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

Hui-Jun Chen

The Ohio State University

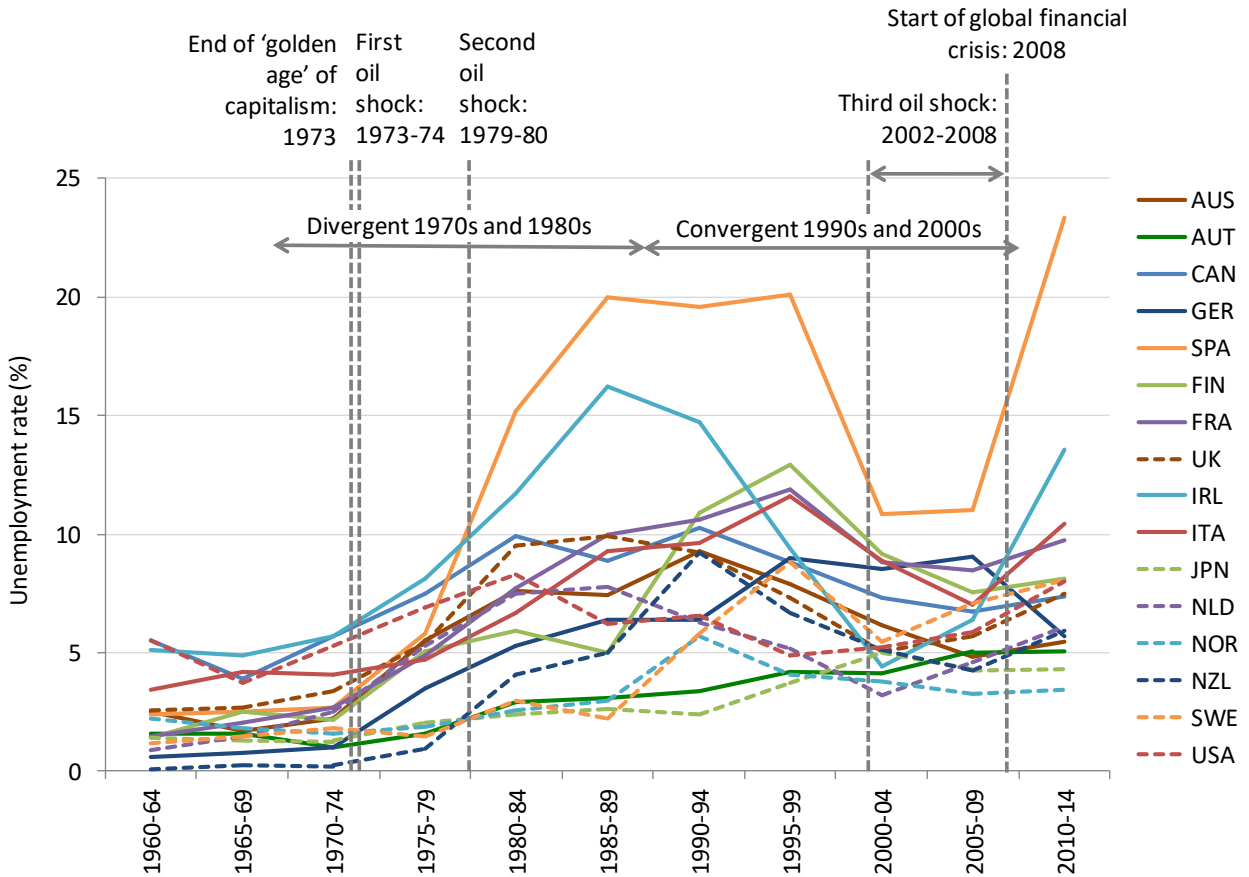
March 29, 2023

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).

