Unit 16
Technological Progress, Unemployment, and Living Standards in the Long Run

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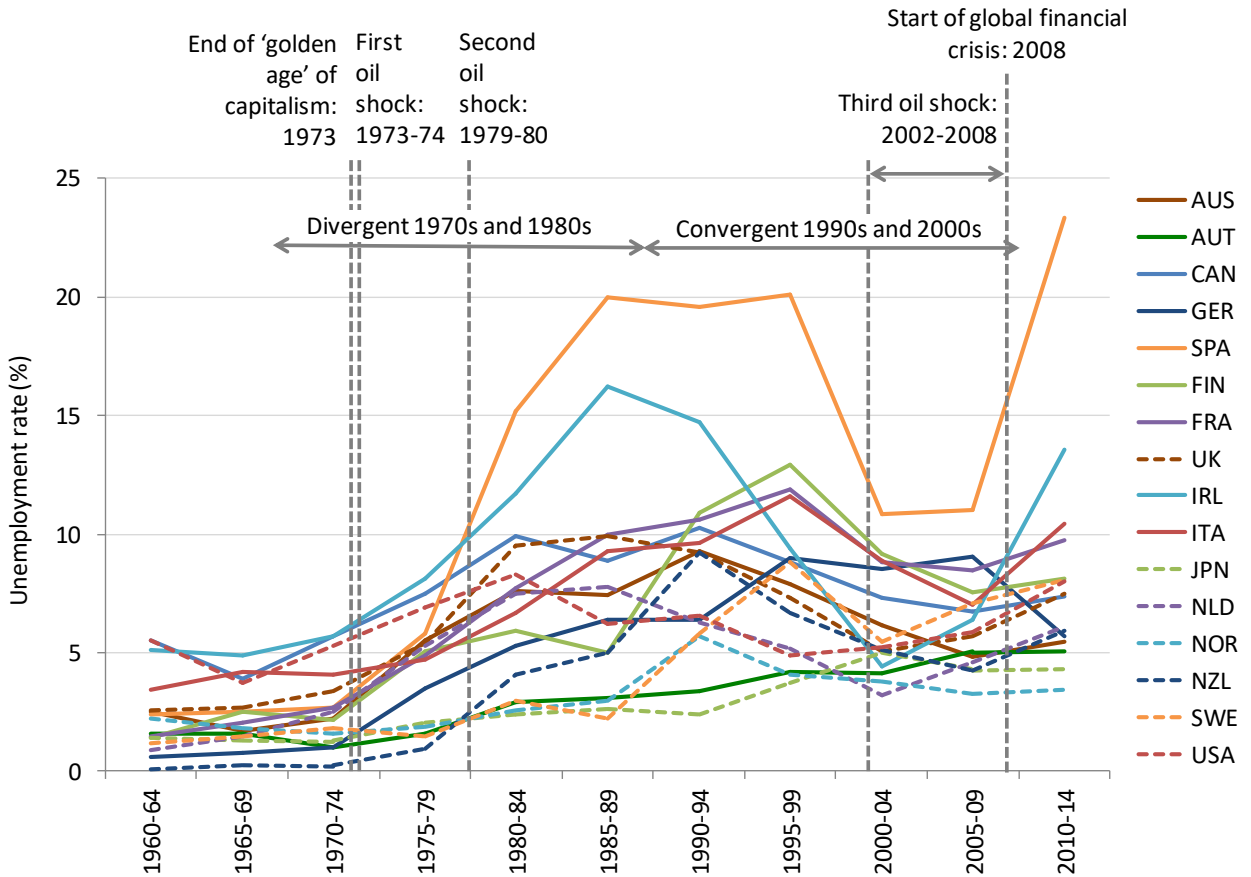
Introduction

Introduction Textbook

- Tech change long-run living standards ↑ yet cause short-run unemployment
- Cross-countries of unemployment cannot be explained by innovation

Figure 16.1. Unemployment rates in selected OECD countries (1960-2014).



How can institutions and policies explain these differences?

Introduction Textbook

- Production has become more capital intensive, without resulting in mass unemployment. How could this outcome occur?

