Principles of Economics II

Introduction

Fall 2022
Kristiina Huttunen

Welcome!

Teacher: Kristiina Huttunen

- Kristiina.huttunen@aalto.fi
- https://sites.google.com/site/krhuttunen/research

TA and review sessions: Anna Holvio

- Anna.holvio@aalto.fi

Lectures: Tue 10–12, Wed 10–12

Review Session: Friday 10-12

Course organization

Course homepage

- mycourses.aalto.fi -> my own courses-> Principles of Economics II
- Lecture slides, problem sets, return of problem sets

Textbook

- CORE-team: The Economy: www.core-econ.org/the-economy
- Relevant chapters indicated in the Syllabus of the course

Lectures

- Indicate the central content in the textbook and develop some themes further

Learning objectives

Principles of Economics (4 separate units) aims to

- Provide an overall view of economic activity in modern societies
- Take a first look at economic modeling and economic analysis
- Give an introduction to the use of data in economics
- Introduce economics behind major societal challenges

Objectives for Part II

- Understand aggregate economic phenomena: labor market, market failures, inflation, the role of public sector

Assessment and grading

Grading

- 80% of your grade is based on final examination (Dec 5)
- 20% of your grade based on problem sets

Review sessions: discuss the lecture material and suggested solutions to problem sets

- Answers to problem sets returned via MyCourses
- An ideal place to ask questions regarding course material

It is essential to complete the problem sets!

The course (160h) assumes a large amount of independent work on top of the lectures

How to get the most from the course?

Familiarize yourself with the topic of the lecture in advance

Check that you have understood the main concepts in the lecture

- You can do this using the interactive tools in the textbook and by reviewing the list of concepts provided at the end of each chapter

Concentrate on the most relevant concepts and ideas

- One of the learning goals in this course is that you should learn to identify the key ideas
- Lecture material and problem sets are designed with this in mind

Feedback

You will get feedback on

- Performance in the problem sets
- Performance in the final examination

We want to get your feedback

- During lectures: ask questions! If you do not understand something, many others will have the same problem
- After lectures: I am available for short questions immediately after class and can set up an appointment for longer ones
- In review sessions
- A questionnaire during the course and after the course

Outline for the course (tentative)

Lecture 1–2: The labour market: Wages, profits, and unemployment. Unit 9

Lecture 3–4: Markets, efficiency and public policy. Unit 12

Lecture 4-5: Economic fluctuations and unemployment. Unit 13

Lecture 6–7: Unemployment and fiscal policy. Unit 14

Lecture 8–9: Inflation, unemployment, and monetary policy. Unit 15

Lecture 10–11: Technological progress, employment, and living standards in the long run. Unit 16

Lecture 12: Recap

Principles of Economics II

Lecture 1: Labor markets

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This weeks lectures

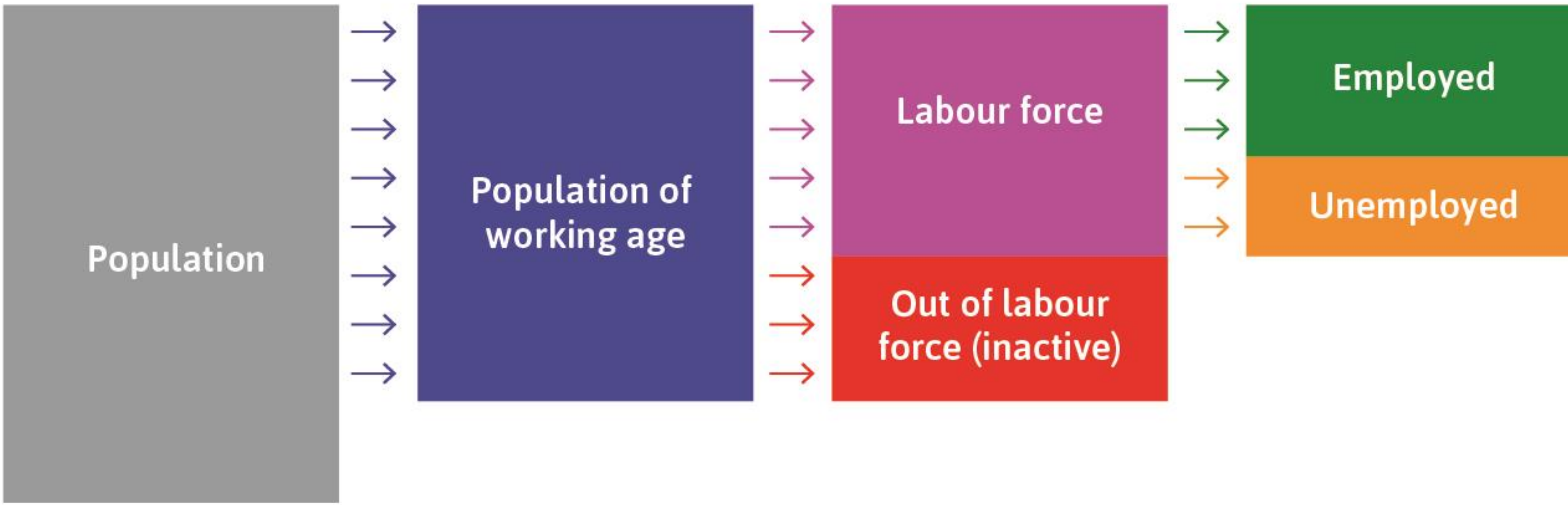
- **Measuring unemployment (employment)**
- *Competitive Labor market model (briefly)*
- **The Economy's labour market model (unit 9)**
    - Price-setting and wage-setting
    - Labour market equilibrium
    - Involuntary unemployment
    - Some applications

Measuring unemployment

The unemployed

- **The unemployed are the people who:**
  - are not in paid employment or self-employment
  - are available for work
  - are actively seeking work

The labour market



The Finnish labour market in 2017

Population of working age (15–74y) : 4.1M

Labour force:
2.7M

Out of labour force: 1.4M

Employed:
2.5M

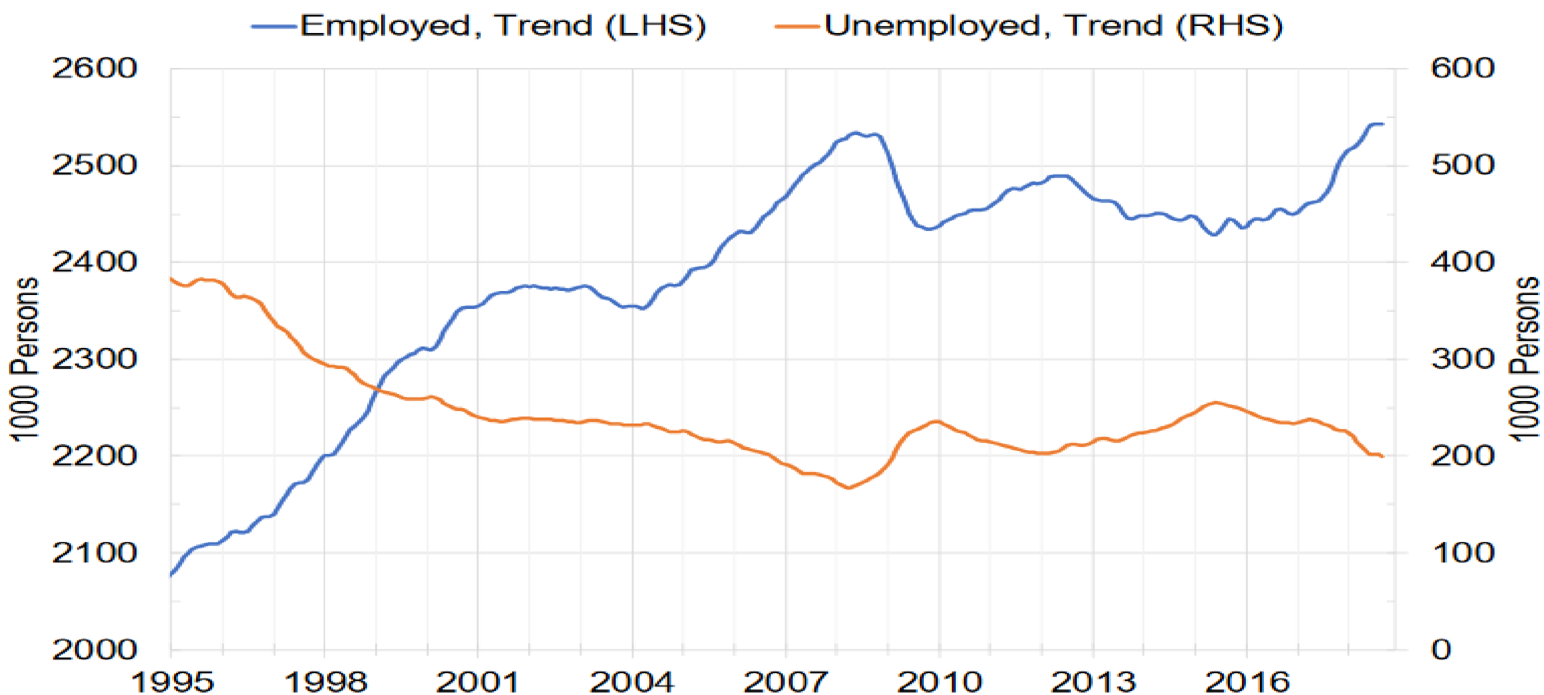
Unemployed:
230 000

Labour market statistics

- **Unemployment rate:**
  - unemployed / labour force = 0.23M/2.7M = 8.5%
- **Employment rate:**
  - employed / population of working age = 2.5M/4.1M = 61.0%
- **Participation rate:**
  - labour force / population of working age = 2.7M/4.1M = 65.8%

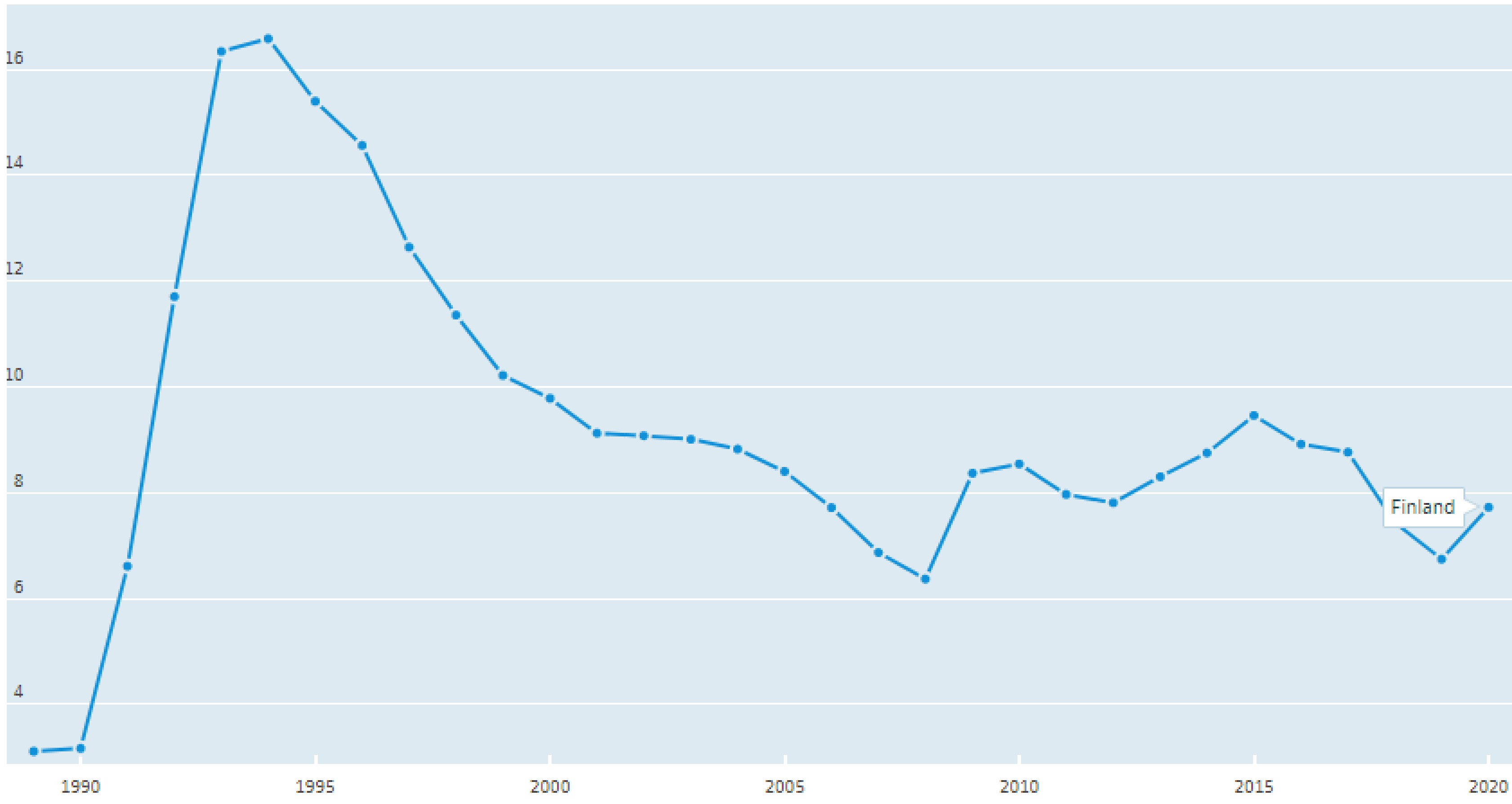
Employment and unemployment

Figure 3.1.1: Employment of 15-74-year-olds has increased faster than unemployment has decreased.



Source: Statistics Finland: Labour Force Survey and EPC.

Unemployment rate in Finland 1989-2018

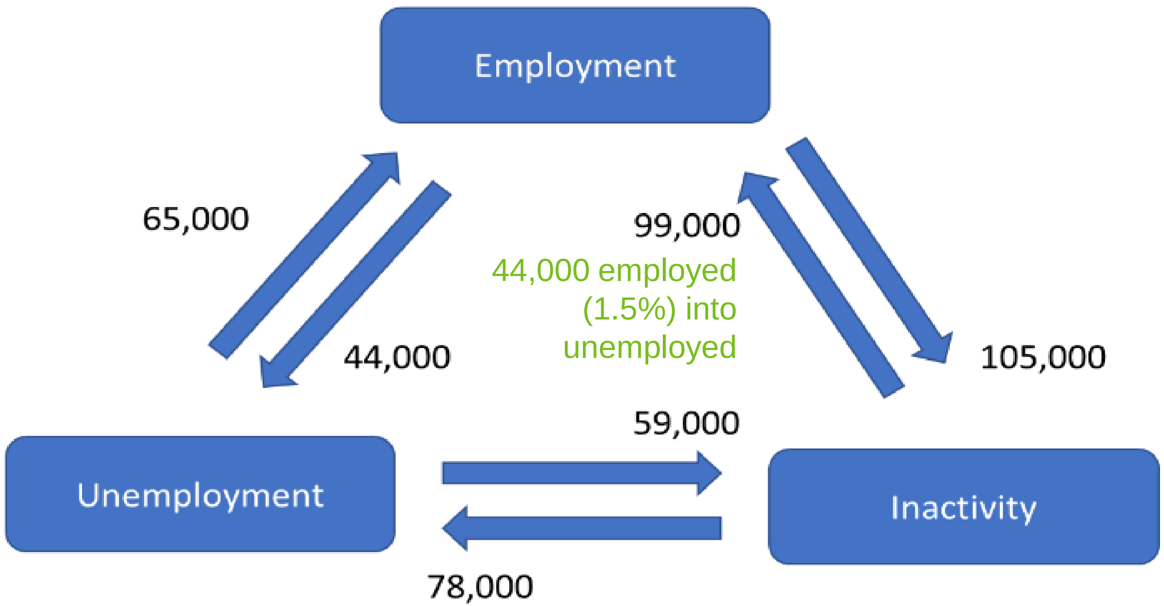


Source: OECD (Labor force survey)

Flows between employment, unemployment and inactivity in 2017

Figure 3.1.2: Average quarterly flows between employment, unemployment and inactivity in 2017.

In 2017, 65,000 unemployed persons (28%) found a new job within a typical 3 month unemployment period



Flows between employment and inactivity are larger than between employment and unemployment

Sources: Eurostat Labour Force Survey and EPC.