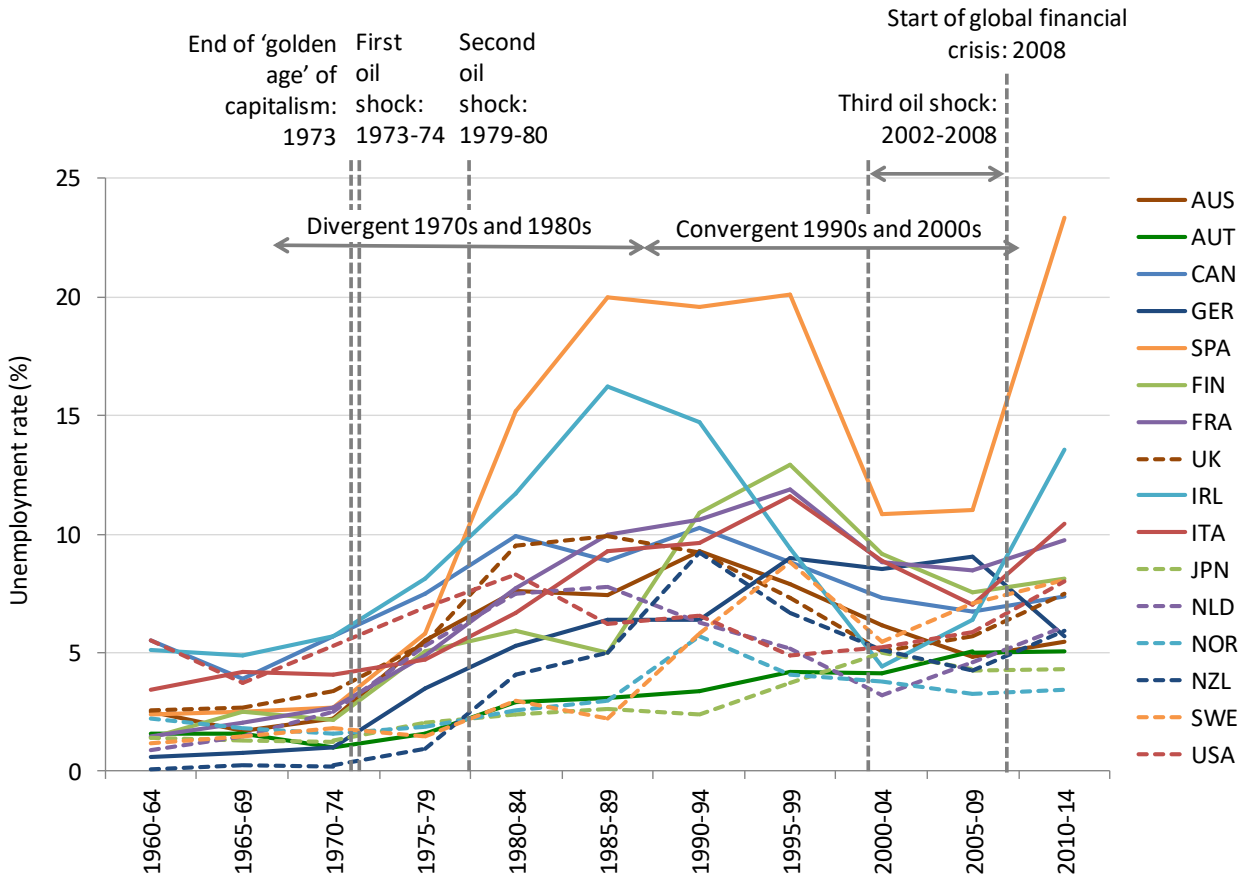


How can institutions and policies explain these differences?