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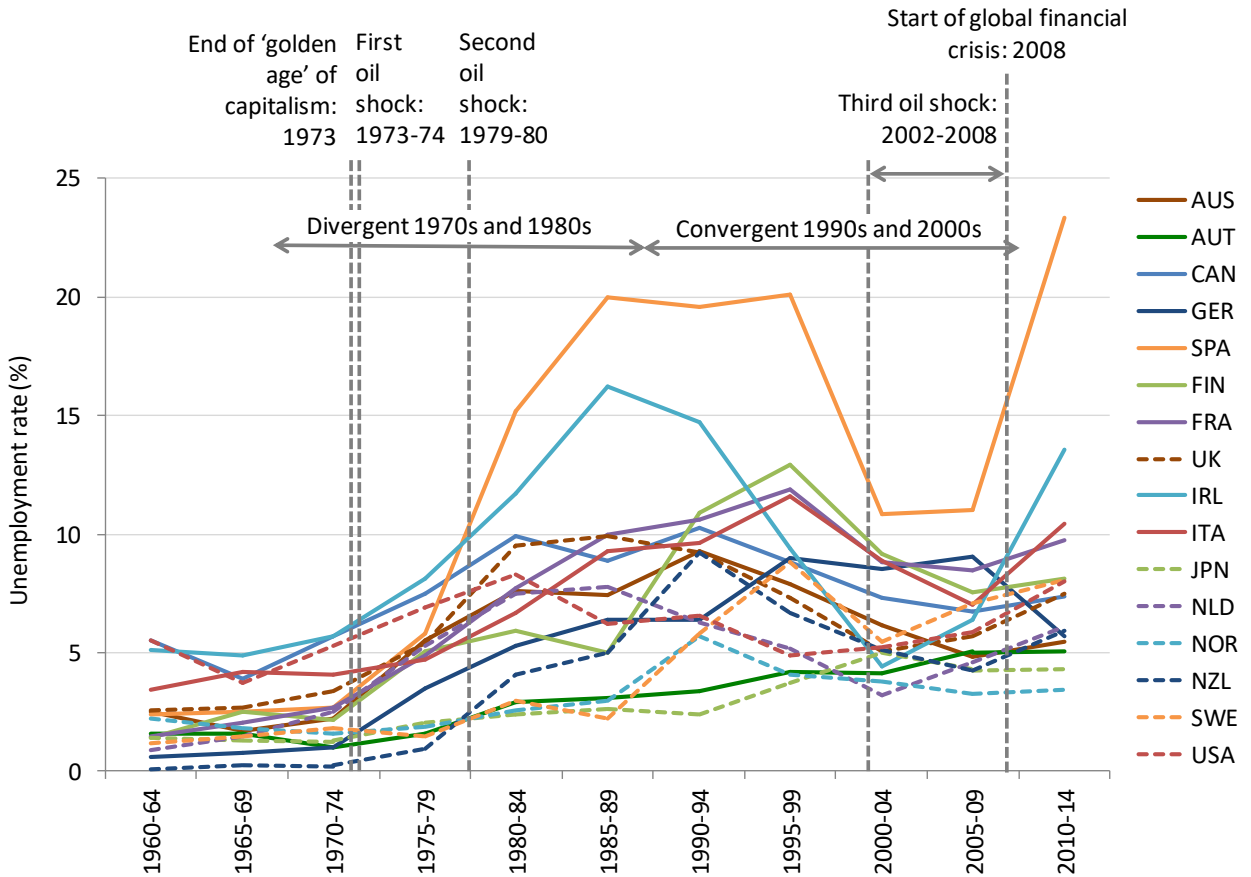
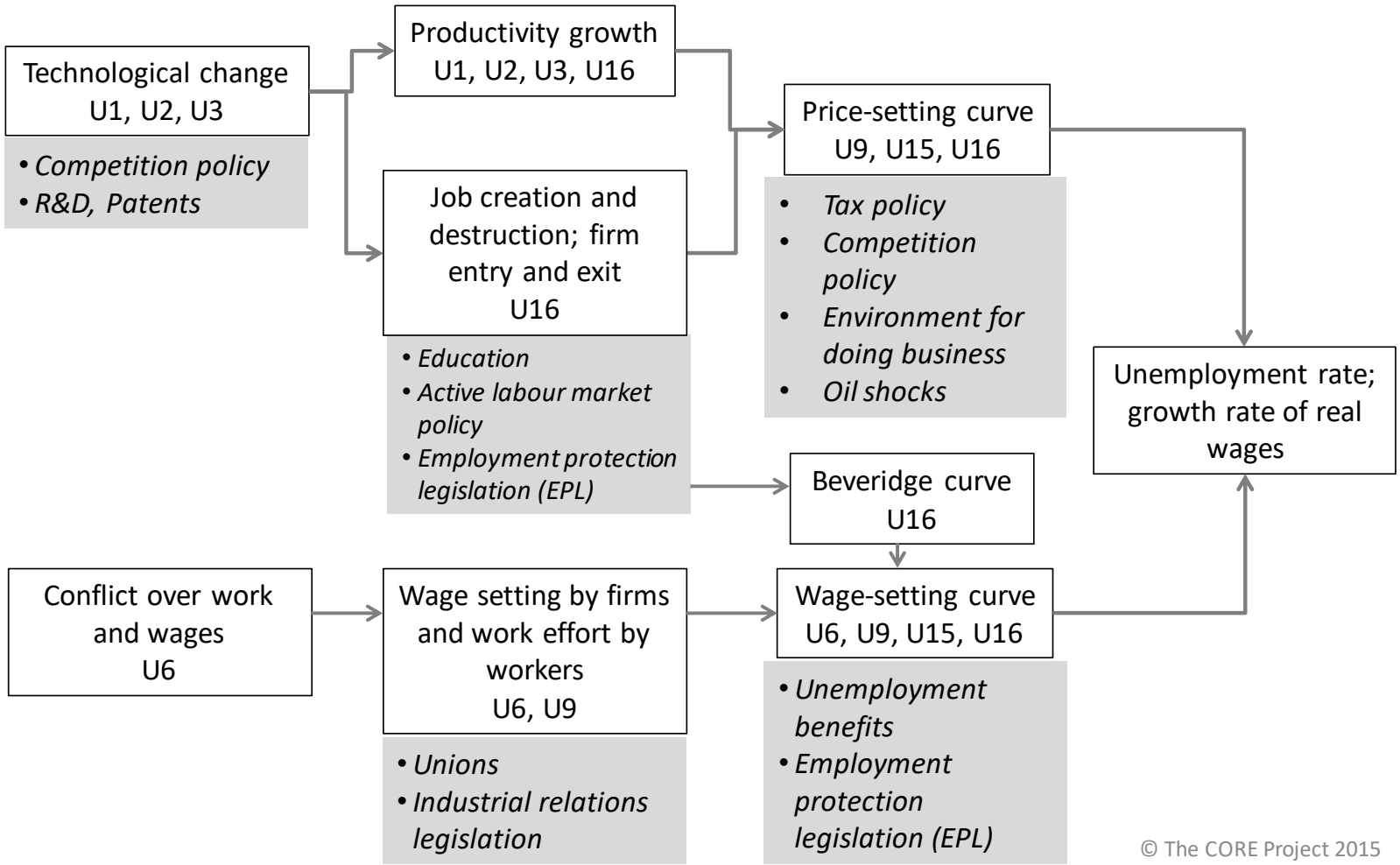


How can institutions and policies explain these differences?

Structure of Units

Figure 16.21. The institutions, policies, and shocks that can influence unemployment and real wages.