Source: Economic Policy Council Report 2018

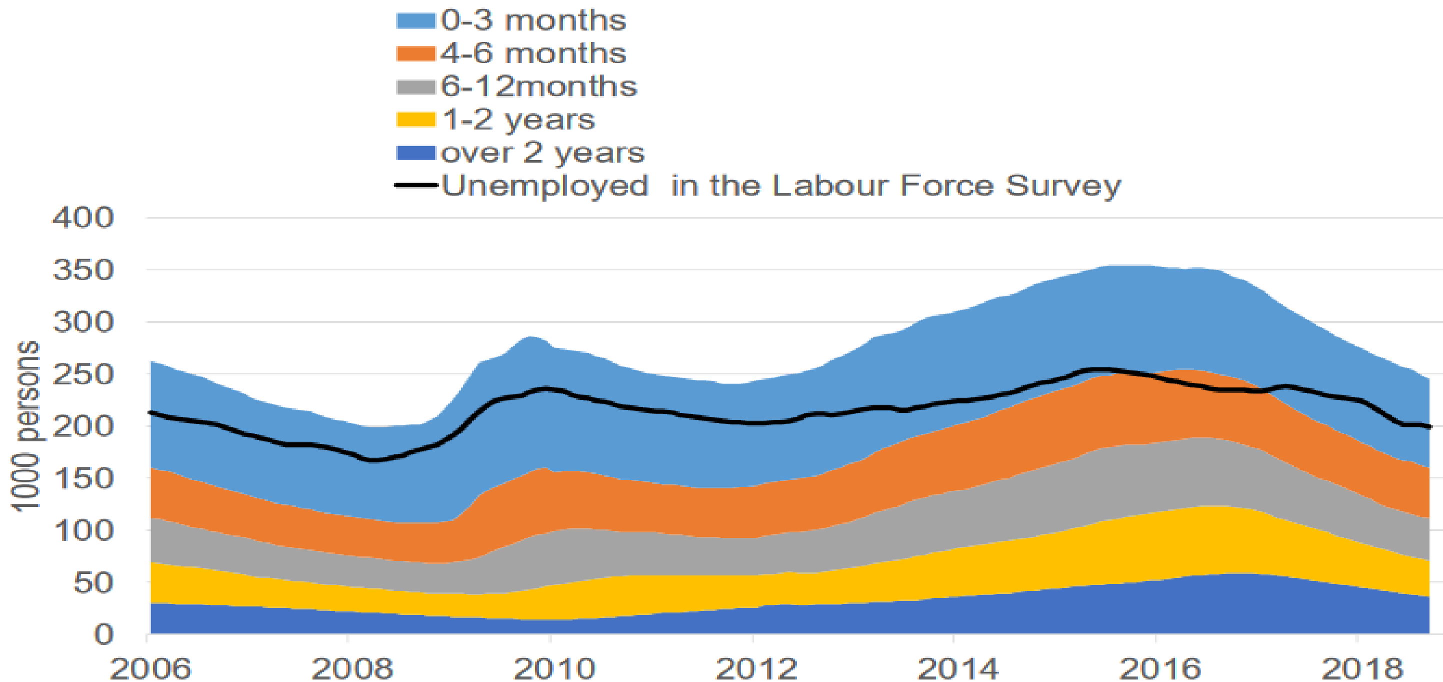
As are flows between inactivity and unemployment

Two data sources for unemployment rate

- **Labour Force Survey:**
  - A random sample from the Statistics Finland population database
  - The monthly sample consists of some 12,000 persons and the data are collected with computer-assisted telephone interviews
  - Unemployed = respondent says (i) unemployed, (ii) has seeked a job within the last four months and (iii) is willing to accept a job offer within two weeks of the offer
- **Employment Service Statistics:**
  - Jobseekers registered at the employment and economic development offices
  - Unemployed = person registered as jobseeker who is not working over 4h a week, is not a student, entrepreneur or pensioner
  - https://www.stat.fi/til/tyti/tyti_2016-08-23_men_001_en.html

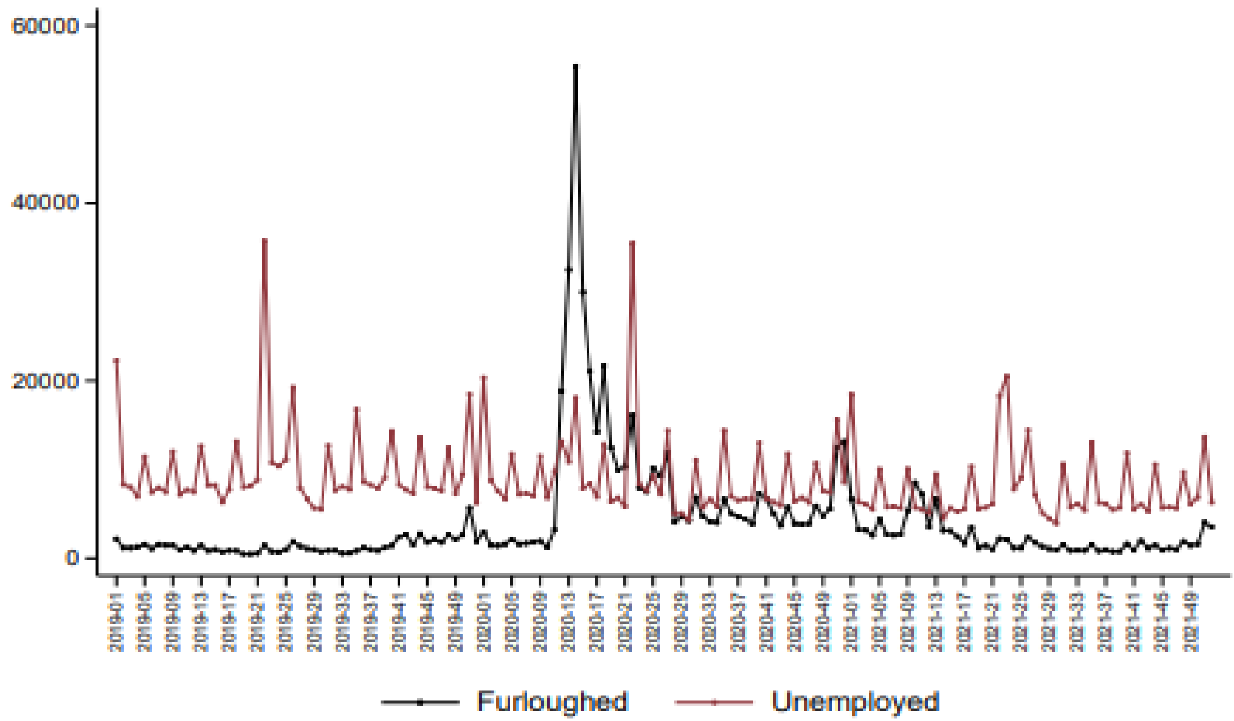
Registered unemployed persons vs. Labour Force Survey

Figure 3.1.3: The stock of registered unemployed persons by the duration of unemployment and number of unemployed according to the Labour Force survey, trends.



Sources: Ministry of Economic Affairs and Employment; and Statistics Finland. Trend adjustment by the EPC.

New unemployment and furlough spells during the Covid-19 pandemic



Source: Income statistics

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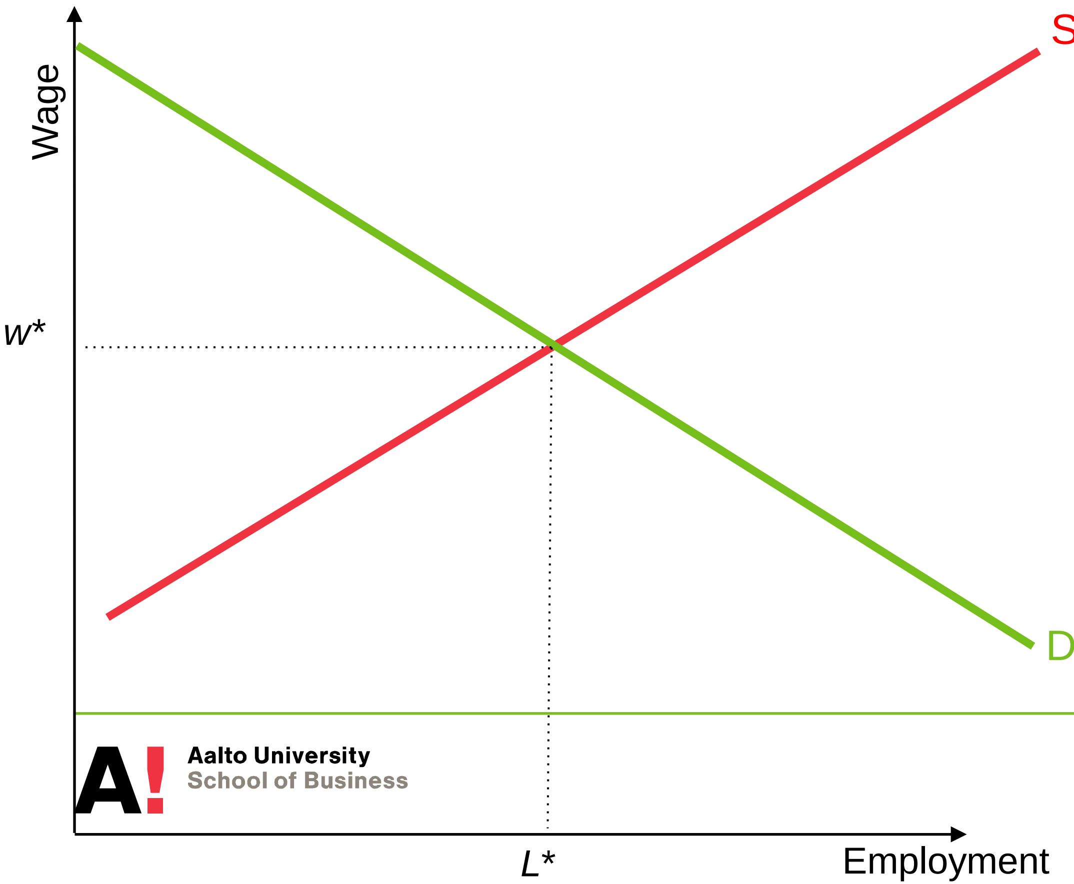
Competitive labour market model

Brief introduction

Building blocks of the model

- **Firms maximise profits and are competitive both in the product market (seller) and the labour market (buyer)**
- **Workers are the sellers in the labor market**
- **Labour demand: how many workers to hire at a given wage level**
  - Diminishing marginal product => demand curve slopes down
- **Labour supply: how much workers are willing to work for a given wage level**
  - Assume that as wage increases the willingness to work increases => supply curve slopes up

Market equilibrium in competitive labor markets

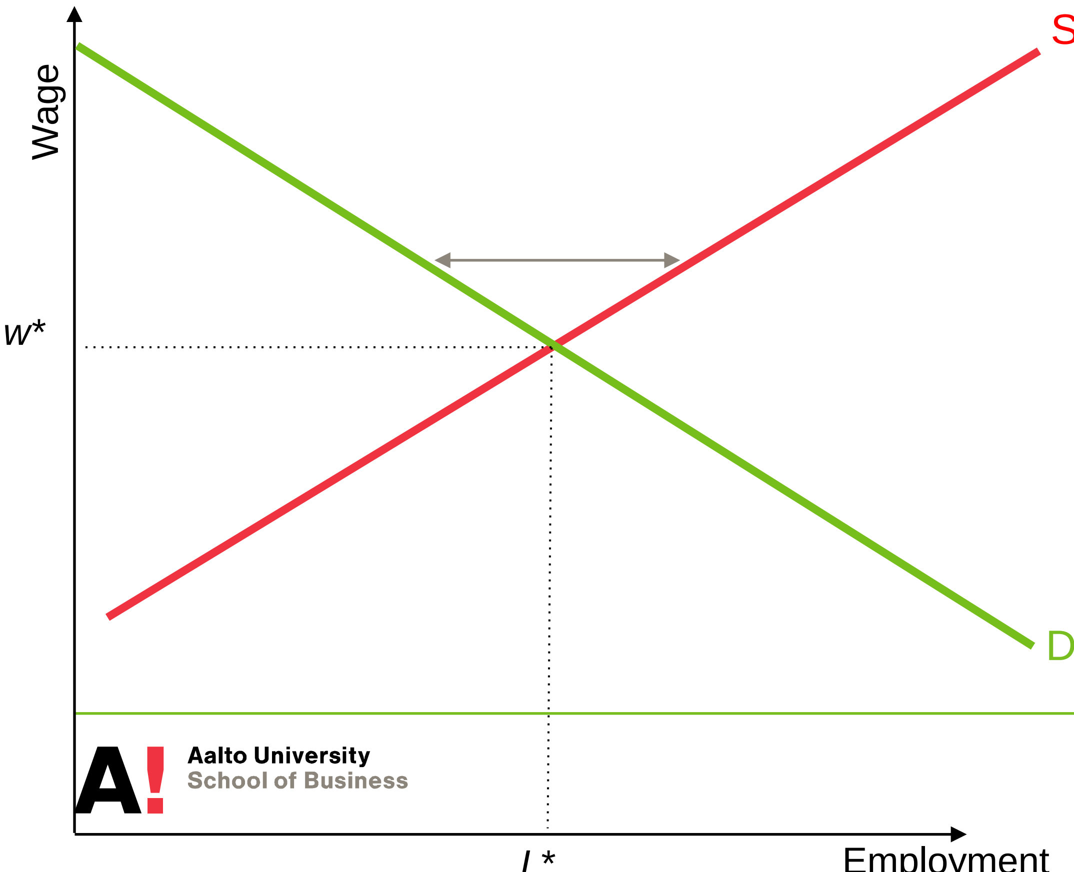


In equilibrium, demand = supply

Equilibrium wage is *w** and equilibrium employment is *L**

No unemployment

Market equilibrium



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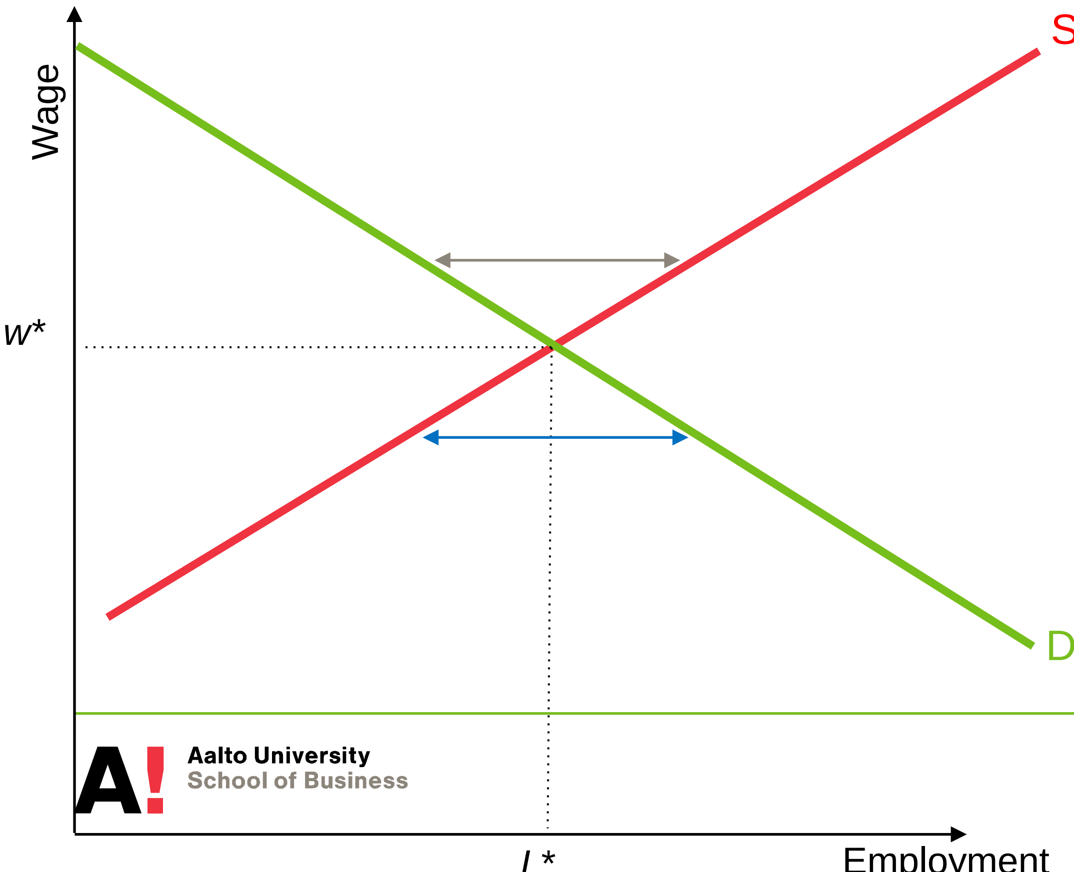
No unemployment

If the wage level would be higher than *w** more people would be willing to work than firms would be willing to hire

Market equilibrium



In equilibrium, demand = supply

Equilibrium wage is *w** and equilibrium employment is *L**

If the wage level would be higher than *w** more people would be willing to work than firms would be willing to hire

If the wage level would be lower than *w** firms would be willing to hire more people than would be willing to work for this wage

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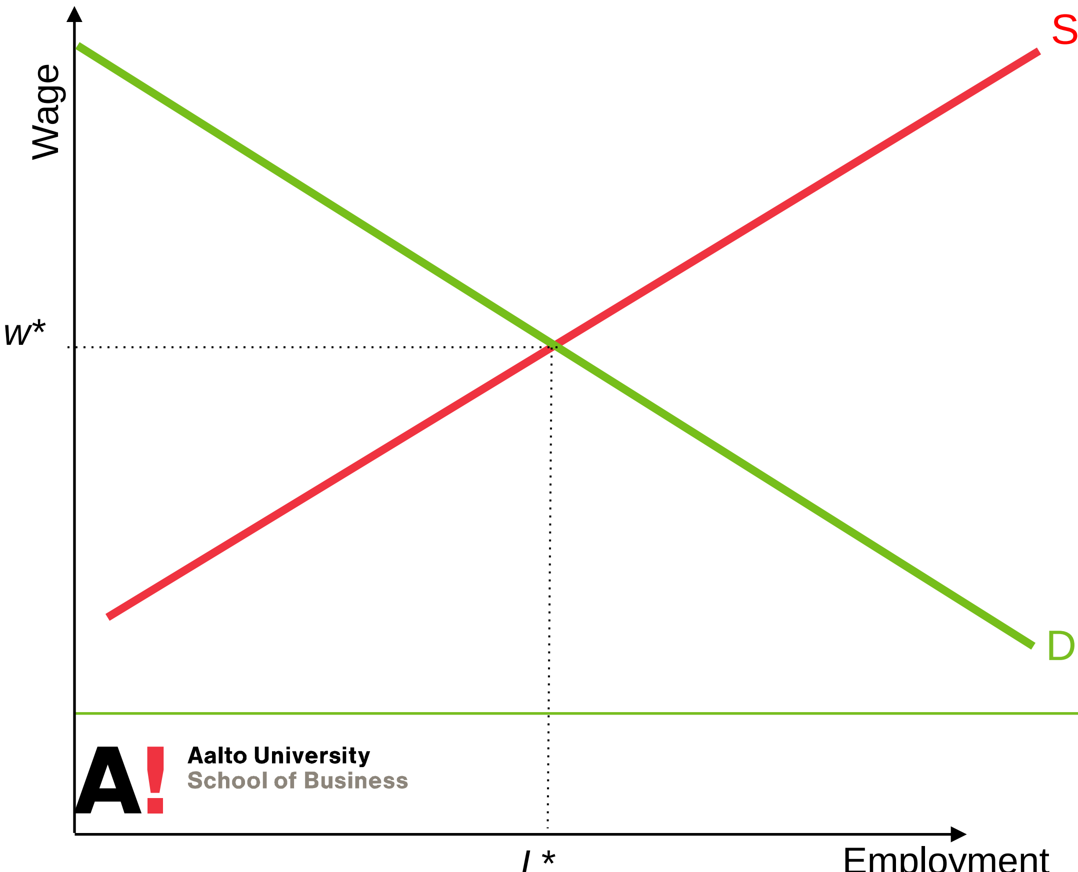
Effect of immigration on wages and employment

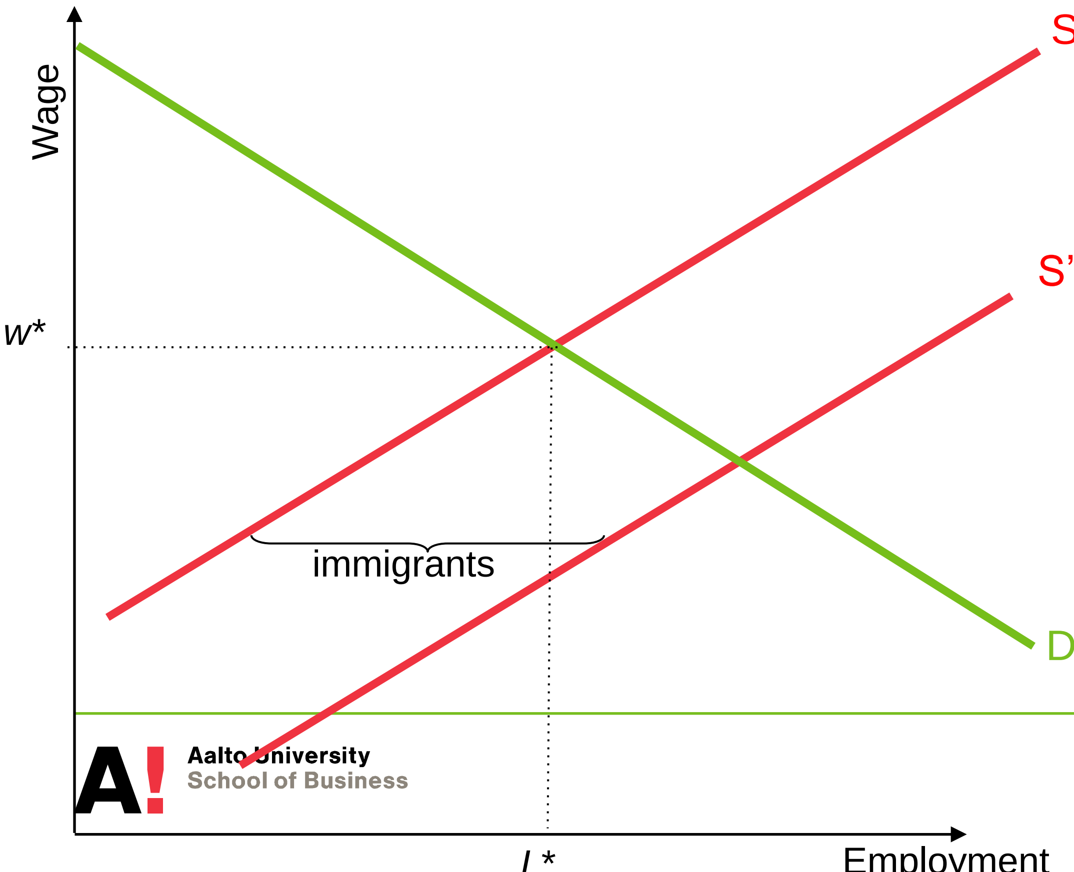
- **This is a simple model, but let's use it to analyse some important and not so simple questions**
  - What happens to wages and employment when immigration increases?
  - What about when a minimum wage is introduced?

