worker to the output of one good or the other in that country.
  - Home Wage =  $MPL * P$
  - First Foreign worker to migrate has marginal product equal to the Home wage ( $W$  at point A).
  - As more Foreign workers migrate, the MPL falls due to diminishing returns.
  - The immigrants' marginal product is measured by the wage which falls from  $W$  to  $W'$ .

# 4.1 Gains from immigration

Gains for the Home country (cont'd)

- At equilibrium point B, all Foreign immigrants are paid Home wage of  $W'$ .
- Even though all workers are paid same wage, the first worker had MPL equal to  $W$ .
- Each additional worker had the MPL equal to some point between  $W$  and  $W'$ .
- The last worker has an  $MPL = W'$ .
- So there has been a gain in production for every worker up to the very last worker.
- The output of goods in the Home economy *exceeds* the wage that they are paid.

# 4.1 Gains from immigration

Gains for the Home country (cont'd)

- Difference between marginal products of workers and wage paid is gain for the Home economy.
- Adding up all gains from the Foreign workers, we get triangle ABC.
  - Home gains due to full immigration.

# 4.1 Gains from immigration

## Gains for the Foreign Country

- Include wages received by emigrants when calculating Foreign income (often returned to families – remittances, see textbook estimates).
- Even if wages are not sent back, we still incorporate them in the measure of Foreign income since that is where the migrants originally came from.
- Foreign Wage  $W^* = MPL * P$ .
- As foreign workers emigrate, MPL in Foreign rises, Foreign wages rise from  $W^*$  to  $W'$ .
- Each higher marginal product or wage, between  $W^*$  and  $W'$ , equals drop in foreign output from workers leaving.

# 4.1 Gains from immigration

## Gains for the Foreign Country (cont'd)

- Wage Foreign workers earn in Home is higher than their Foreign marginal products of labor: between  $W^*$  and  $W'$ .
- Difference between wage earned by the migrants and their Foreign marginal products is the gain to Foreign.
- Adding up all the gains to foreign immigrants we obtain triangle  $A^*BC$ .
  - This gain represents earnings of the emigrants over and above the drop in output that occurs when they leave Foreign.

# 4.1 Gains from immigration

## World Gains from Migration

- Combining gains to Home and Foreign we obtain the triangular region  $ABA^*$ , world gains from migration.
- We can measure the area of this triangle but we need to know the difference in wages before any migration and the number of people who would migrate.
- One way to think about world gains from migration is that it equals the *increase in world GDP due to immigration*.
- We can then say the difference between the Home and Foreign wages equals the net increase in world GDP due to migration (triangle  $ABA^*$ ).

# 4.1 Gains from immigration

## World Gains from Migration (cont'd)

- In practice, however, there are other costs that immigrants bear which would make the gains from immigration less than the increase in world GDP (see textbook estimates).
- These costs must be subtracted from the increase in GDP in order to obtain the net gains.

## 4.2 Gains from immigration - empirics

- How large are gains from migration?
- Estimates shown in first row of Table 5.5.
- Net gains to U.S. equal increase in U.S. GDP.
- Different studies have been done to estimate these gains from migration.
- Each row of Table 5.5 shows different estimate and study.

# 4.2 Gains from immigration - empirics

Amount of Immigration  
(% of Home labor)      Increase in GDP (%)

## Part A: Calculation of Home Gains

*Study used*

Borjas (1995, 1999), U.S. gains	10%	0.1%–0.4%
Kremer and Watt (2006), Household workers	7	1.2–1.4

## Part B: Calculation of Regional Gains

*Study used*

Walmsley and Winters (2005), From developed to developing countries	3	0.6
Klein and Ventura (2006), Enlargement of the European Union		
After 10 years	0.8–1.8	0.2–0.7
After 25 years	2.5–5.0	0.6–1.8
After 50 years	4.8–8.8	1.7–4.5
Very long run	na	8
Common Labor Market in NAFTA		
After 10 years	1.0–2.4	0.1–0.4
After 25 years	2.8–5.5	0.4–1.0
After 50 years	4.4–9.1	1.3–3.0
Very long run	na	10.5