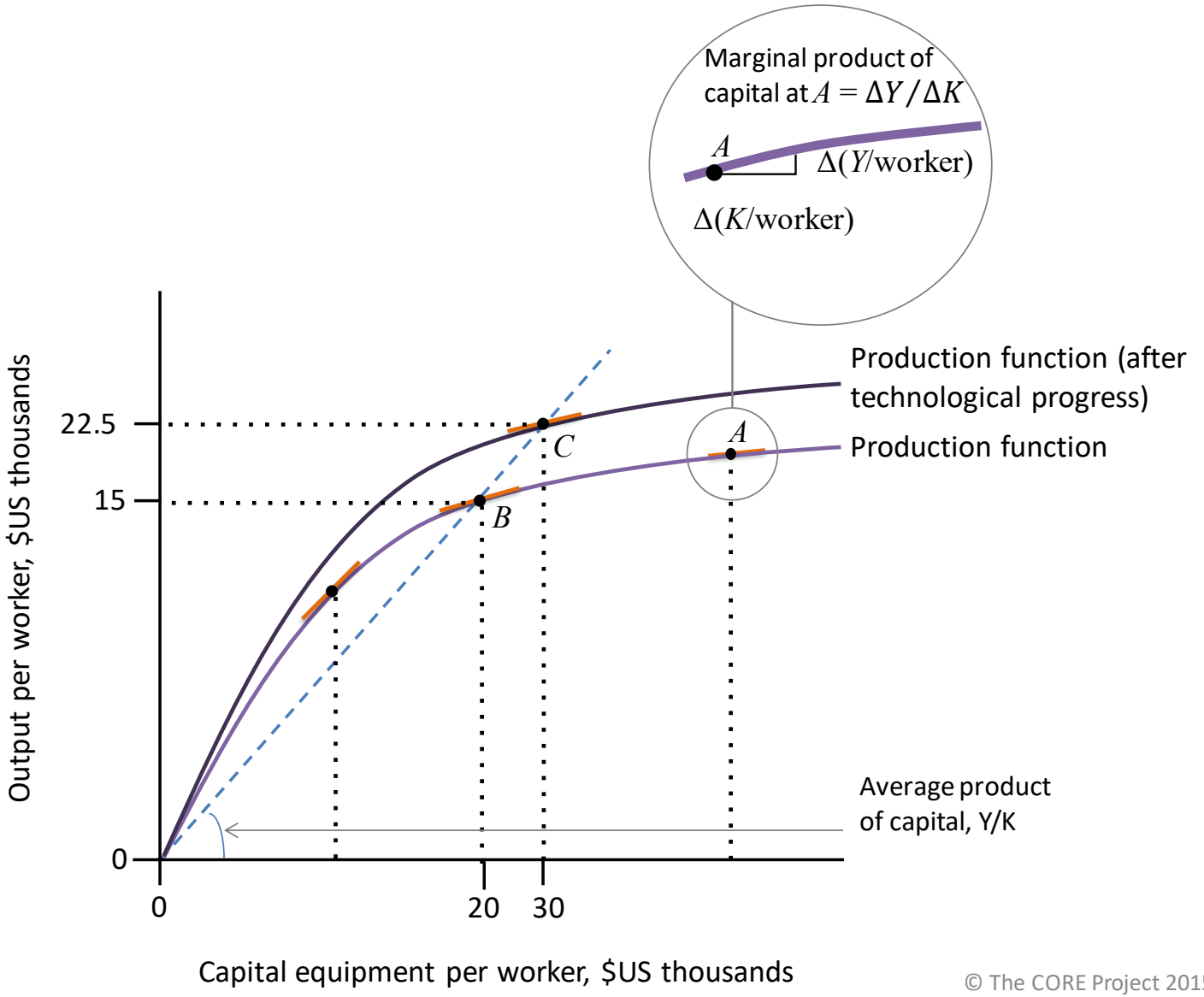
Job Creation and Unemployment

Technological progress and living standards

- Firms can earn **innovation rents** by introducing new technology.
- Firms that cannot keep up with innovation eventually fail
  - $\Rightarrow$ Schumpeter: creative destruction
- New technologies require new machines
- Technological advance relies on capital-intensive methods of production to be profitable.
- This process allows a sustained increase in average living standards.

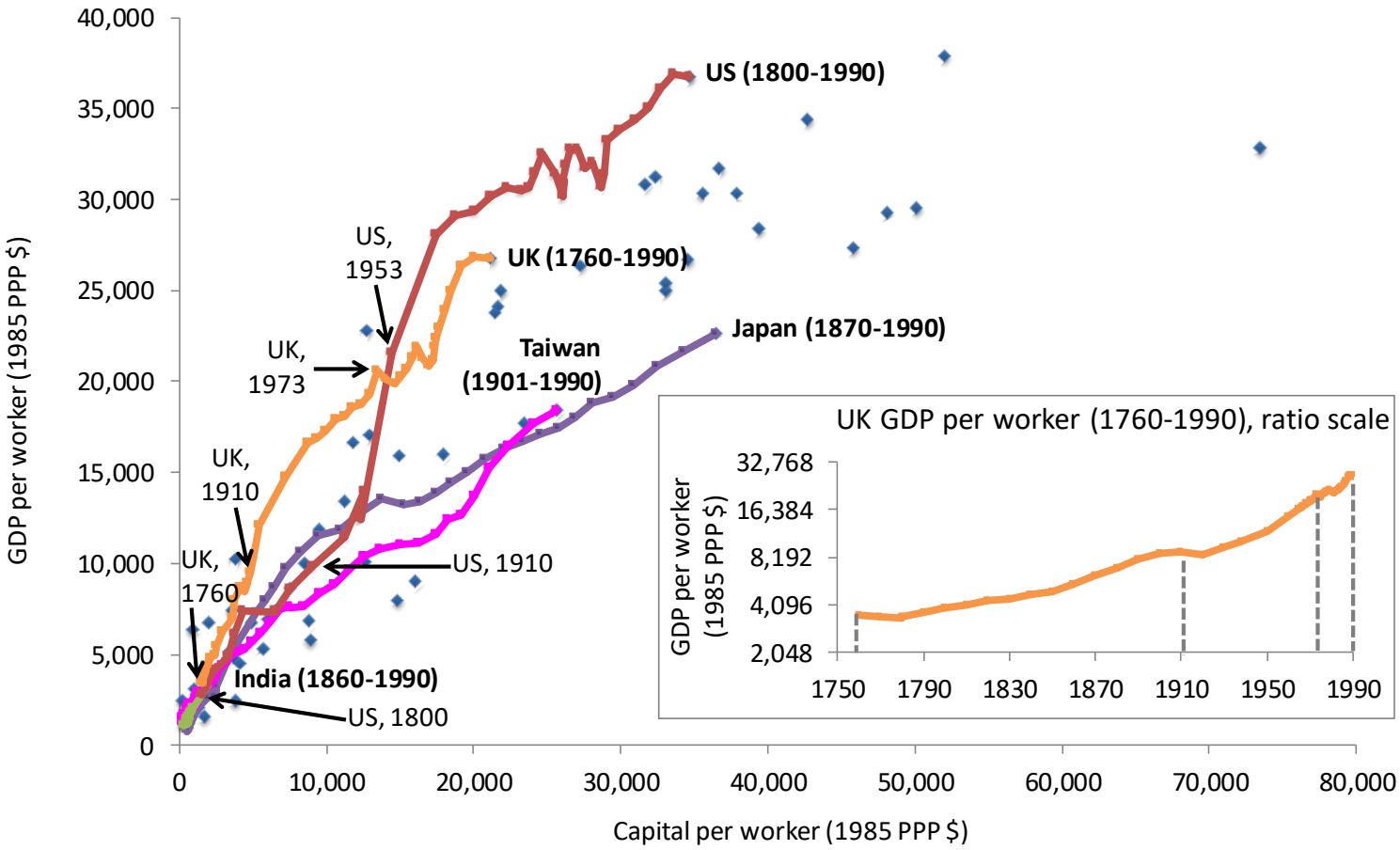
Classical Growth Model: Decreasing MPK

Figure 16.2. The economy's production function and technological progress.



