Announcement:

Office hour:
1. Wednesday 4-5 pm
2. Friday 11am-12pm

INEQUALITY

EE461 Sem 2/2019

Questions

- What are the theories that can explain the level of economic inequalities and its dynamic?

- How do policies affect inequalities?

Roadmap

- Understanding Inequality
- Addressing Inequality

❖Understanding inequality

General Framework

- Technology-Institution-endowment framework (coreecon unit 19)
- Inequality and principal-agent framework (coreecon unit 19)

❖Understanding inequality

Labor

- Inequality in labor income: the role of market forces

(The economics of inequality chapter 3 &

coreecon, unit 9 &

Autor, David “Skills, education, and the rise of earnings inequality among the ‘other 99 percent’”

, Science, 2014)

- The effect of changes in labor market on labor income inequality:
  - Education/skill premium
  - Labor market segmentation
  - Automation

❖Understanding inequality

Capital

- Inequality, saving , and growth(Ray, Chapter 7)
- Inequality, capital markets, and development (Ray, Chapter 7)
- Capital-labor inequality (The economics of inequality chapter 2, Thomas Piketty)

❖ Addressing Inequality

- Predistribution
  - Labor income inequality: the role of institutions(Gabriel Zucman)
- Redistribution:
  - Instrument for Redistribution: “Fiscal” or “Direct”
    (The economics of inequality, chapter 4)
  - Tax and transfer(e.g. welfare state)
  - Progressive and regressive redistribution (coreecon)
- Tax Evasion and Inequality(Gabriel Zucman)
- Optimal labor income tax rate
- Optimal capital tax rate

Understanding inequality:
General Framework

Economic inequality: Technology-Institution-endowment

An individual's income depends on:
1) His/her **endowments**
2) The value of each item in his/her endowment.

Technology and institutions affect the value of particular endowments.

Economic inequality is due to changes in institutions, technology, and differences in endowments.

Endowment, institutions & policies, technology

- Endowment: The facts about an individual that may affect his or her income, such as
  - The physical wealth a person has, either land, housing, or a portfolio of shares (stocks).
  - Also includes level and quality of schooling, special training, the computer languages in which the individual can work,
  - Work experience in internships,
  - Citizenship, whether the individual has a visa (or green card) allowing employment in a particular labour market,
  - The nationality and gender of the individual, and
  - The person's race or social class background.
- By studying why people have differing endowments, and what determines the income associated with each of the endowments, we can understand income inequality

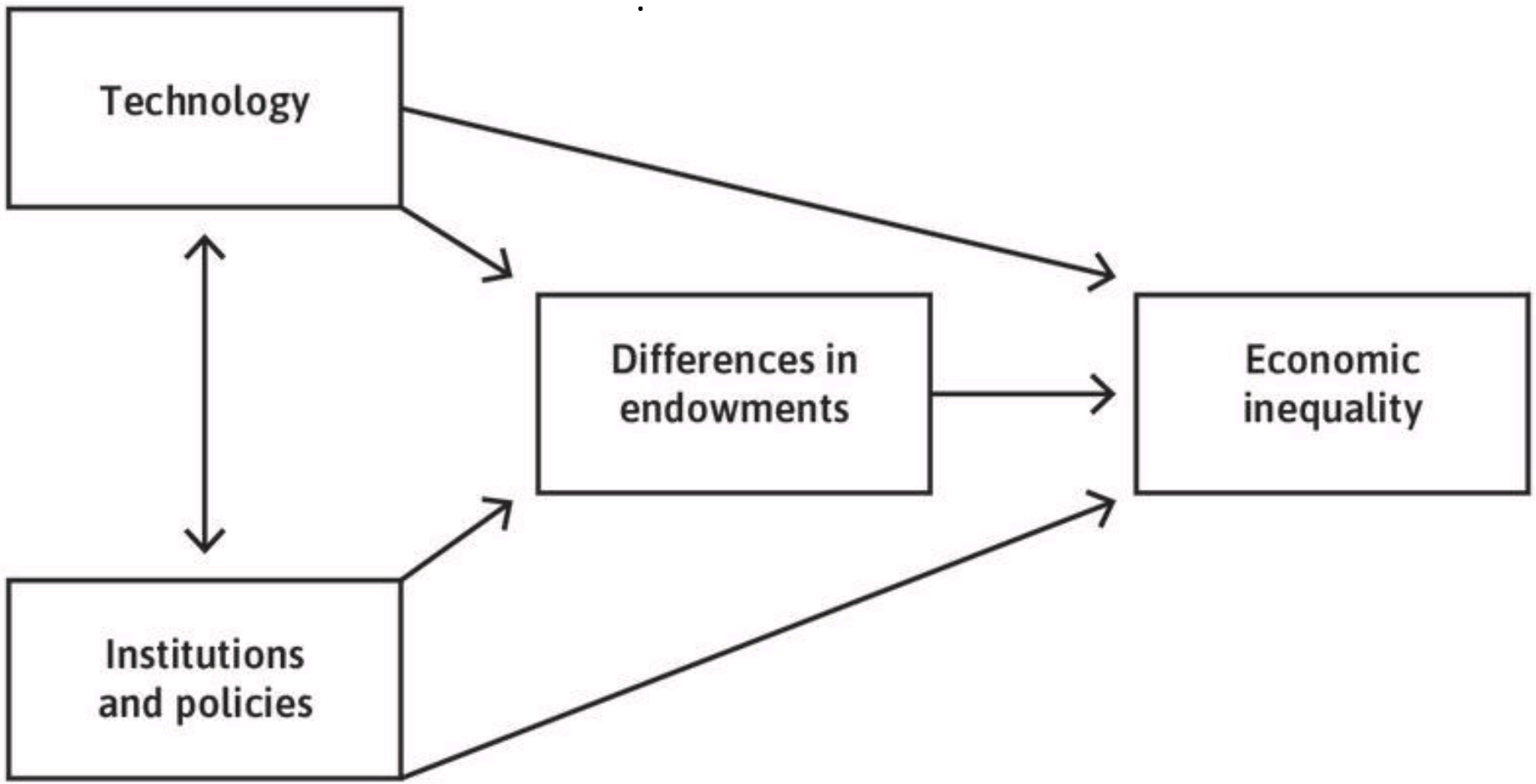
Endowment, institutions & policies, technology

- Institutions and policies are such as:
  - Inherited wealth and whether it is (heavily) taxed
  - Subsidized higher education and whether educational policies allow the wealthy to acquire more and better education for their children
  - Exclusive social clubs from elite private universities
  - Gender discrimination
  - Legislation limiting work hours and work conditions
  - Level of unemployment insurance
  - Interest rate regulation and policies affecting whether one can borrow
  - Competitions in the lending market
  - Price-setting power by each trade party
  - Regulations governing the use of pollutants

Endowment, institutions & policies, technology

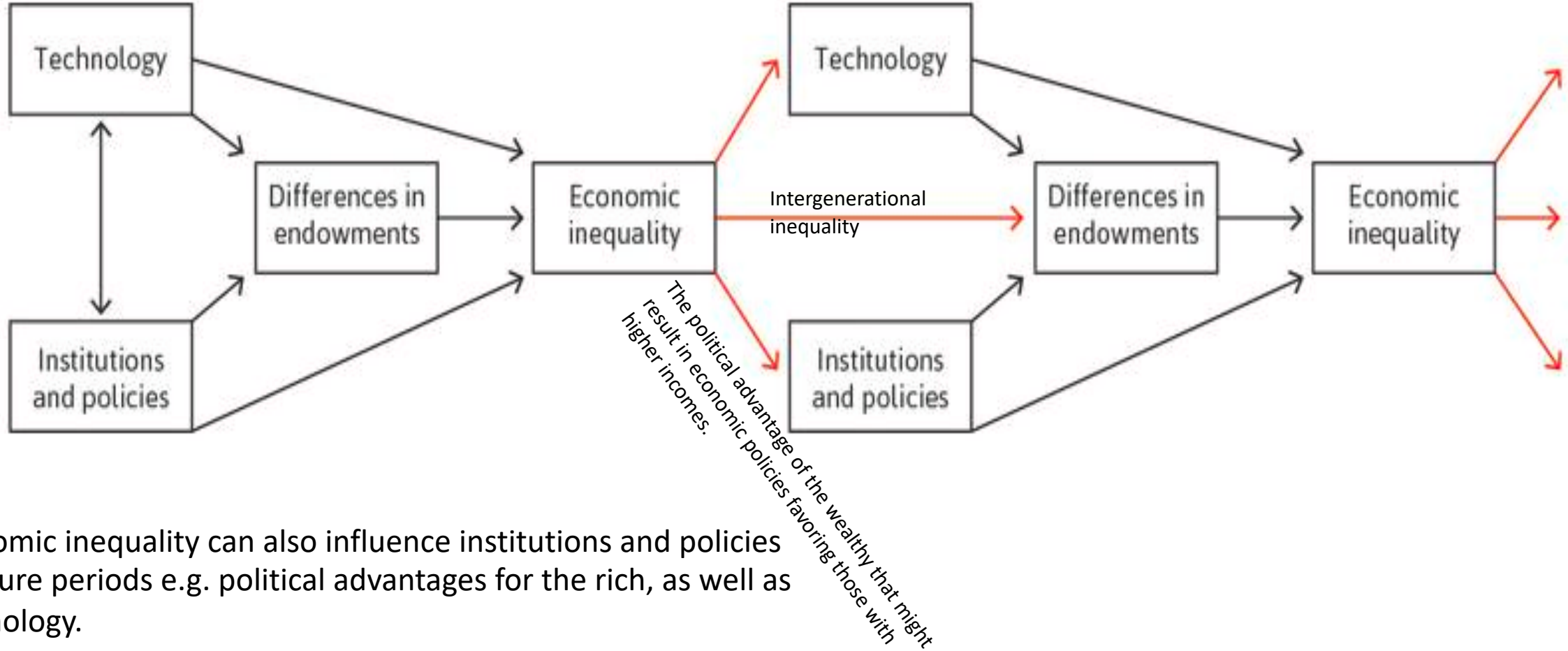
- Technology
  - Where there are strong economies of scale, a few people—the winners—will end up with substantial endowments
  - The technology of digital platforms
  - A labour-saving technology
  - An improvement in seeds
  - An improvement in storage technology
  - A new technology that increases the productivity of the employee’s effort

Endowment, institutions & policies, technology



https://www.core-econ.org/the-economy/book/text/19.html#195-endowments-technology-and-institutions

Endowment, institutions & policies, technology



Economic inequality can also influence institutions and policies in future periods e.g. political advantages for the rich, as well as technology.

https://www.core-econ.org/the-economy/book/text/19.html#195-endowments-technology-and-institutions

Economic inequality: Principal-Agent

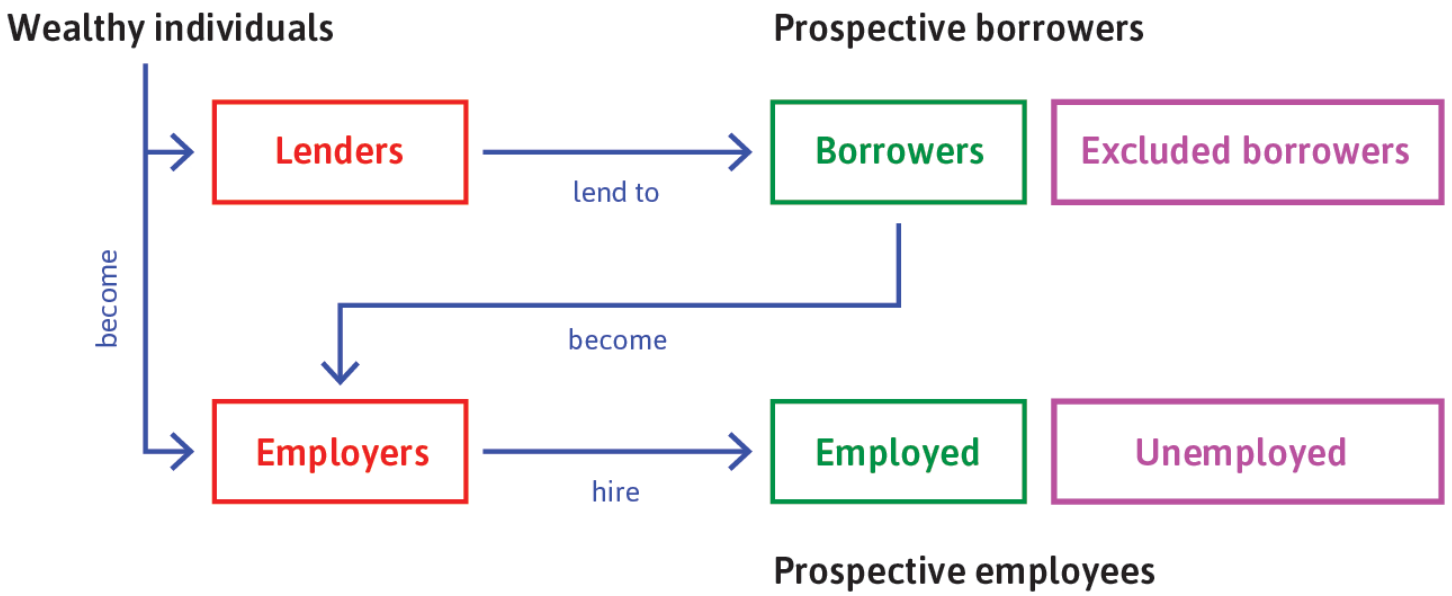
Differences in endowments determine:

- the ability to become the principal or the agent e.g. ability to borrow/lend.
- the balance of power in interactions
- The type of choices that a person may feasibly make

In **principal-agent** relationships, the principal can exercise power over agents, but not vice versa.