Immigration



Let’s analyse the supply response first

Immigration



Let's analyse the supply response first

As immigration increases, there are more workers willing to work at any given wage level

We see this as a rightward shift in the labour supply curve

At the initial wage, labour supplied exceeds the quantity demanded

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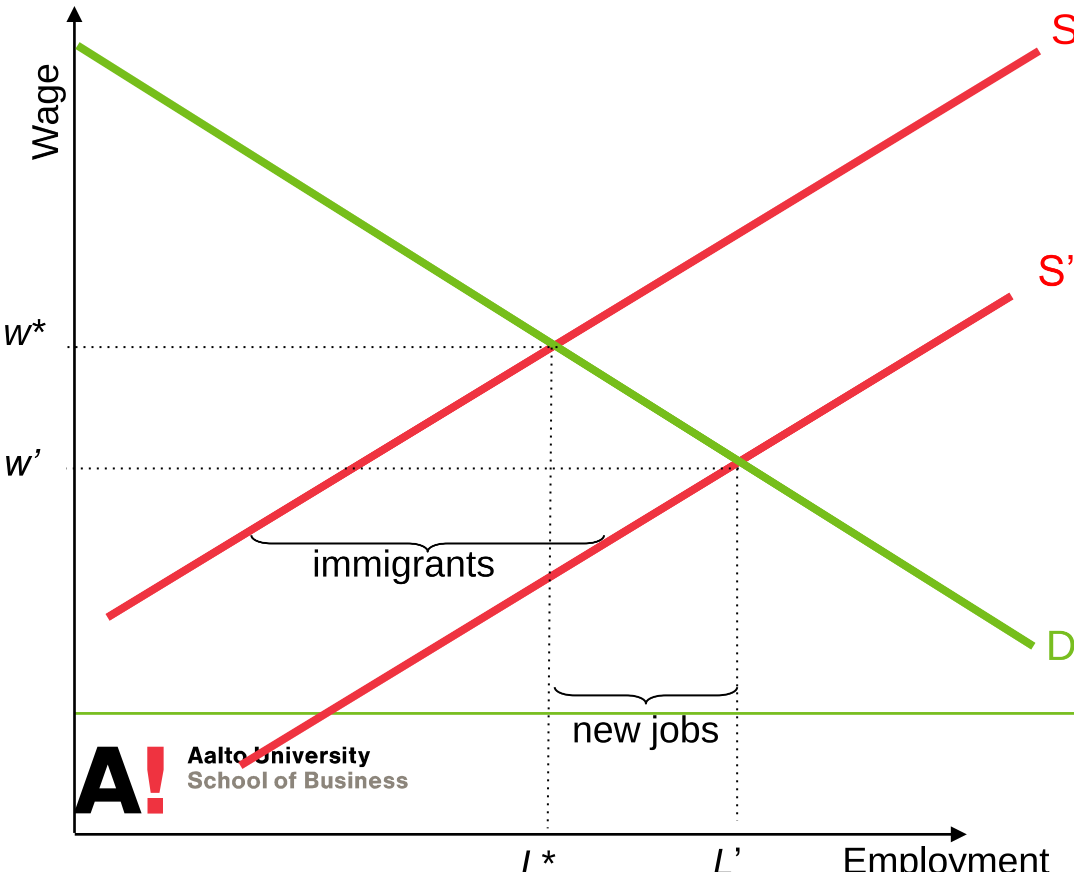
Immigration



Let's analyse the supply response first

As immigration increases, there are more workers willing to work at any given wage level

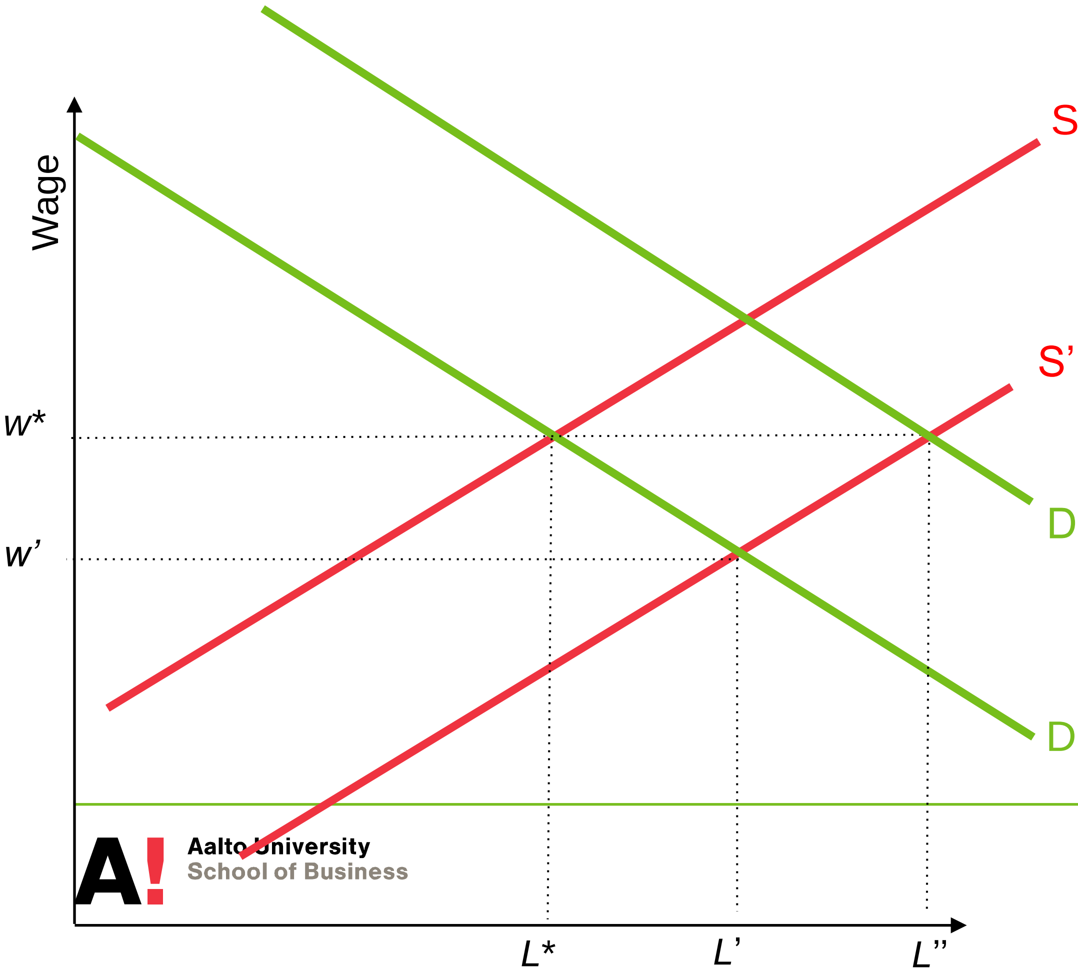
We see this as a rightward shift in the labour supply curve

At the initial wage, labour supplied exceeds the quantity demanded

This puts downward pressure on wage: *w** => *w'*

But the supply response is not the whole story!

Immigration



The new workers will of course spend their money

They may become employers etc.

This means that as a result labour demand will also increase

We see this as a rightward shift in the labour demand curve

In the figure, immigration has no effect on the wage level or employment of the native workers

What happens in the end, will depend on the magnitude of the labour demand shift

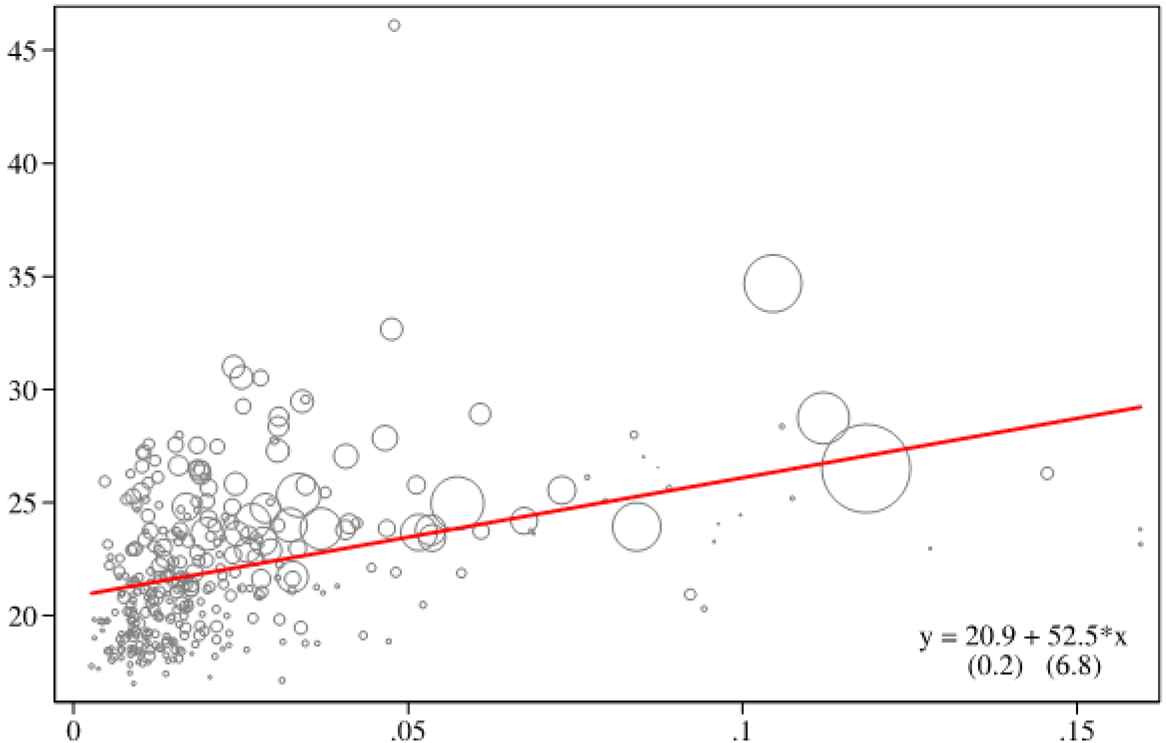
Effect of immigration on wages and employment

- **In a more general model we would have heterogeneity among workers**
  - Some native workers have more similar skills than immigrants (substitutes) => competition in the labour market increases
  - For others, the immigrants are complements in terms of skills and tasks => for these natives wages and employment opportunities may increase
- **The labour market effects of immigration will depend on**
  - Are immigrants substitutes or complements?
  - How fast the economy will adjust to increased labour?

Empirical challenges

- **The causal question**
  - For example, what is the average wage of a particular worker group in Helsinki today when immigrant share is x, as oppose to the share being y (the counterfactual)?
- **How can we construct a plausible counterfactual?**
  - Experimental research designs difficult/impossible to come by => we need to compare labour markets with high and low immigration

Average income and immigrant share in Finnish municipalities



Is this sorting or due immigrants really increase the local wage level?

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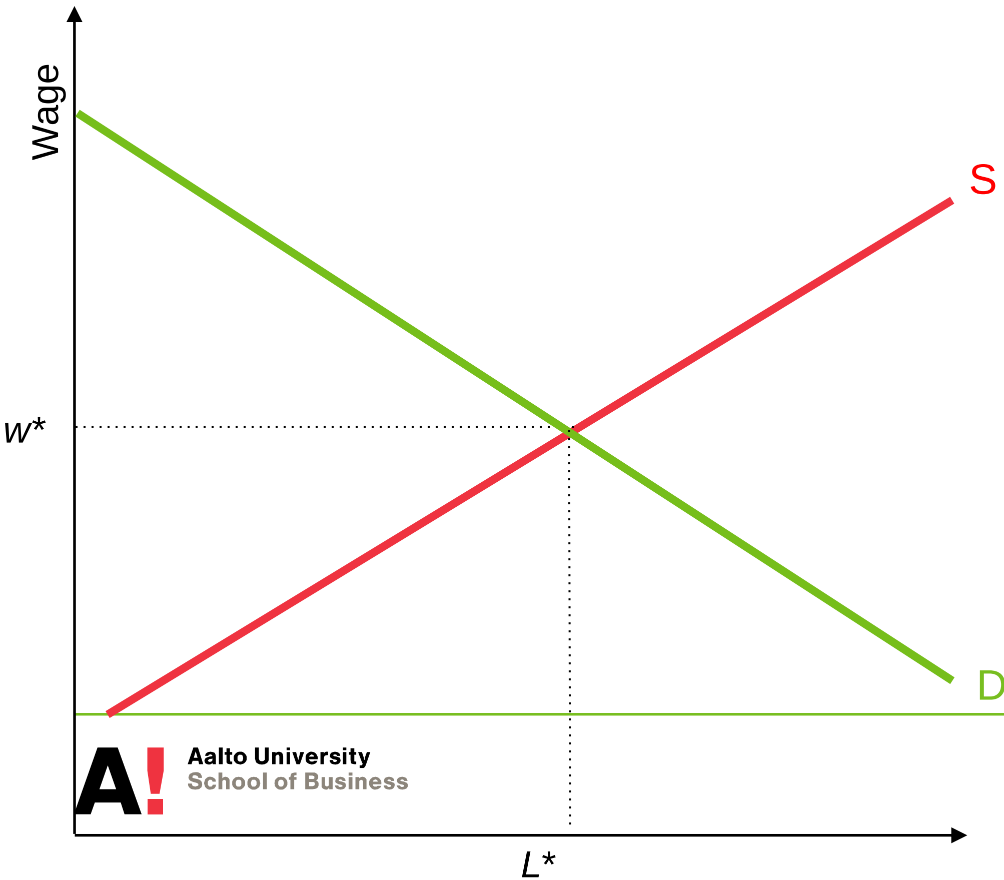
How to study impact of immigration: Natural experiments

- **Card (1990): Cuban mass immigration during the “Mariel boatlift”**
  - On April 20, 1980, Fidel Castro declared that any Cuban wishing to emigrate to the US can do so from the port of Mariel => a 7% increase in the labour force in Miami
  - No effect on the wages or unemployment rates of less-skilled workers
- **Friedberg (2001): Soviet mass migration**
  - Mass migration from the former Soviet Union into Israel had no effect or slightly increased Israeli wages and employment

Minimum wage



Let's assume that the public sector wants to increase the wages of low-skilled workers (typically low wage workers) by setting a minimum wage (w^{min}) which is higher than the market wage (w^*)

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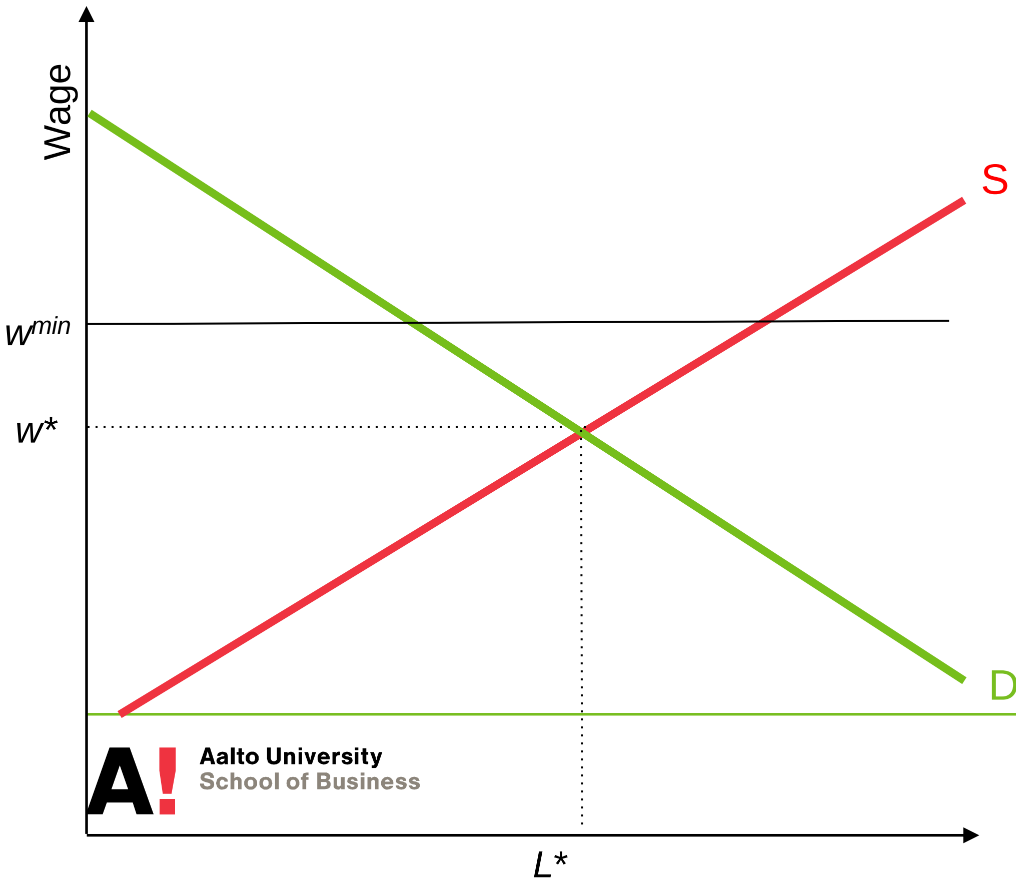
Minimum wage