Technological progress over time

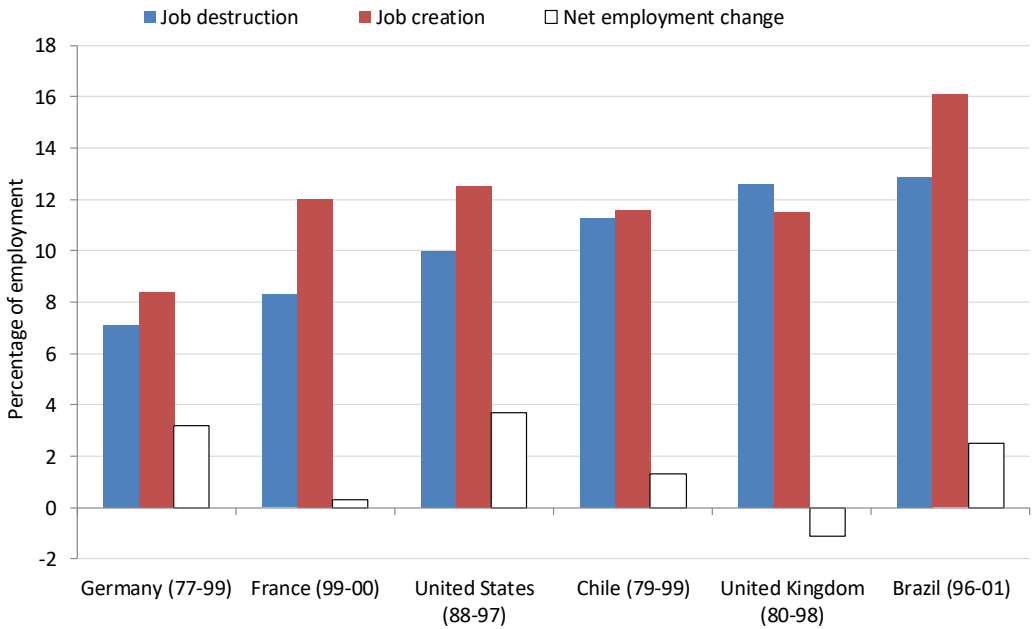
Figure 16.3. Long-run growth trajectories of selected economies.



capital productivity remained roughly constant, why?

Job creation/destruction

Figure 16.4. Job destruction, job creation, and net employment across countries.



- Labour-saving technological progress can also create jobs
- e.g. reallocation of work from low- to high-productivity firms
- Net employment change = job creation – job destruction

The Beveridge Curve

- **Def**: inverse relationship between the unemployment rate and the job vacancy rate
- Recession: post fewer vacancies and lay off more workers
- Boom: post more vacancies and need more workers

The Beveridge Curve

- German Beveridge curve shifted closer to the origin due to reforms that helped unemployed workers find jobs.
- US curve shifted away from the origin due to a skill-based mismatch and limited worker mobility.

Labor Market Matching

Beveridge curve can shift over time!

- ∵ changes in the labour market matching efficiency
- Skill Mismatch: the unemployed may not have the skills required for the job jobseekers
- Geographical constraint: vacancies may be located in different parts of the country
- Policies and technology can improve efficiency

Long-run Labor Market Model

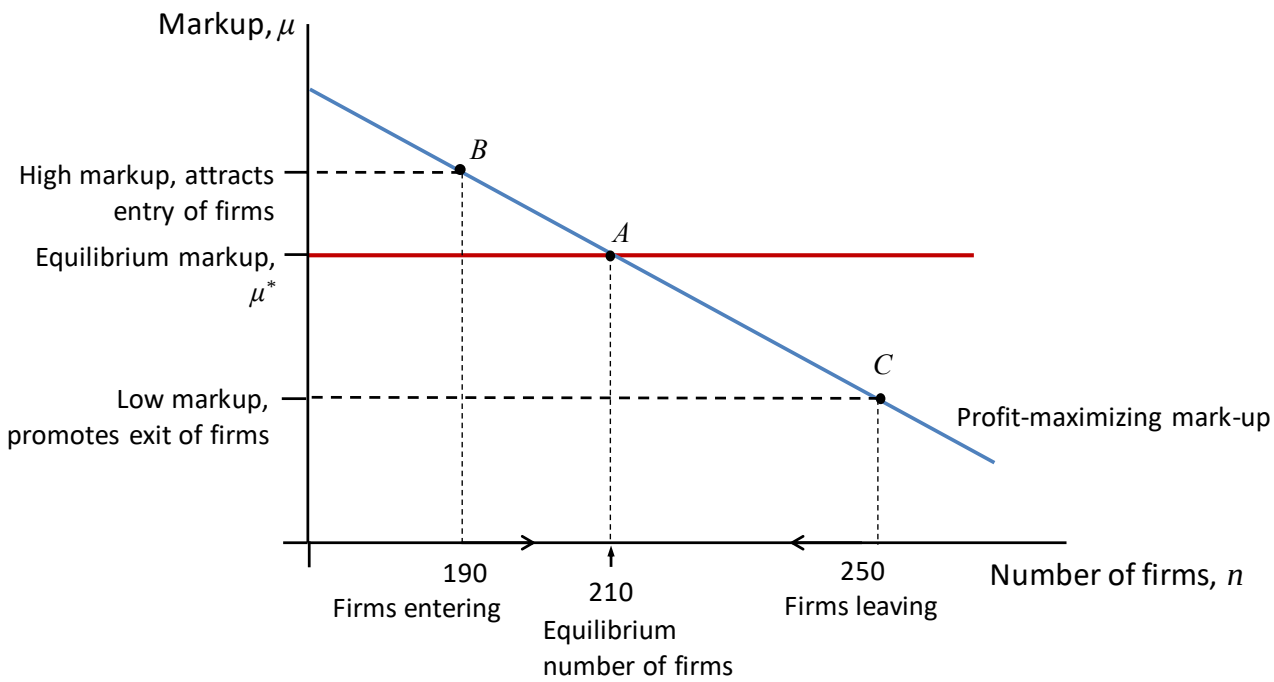
Long-run unemployment

- In the long run, firms can enter/exit (so capital stock can change)
- Work incentives: depend on **wage-setting curve**
- Investment incentives: depend on **price-setting curve**
- Long-run equilibrium in the labour market is when
  1. wages,
  2. employment level, and
  3. the number of firms are constant

Equilibrium Profit

- Profit determines the number of firms in the market.
- High markup = firms enter
- lower markup = firms exit.