- Employer-employee
- Lender-borrower

Economic inequality: Principal-Agent



Understanding inequality:
Labor

Capital-Labor Inequality

- Inequality is originally described as a contrast between those who own capital, that is, the means of production, and those who do not and must therefore make do with what they can earn from their labor.
- The fundamental source of inequality is the unequal ownership of capital.

Inequality in labor income

- “the lion’s share of income inequality today (and probably for a long time in the past) is due to labor income inequality.” Thomas Piketty

- “In order to understand inequality as it presently exists and redistribution as it might exist in the future, we must therefore give up the idea that labor incomes are relatively equal and that inequality exists primarily between capital and labor.” Thomas Piketty

The role of skills in the labor market

- What determines labor income inequality?
- Inequality of Wages and Human Capital
- The simplest theory of wage inequality is that different workers contribute different amounts to a firm’s output.
- Wage depends on skill demand (skills employers require) and skill supply (skills workers have acquired)

Inequality in labor income

- The theory of human capital simply states
  - that labor is not a homogeneous entity and
  - that for various reasons different individuals are characterized by different endowments of human capital, that is, by different capacities to contribute to the production of goods and services demanded by consumers.
  - Given some distribution of human capital within the population of workers and the demand for various goods and for the human capital needed to produce them (the demand for labor), then the laws of supply and demand determine the wages associated with each level of human capital and thus the distribution of labor income.
- The notion of human capital is therefore quite general, because it includes credentials such as diplomas, experience, and, more generally, individual characteristics that influence a worker's ability to participate in the production process for the demanded variety of goods and services.

The skill premium

- Assume $Y = F(L_s, L_u) = L_s^{\alpha} L_u^{1-\alpha}$, L_s is high-skill labor, L_u is low-skill labor
- The demand for L_s rises over time because of technological change (the increase in α)
- If the skill supply of L_s is fixed, then the skill premium of high-skill labor $\frac{w_s}{w_u}$ (the relative wage of high-skill labor to low-skill labor) will rise over time.
- A race between education (skill supply) and technology (skill demand)

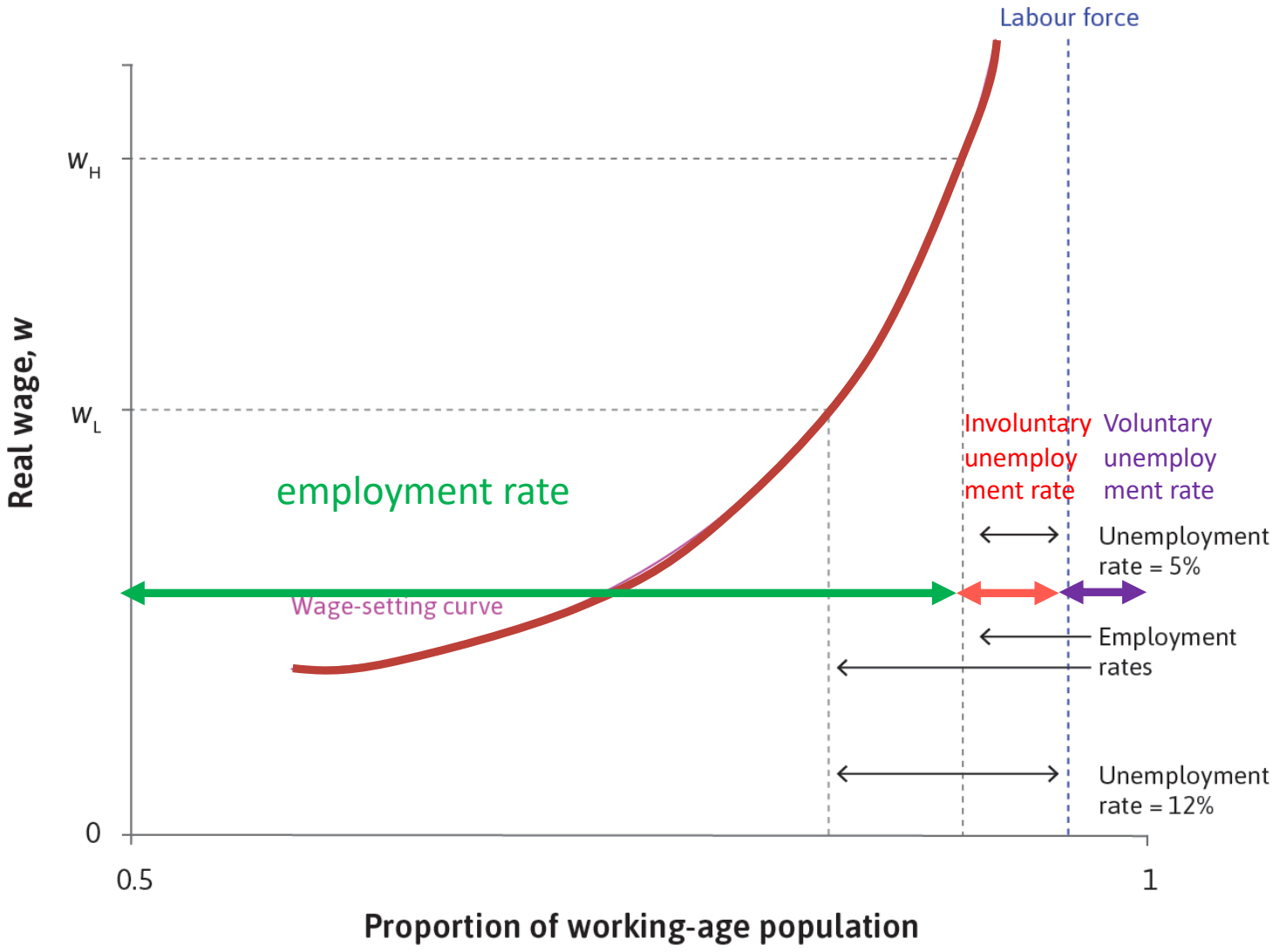
Inequality in labor income

- Skill-Biased Technological Change?
- Skill-Biased Technical Change is a shift in the production technology that favors skilled over unskilled labor by increasing its relative productivity and, therefore, its relative demand.
- Can observed wage inequality be explained solely in terms of differences of productivity?
- Where does human capital inequality come from, and what instruments would enable us to change it in an efficient way?

Inequality in income from another len of labor market

- Wage-setting curve
- Price-setting curve
- Lorenze curve to express distribution of income at labor market equilibrium

The wage-setting curve



- The horizontal axis represents the proportion of the working-age population, and goes up to a value of 1. The vertical axis is the economy-wide wage.

- *The labour force is the vertical line furthest to the right*: it has a value less than 1, depending on the participation rate.

- *Inactive workers* are to the right of the labour force line.

- *The employment rate* is the vertical line to the left of the labour force, indicating the share of the population who are actually working.

- *The unemployment rate is the proportion of those in the labour force who are not employed*: that is, those workers in between the employment rate line and the labour force line.

The wage-setting curve

The wage-setting curve

- **The wage curve**
- The pseudo-labor-supply curve
- The real wage necessary at each level of economy-wide employment to provide workers with incentives to work hard and well.

Reference: Blanchflower&Oswald(1995 JEP; 2006 The New Palgrave); Blanchard(1997, the medium run)

A possible story

- One theory of the wage curve—is that outside unemployment frightens workers. This may be because if something goes wrong, and individual workers need to obtain other jobs, finding jobs is likely to be harder when the local labor market is depressed. Therefore, although some details of the process here remain cloudy, rising joblessness might be thought to spawn declining levels of pay.

Ref: David G. Blanchflower and Andrew J. Oswald 1995 JEP An Introduction to the Wage Curve

A possible story

- Why the wage curve exists, however, is not so well-understood. One way to rationalize such a pattern is to appeal to non-competitive theories of the labor market -- for example to the idea of a no-shirking condition or a bargaining-power locus. According to this kind of analytical framework, high local unemployment makes life tougher for workers (because, for example, they will find it harder to obtain work if laid off by their current employer), and therefore it is not necessary for employers to remunerate them so generously.

Ref: David G. Blanchflower and Andrew J. Oswald 1995 JEP An Introduction to the Wage Curve

Wage setting curve

- Wage setters can only set the money wage W in their company or in their sector of the economy: the consumer price level P is the economy-wide consumer price level, and over this, the individual wage-setter has virtually no control.
- Each good is assumed to be produced by labor alone $\mathrm{Q} = F(L)$ — each good is thus a final good and not an input into the production of other goods.
- We therefore assume that no capital is used in the production of goods.
- As an additional simplifying assumption, we assume that labor productivity, lambda , is constant. $MP_L = AP_L = \lambda$

The Employment Game

1. The employer chooses a wage.

2. The worker chooses a level of work effort, taking into account the costs of losing her job if she does not provide enough effort. This model might be called “the labor discipline model”

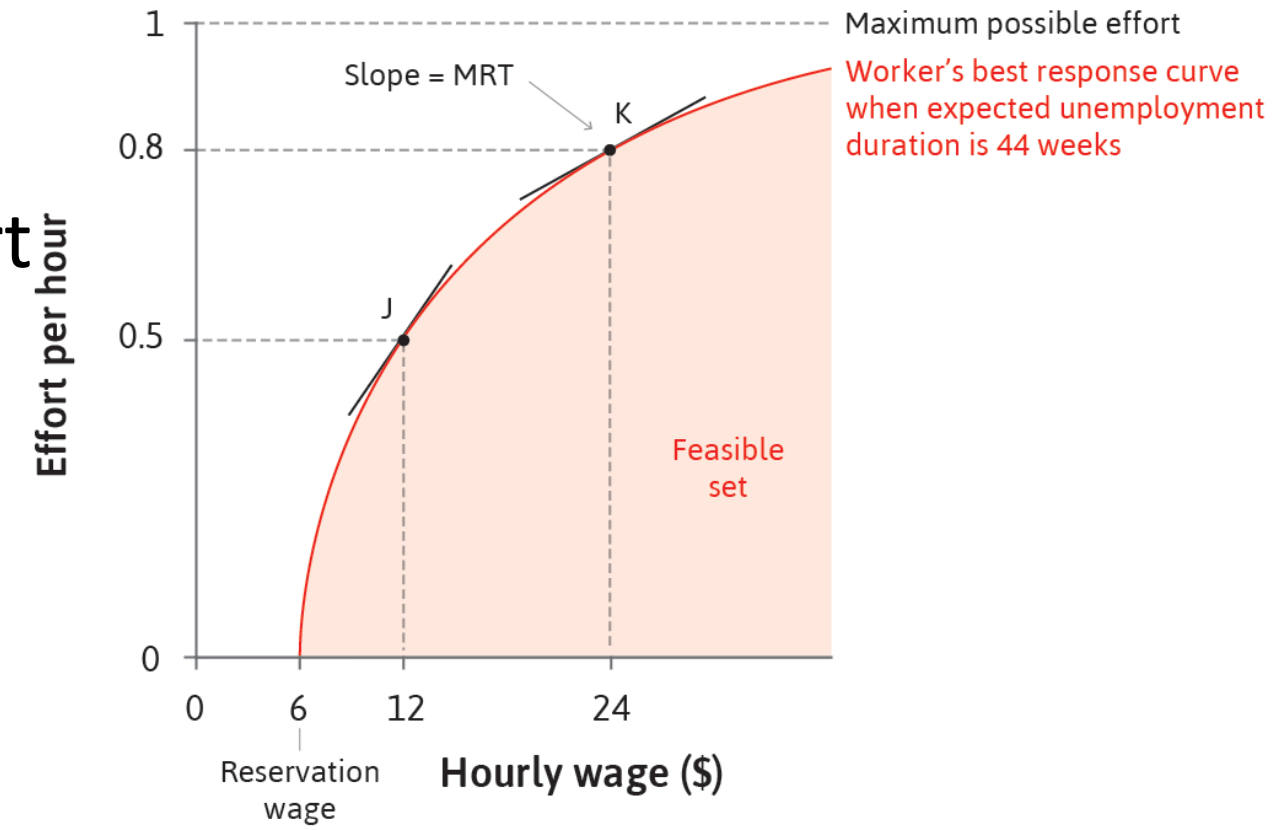
<u>Payoffs:</u>

- Firm: profit = worker's output – wage
- Worker: employment rent

Worker's Best Response Curve

Given the unemployment rate in economy, **Best response curve** shows the optimal amount of effort workers will exert for each wage offered