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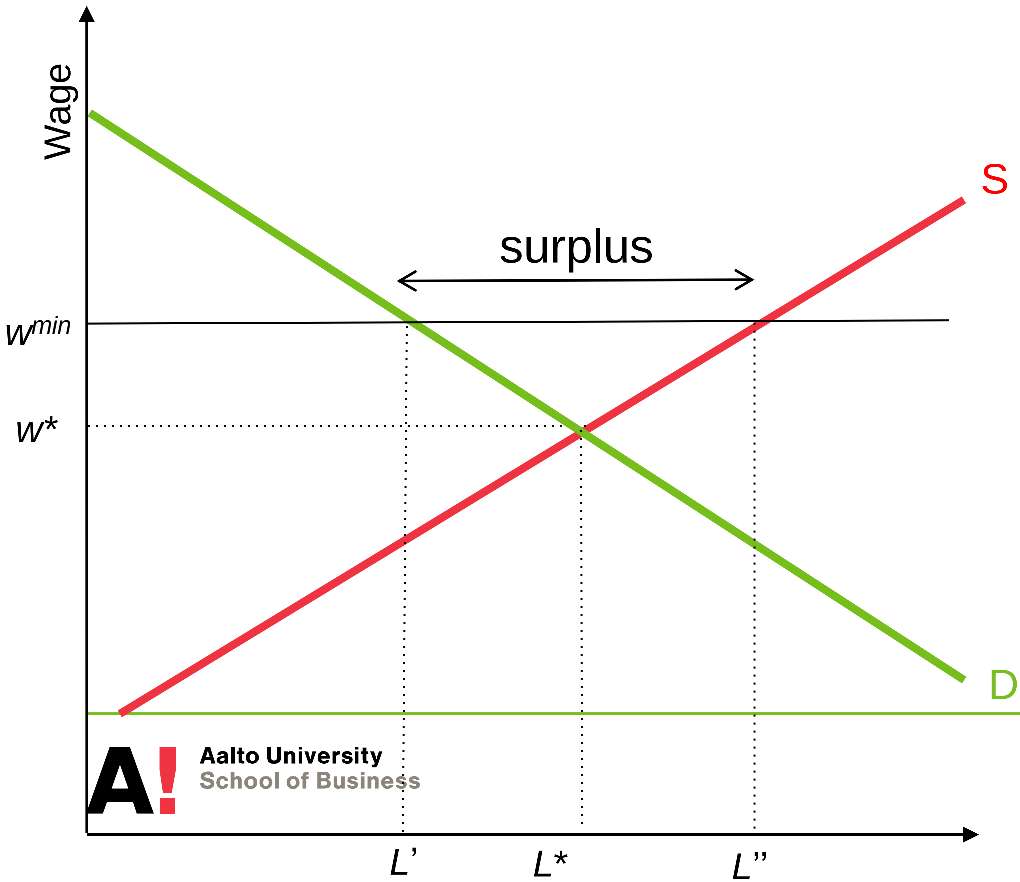
Minimum wage



Let's assume that the public sector wants to increase the wages of low-skilled workers (typically low wage workers) by setting a minimum wage (w^{min}) which is higher than the market wage (w^*)

At this new higher wage L'' workers are willing to work, but firms are only willing to hire L' workers

The result is a surplus or unemployment (at the higher wage level)

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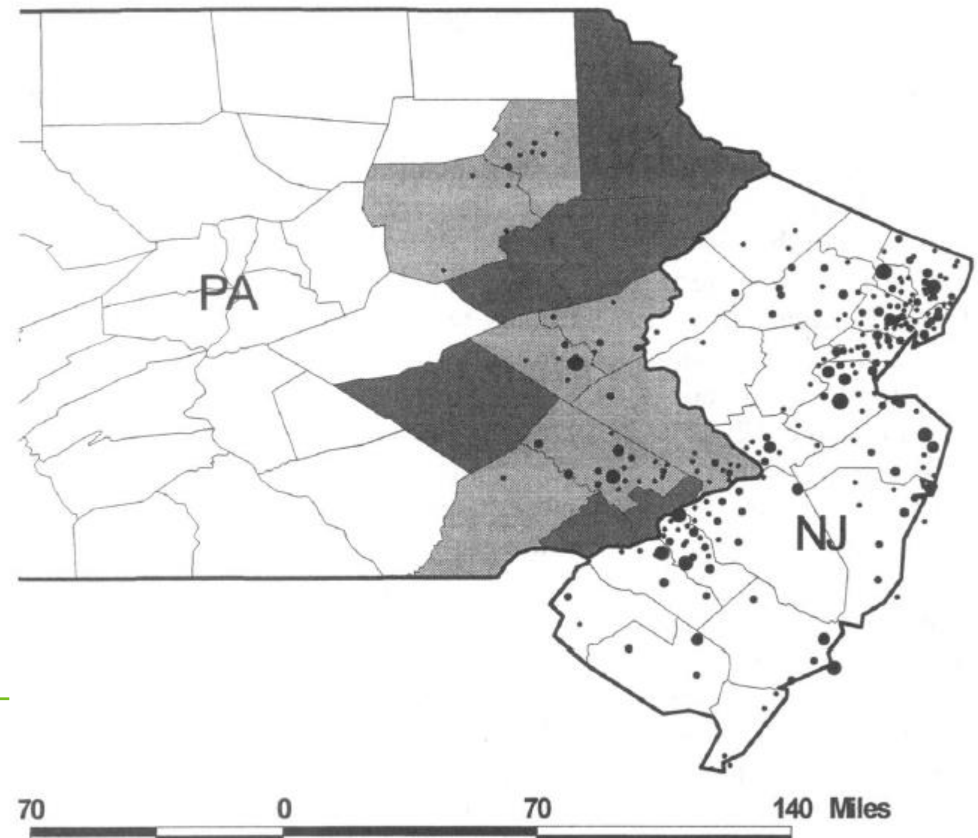
Empirical example: New Jersey minimum wage increase

On April 1, 1992, NJ increased the state minimum wage from $4.25 to $5.05; PA's minimum wage stayed at $4.25

Card & Krueger (1994) surveyed about 400 fast food stores both in NJ and in PA before (February) and after (November) the minimum wage increase

Results: Surprisingly, employment rose in New Jersey!

Other models? If employers have market power in the labour market, this can happen



Newer results on minimum wage

- **Still an open question and also quite a heated debate**
  - It seems that major employment effects are rarely found
  - At the same time, minimum wage reforms are often quite small
  - Large enough minimum wage hikes are going to lower employment

Summary

- **The model assumes that the labour market is simply a re-labelled product market with complete contracts**
- **Unrealistic, but is the model useful?**
  - Yes! Real-world markets are typically not perfectly competitive, but some policy problems can be analysed using this rather simple demand and supply model
  - You will see lots of more applications in future courses (especially in product markets)
- **On the other hand, it is too simple to for some markets and questions**
  - Next we will turn to another labour market model

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Principles of Economics II

Lecture 2: The labour market: Wages, profits, and unemployment

Fall 2022
Kristiina Huttunen

Outline

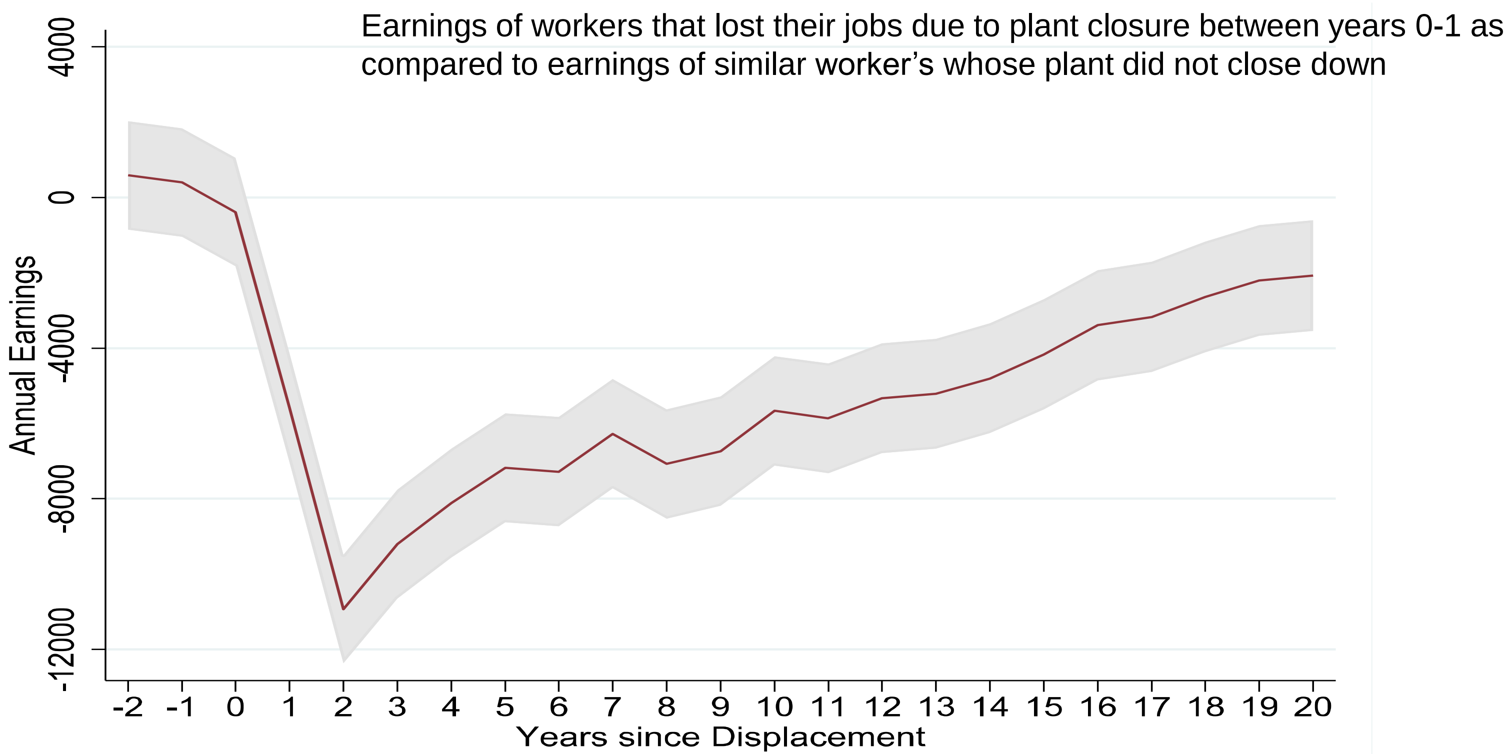
- **The Economy's labour market model (unit 9)**
  - Price-setting and wage-setting
  - Labour market equilibrium
  - Involuntary unemployment
  - Some applications

The Economy's labor market model

- **Models price-setting and wage-setting behaviour of firms, which determines economy-wide unemployment rate and real wage**
- **The starting point is the labor discipline model (unit 6)**
  - Contracts between workers and employers are incomplete (worker's effort may be hard to measure)
  - There are costs related to job loss
  - Explains why involuntary unemployment exists even in equilibrium

There are only few jobs where we can directly observe output

Losing a job is costly
Cost of job loss in Finland during 1990's recession



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Building blocks of the model

- **Model the labour market of an entire economy**
- **Firms and employees:**
  - Firms set wage sufficiently high to make job loss costly, in order to motivate employees to work hard in the absence of complete contracts (employment rent, unit 6)
- **Firms and customers:**
  - Firms produce differentiated products and set a markup above the cost of production, to maximise their profits subject to demand (Unit 7)

Building blocks of the model

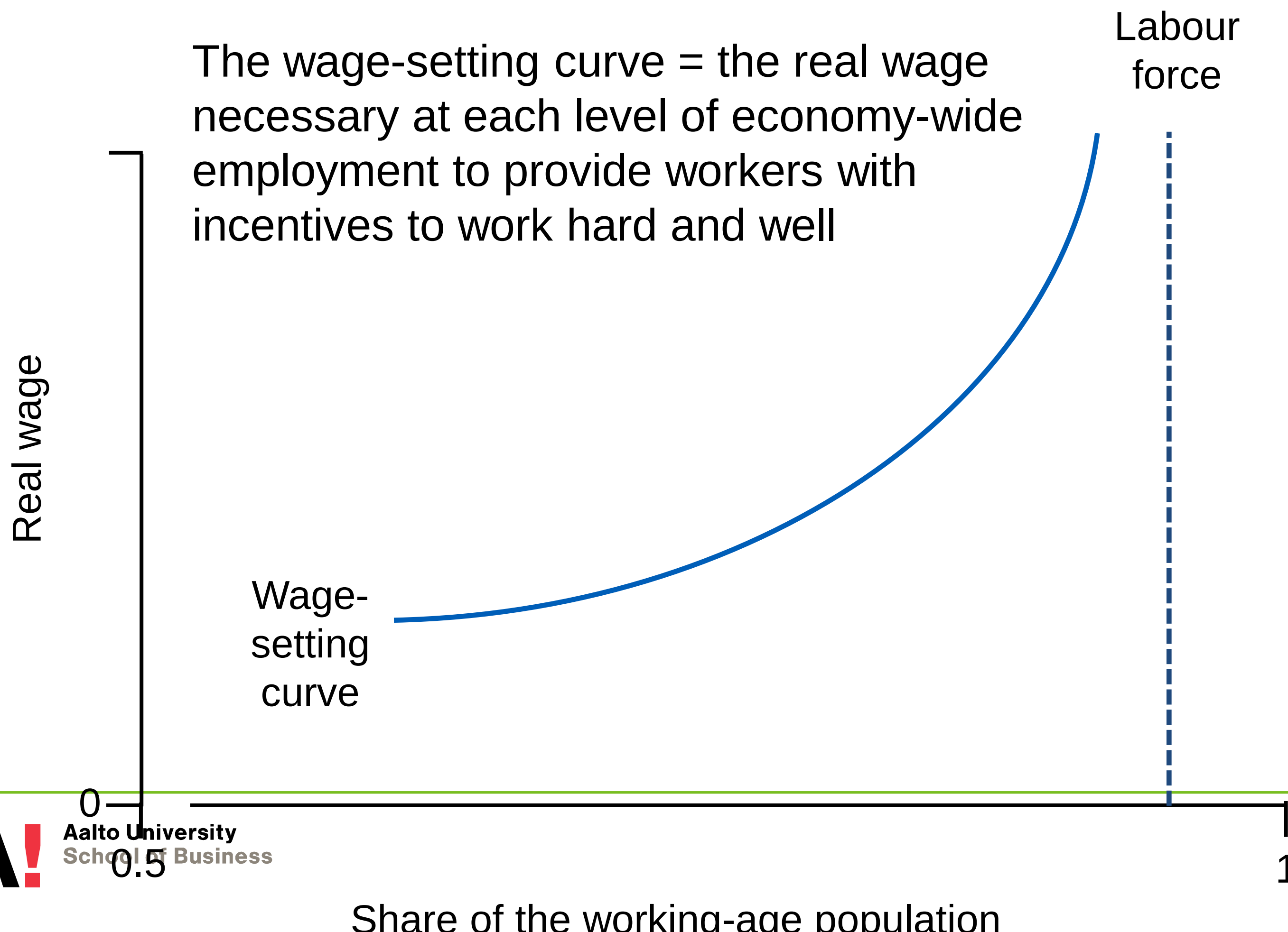
- **The real wage is the nominal wage divided by the price level of the bundle of consumer goods purchased:**
  - Nominal wage (W): wage received by a worker in form of money
  - Price level (P): price level of a standard bundle of consumer goods
  - Real wage (w): $w = W/P$ amount of goods and services the worker can buy

The setup

- Each firm decides on its: **price**, **wage**, **how many people to hire**
- Adding up all of these across all firms gives the total employment in the economy and the real wage

The wage-setting curve

The wage-setting curve = the real wage necessary at each level of economy-wide employment to provide workers with incentives to work hard and well



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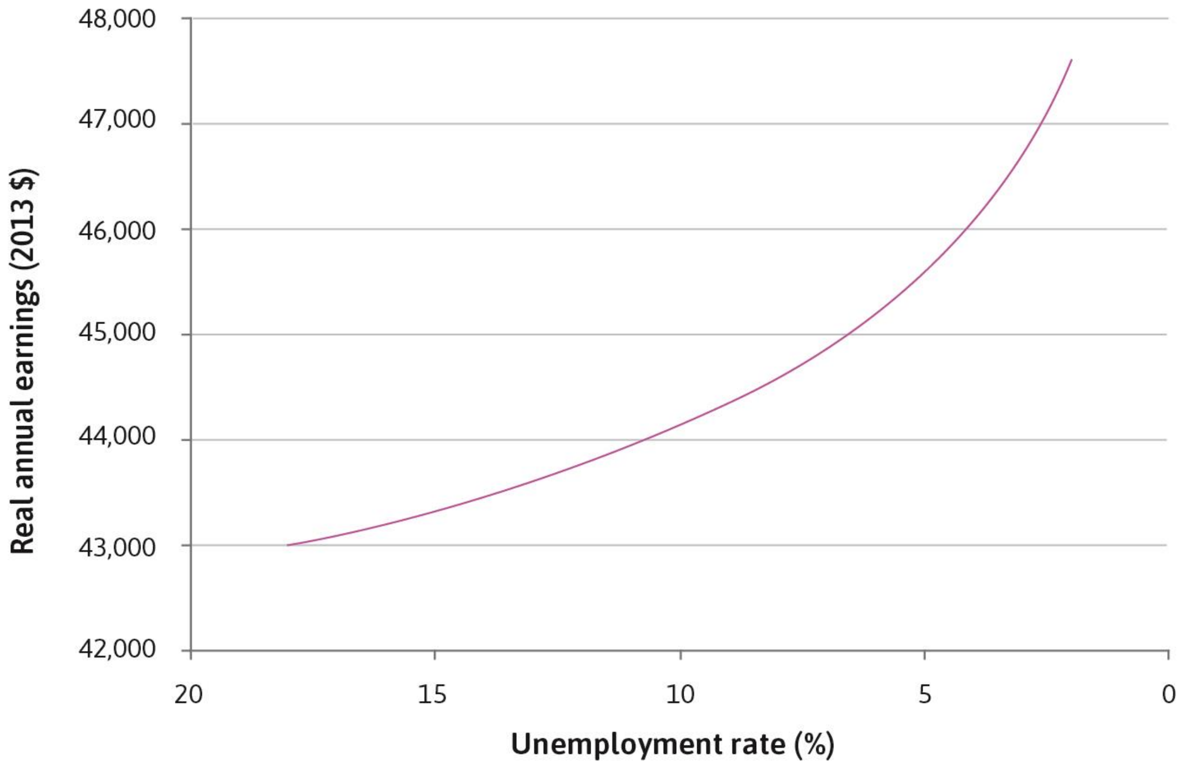
Estimated wage curve