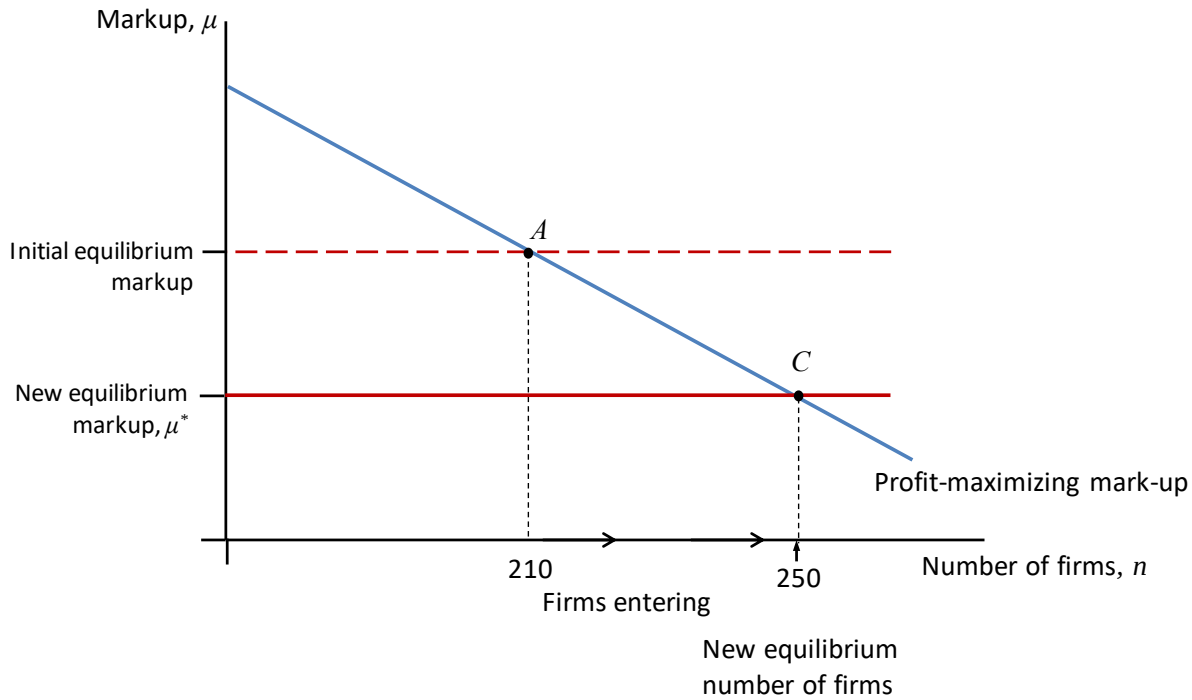
Figure 16.7a. Firm entry, exit, and the equilibrium markup.



Equilibrium Profit

- Self-correcting process:
- more firms
- = more competition
- = higher elasticity of demand
- = lower markup
- = fewer firms

Figure 16.7b. An improvement in conditions for doing business: Firm entry, exit, and the equilibrium markup.



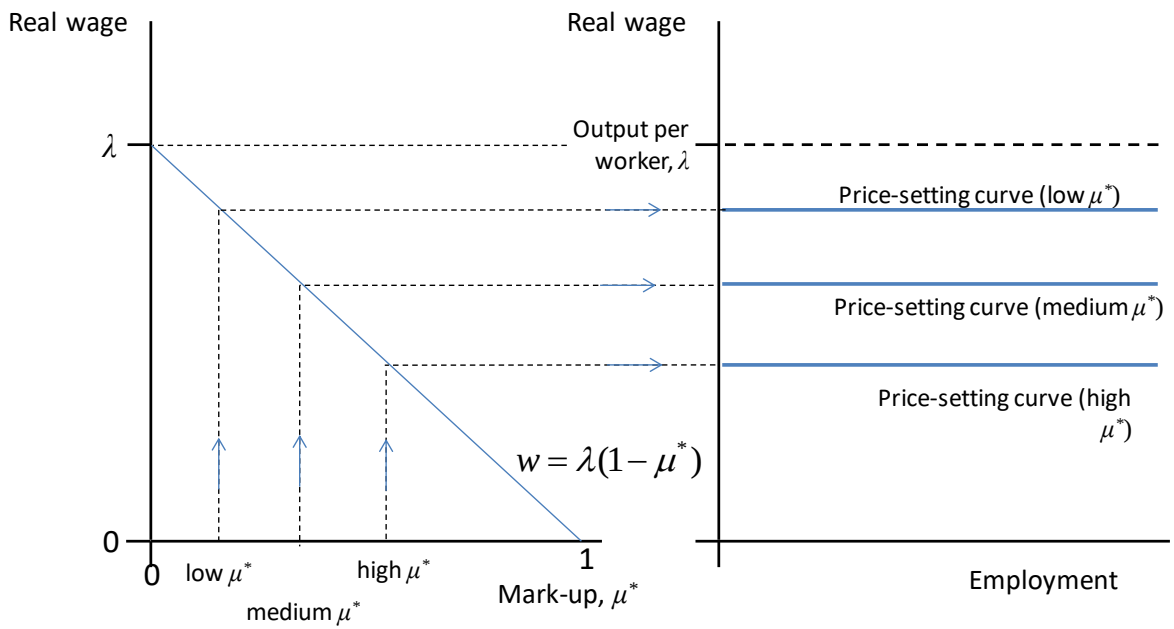
Equilibrium profits can change:

e.g. property protection legislation

Long-run price-setting curve

- Real wage depends on productivity (λ) and equilibrium profits (μ^*).
- Long-run price-setting curve: $w = \lambda(1 - \mu^*)$
- The price-setting curve depends on:

Figure 16.8. Changes in the long-run markup shift the price-setting curve.