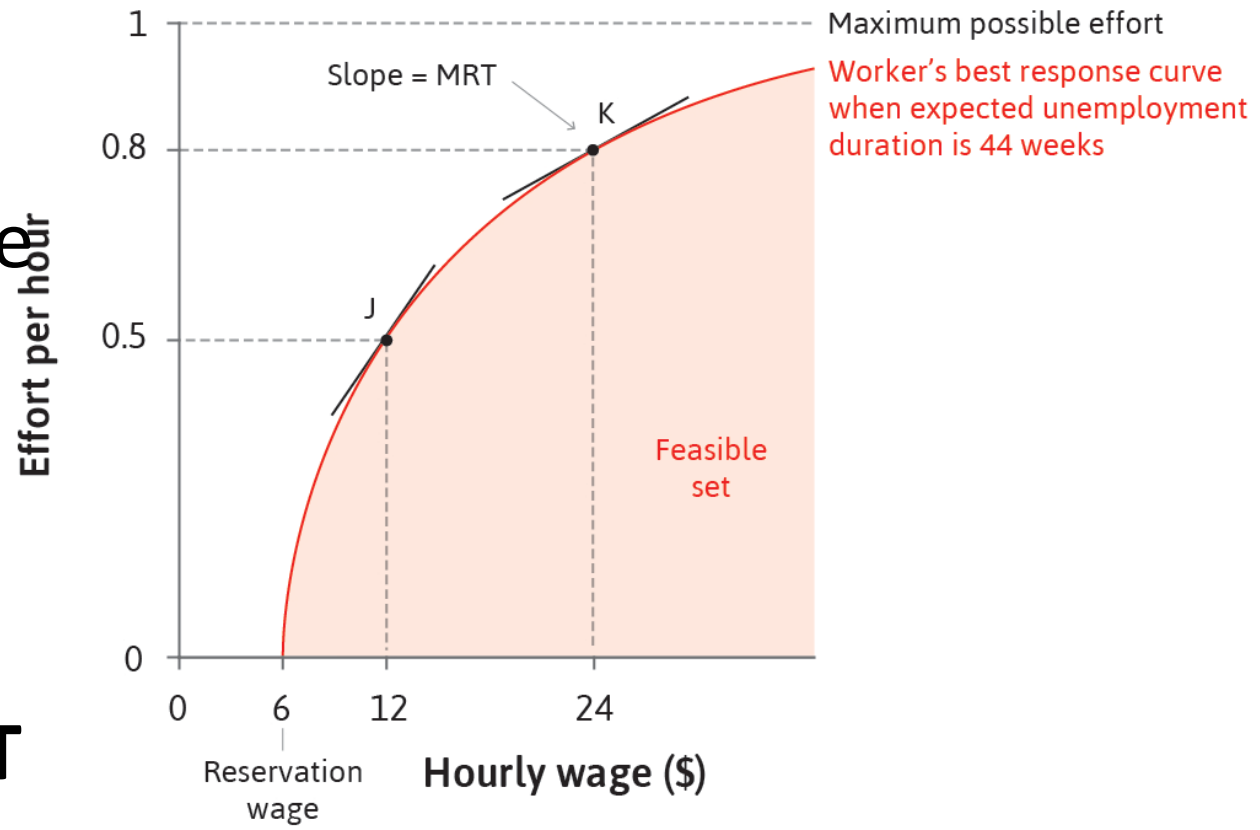
This represents the firm's **feasible frontier** for wages and effort



Worker's Best Response Curve

The best response curve slopes upwards means that employers face a trade-off. They can get more effort only by paying higher wages.

Slope of best response curve = **MRT**



Firm's best response

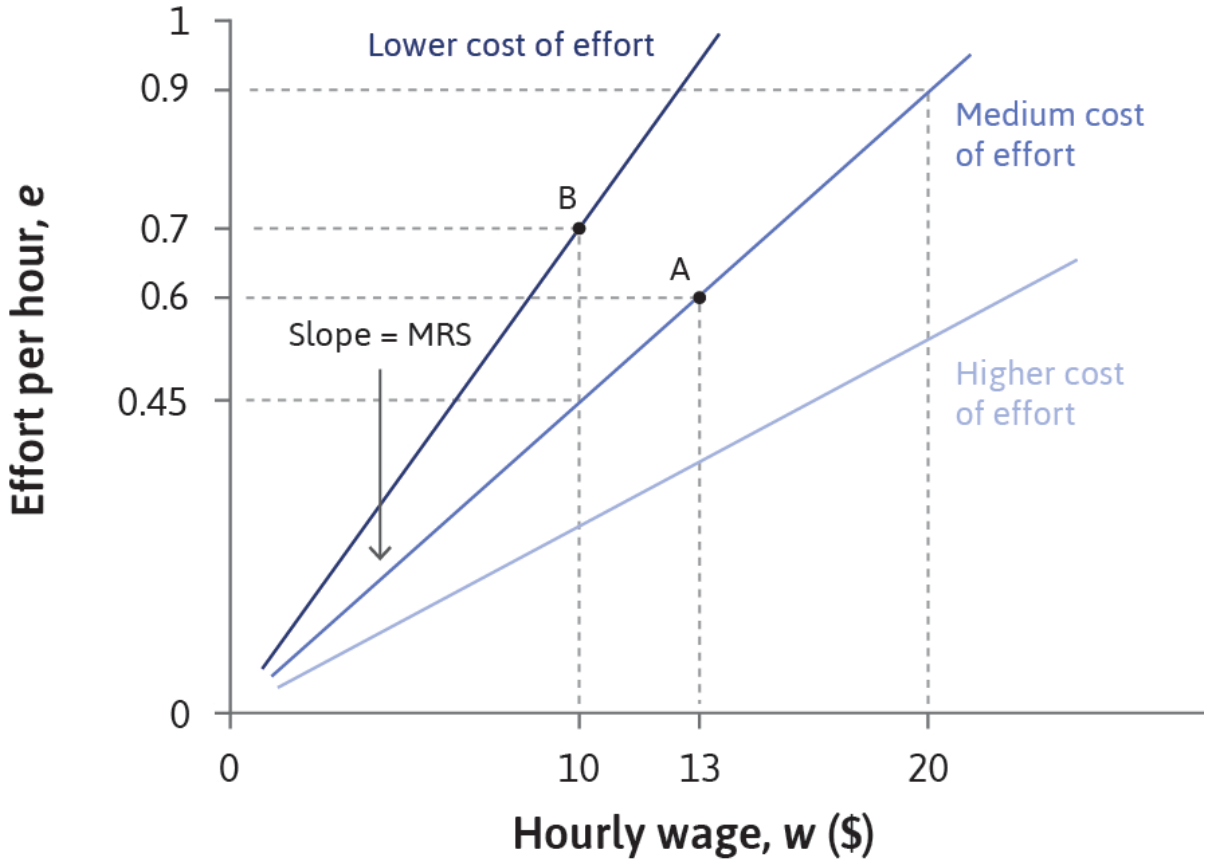
To maximise profits, firms want to minimise the costs of production.

Because there is a trade-off between wages and effort, the employer should find a feasible combination of effort and wage that minimises the cost per unit of effort $\frac{W}{e}$.

Isocost lines for effort

The cost of effort is the same at all points on an **isocost line**.

Slope of isocost curve = **MRS** = the rate at which the employer is willing to increase wages to get higher effort.

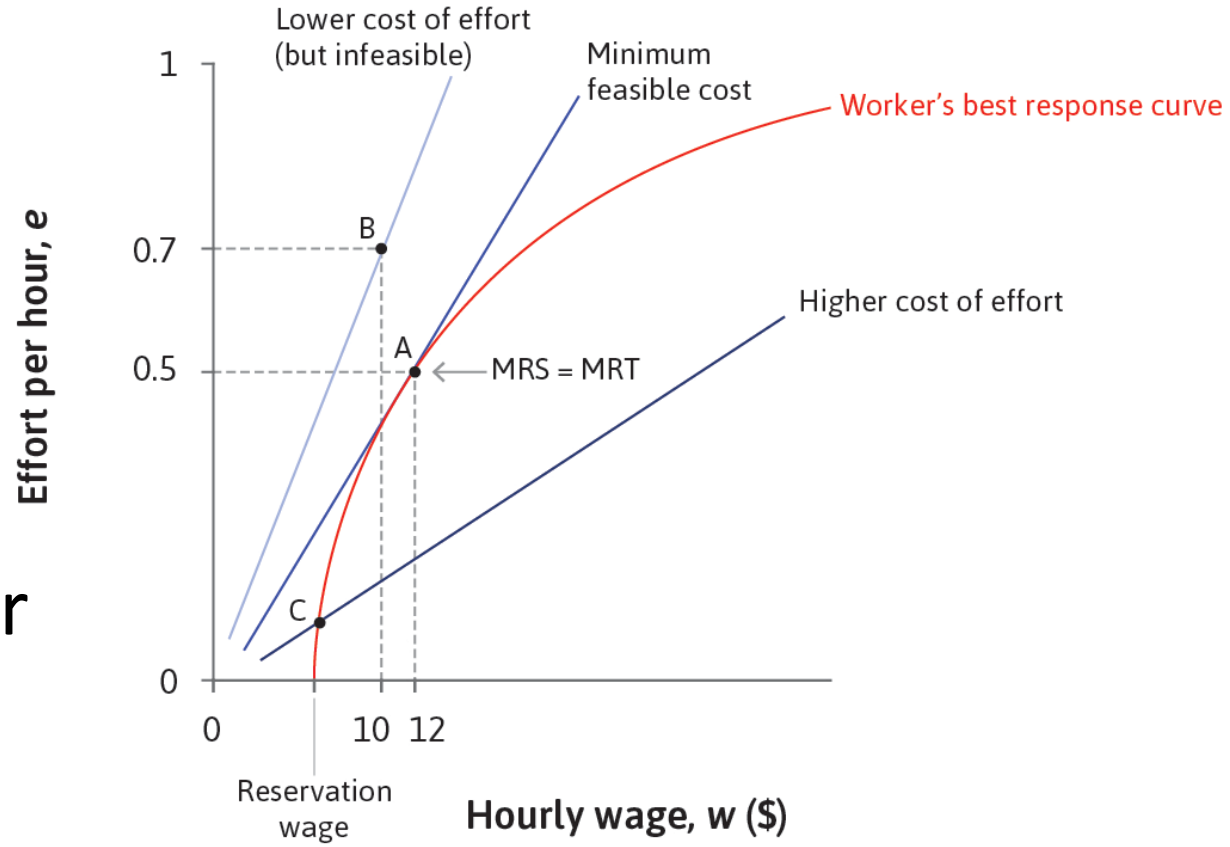


Determining wages

Profits are maximised at the steepest isocost line, subject to the worker's best response curve.

MRS = MRT

Efficiency wage = wages set higher than the reservation wage so workers will care about losing the job and provide more effort.



Involuntary unemployment

Involuntary unemployment = being out of work, but preferring to have a job at the wages and working conditions that otherwise identical employed workers have.

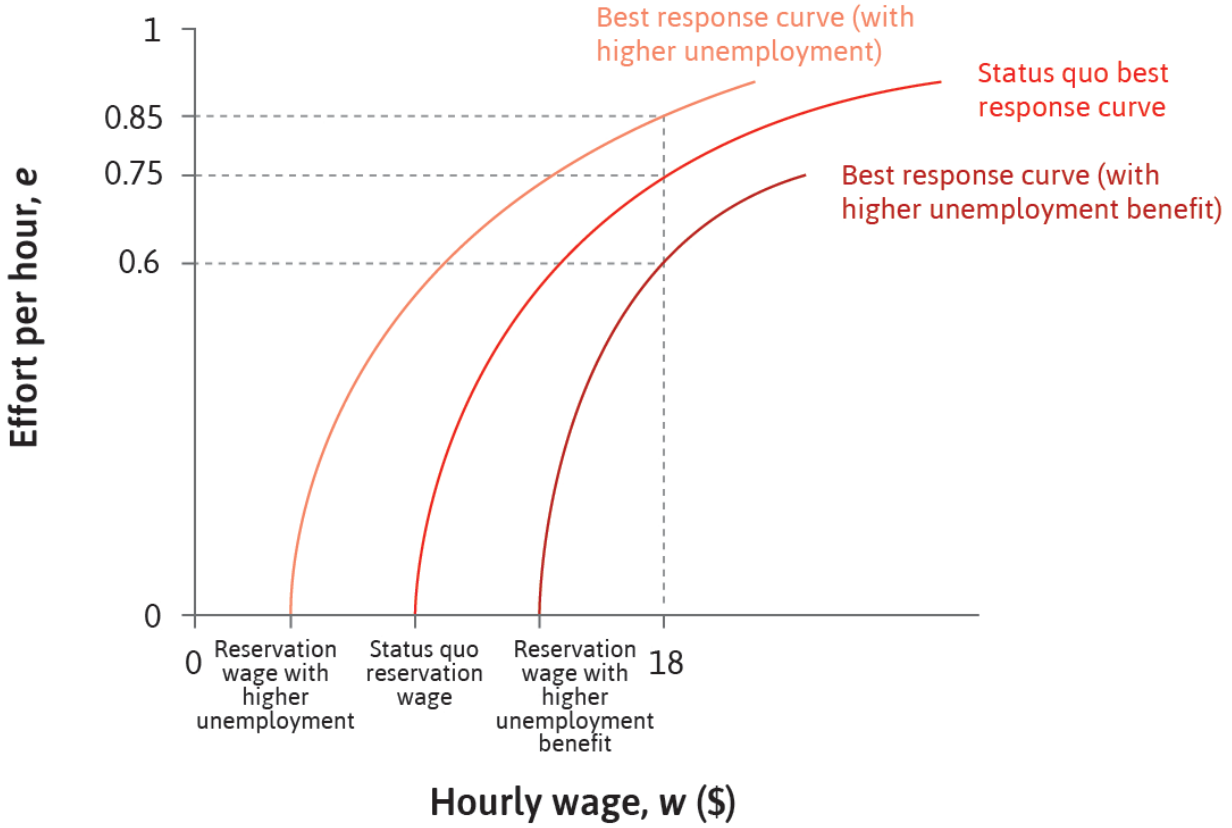
There must always be **involuntary unemployment** in the labour discipline model.