Introduction Textbook

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

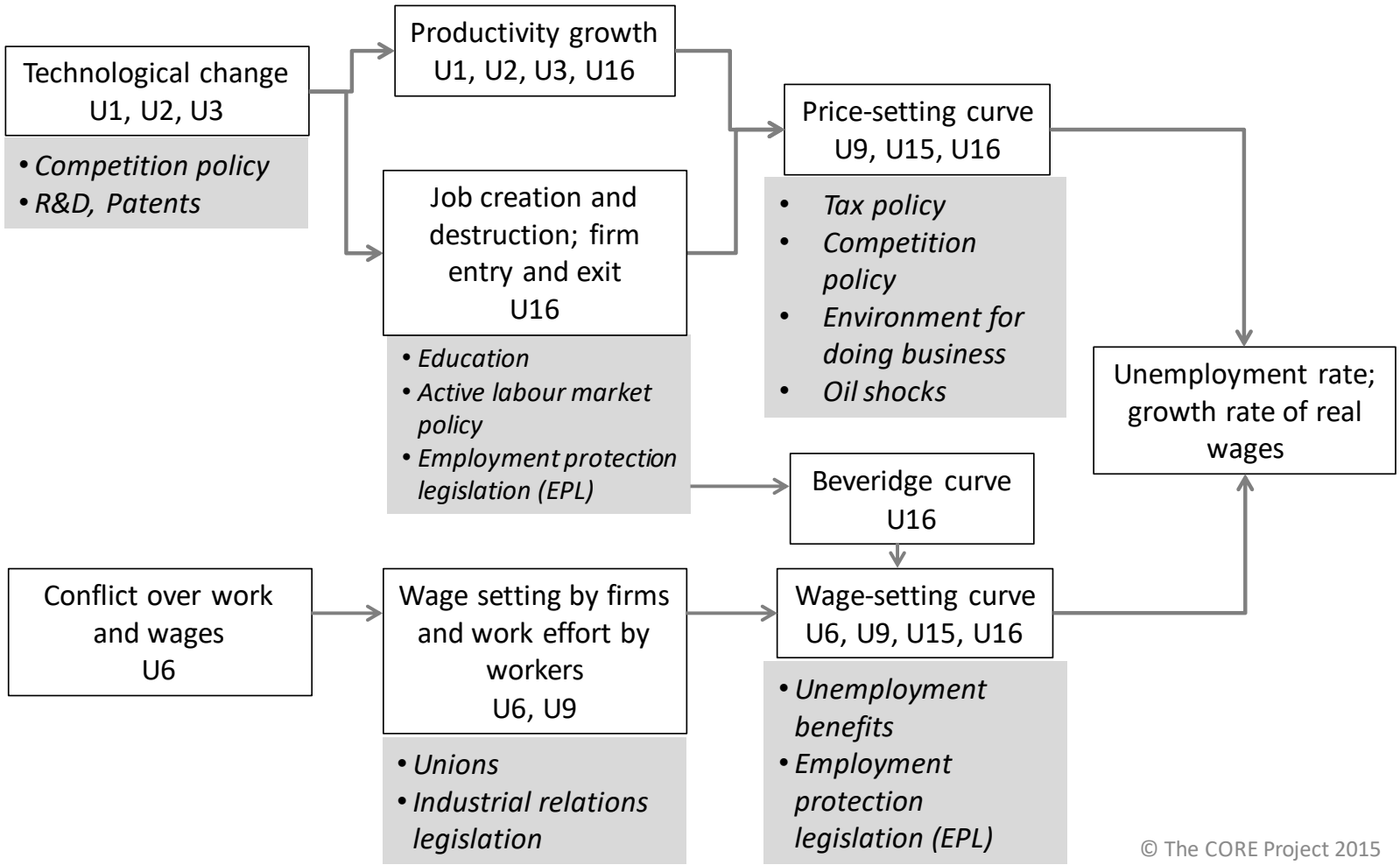
Figure 16.1. Unemployment rates in selected OECD countries (1960-2014).



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.