Long-run price-setting curve

- Expected long-run tax rates
- Competition
- Risk of expropriation
- Quality of human capital/infrastructure
- Opportunity cost of capital
- Expected material costs

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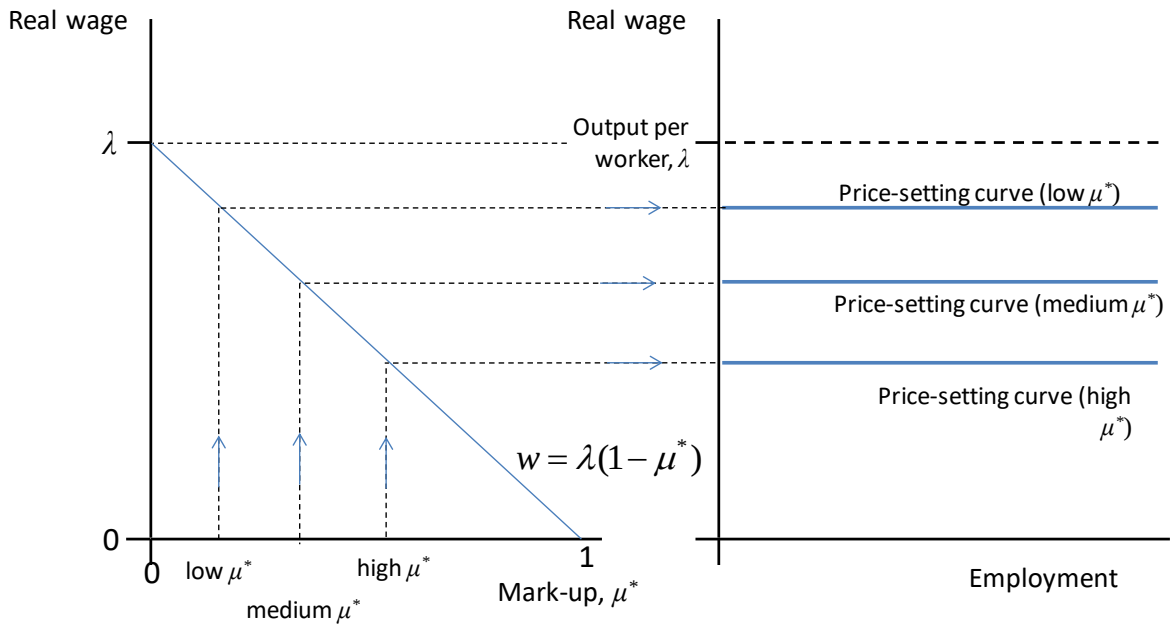
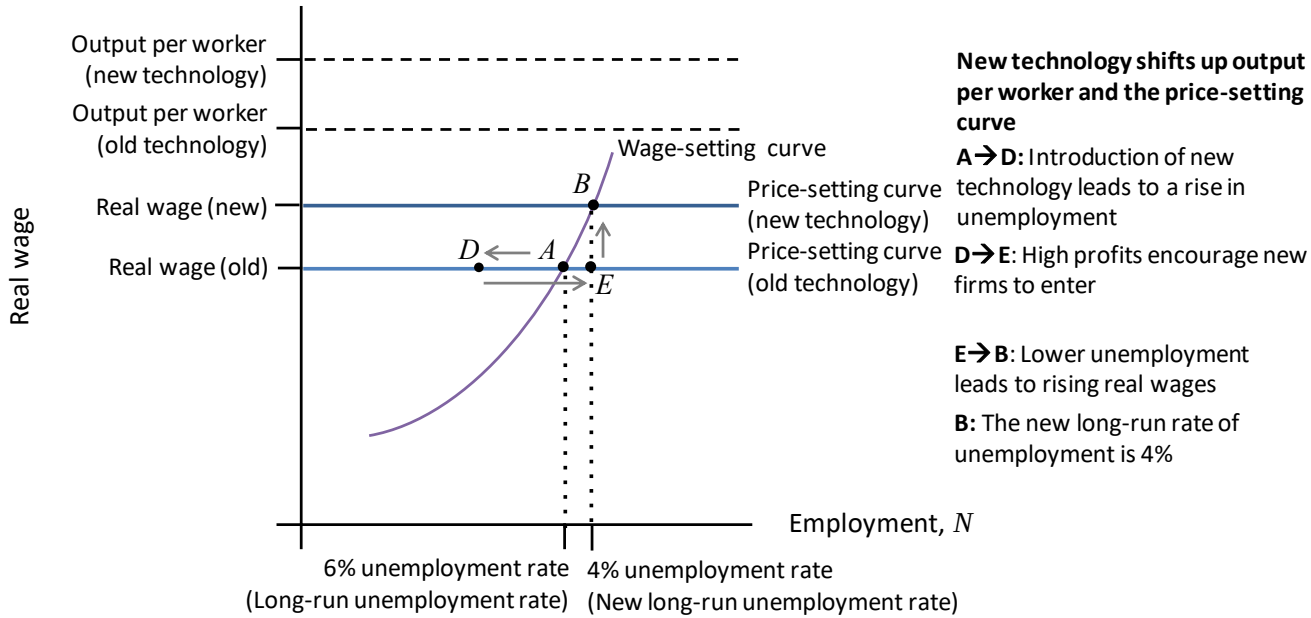


Technological Improvement

- New technology can increase both real wages and employment in the long-run.
- The adjustment process takes time, and may involve job destruction in the short-run.

Figure 16.9b. The long-run unemployment rate and new technology.



Technological Improvement

- **Adjustment gap**: The lag between outside change in labor mkt conditions and the movement to the new equilibrium.
- **Diffusion gap**: time for whole economy to adopt the innovation