Why? In equilibrium, both wages and involuntary unemployment have to be high enough to ensure workers to put in effort.

Factors shifting the equilibrium

The best response function will shift in reaction to changes in:

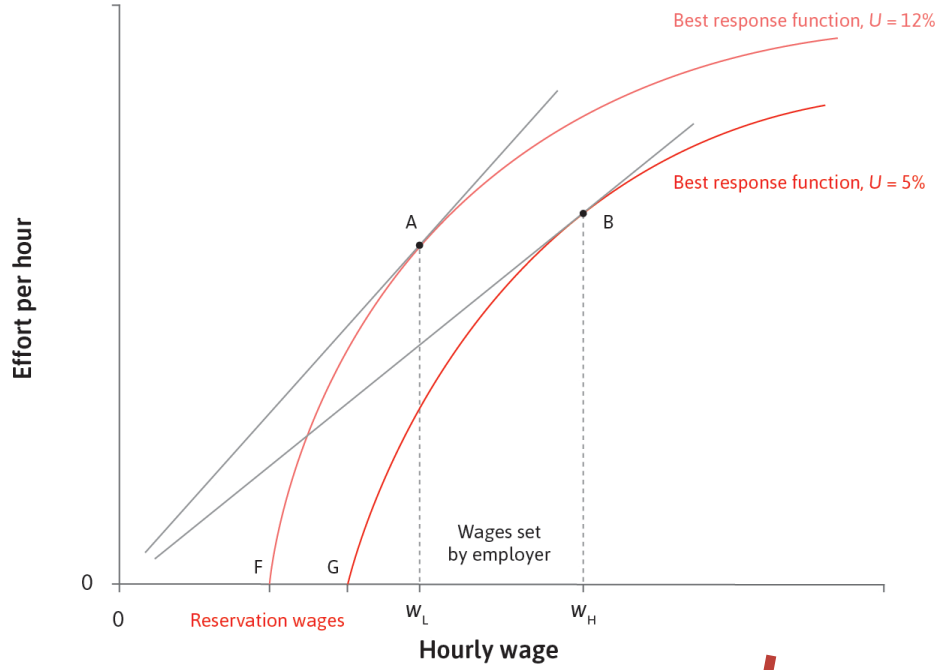
- the utility of the things that the wage can buy
- the disutility of effort
- the reservation wage
- the probability of getting fired at each effort level

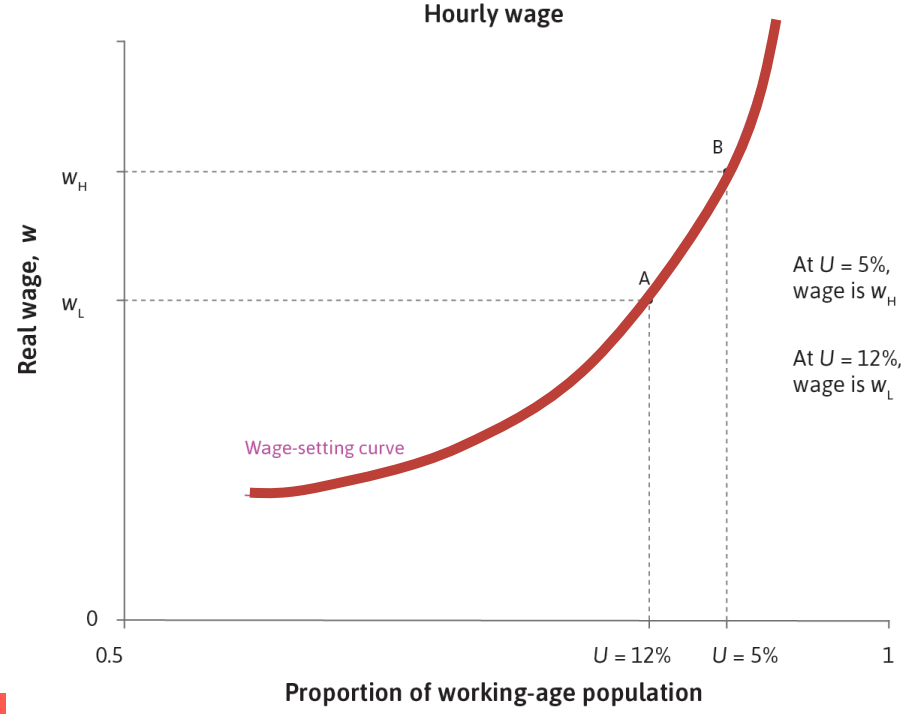


A higher unemployment rate reduces the reservation wage, because a worker faces a longer expected period of unemployment he or she loses a job. This weakens the employees' bargaining power and shifts the best response curve to the left.

Deriving the wage-setting curve

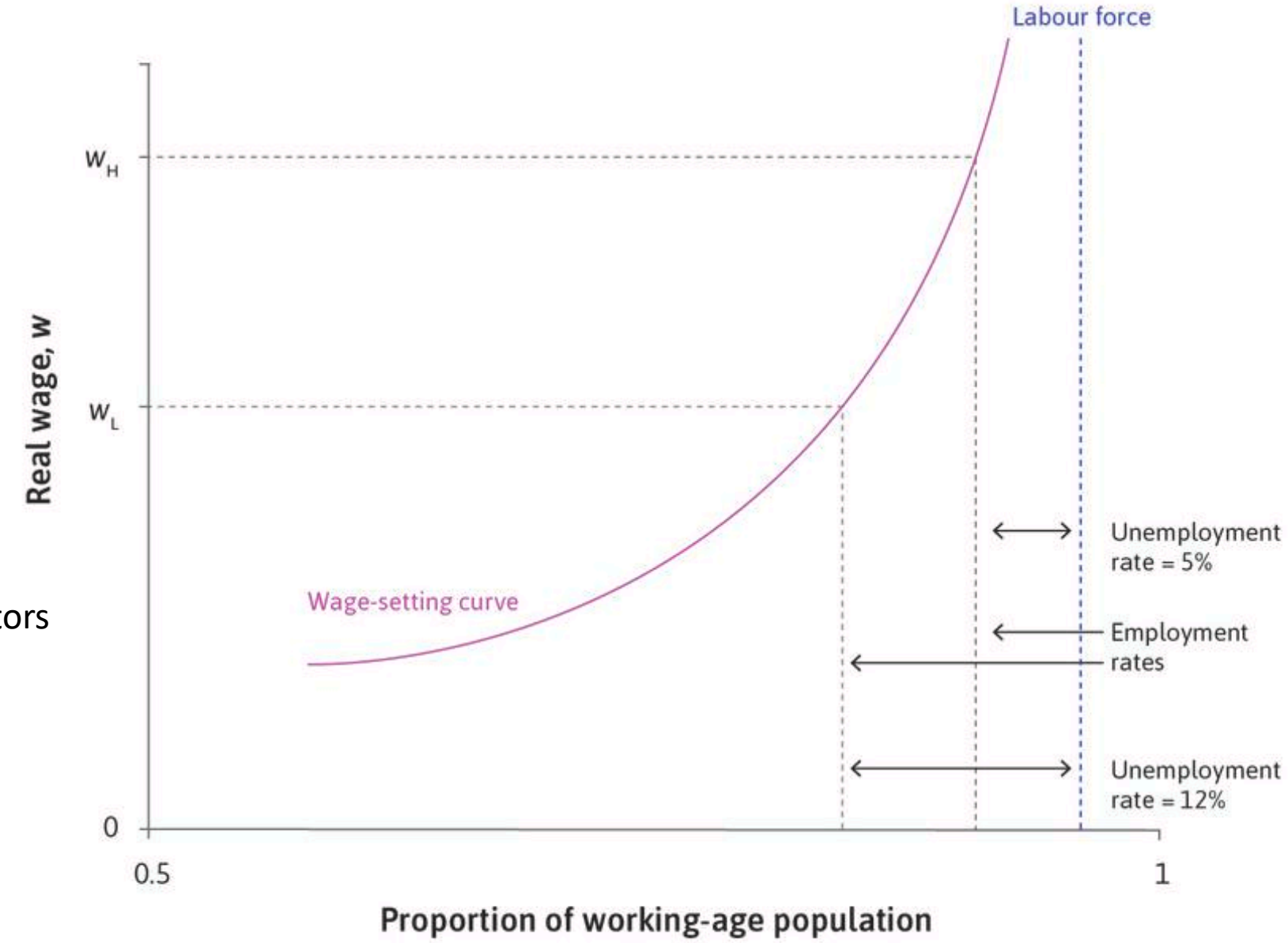
- Lowering the unemployment rate will shift worker's best response curve to the right (reservation wage↑) and increase wage
- This results in <u>upward-sloping wage-setting curve</u>





$$\frac{W}{\mathrm{P}} = g(u, z)$$

Z are the shift factors



At 5% unemployment in the economy, the employee's reservation wage is high and they will not put in much effort unless the wage is high. The firm's profit-maximizing wage is therefore higher.

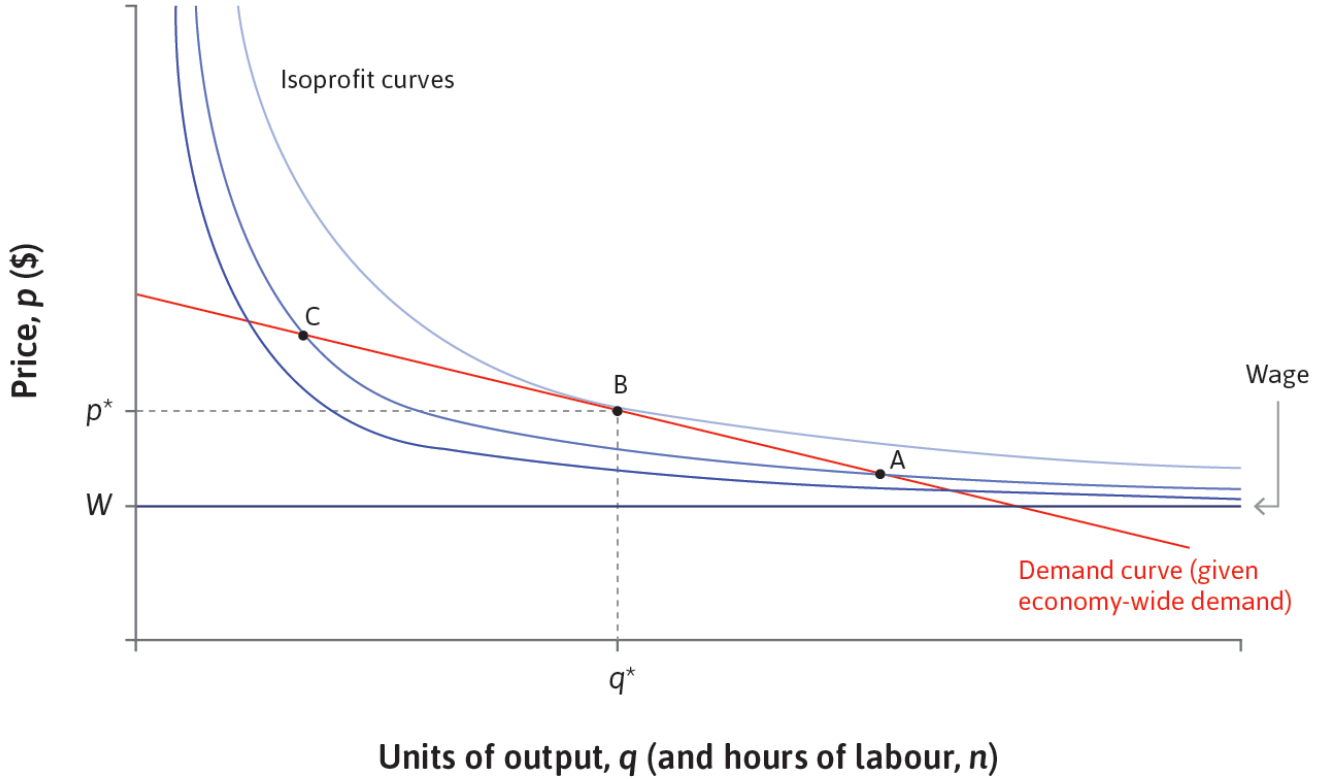
The price setting curve

- We can think of monopoly and Bertrand pricing.