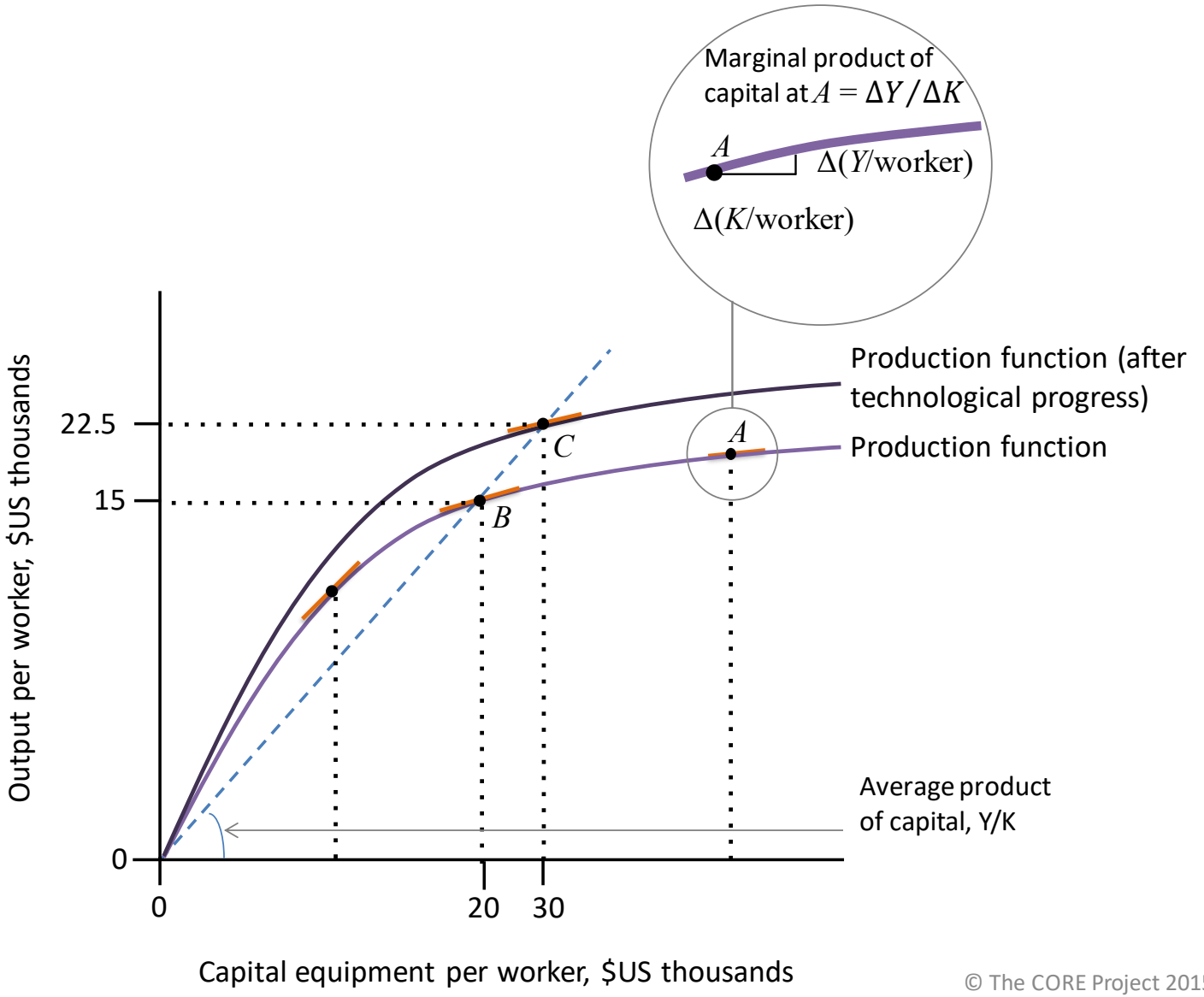
Job Creation and Unemployment

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.