Estimated from area-level US data



The chain of firm's decisions

Nominal wage = f(other firms' prices and wages, unemployment rate)

↓

Price = f(own nominal wage, demand for own product)

↓

Output = f(optimal price, demand curve)

↓

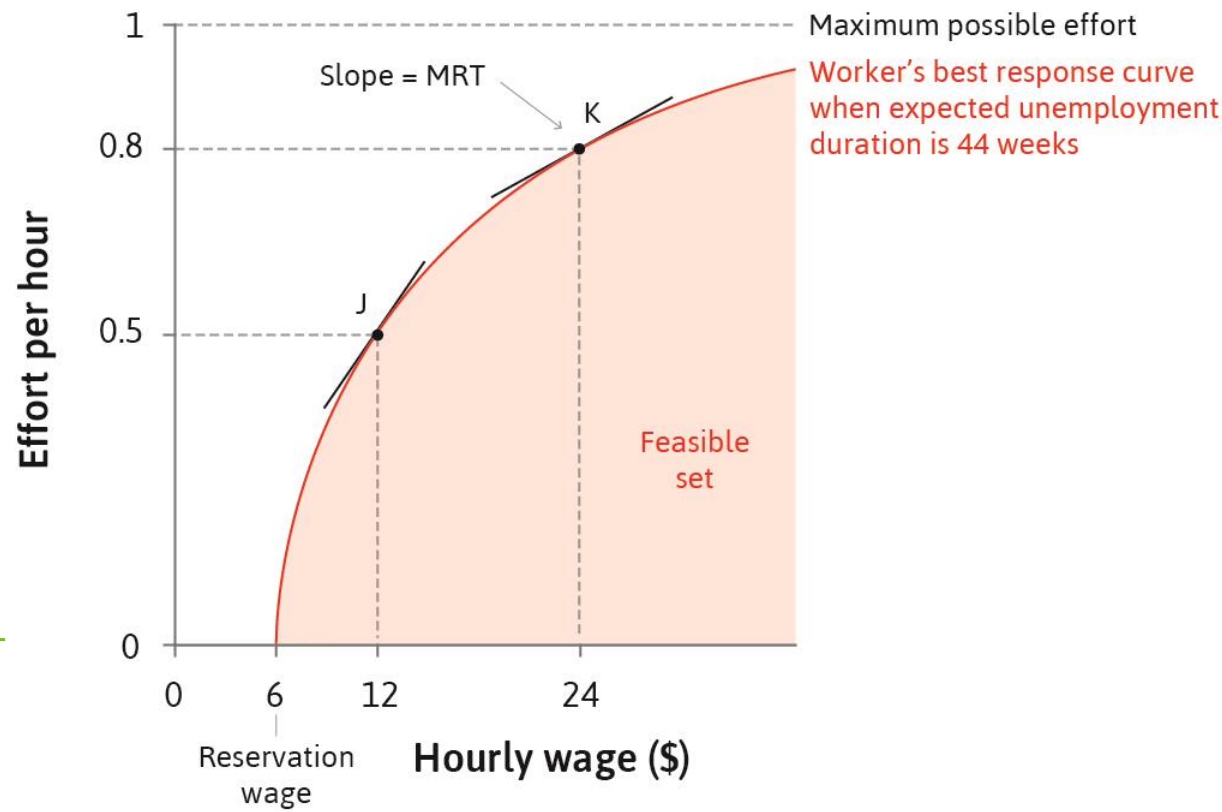
Number of employees = f(output, production function)

Employee's best response to the wage

Best response curve shows the optimal amount of effort workers will exert for each wage offered

Represents the firm's feasible frontier for wages and effort

Slope of best response curve = MRT (employer's marginal rate of transfomation of high wages into more effort)

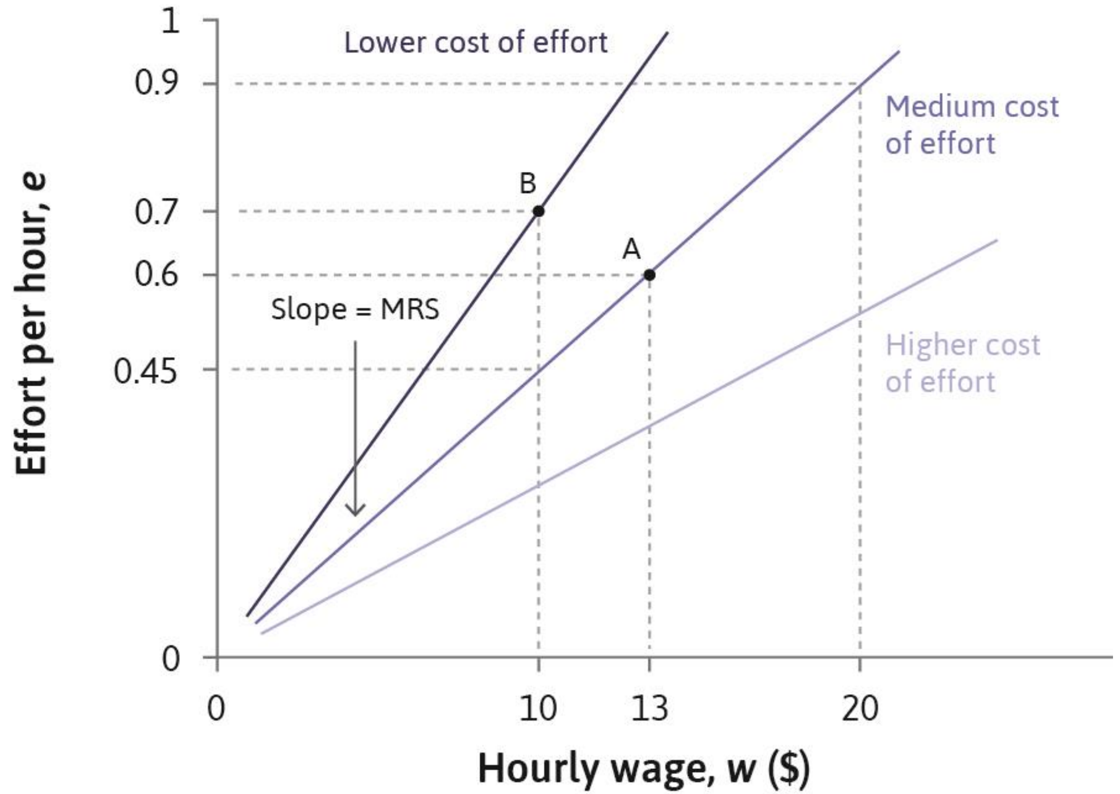


The employer's indifference curves: isocost lines for effort

The cost of effort is the same at all points on an isocost curve

Slope of isocost curve = MRS =

the rate at which the employer is willing to increase wages to get higher effort

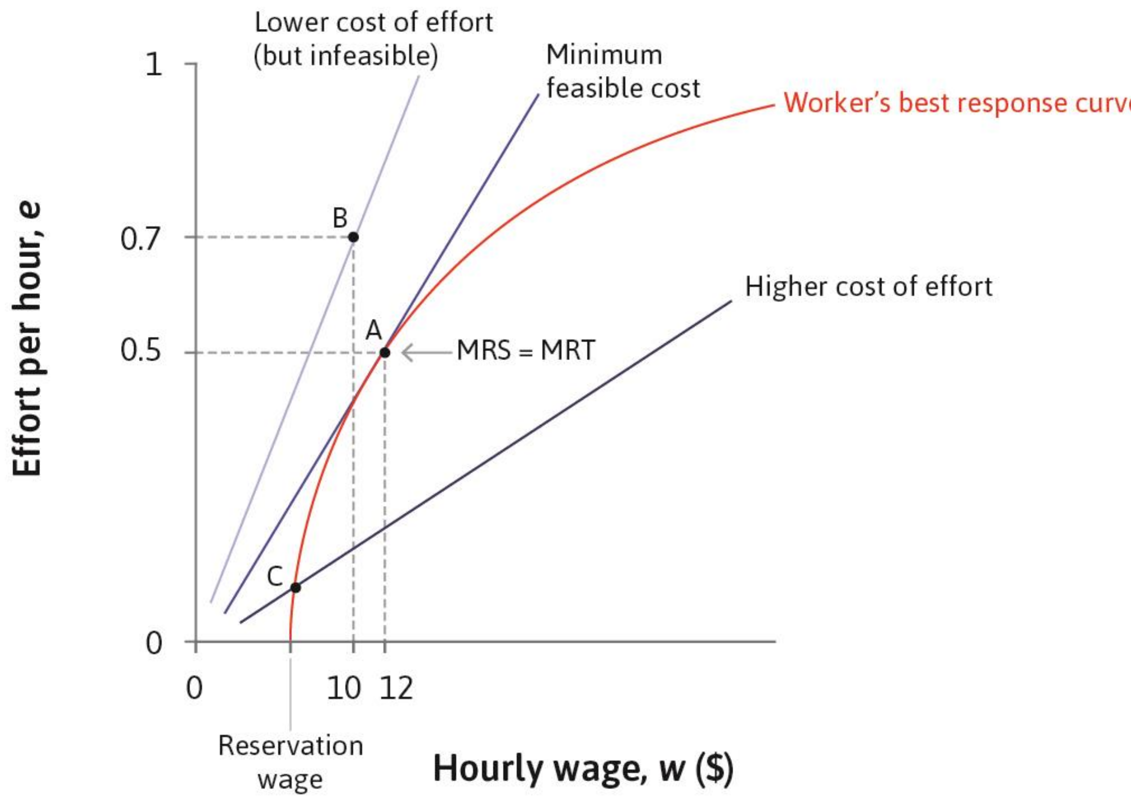


Determining wages

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

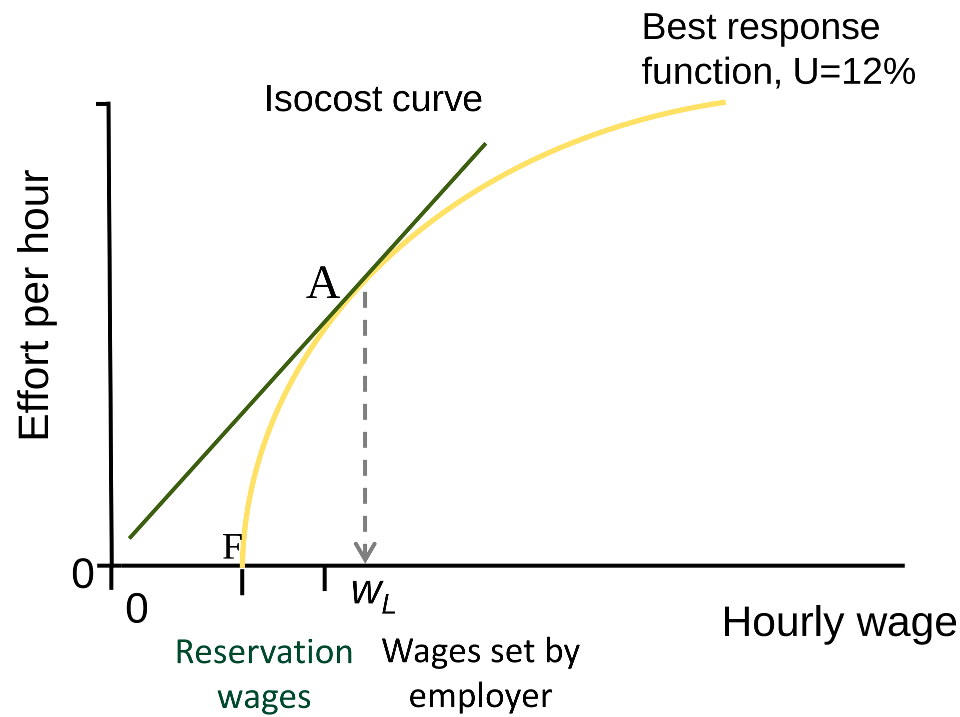


Deriving the wage-setting curve

When unemployment is low, workers who lose their jobs can expect a shorter spell of unemployment

Decrease in the duration of a spell of unemployment has two effects:

- It increases the reservation wage: reducing the employment rent per hour
- It shortens the period of lost work time: decreases total employment rents (the cost of job loss)

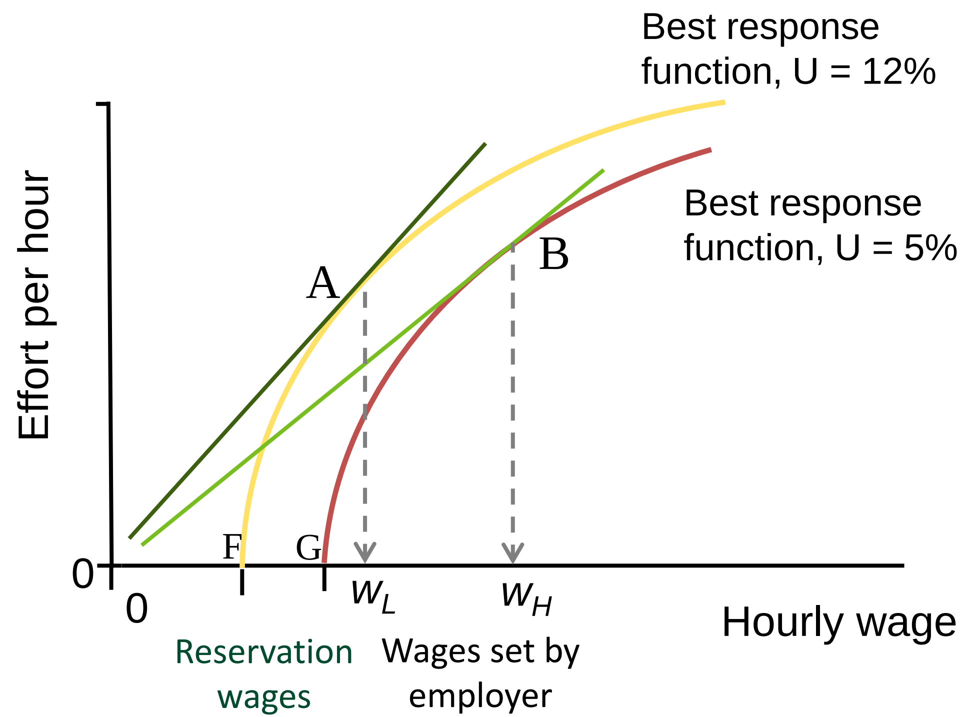


Deriving the wage-setting curve

Lowering the unemployment rate will shift worker's best response curve to the right (reservation wage↑) and increase wage

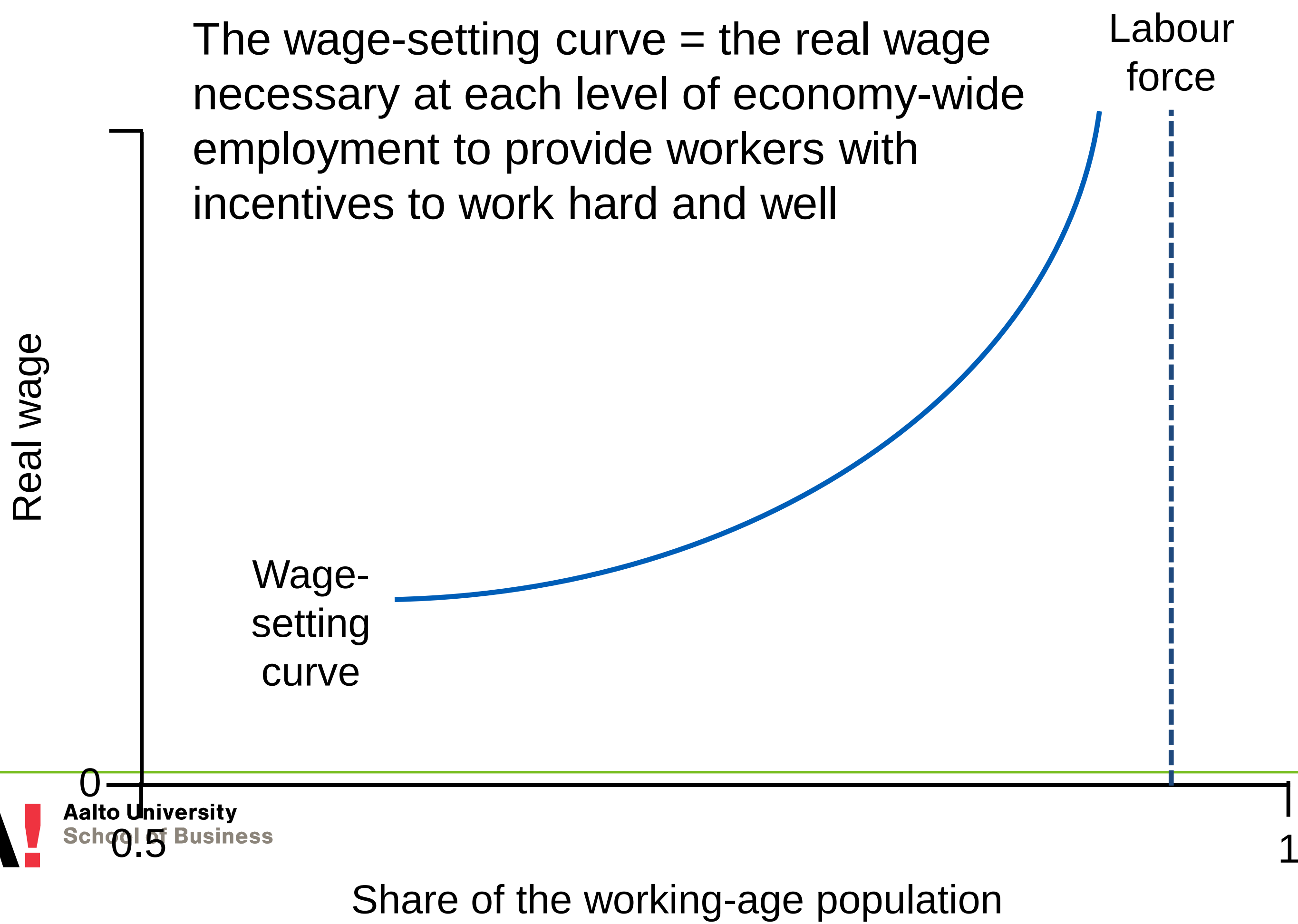
At each wage level, the worker is willing to put in less effort because the cost of job loss is lower