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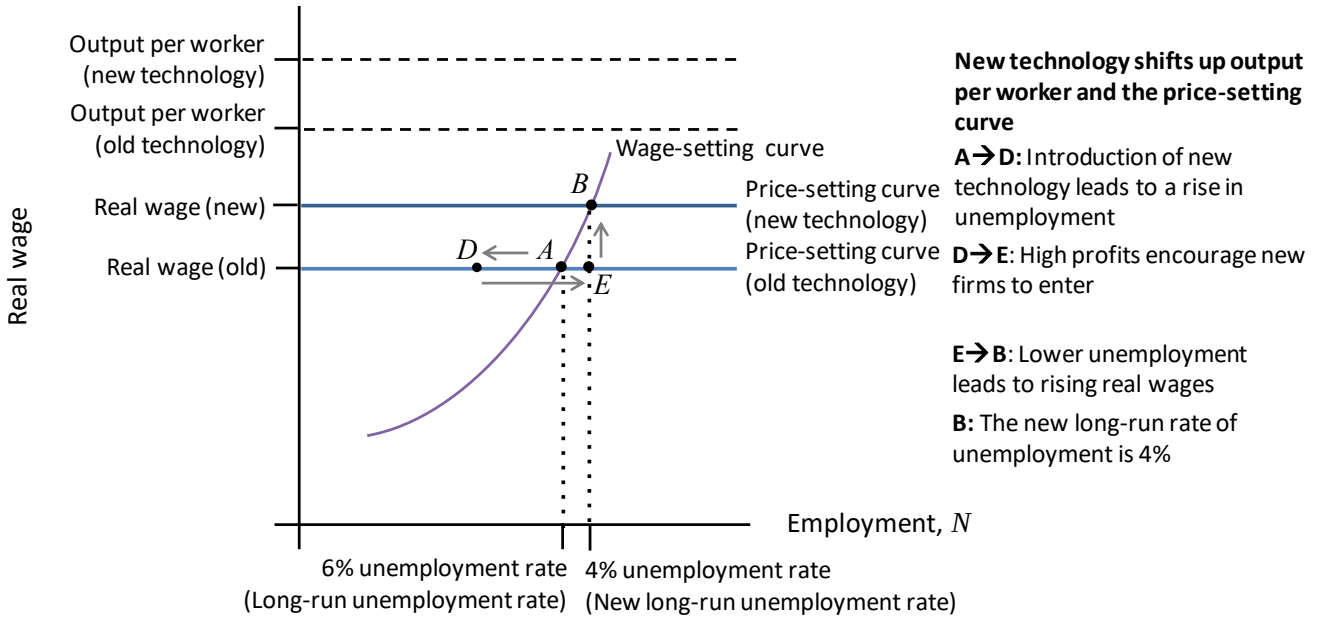


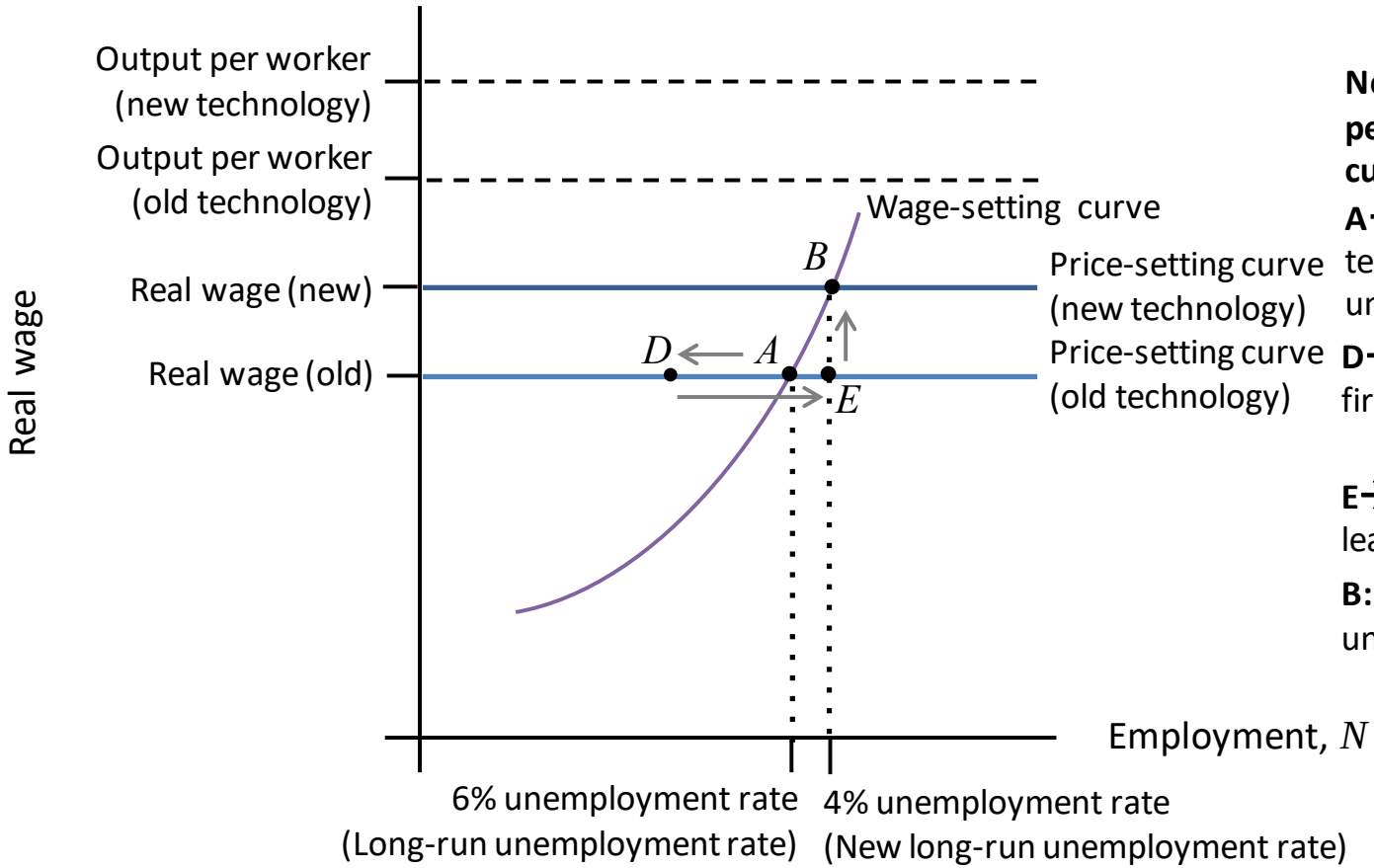
Long-run wage-setting curve

Unemployment does not continuously fall with technological progress because the **wage-setting curve can shift upwards**.