- We look at price-setting firms, selling differentiated products and a large number of identical workers who may be employed by the firms for the same wage set by the firm

- There is strong empirical evidence that prices are set on the basis of some mark-up on unit costs of production and in particular on unit labor costs, i.e. the money wage divided by labor productivity $\frac{W}{MP_L} = \frac{W}{\lambda}$.

Profit-maximizing price



Firm's **optimal price** lies where the demand curve is tangent to an isoprofit curve.

The firm then hires a number of employees necessary to produce the quantity of output demanded at that price.

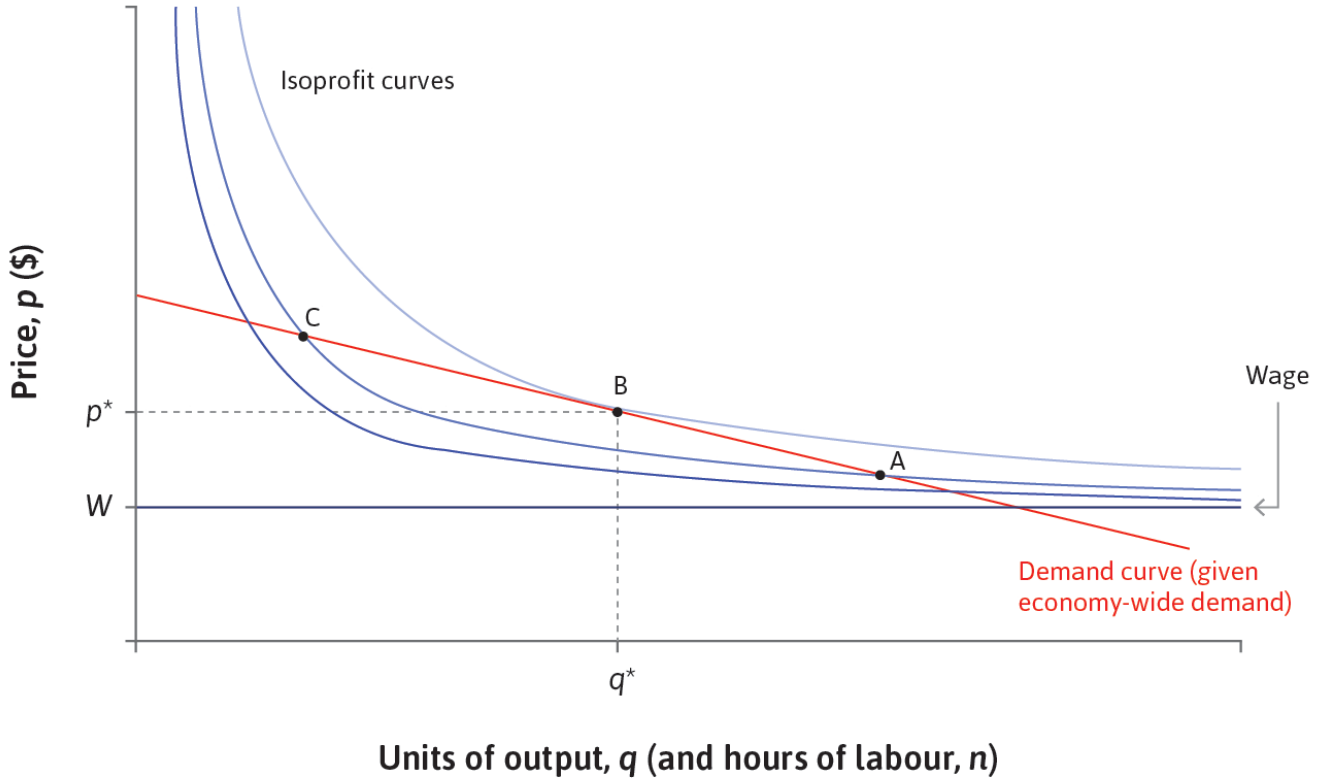
For simplicity, assume that one hour of labor produces one unit of output

$\mathrm{Q} = F(L) = L$:

$MP_L = AP_L = \lambda = 1 \; ; MC = W$

$\pi = PQ - WL = PQ - WQ$

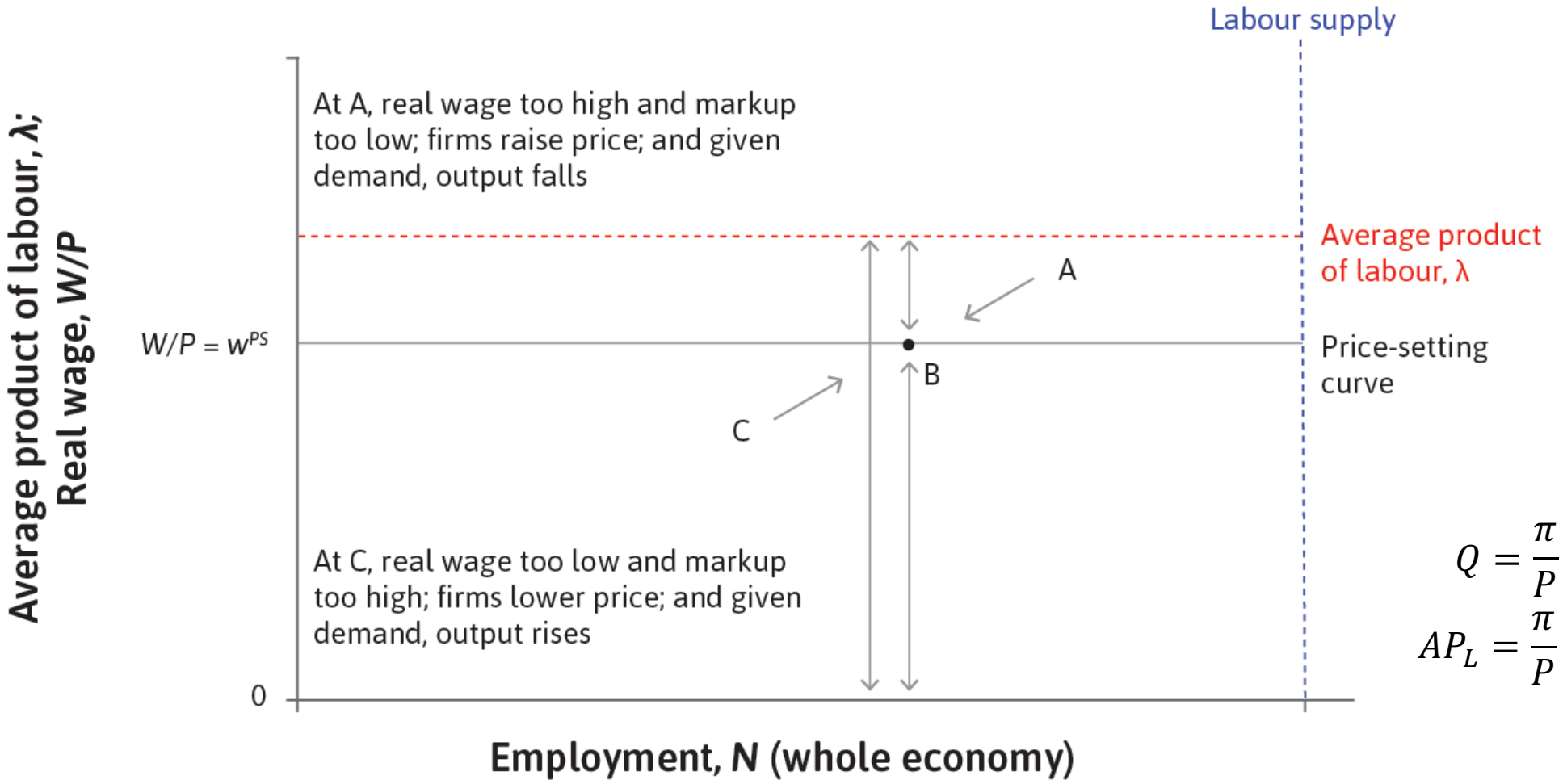
Profit-maximizing price



When the firm sells q^* goods at a price p^*, its total revenue is p^*q^*. Notice from the figure that once the firm has set a price, it has determined the division of the total revenue between profits and wages. This is based on the markup rate $\mu = \frac{p-W}{p} = 1 - \frac{W}{P}$.

, i.e. $p = \frac{1}{1-\mu} W = \frac{1}{1-\mu} MC$

The price-setting curve



$$Q = \frac{\pi}{P} + \frac{W}{P}Q$$

$$AP_L = \frac{\pi}{P} + \frac{W}{P} = 1$$

The price-setting curve = the real wage paid when firms choose their profit-maximizing price.

Distribution of output

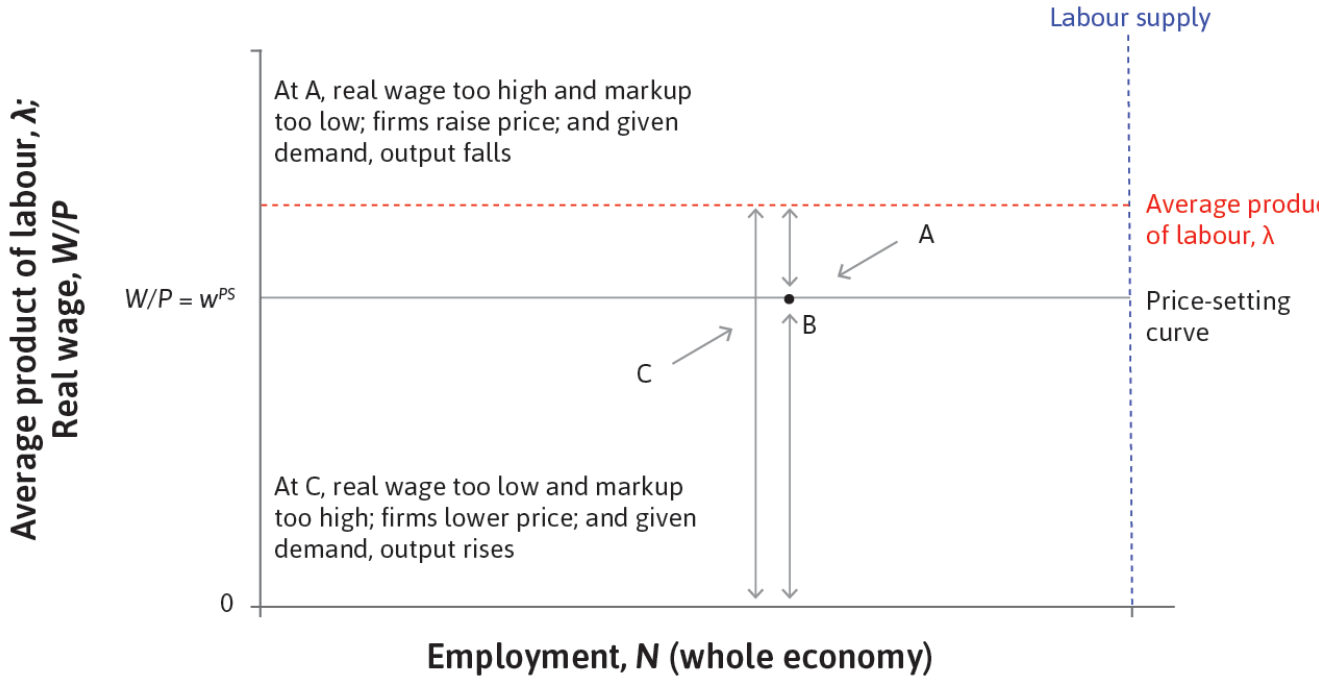
The firm's choice of profit-maximizing price determines how output is distributed between the firm-owners and the workers.

$$\frac{output}{worker} = real\ profit + real\ wage$$

The price-setting curve

The price-setting curve depends on factors such as competition, which determines markup.

Less competition, higher mark up, higher price, lower real wage



Oliver Blanchard, 1997, “The Medium Run”

- I do not take "labor supply" necessarily to mean competitive labor supply, but rather (and more generally), the relation between the wage and unemployment implied by wage-setting in the labor market. Other researchers have variously called this the wage curve, the wage-setting relation, or the pseudo-labor-supply curve.
- By "labor demand”, I do not necessarily mean competitive labor demand, but rather, the relation between the real wage and employment that emerges from the employment and pricing decisions of firms. This is sometimes called the price-setting relation or the pseudo-labor-demand curve.
- It may have come either from changes in price-setting in the goods market or from changes in wage-setting in the labor market.
- But in a number of plausible descriptions of wage-setting, the wage need not be equal to the marginal product of labor.