This results in an upward-sloping wage-setting curve

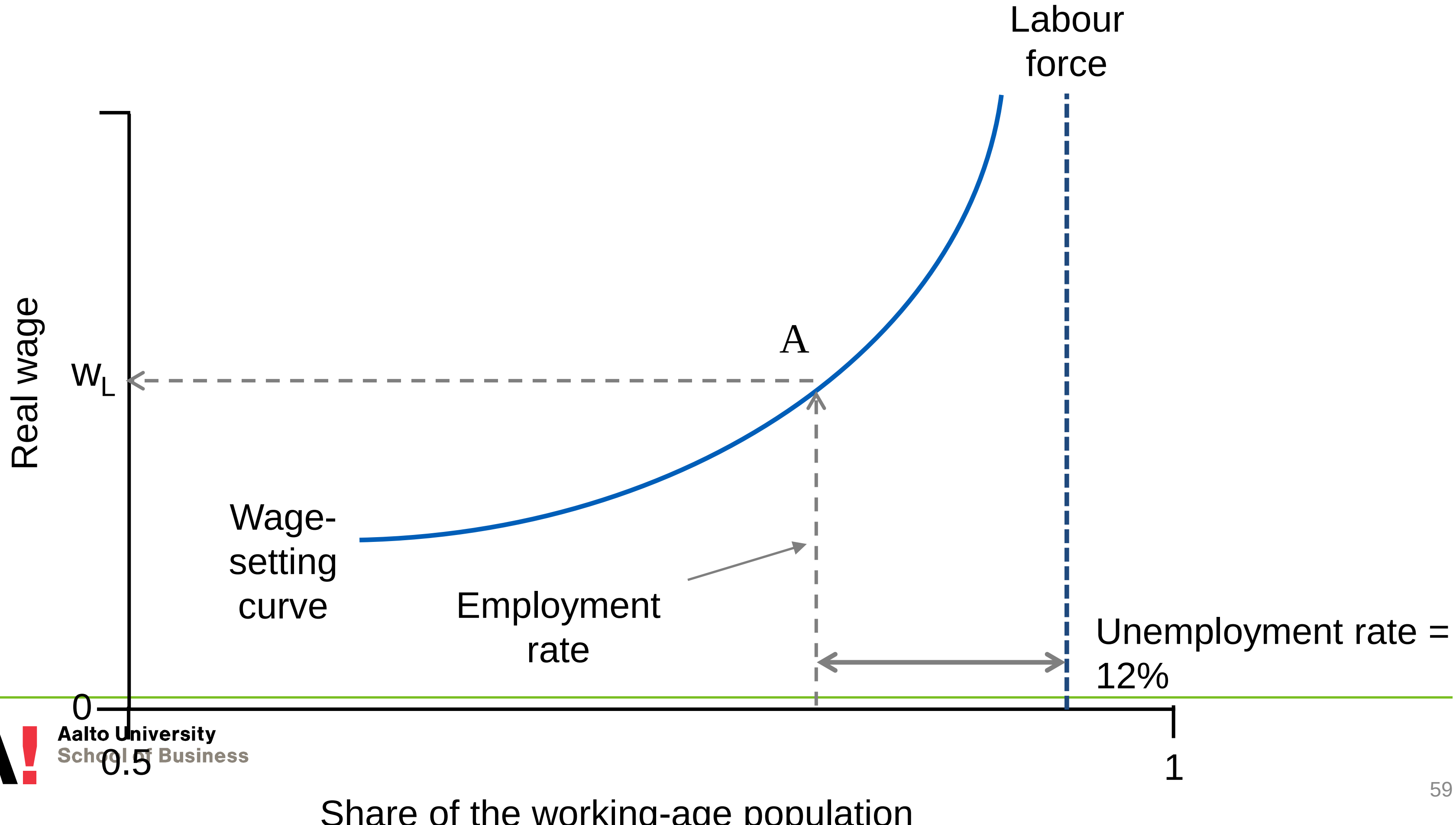


The wage-setting curve

The wage-setting curve = the real wage necessary at each level of economy-wide employment to provide workers with incentives to work hard and well



The wage-setting curve



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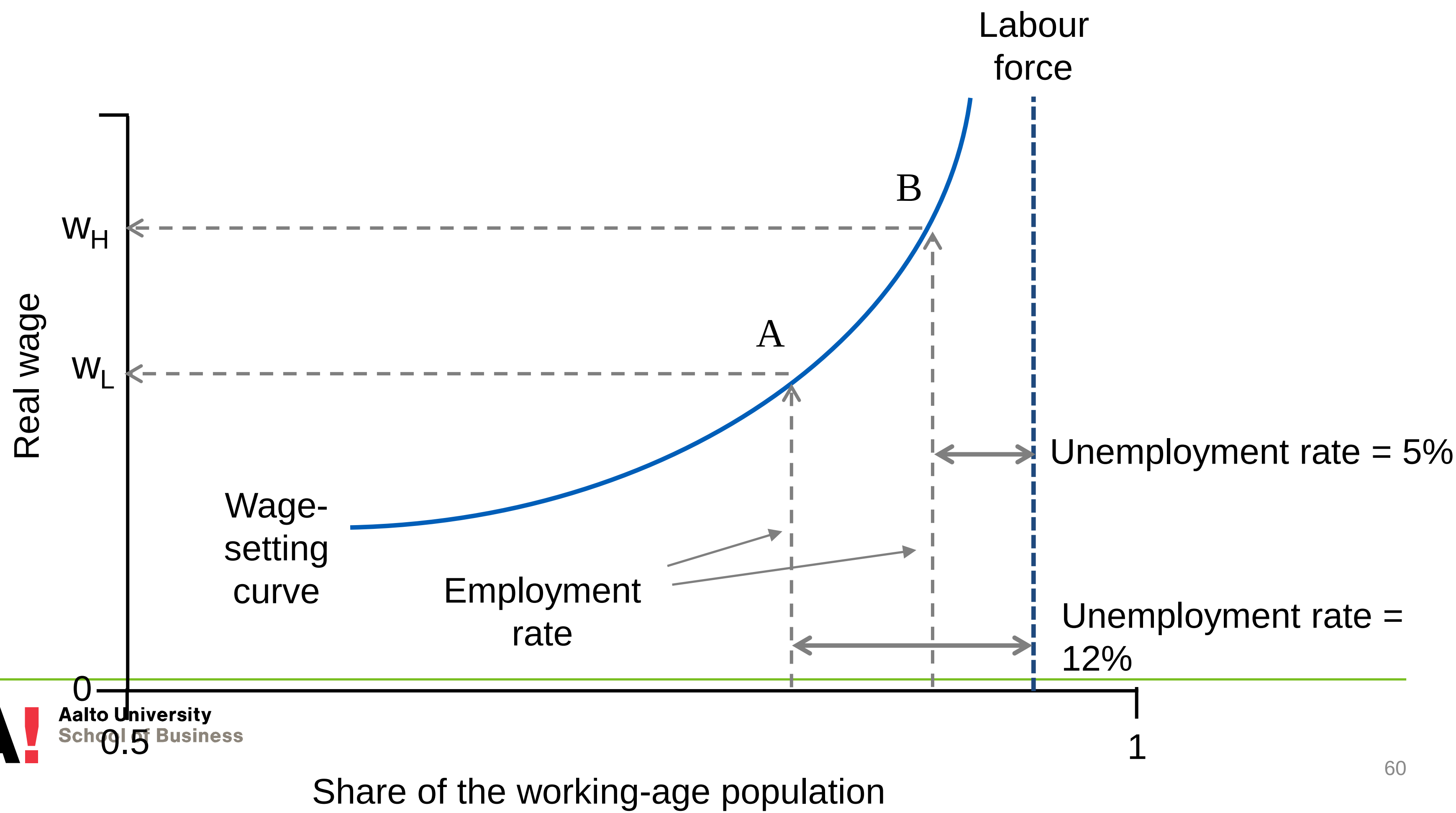

What shifts the wage-setting curve?

- **For any unemployment rate, increase in employment rent will shift the curve downwards**
  - Lower unemployment benefit makes it more costly if you lose your job, your employment rent is higher and the firm can set a lower wage and you will work, rather than shirk
  - Increase in the labour force: If there are more people searching for jobs, then you can expect to remain without work for longer if you lose your job
  - A new monitoring technology: makes detection of shirking less costly (such as the use of GPS trackers in trucks, monitoring their location at any time)

Firm's hiring decision

- **Labour is the only input (!), so wage is the only cost**
  - One hour of labour produces one output (given the wage)
  - Average product of labour $\lambda = 1$
  - So the wage the firm pays (W) is the cost of a unit of output
  - Firm's produce differentiated products
- **The firm process**
  - HR (Human resources department) sets the **wage W** at a level sufficient to motivate the workforce
  - MD (Marketing department) sets the **price p** (taking into account feasible combinations of p and q)
  - PD (Production) chooses the amount of workers $n^* = q^*$

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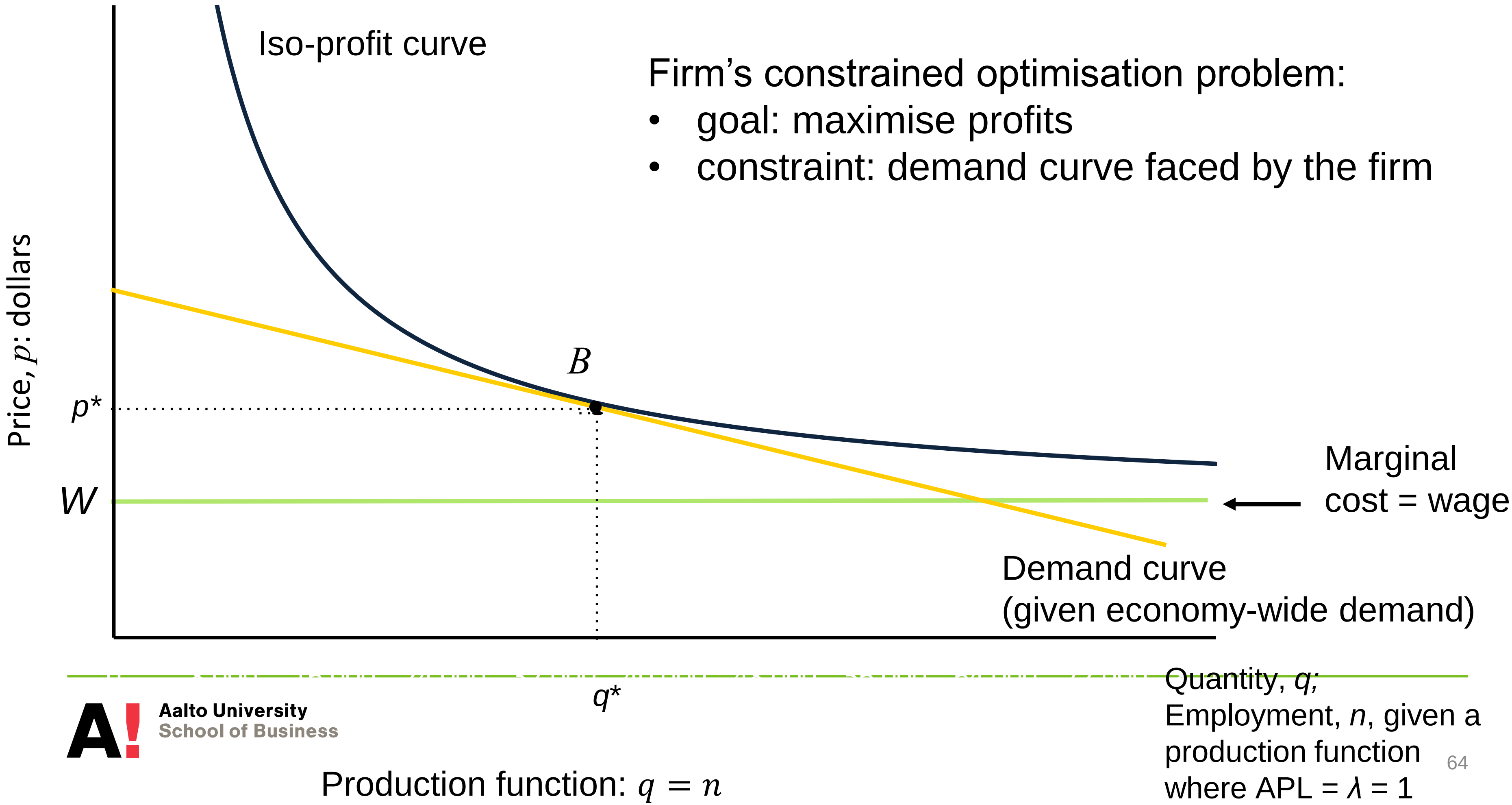
Firms hiring decision

Department	… knows	… and on this basis sets the firm's
Human resources	Prices, wages and employment in other firms	Nominal wage, W
Marketing	All of the above and firm's demand function	Price of output, p
Production	All of the above, plus **labour productivity** and amount the firm can sell	Employment, n

Profit-maximizing price

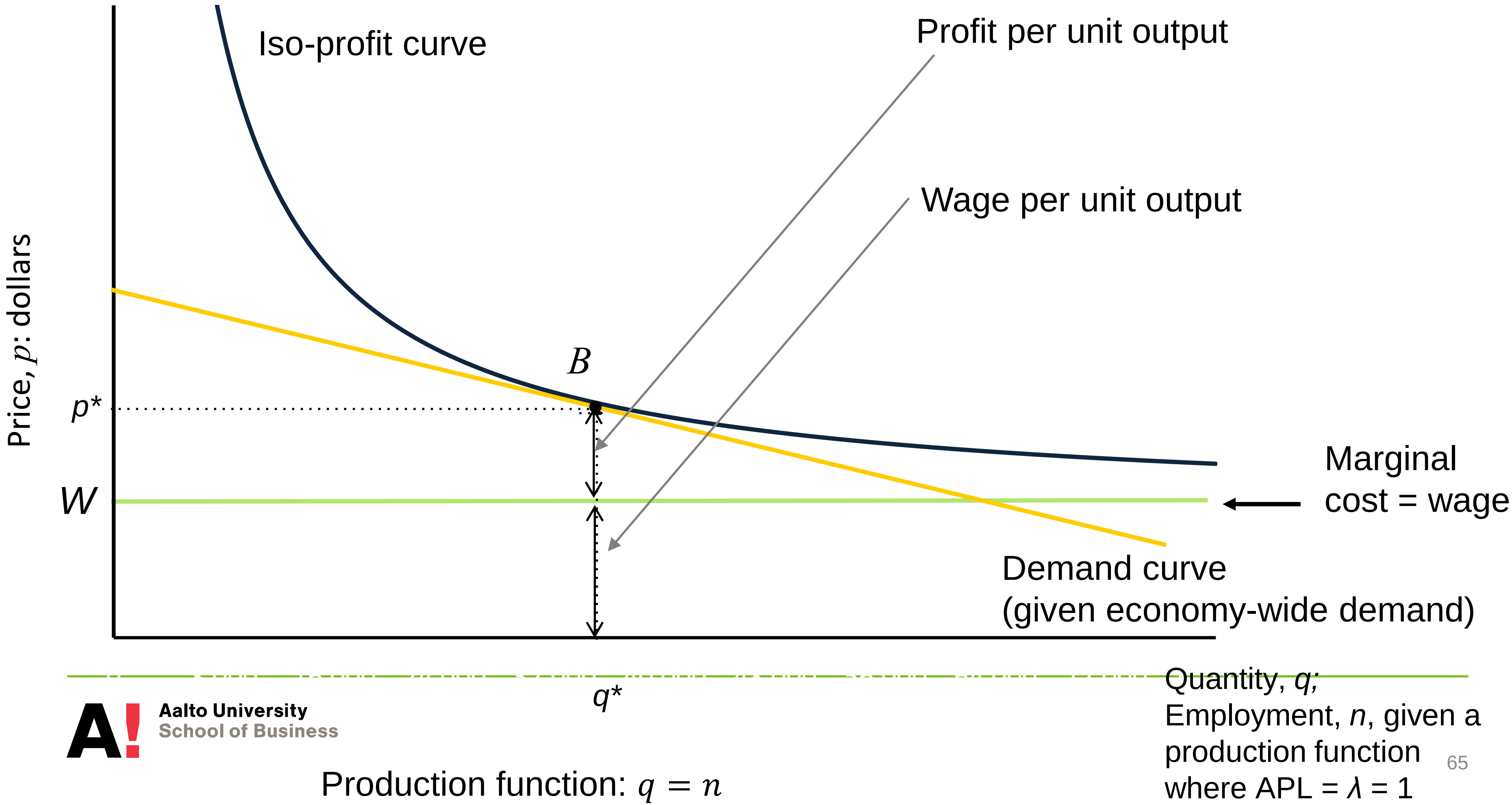
Firm's constrained optimisation problem:

- goal: maximise profits
- constraint: demand curve faced by the firm



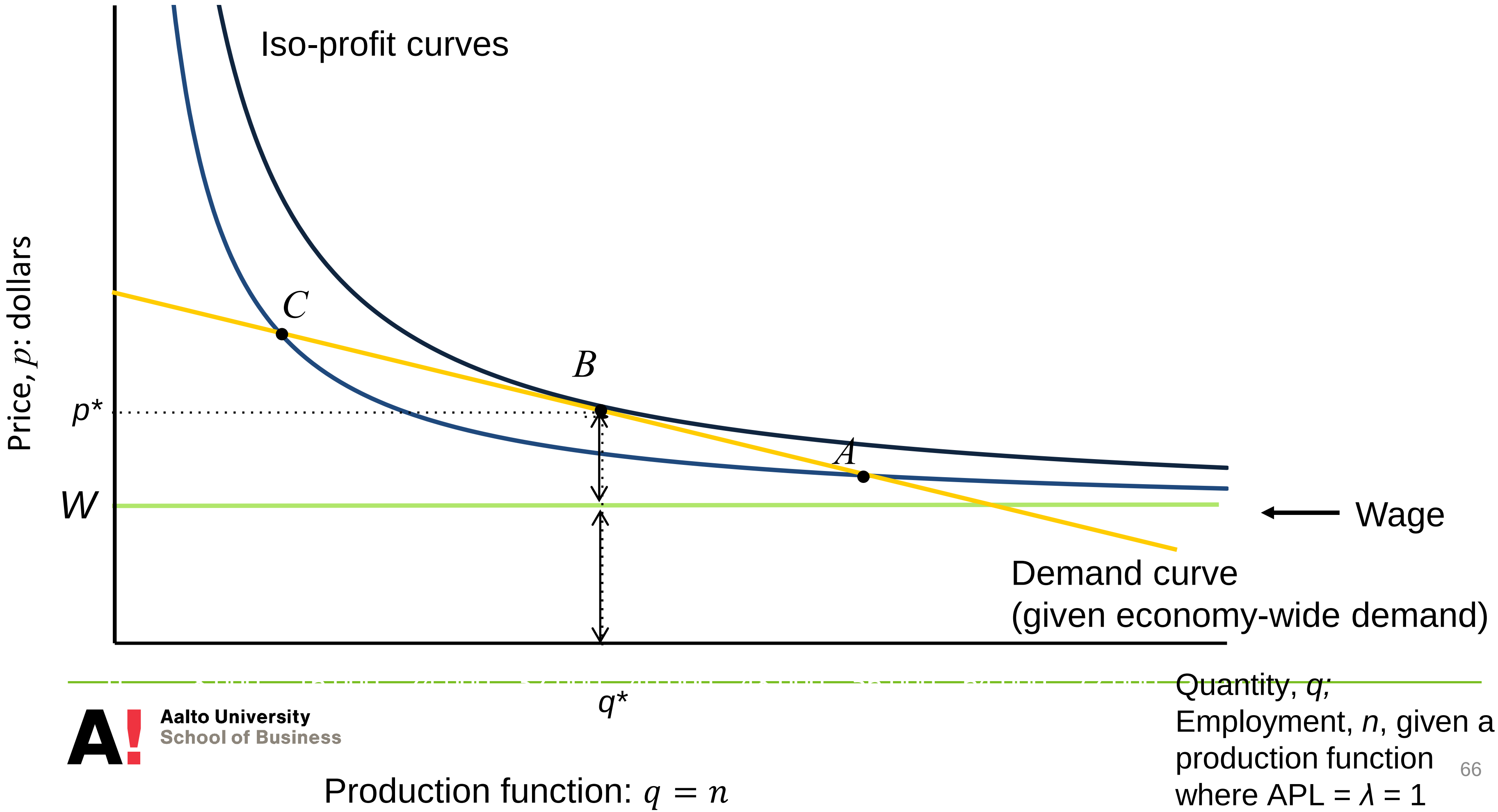
Production function: $q = n$

Profit-maximizing price



Production function: $q = n$

Profit-maximizing price

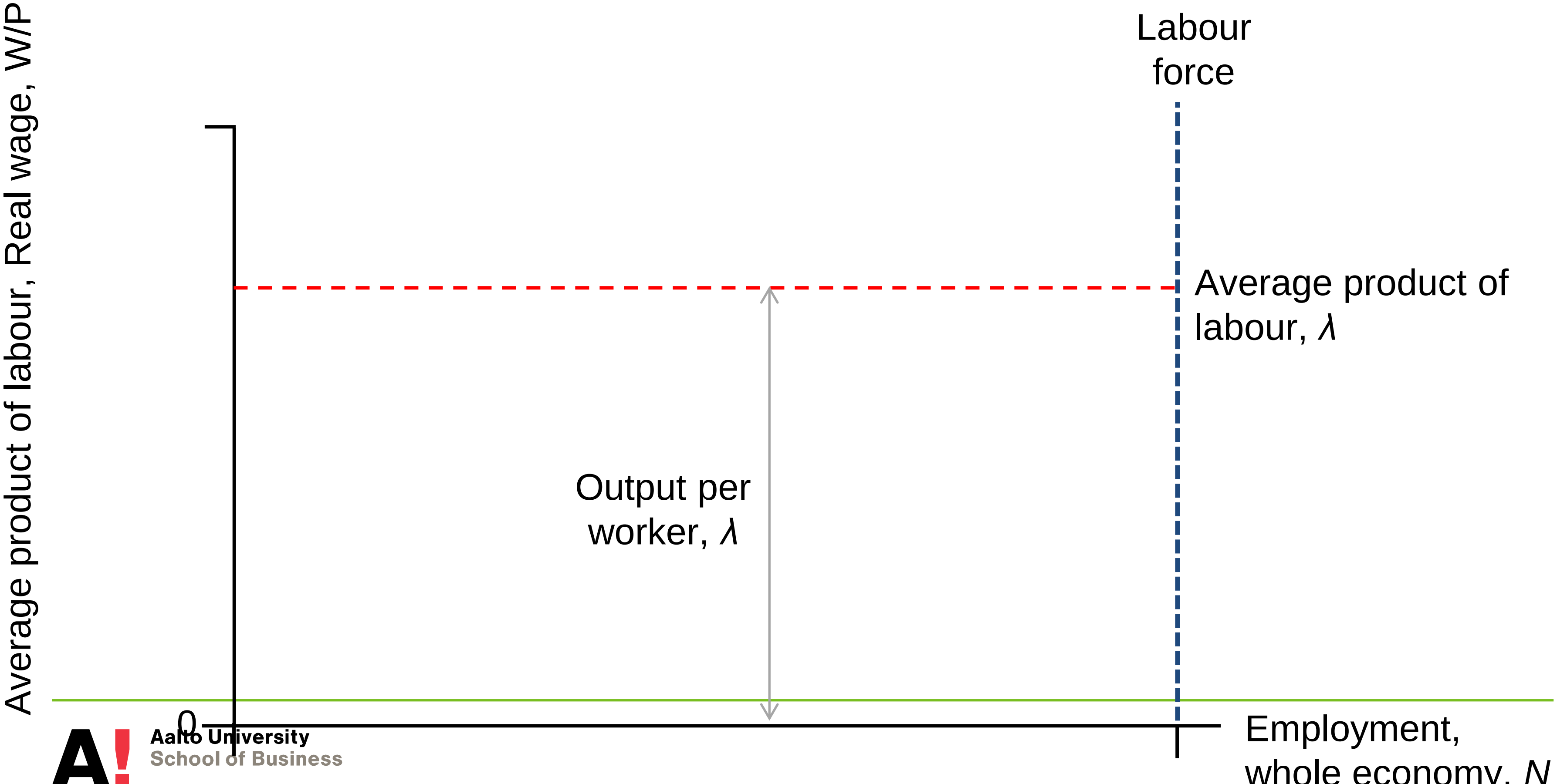


Production function: $q = n$

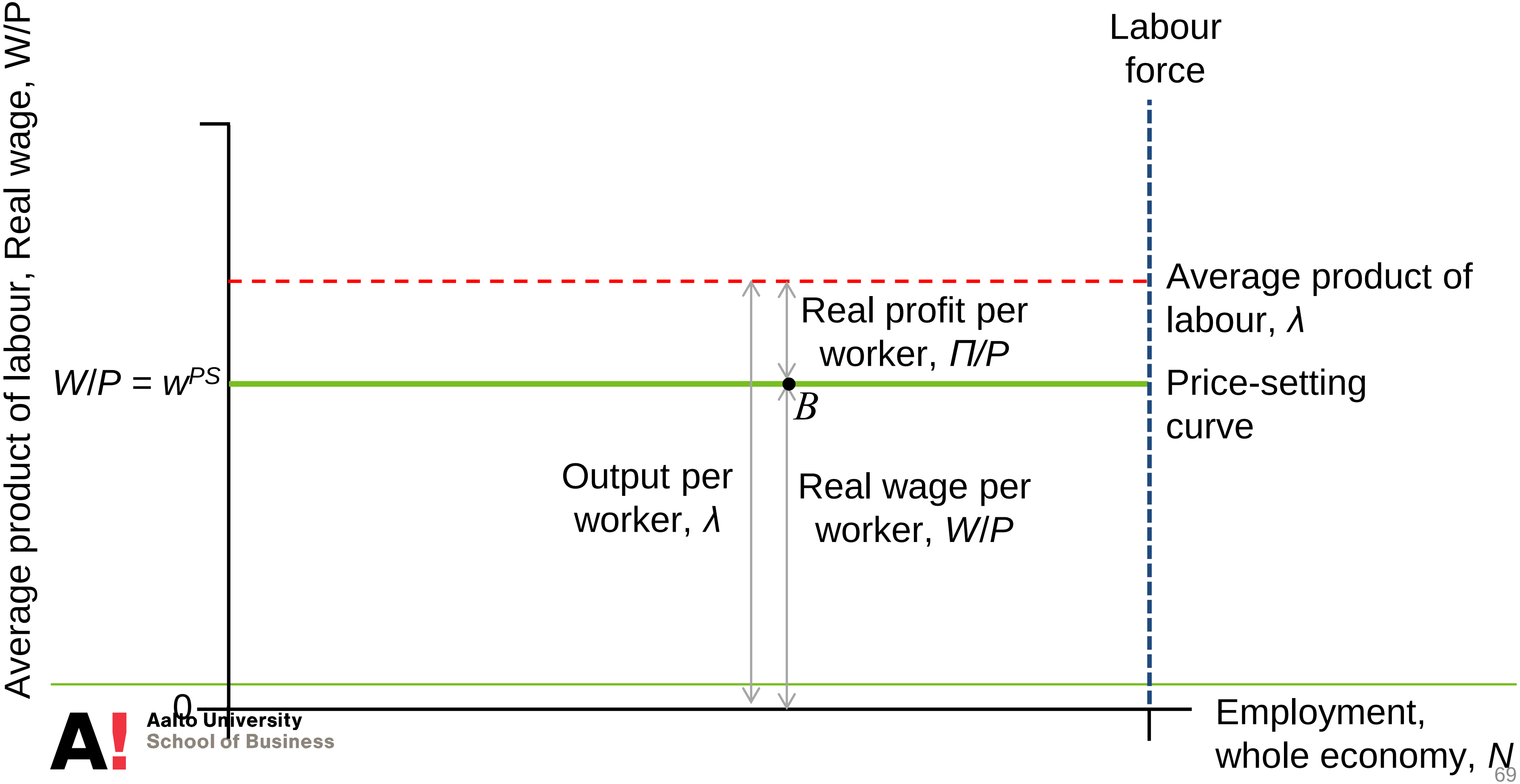
The price-setting curve

- When the firm sets the price as a markup on its wage cost, this means that the price per unit of output is split into the profit per unit and the wage cost per unit
- For the economy as a whole, when all firms set prices this way, **output per worker** (labour productivity, or equivalently, the average product of labour, called lambda, λ) **is split into**
  - Real profit per worker Π/P and
  - The real wage W/P
- **This is depicted in the next figures**

The price-setting curve



The price-setting curve



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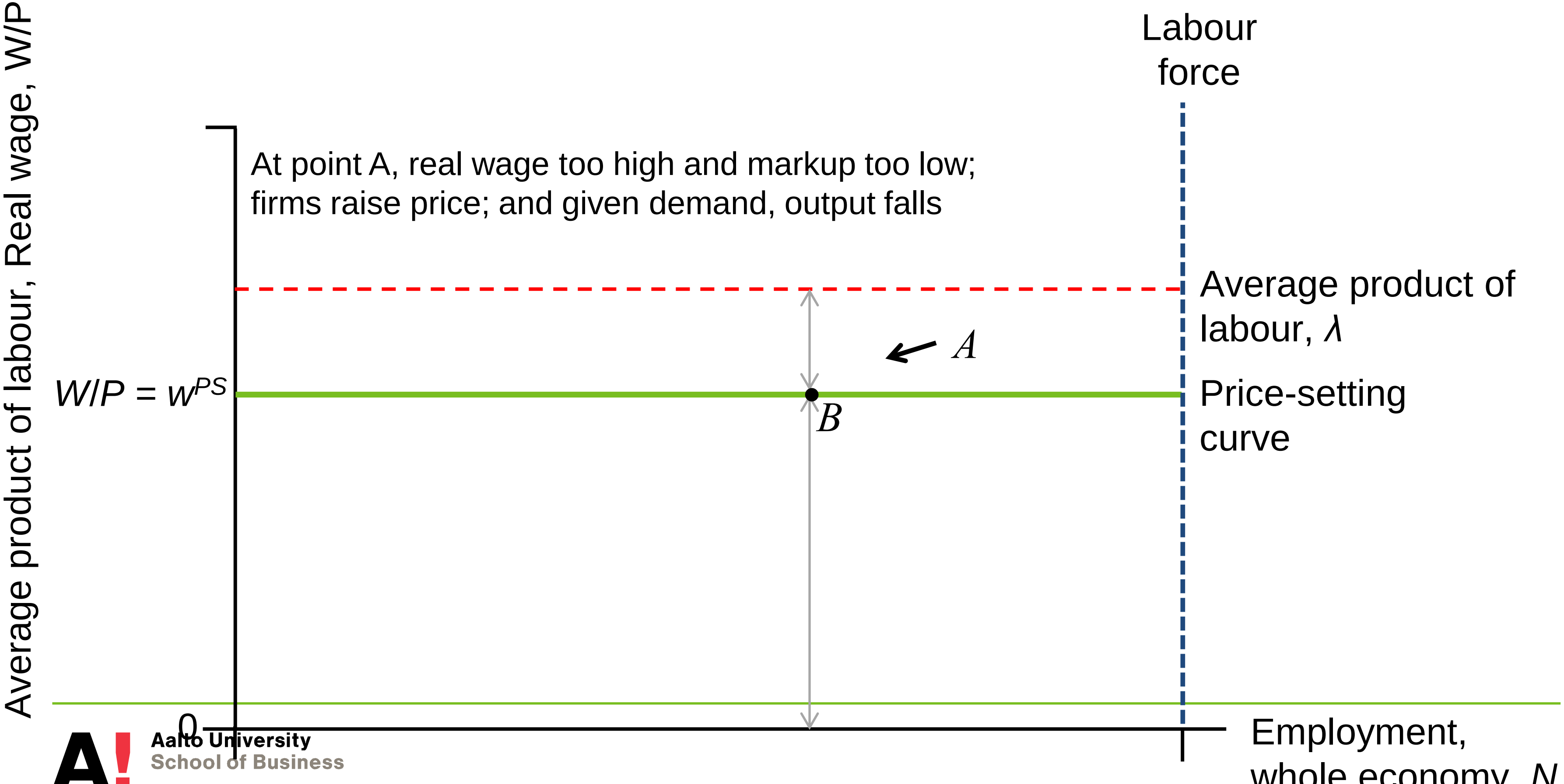
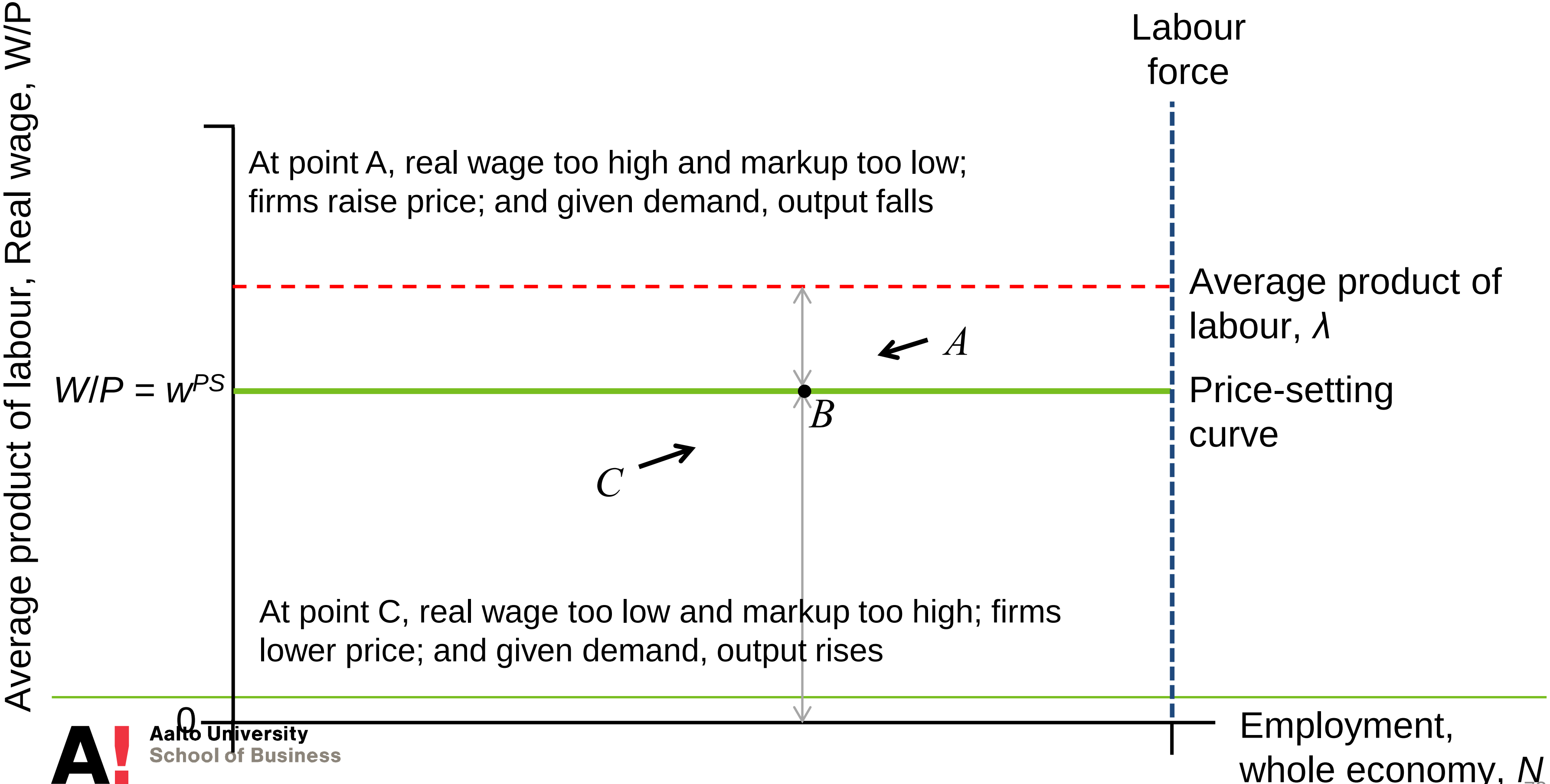
The price-setting curve

- **The price-setting ‘curve’ is just a single number** that gives the value of **the real wage** that is **consistent with the markup over costs, when all firms set their price to maximize their profits**
- The value of the real wage consistent with the markup does not depend on the level of employment in the economy, so it is shown as a horizontal line at the height of w^{PS}
- Point B in the figure on the price-setting curve shows the outcome of profit-maximizing price-setting behaviour of firms for the economy as a whole