Technological change can indirectly shift the wage-setting curve due to:

- Fair shares bargaining by unions
- Policies to help those affected e.g. employment protection laws
- Greater disutility of effort
- Improvement in the reservation wage

Long Run v.s. Short Run



New technology shifts up output per worker and the price-setting curve

A→D: Introduction of new technology leads to a rise in unemployment

D→E: High profits encourage new firms to enter

E→B: Lower unemployment leads to rising real wages

B: The new long-run rate of unemployment is 4%

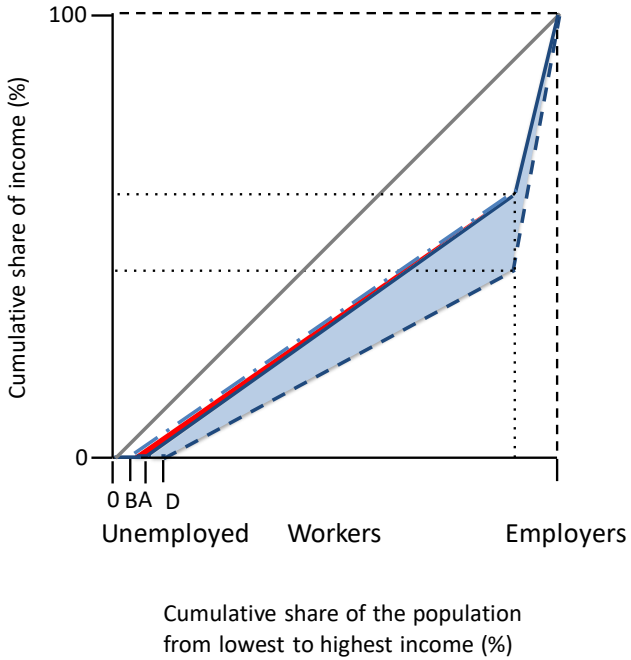
	In Fig	Employment	Unemployment	Wage share	Inequality
Short run	A → D	Down	Up	Down	Up
Long run	A → B	Up	Down	No change	Slightly Down

Effect on Inequality

Technological change increased inequality in the short run but reduced inequality in the long run:

- Employees' share of output returned to initial levels due to an increase in real wages
- The higher real wage motivated employees to work hard at a lower level of unemployment.

Figure 16.11. Effects of a new technology on inequality in the short and long run.



How long is the long run?

The economy can go through a long adjustment process before reaching the new long-run equilibrium.

Example

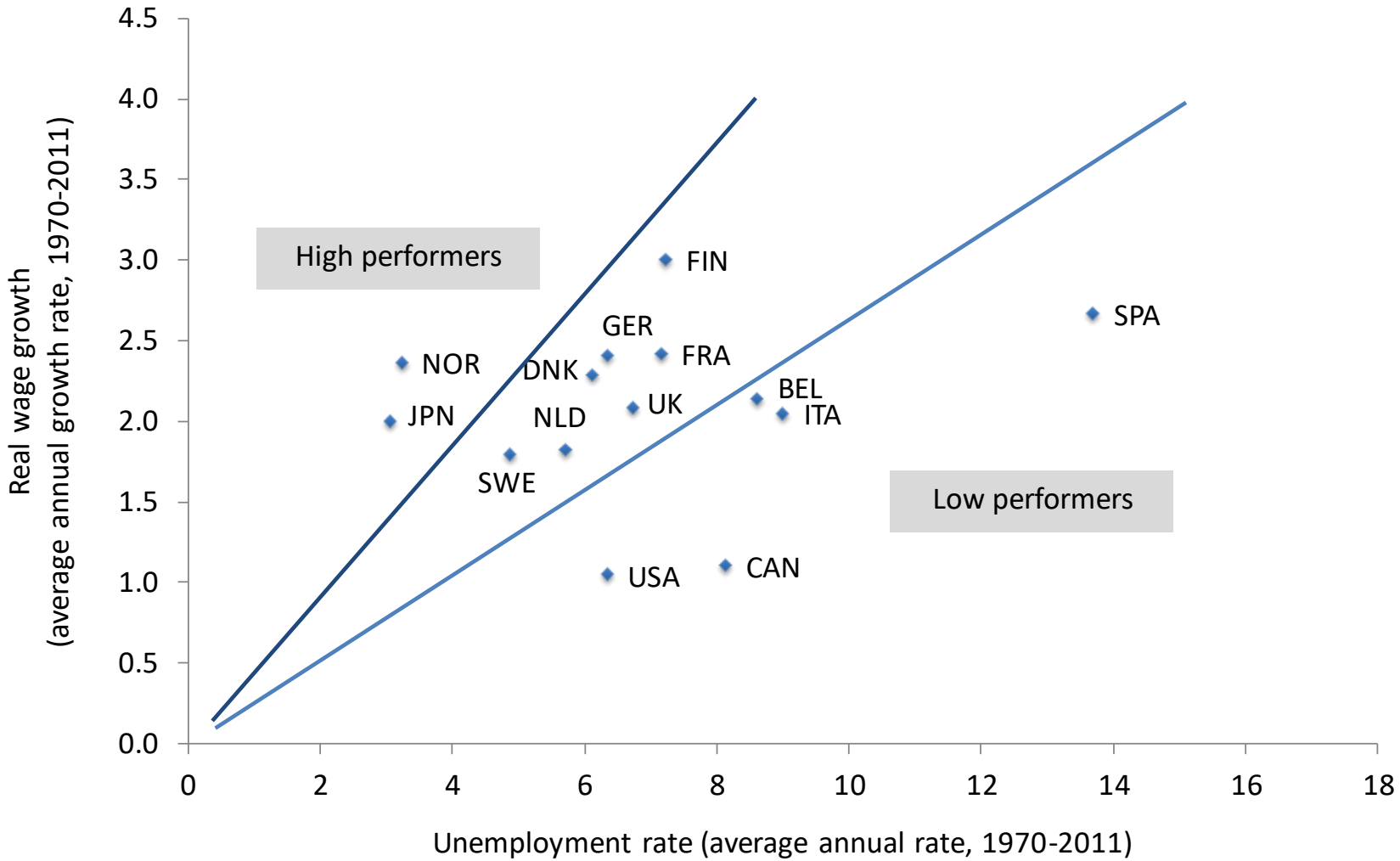
Adjustment of the US labor markets to the Chinese import shock.

- Many economists thought that this shock would not have a major negative effect on wages or employment, because workers in import-competing sectors could easily relocate to other regions.
- However, they underestimated the size of the shock and overestimated the degree of labour mobility – 2.4 million jobs were lost, and the labour market is still adjusting.

The role of institutions and policies

Differences across countries

Figure 16.12. Long-run unemployment and real wage growth across the OECD (1970-2011).



Important Factors

To achieve "good" economic performance, an economy must:

1. Ensure price-setting curve shifts up more than wage-setting curve

Possible explanation for cross-country differences are:

No magic formula: Institutions and policies used differ across successful countries and over time

Important Factors

To achieve "good" economic performance, an economy must:

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2. Adjust rapidly and fully $\Rightarrow$ whole economy benefits from tech progress

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Possible explanation for cross-country differences are:

1. Institutions: inclusive trade unions (represent many firms and sectors) choose not to exercise maximum bargaining power because wage increases affect job creation in the long run.
2. Policies: well-designed unemployment insurance schemes and job placement services can achieve low unemployment rates.

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Appendix

References I