Table 5.5 Gains from immigration

## 4.3 Gains from FDI

### Gains from Foreign Direct Investment

- Similar to gains from immigration.
- Figure 5.15 shows world amount of capital on the horizontal axis:  $\bar{K} + \bar{K}^*$
- Rental earned in each country is on vertical axis.
- Home rental is  $R$ , at point  $A$ .
- Foreign rental  $R^*$  at point  $A^*$ .
- Foreign rental is higher than Home so capital will flow from Home to Foreign.

## 4.3 Gains from FDI

### Gains from Foreign Direct Investment (cont'd)

- As capital enters Foreign, marginal product of capital and rental will fall.
- As capital leaves Home, marginal product and rental will rise.
- Equilibrium with full capital flows at B, where rentals are equal at  $R'$ .
- Gains to Home from capital outflow is triangle ABC.
- Gains to Foreign is triangle  $A^*BC$ .
- World gains are  $A^*BA$ .

# 4.3 Gains from FDI

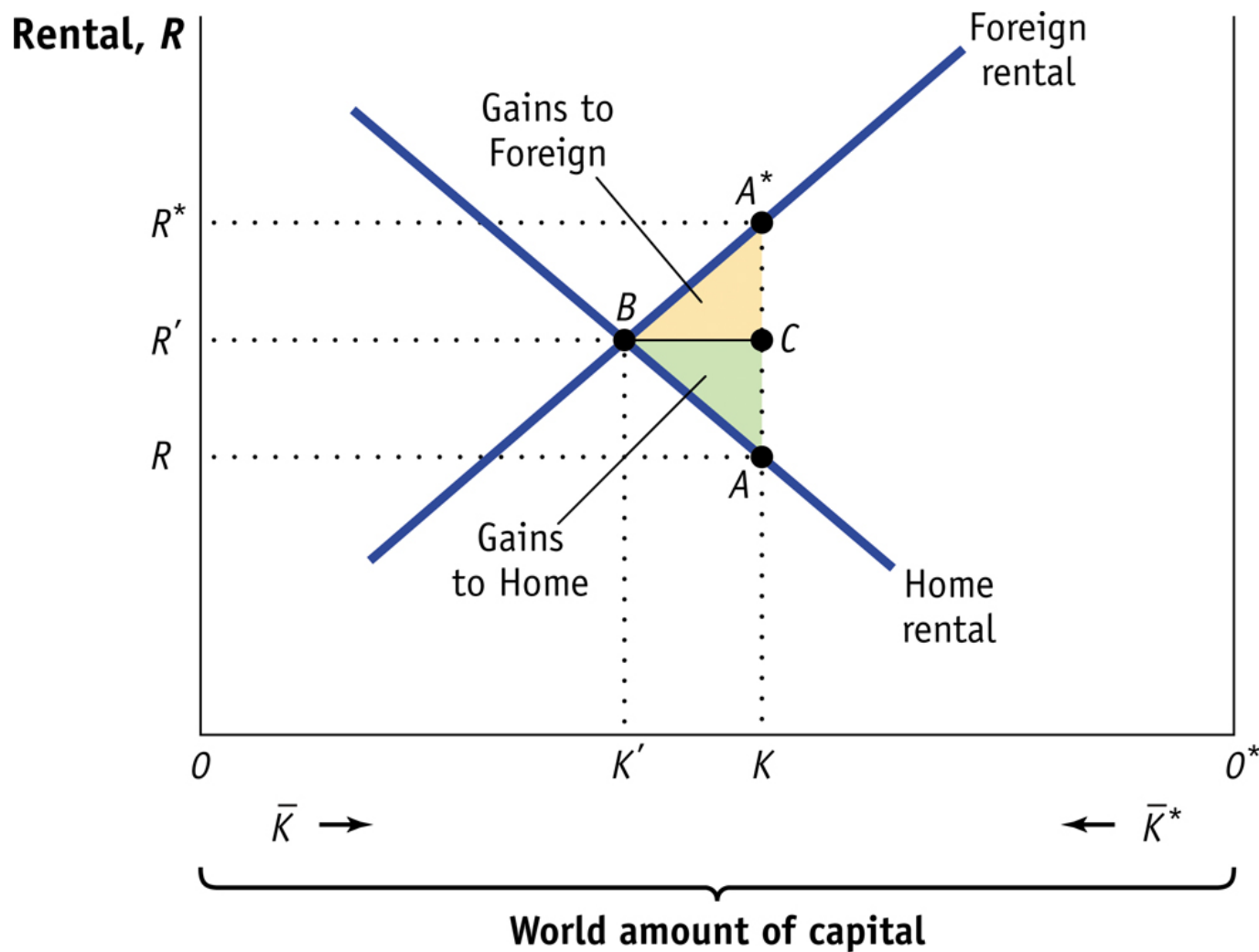


Figure 5.15  
World capital  
market

# 4.4 FDI flows during the financial crisis

## The fallout from the financial crisis: implications for FDI to developing countries

- With capital account liberalization, FDI has become major source of capital inflow for many developing countries, for example in Africa (Chad, Mauritania, Sudan, Zambia, ...).
- FDI generally viewed as more stable source of external financing than private debt and portfolio equity flows.
  - Less vulnerability of current account deficits (i.e. when country is net borrower) to external financing difficulties because FDI more long-term.