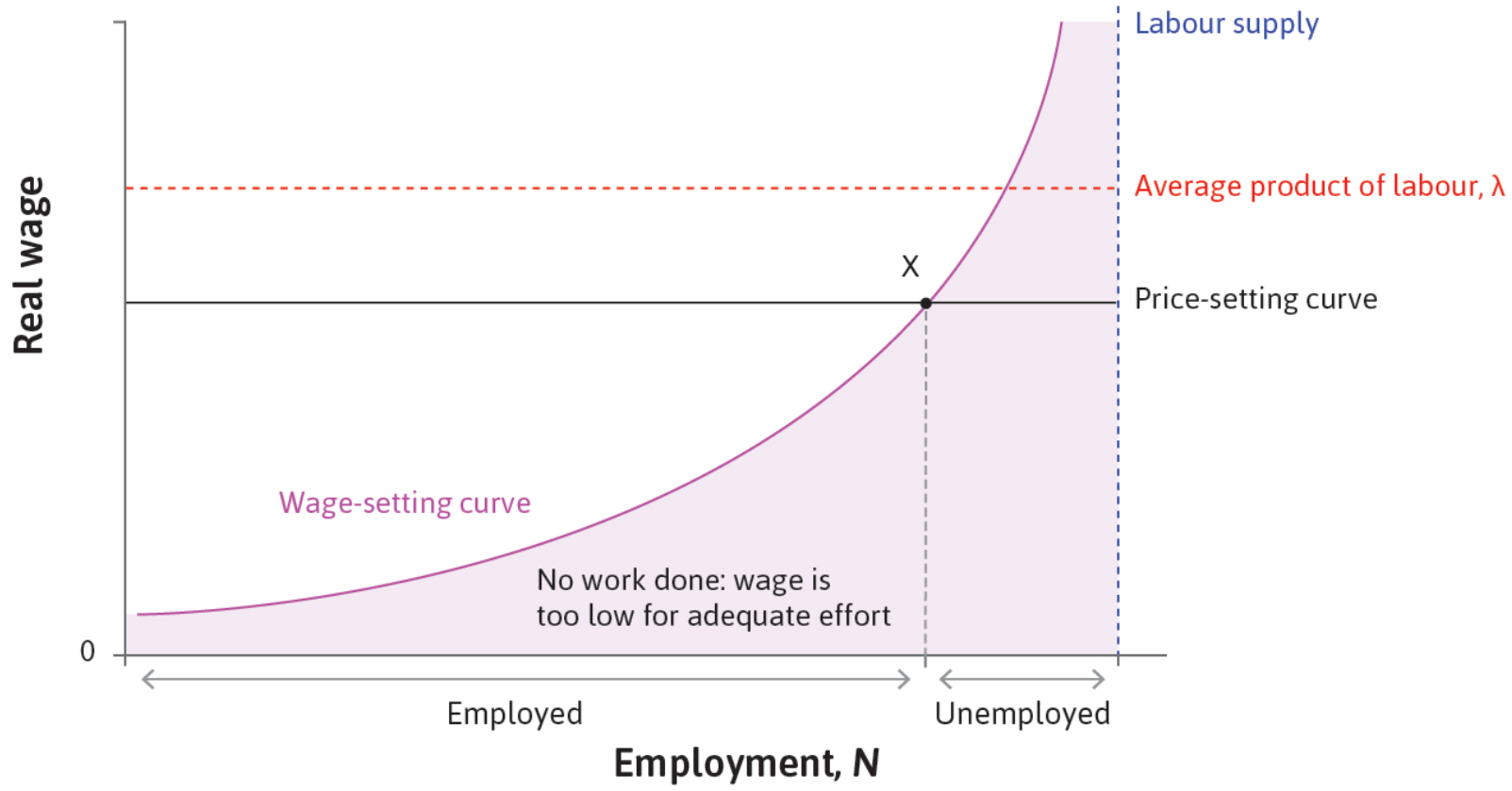
The labour market equilibrium

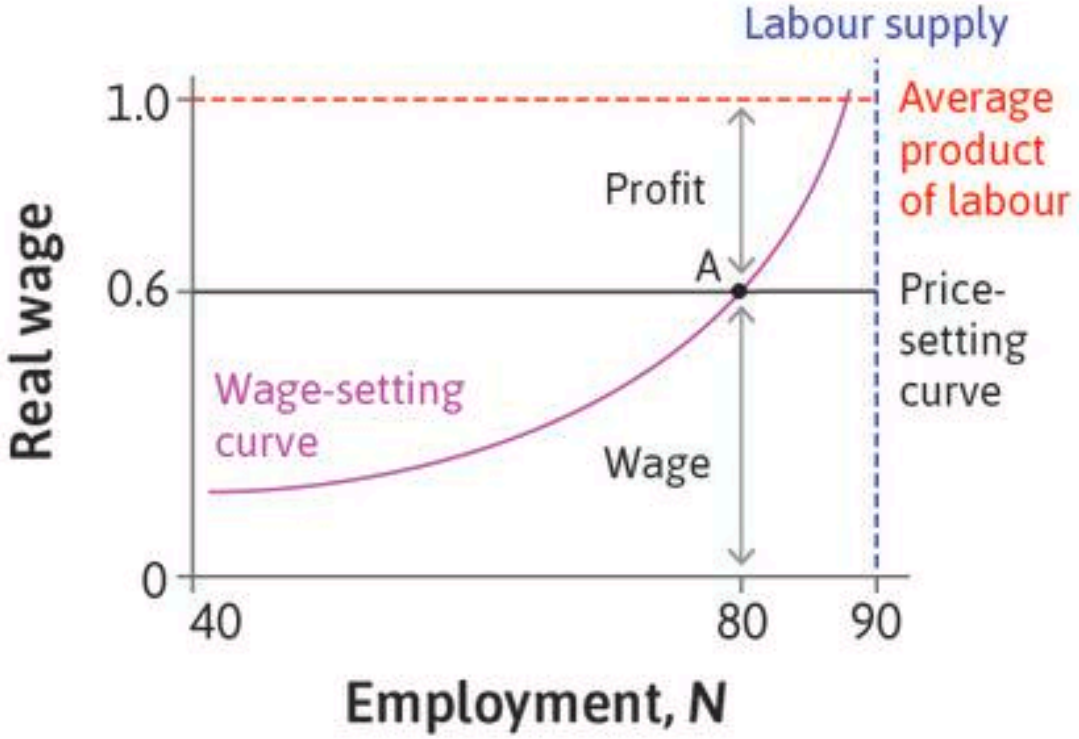
- The labor market model is also a model of the distribution of income in a simple economy in which there are just two classes (employers, who are the owners of the firms, and workers), where some of the latter are without work.

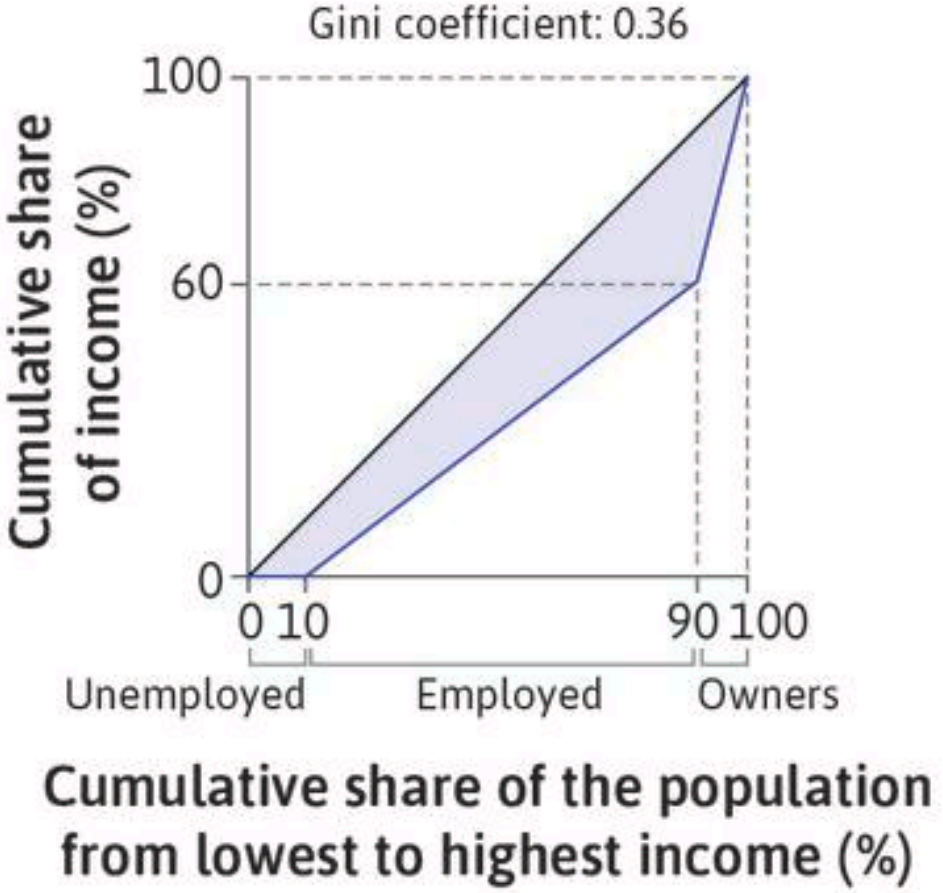
- The equilibrium employment rate is determined when the real wage implied by the wage-setting curve is equal to that implied by the price-setting curve.

The labour market equilibrium

The wage-setting and price-setting curves are two sides of the economy.