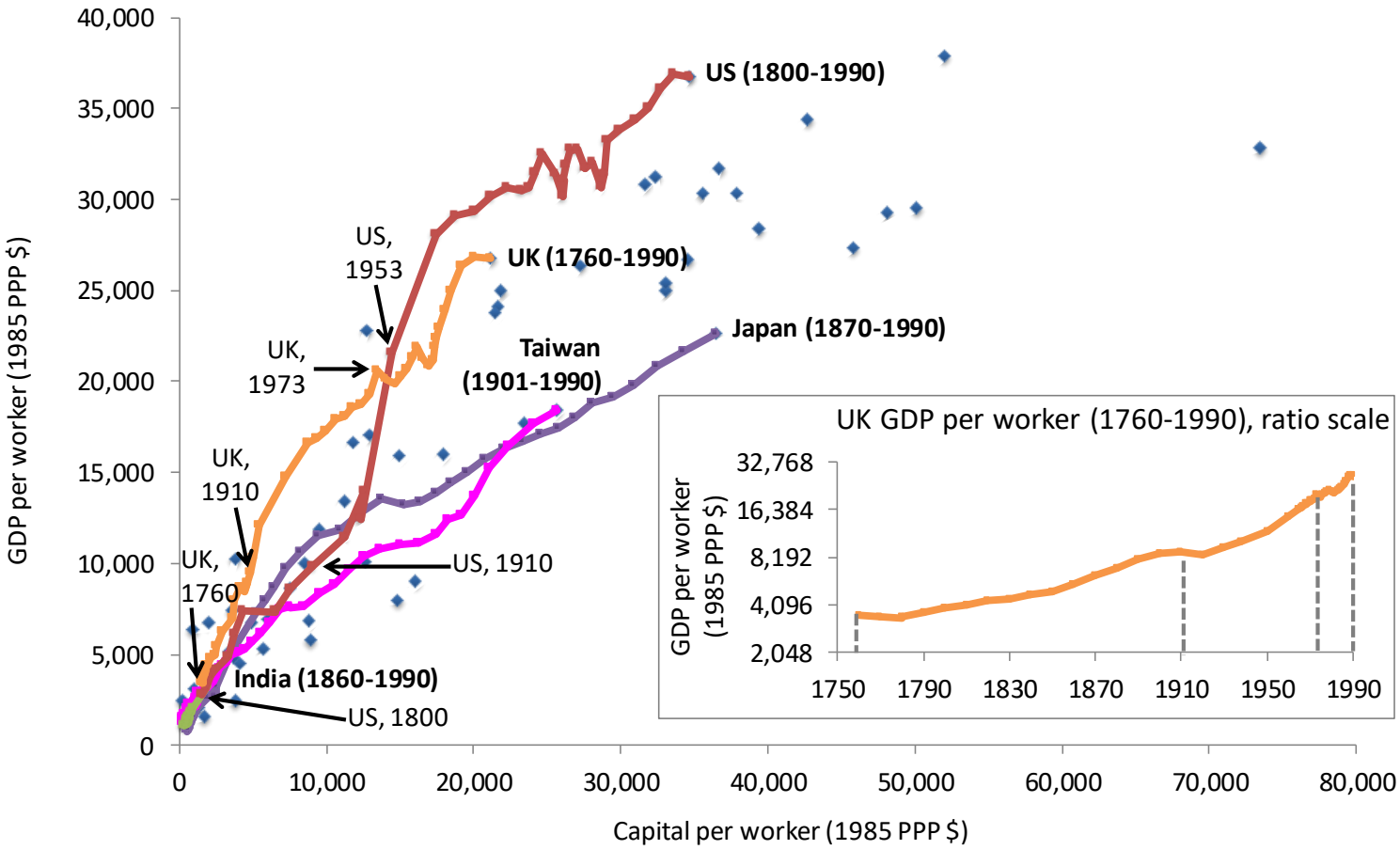
Classical Growth Model: Decreasing MPK

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



Technological progress over time

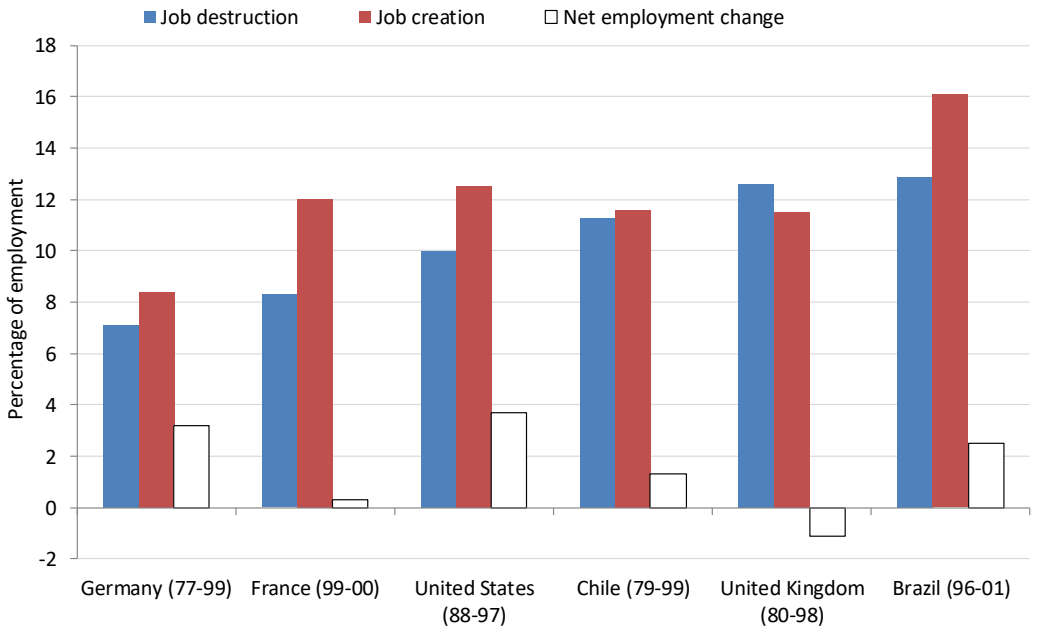