# 4.4 FDI flows during the financial crisis

- Some components of FDI more easily changed or reversed than others. Example: reinvested earnings and intra-company loans.
- FDI tends to be pro-cyclical (though less so than other private capital flows): FDI outflows from OECD countries correlated with economic growth in home and destination countries.

Positive note:

- FDI usually picks up faster after a crisis than other forms of cross-border capital flows.

# 4.4 FDI flows during the financial crisis

- Profit remittances by parent companies can be „expensive“, especially for developing countries: in 2005 profit remittances higher than new FDI inflows for low-income countries. Example: in Chile remittances in 2007 equal to \$21.7 billion or 13.3 percent of GDP.
- Private remittances (private capital inflows) are major source of foreign exchange and household support in African countries; sharp decline expected for 2009.

# 4.4 FDI flows during the financial crisis

- In 2008, FDI flows fell 14% overall, with inflows contracting by 35% and outflows by 19%; in 2009 they fell by another 30-40%.
  - Emerging and developing economies started feeling crisis in 2009, while 2008 still saw slightly positive FDI inflows.
- Around 80% of FDI flows in OECD and 30-35% overall due to international mergers & acquisitions (M&A) → partially dried up as firms faced credit difficulties („fire sale“ FDI aside).
  - Developing countries hard hit by large decline in investments in resource sector: many projects canceled or delayed.