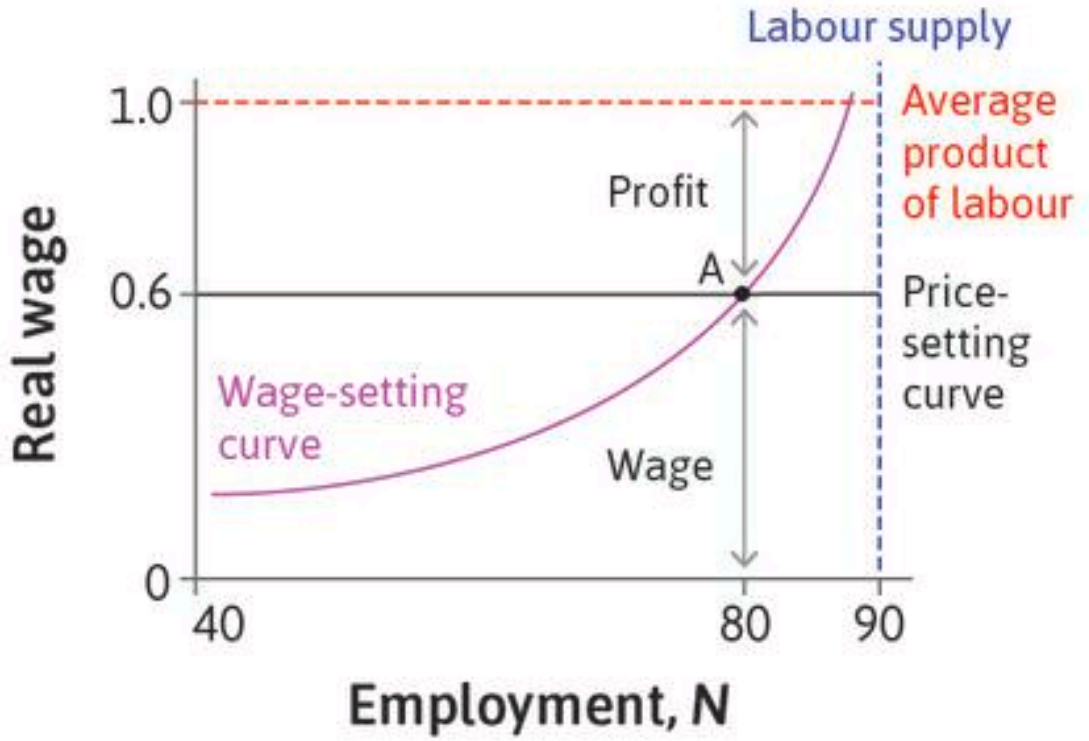


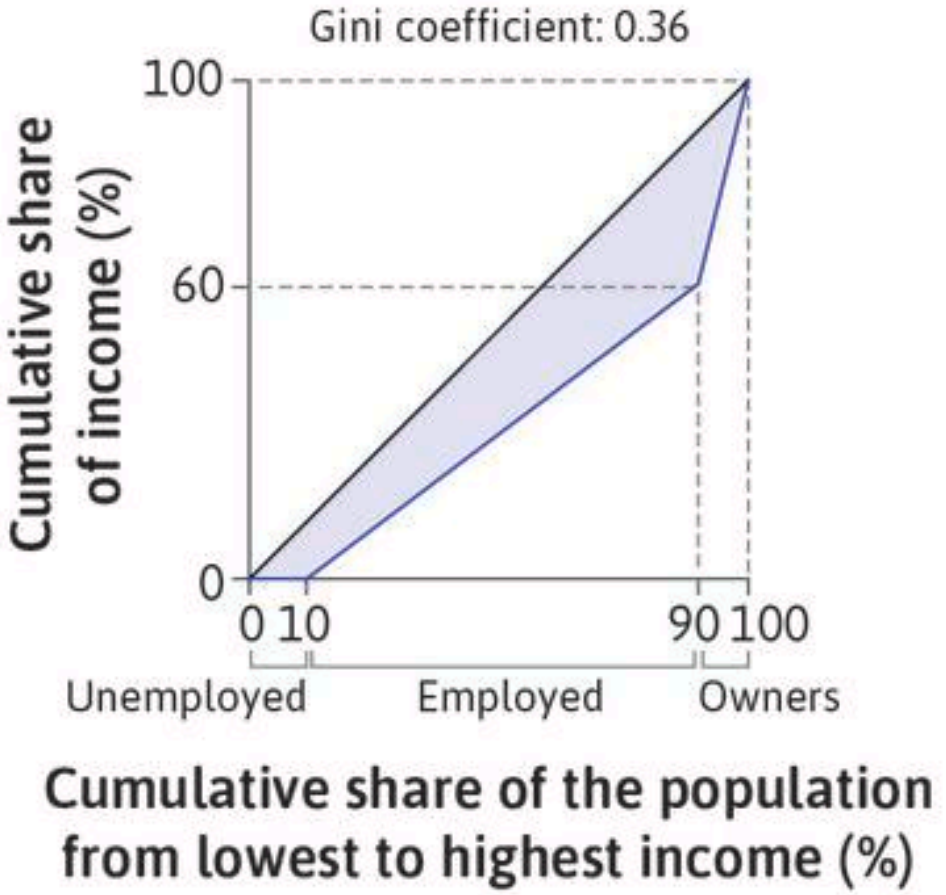




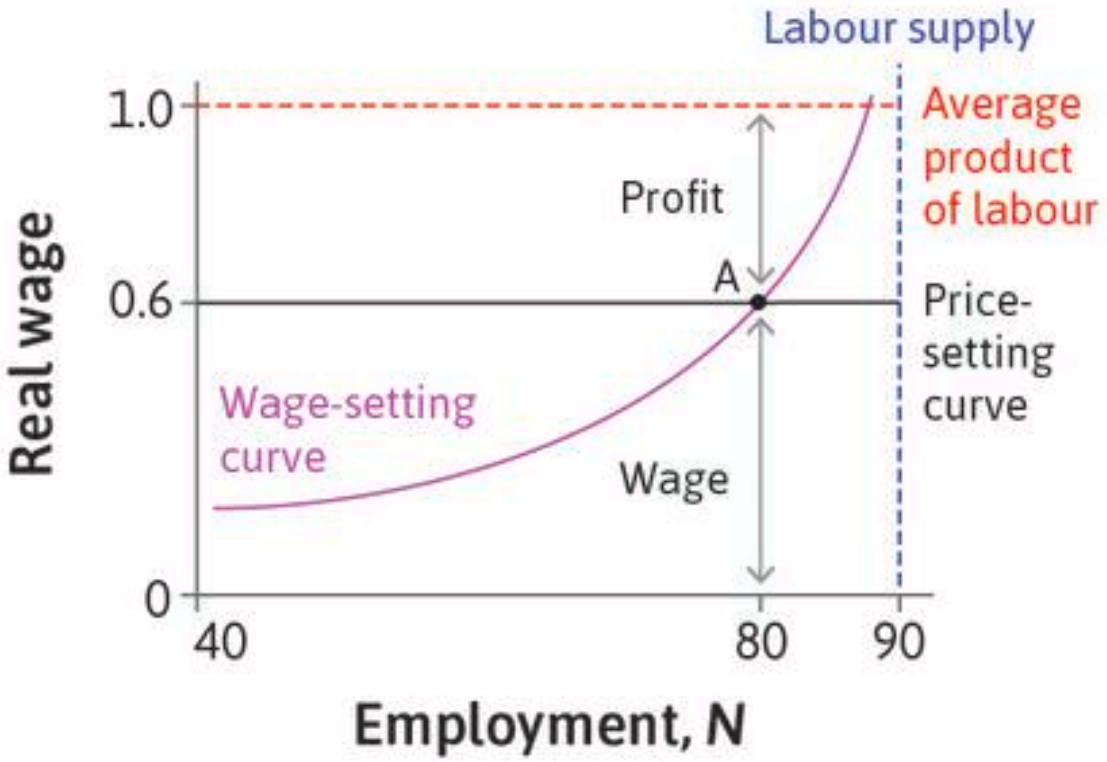
The labor market of an economy with 80 identical employees of 10 identical firms. Each firm has a single owner. There are 10 unemployed people.

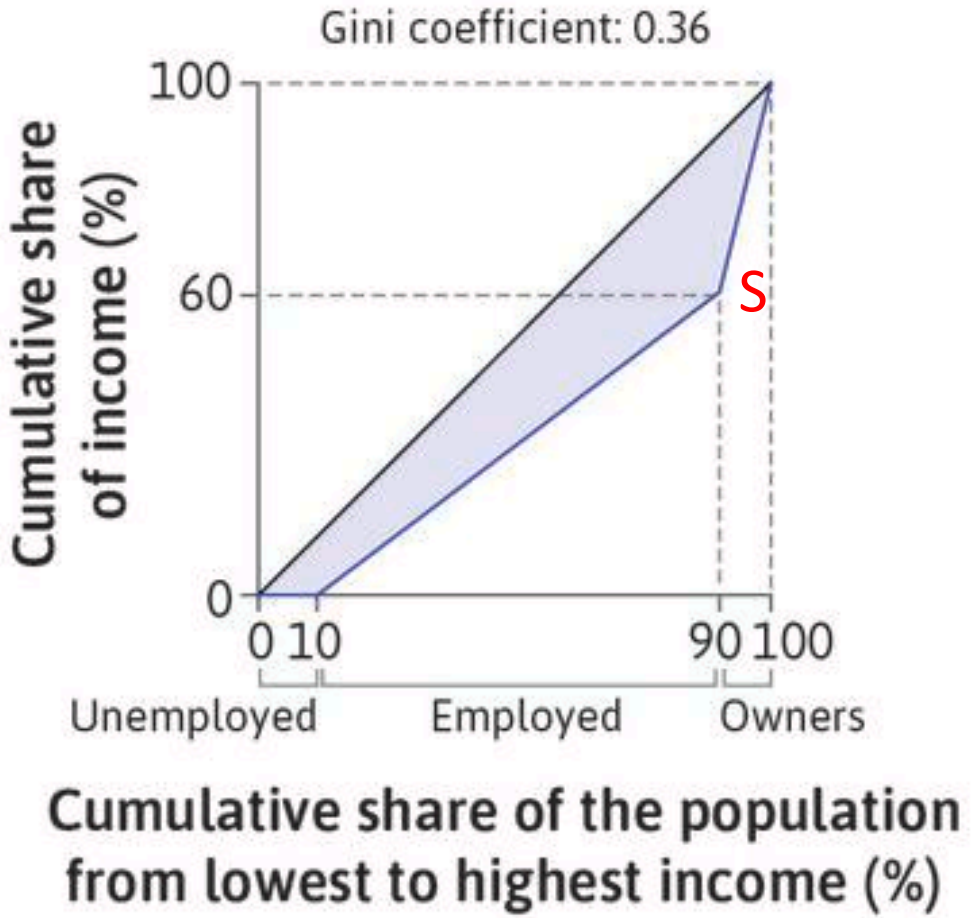
The economy is in equilibrium at point A, where the real wage is both sufficient to motivate workers to work and consistent with the firm's profit-maximizing price markup over costs (w = 0.6 in this case).





The right-hand panel shows the Lorenz curve for income in this economy.
Because the unemployed people receive no income if there are no unemployment benefits, the Lorenz curve (the solid blue line) begins on the horizontal axis to the right of the left-hand corner. The price-setting curve in the left panel indicates that total output is divided up so that workers receive a 60% share and their employers receive the rest.
In the right panel this is shown by the second ‘kink’ in the Lorenz curve, where we see that the poorest 90 people in the population (the 10 unemployed workers and the 80 employees, shown on the horizontal axis) receive 60% of the total output (on the vertical axis).





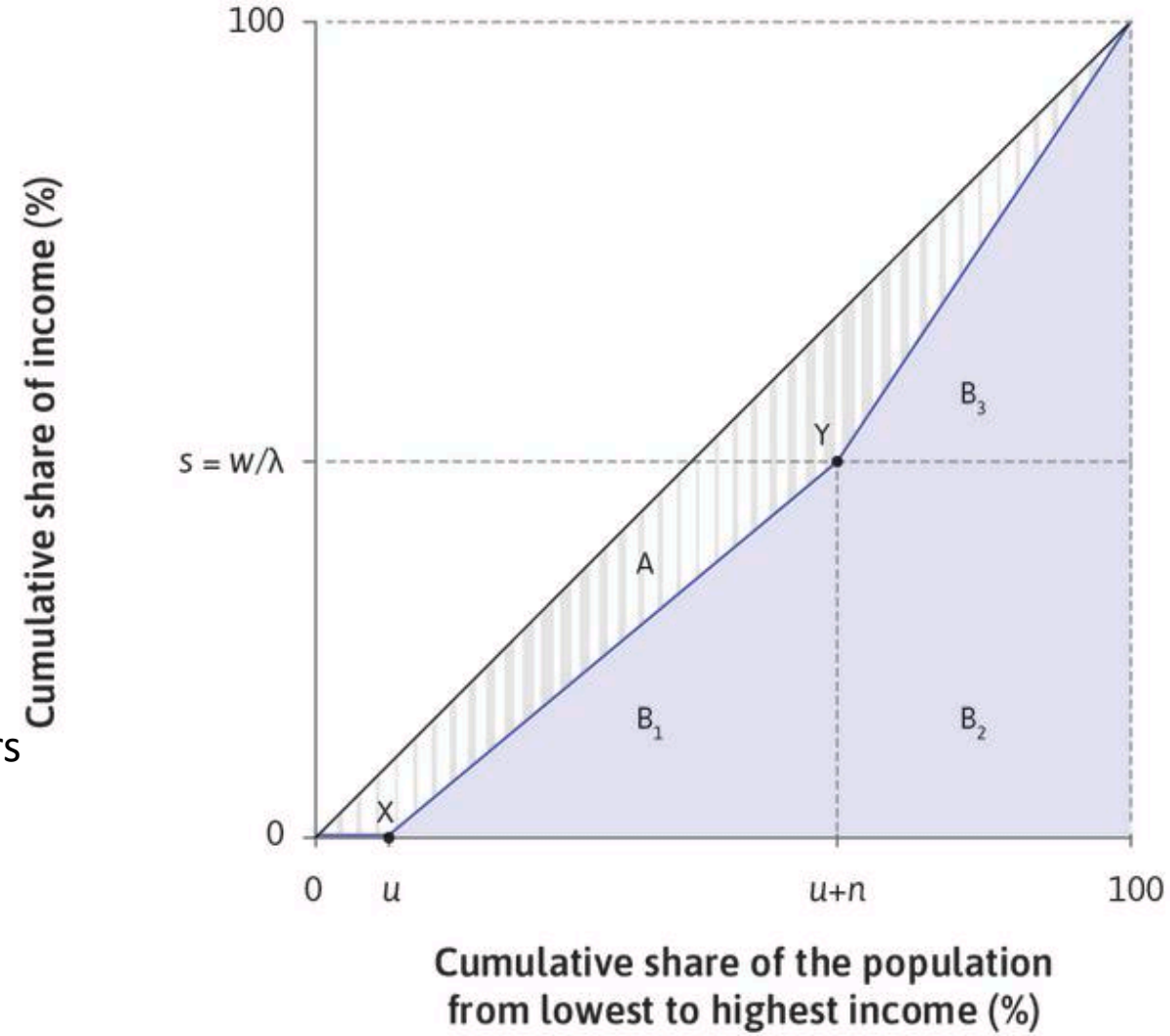
The kink is the fraction of output received in wages, called the wage share in total income:

$$s = wage\ share = \mathrm{w}/\lambda$$

The Lorenz curve and the Gini coefficient in an economy with unemployed, employed, and employers (owners)