Figure 16.3. Long-run growth trajectories of selected economies.



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

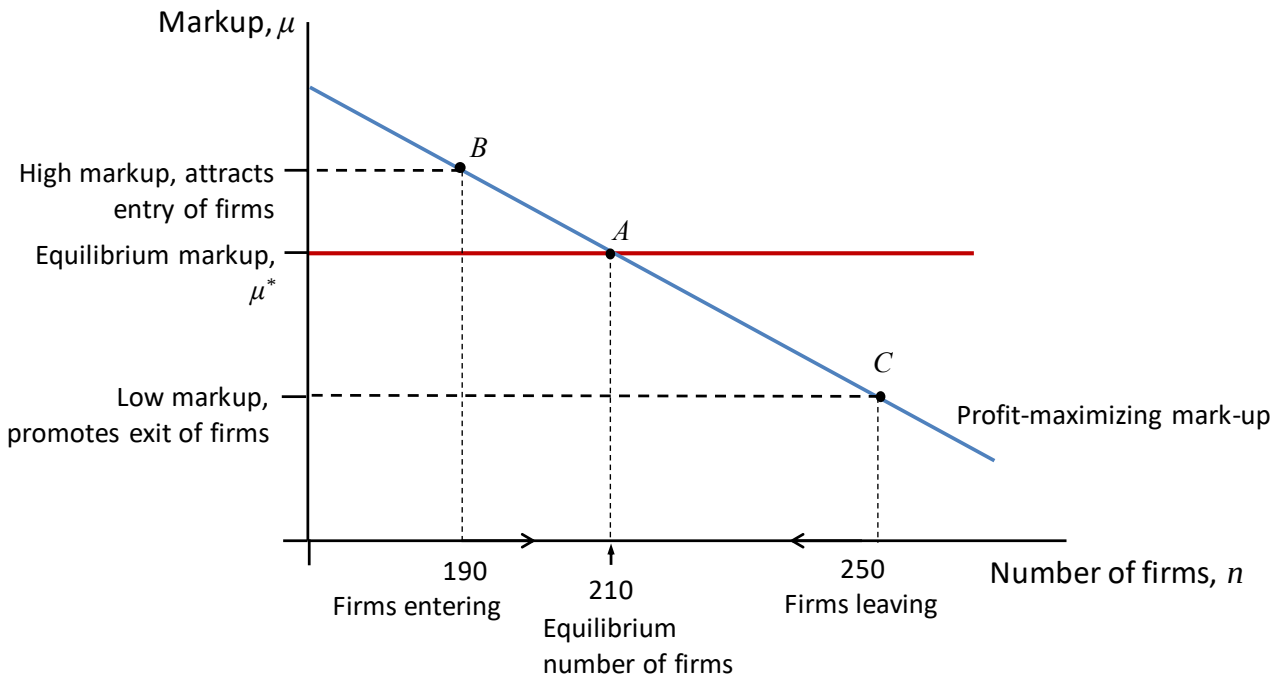
Long-run unemployment

- 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.