# 4.4 FDI flows during the financial crisis

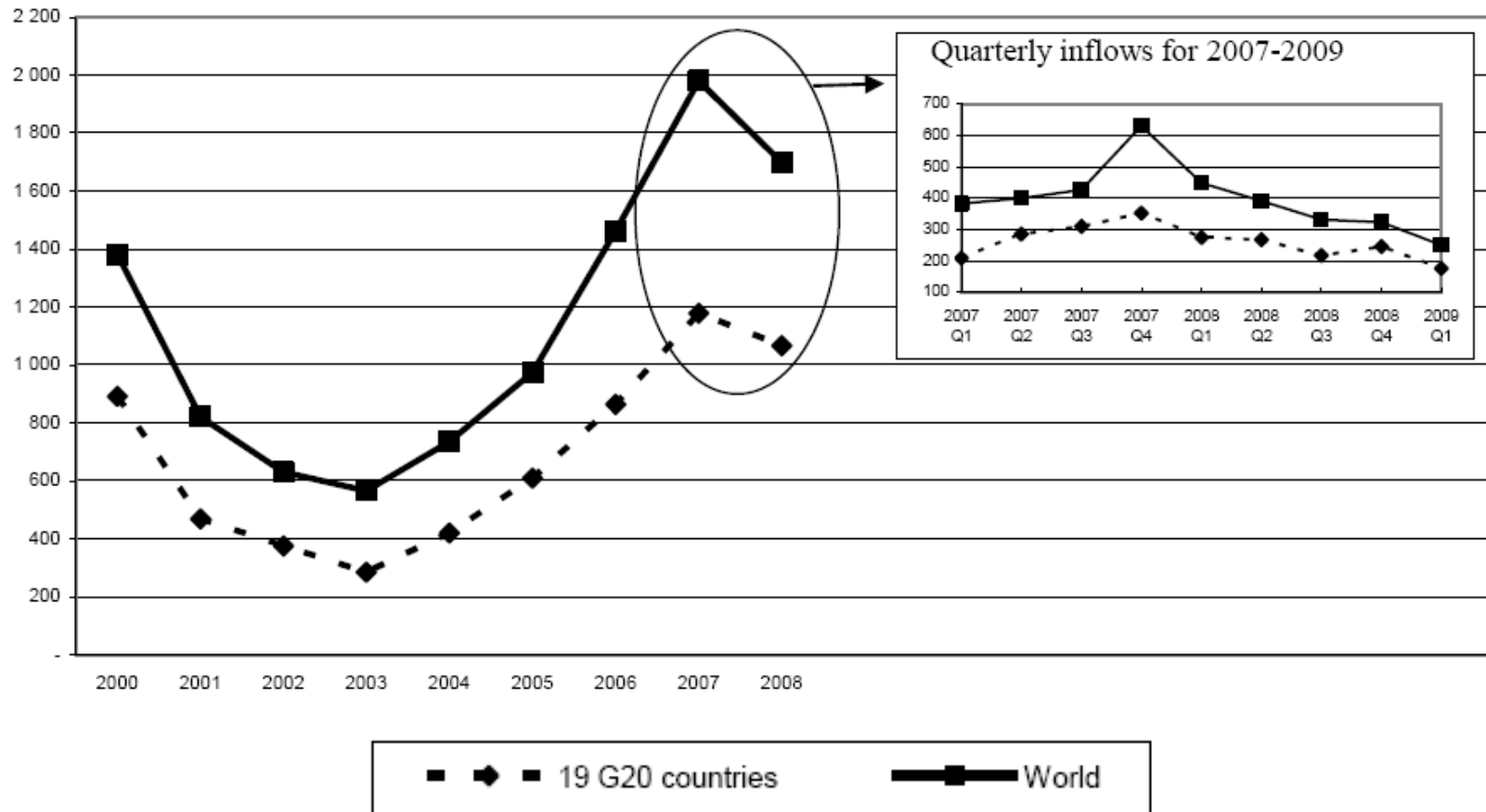


Figure 5.17 FDI inflows in USD million (source: Unctad)