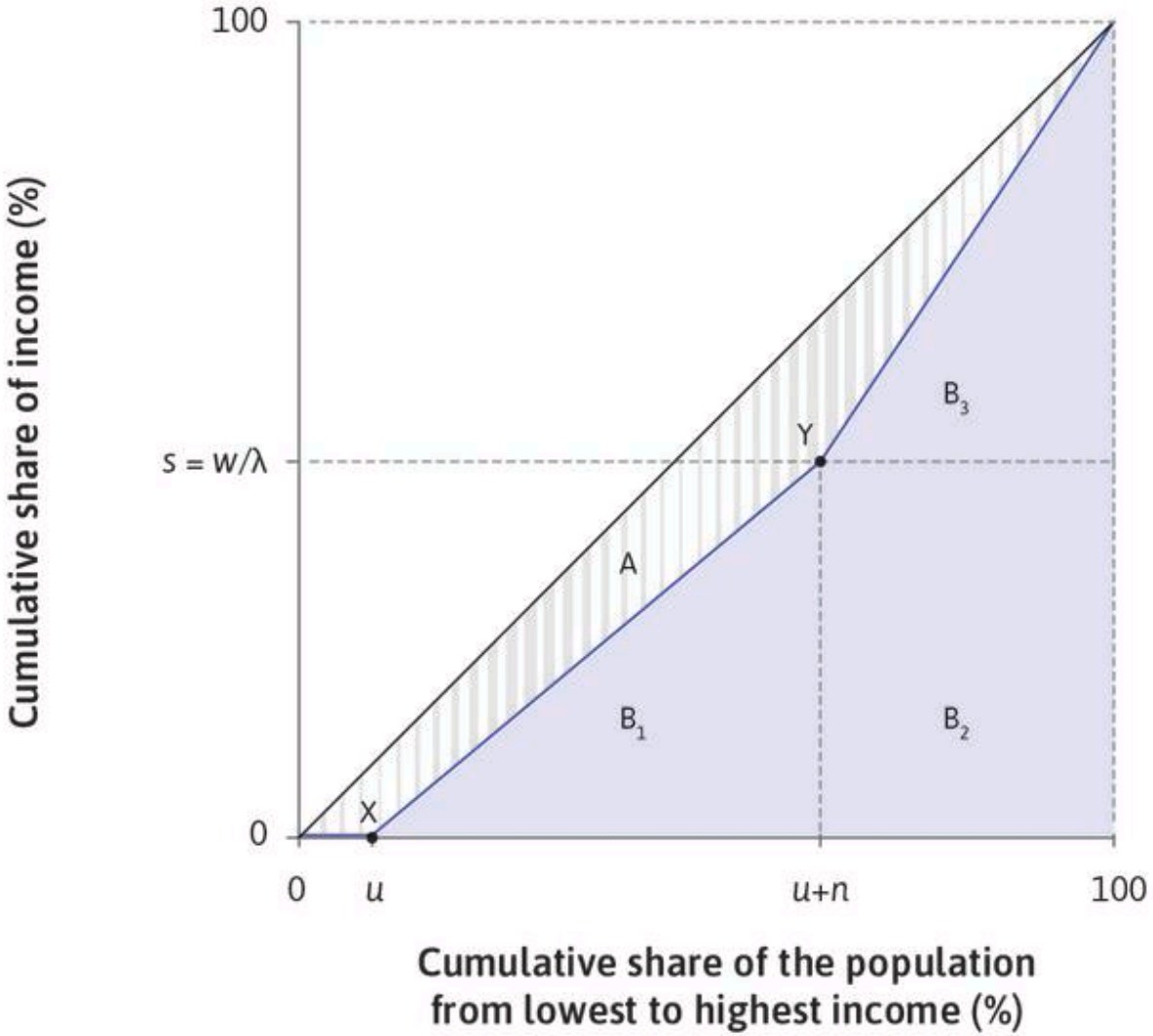
The labour market determines the division of the economy's output between <u>employed workers, the unemployed, and firm-owners.</u>

u, the fraction of the population that is unemployed
n, the fraction of the population that is employed
w, the real wage
λ, output per employed worker
$s = wage\ share = \mathrm{w}/\lambda$, the wage share received by workers



The Lorenz curve and the Gini coefficient in an economy with unemployed, employed, and employers (owners)

Ceteris Paribus, Gini coefficient will rise with:
- unemployment rate ↑
- real wage ↓
- markup ↑
- wage share ↓
- productivity ↑
- the class of employers gets relatively smaller

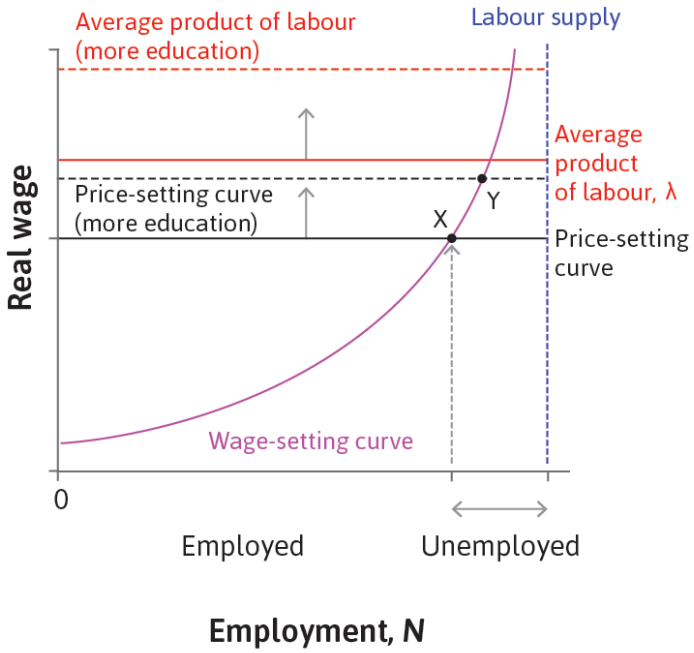


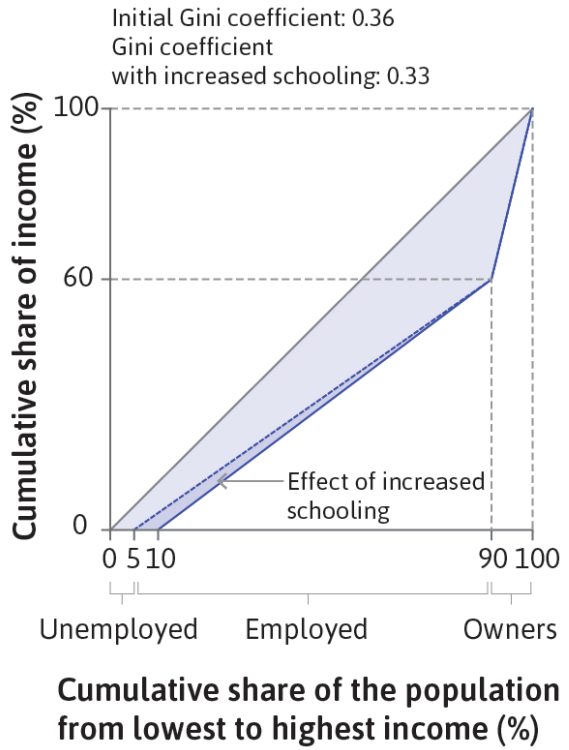
The effect on inequality of an increase in the educational level of the workforce

Productivity can rise if the entire workforce is better educated
e.g. an increase in the compulsory schooling age.

AP_L increases
At the initial wage, firms make higher profits -> Firms enter, reducing unemployment.

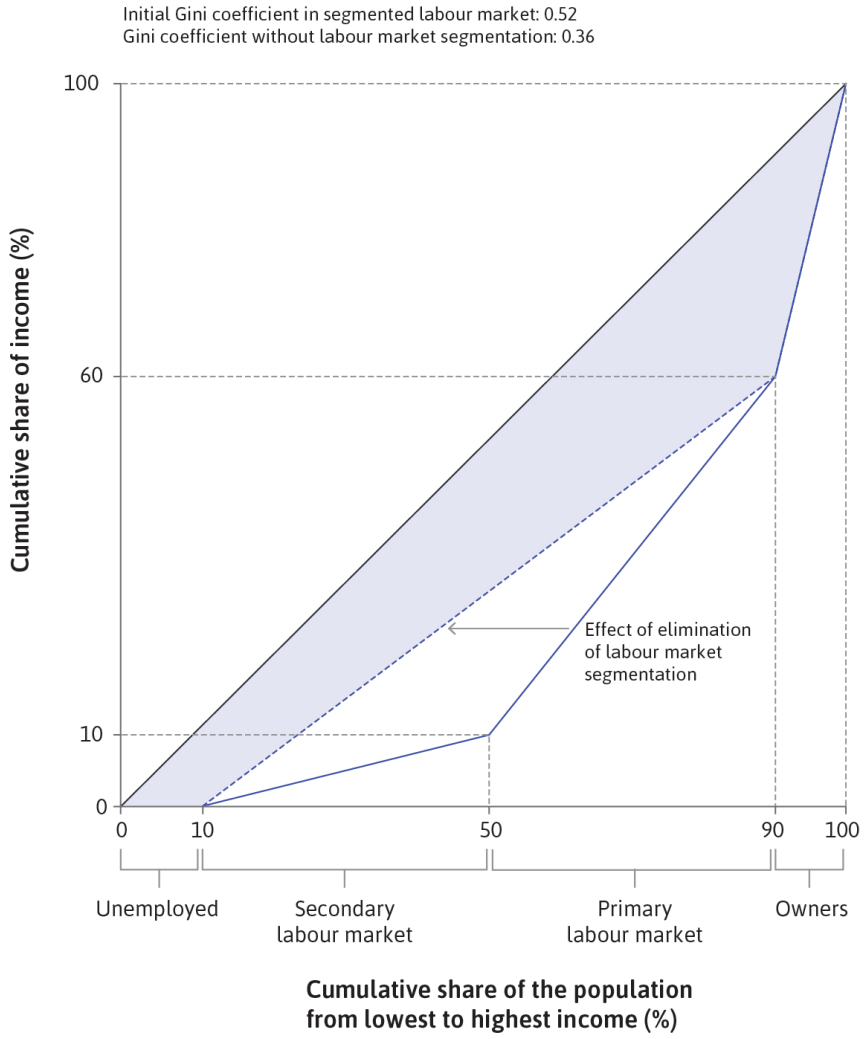
-> Workers have better reservation option so can have higher wages
-> Inequality falls.





The effect on inequality of a reduction in discrimination against a segment of the workforce

- Labour market segmentation
- Primary labor market: ‘Good’ jobs, with high wages, job security, and trade unions
- Secondary labor market: short-term contracts, limited wages and job security.
- Eliminating segmentation raises average wages, reducing inequality.



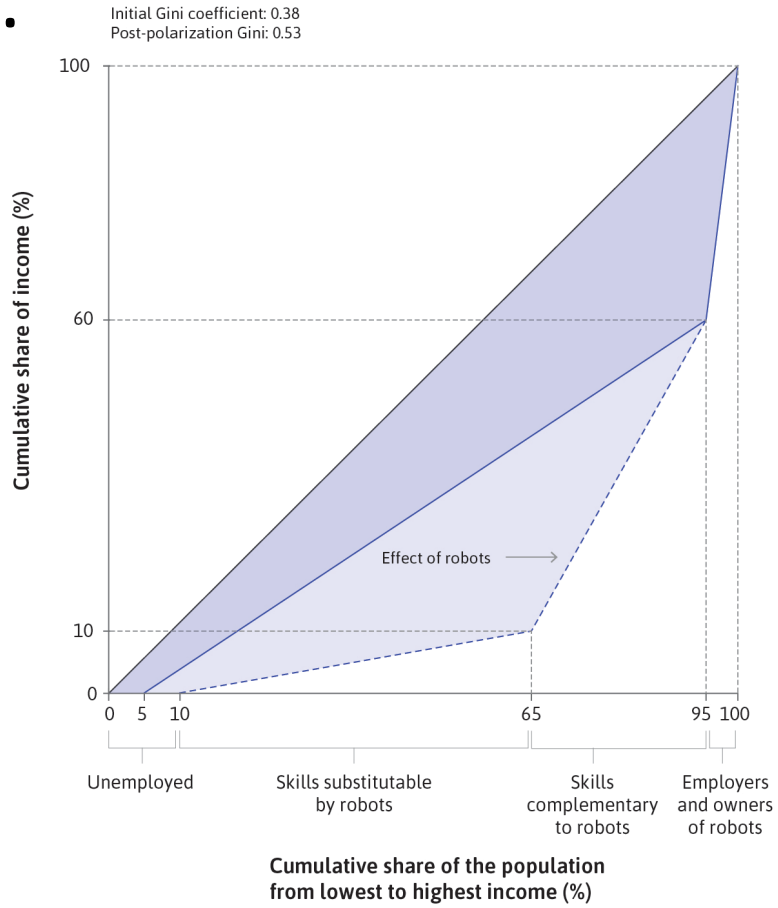
The effect on inequality of automation of production reducing the demand for some skills and increasing others

Automation: Technologies that allow machines to do the work that people used to do.

New technology increases demand for some skills and reduces demand for others.

In the short run:

- Machines replace routine labor, increasing unemployment.
- Workers whose skills are complementary earn higher wages, increasing inequality.



Example #3: Automation

In the long run, there are two opposing effects on wages and employment:

1. Higher unemployment reduces workers' reservation option, lowering the wage that firms have to set.

2. But an increase in productivity increases profits, which motivates and finances capital expansion, which in turn creates new jobs and reduces unemployment, increasing the wage.

Policies can help the transition process:

- Opportunities for displaced workers to upgrade their skills
- Job opportunities and higher wages in non-routine sectors