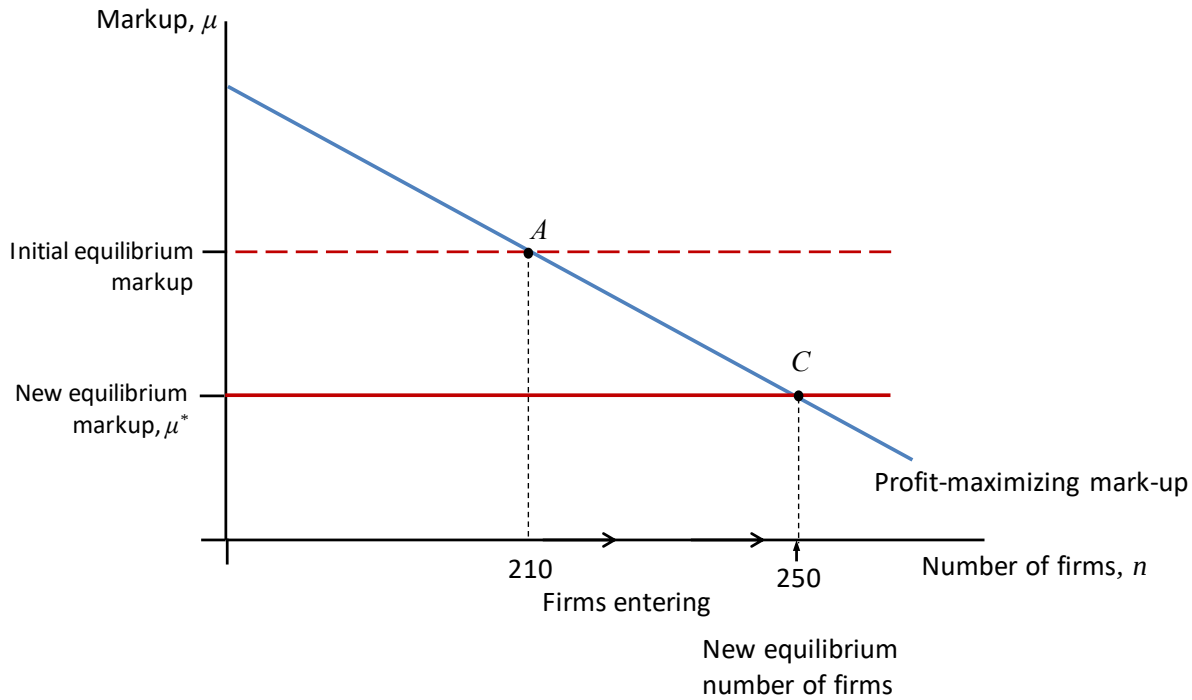
Figure 16.7a. Firm entry, exit, and the equilibrium markup.



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.