# 4.4 FDI flows during the financial crisis

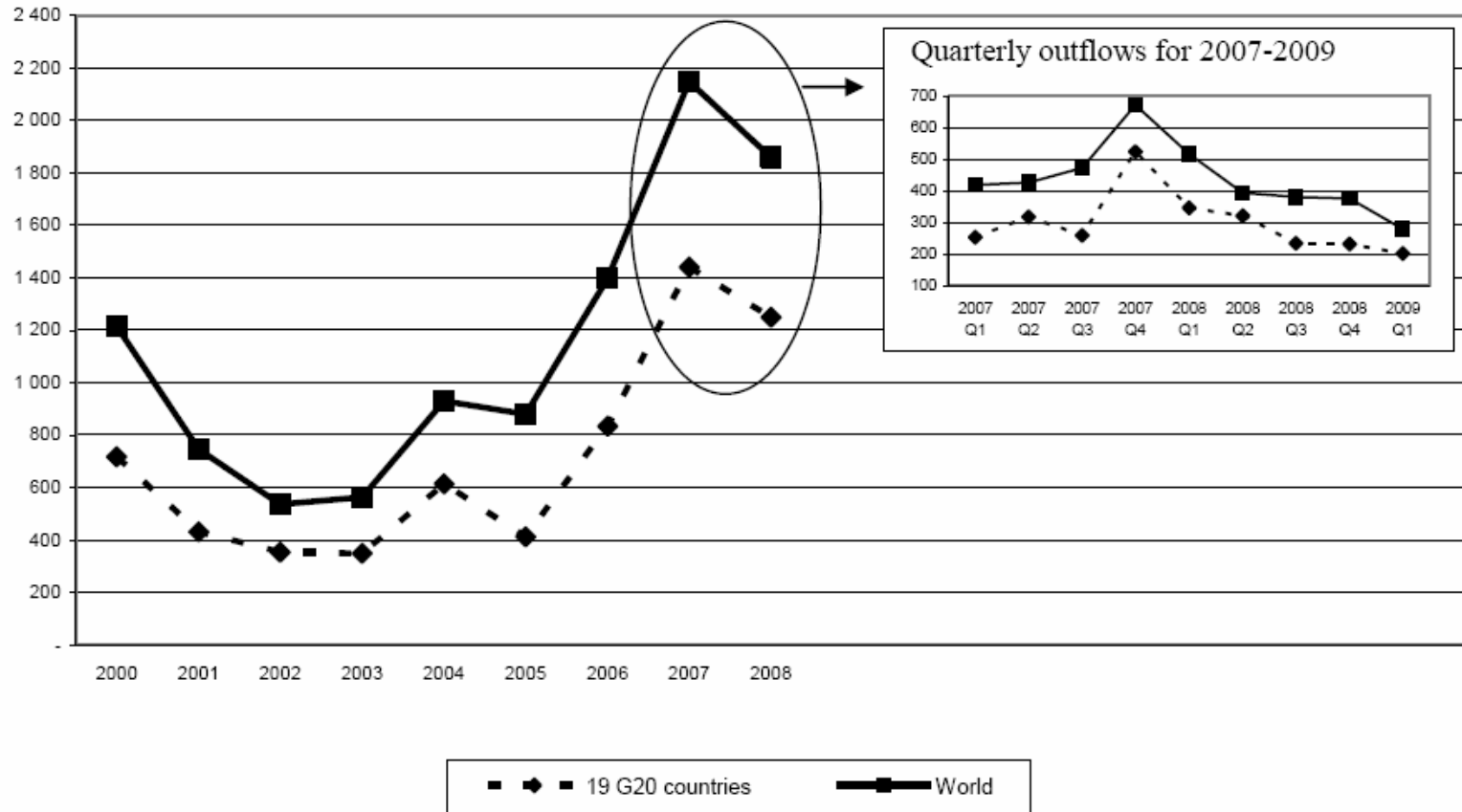


Figure 5.18 FDI outflows in USD million (source: UNCTAD)

# 5. Conclusions

- Immigration potentially affects wages in host country where workers arrive.
- In short-run specific-factors model, a larger supply of workers due to immigration will lower wages.
- The arrival of immigrants is beneficial to owners of capital and land in the specific-factors model.
  - As wages are reduced in the short run the rental on capital and land will rise.
- In the long run, when capital can move between industries, the fall in wage will not occur.
- Industries that use labor intensively can expand, and other industries contract, so that the immigrants become employed without any fall in wages (Rybczynski Theorem).

# 5. Conclusions

- Movement of capital is foreign direct investment (FDI) and has similar effects to immigration.
- In the short run, entry of foreign capital into a country will lower rental on capital, raise wages, and lower rental on land.
- In the long run, when capital and land can move between industries, change in the wage and rental need not occur.
- Industry outputs can adjust according to the Rybczynski Theorem so that the extra capital is fully employed without any change in the wage or rentals.
- Both immigration and FDI create world gains as labor and capital move from countries with low marginal products to countries with high marginal products.