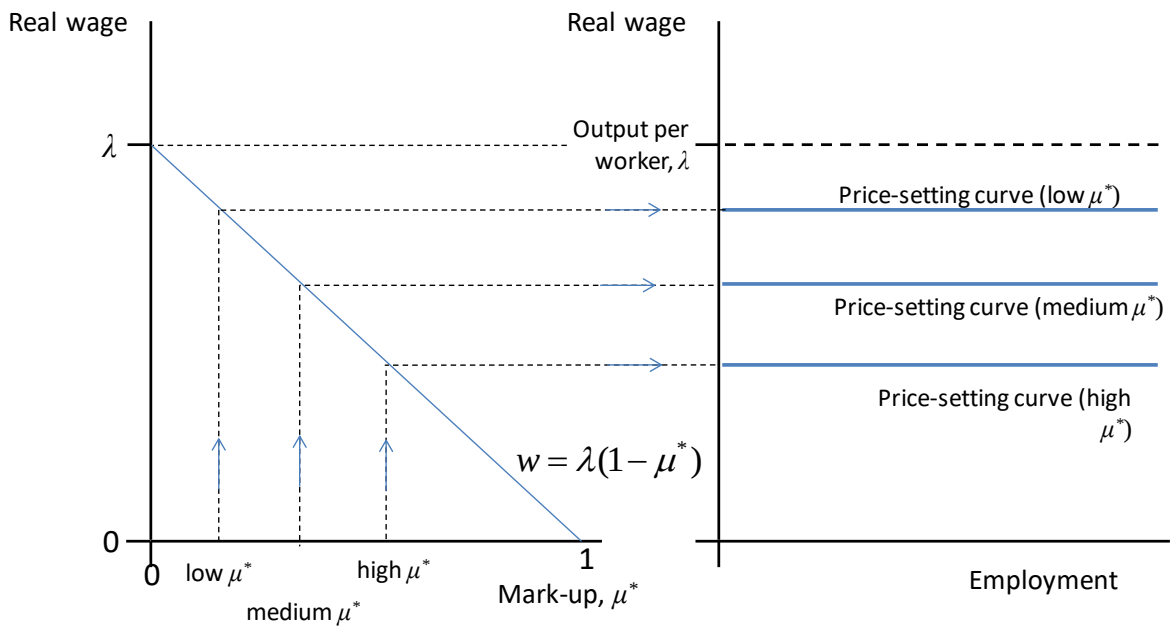
Equilibrium profits can change:

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:

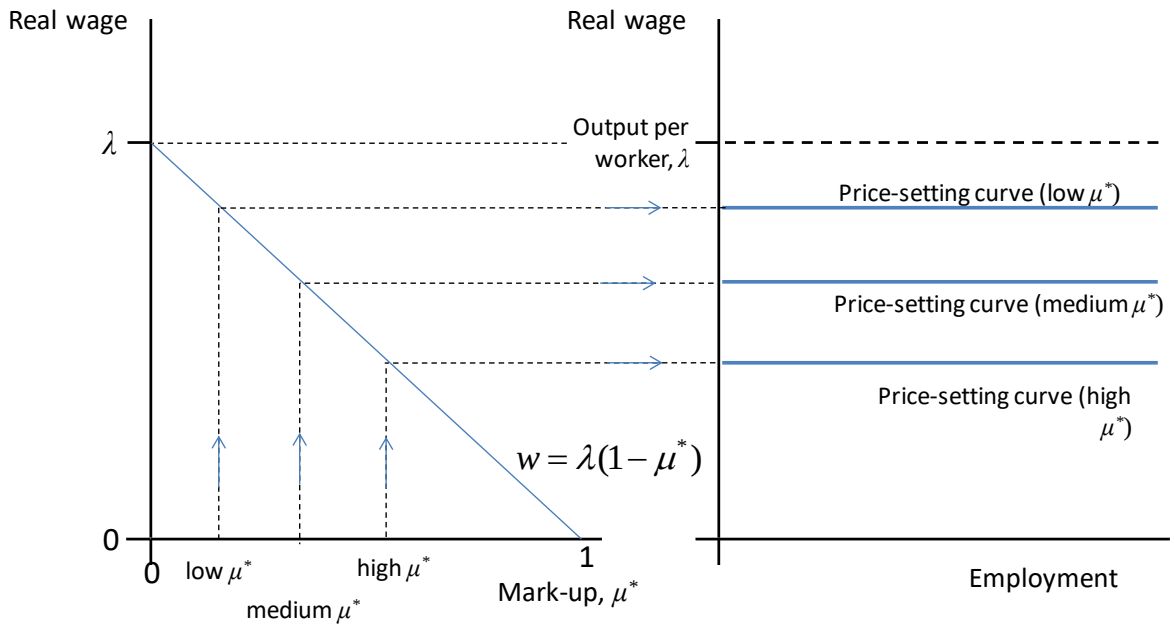
Figure 16.8. Changes in the long-run markup shift the price-setting curve.



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

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



Appendix

References I