The price-setting curve



The price-setting curve



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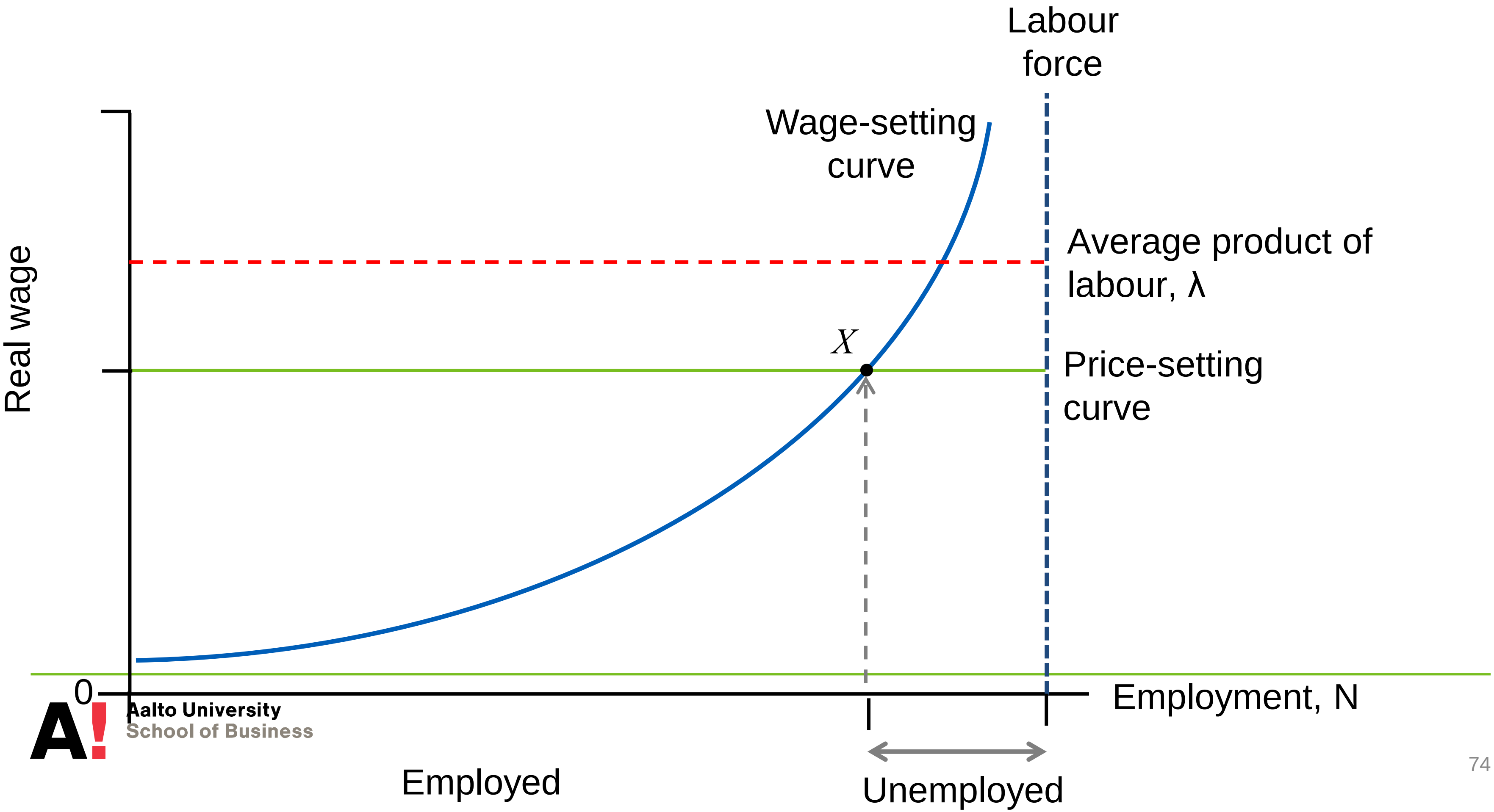
What determines the height of the price-setting curve?

- **Competition** determines the extent to which firms can charge a price that exceeds their costs
  - **The less the competition**, the steeper the demand curve, **the greater the markup** and profit per worker
  - Since this leads to higher prices across the whole economy, it implies **lower real wages**, pushing down the price-setting curve
- **Labour productivity:**
  - For any given markup, the level of labour productivity—how much a worker produces in an hour—determines the real wage
  - **The greater the level of labour productivity (λ), the higher the real wage** that is consistent with a given markup => the price-setting curve will shift upwards, raising the real wage

Equilibrium



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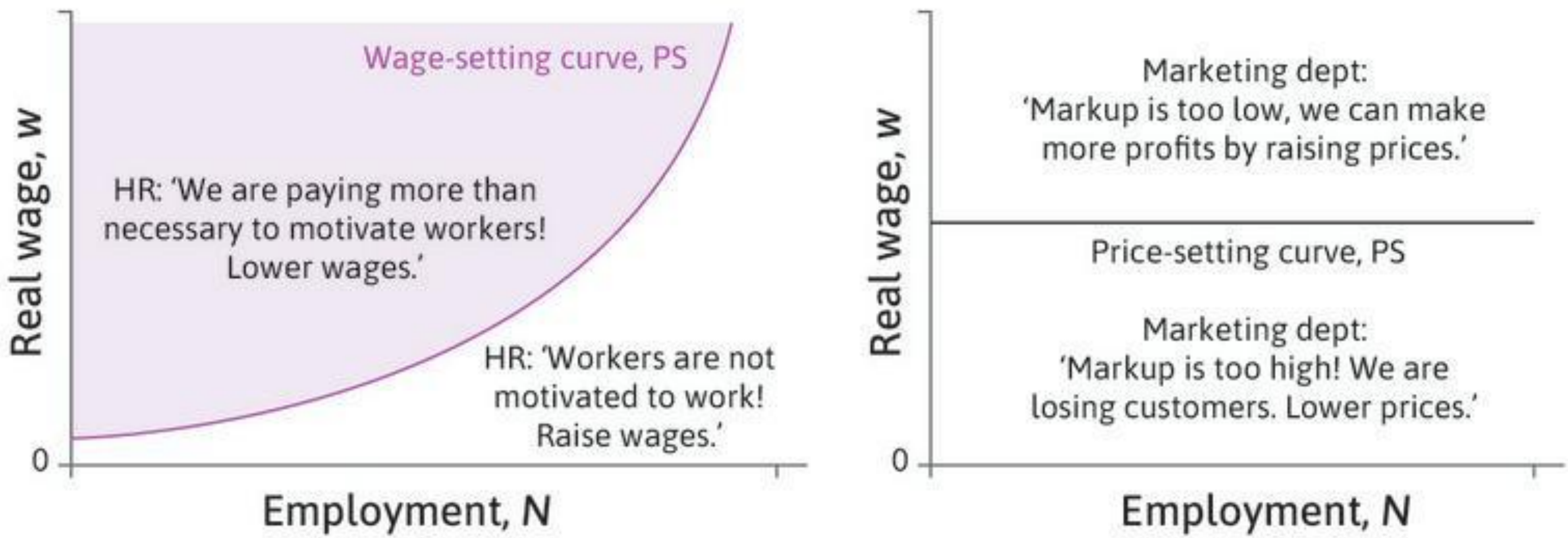
Equilibrium

- **The equilibrium of the labour market is where the wage- and price-setting curves intersect (*X*)**
  - This is a Nash equilibrium because all parties are doing the best they can, given what everyone else is doing
    - *The firms are offering the wage that ensures effective work from employees at least cost (on the wage-setting curve). HR cannot recommend an alternative policy that would deliver higher profits*
    - *Employment is highest it can be, given the wage offered. MD cannot recommend changing prices or output*

Points outside the curve are not Nash-equilibrium



Involuntary unemployment

- **Unemployment can exist in Nash equilibrium in the labour market**
- **In fact, there will always be unemployment in labour market equilibrium, i.e. equilibrium unemployment**
- **Reasoning:**
  - No unemployment → zero cost of job loss → no effort
  - Therefore some unemployment is necessary to motivate workers!
  - These are the involuntarily unemployed
- **Unemployment = excess supply in the labour market**

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Applications

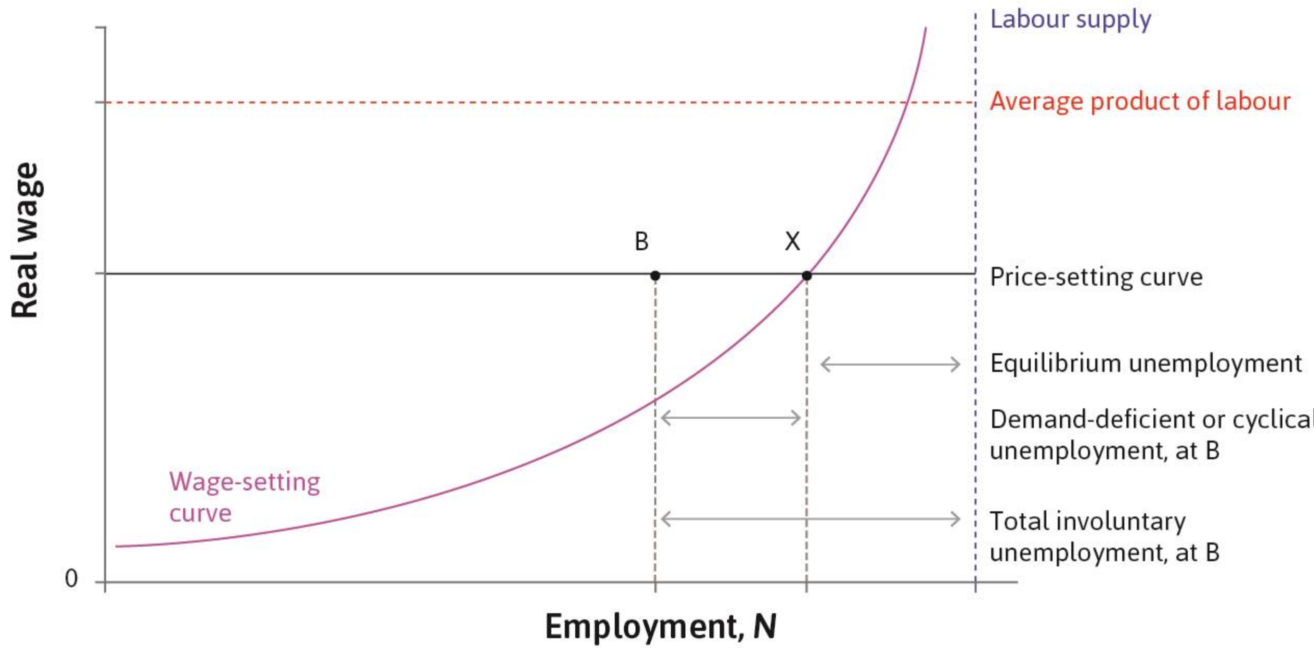
Unemployment and aggregate demand

- **The firm's demand for labour depends on the demand for their goods and services (derived demand for labour)**
- **Aggregate demand = sum of the demand for all of the goods and services produced in the economy**
- **The increase in unemployment caused by the fall in aggregate demand is called demand-deficient unemployment**

Demand deficient unemployment

Low aggregate demand moves the economy from labour market equilibrium (X) to point B

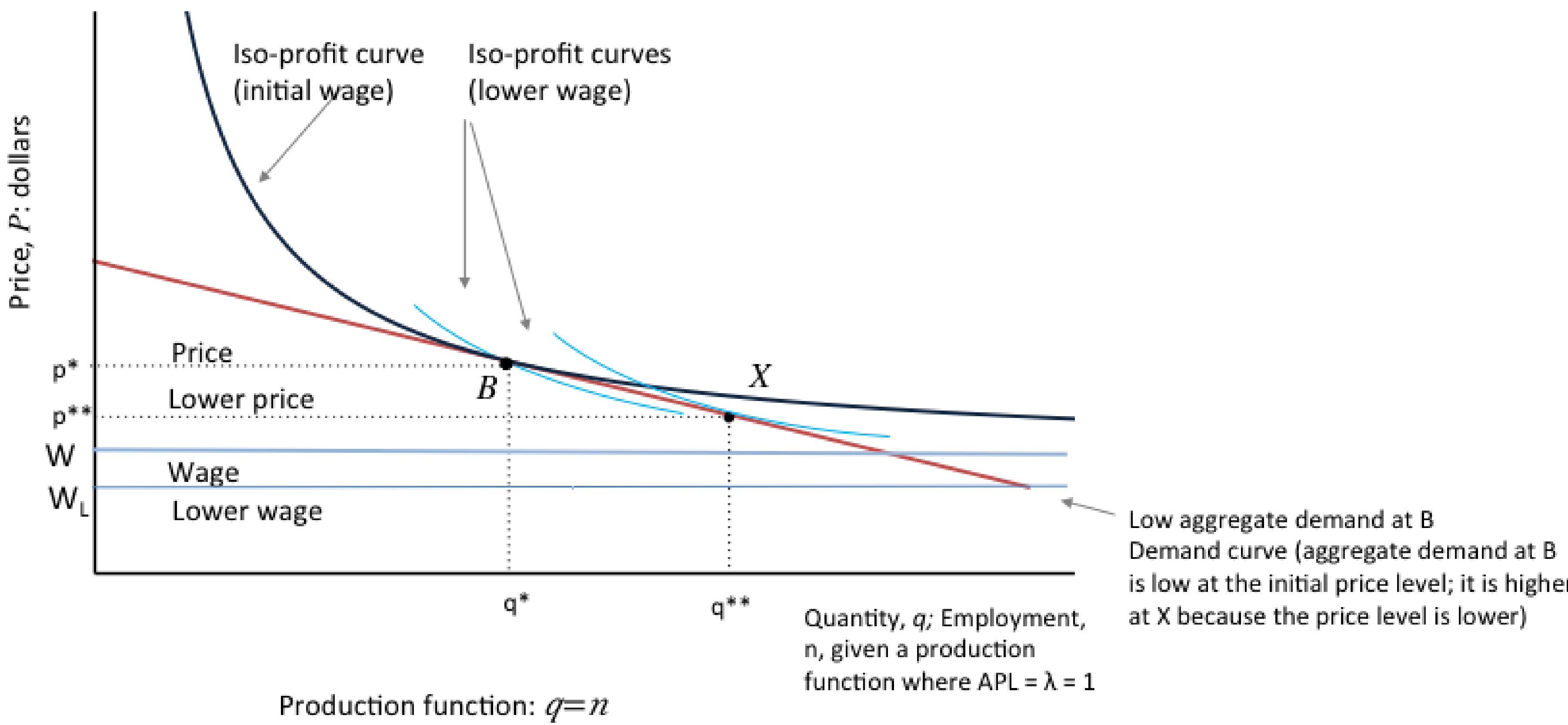
B is not a Nash equilibrium



Automatic adjustment

- **Point B is not a Nash equilibrium:**
  - Firms could lower wages without lowering workers' effort
  - Lower wages allow them to cut their prices
  - Lower prices stimulate demand → output rises
  - Firms hire more workers to produce more
  - … unemployment falls back to X

Automatic adjustment

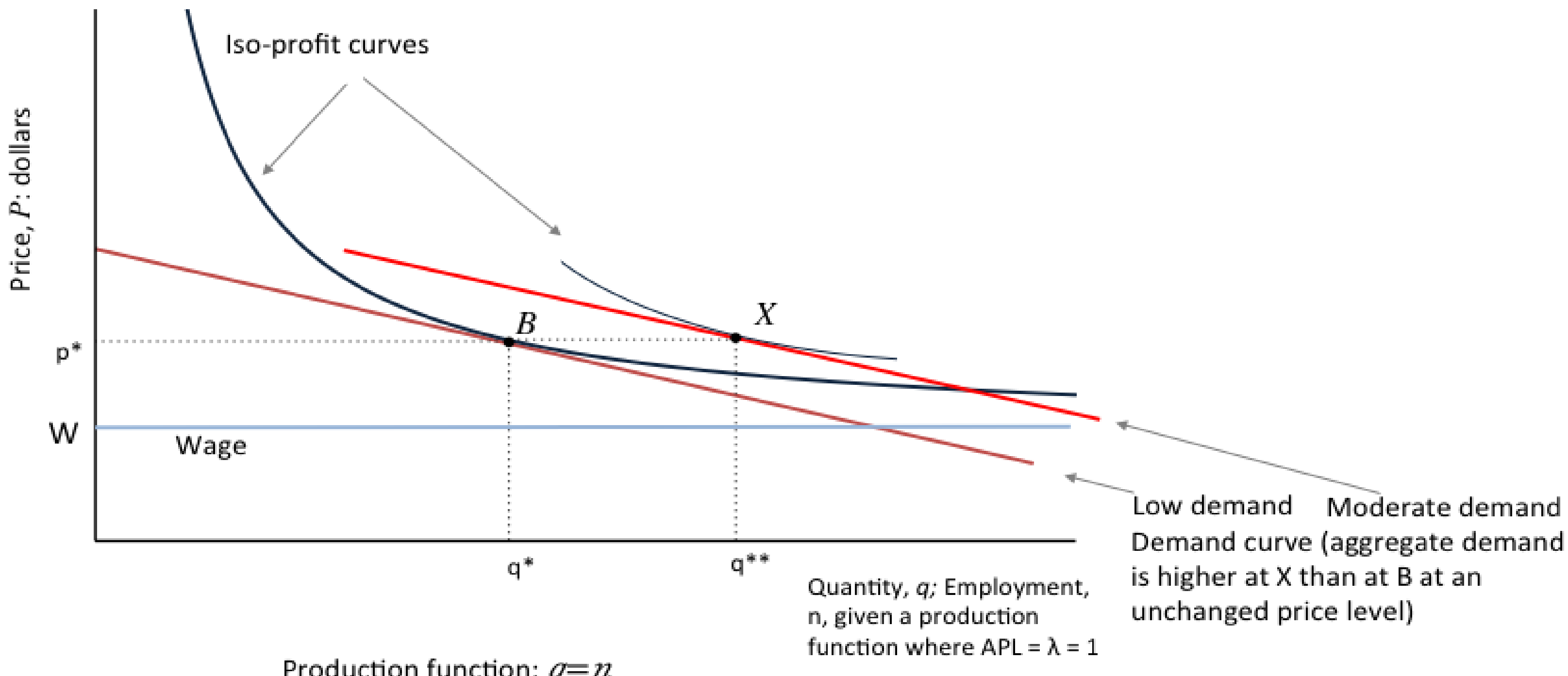


Automatic adjustment in practice

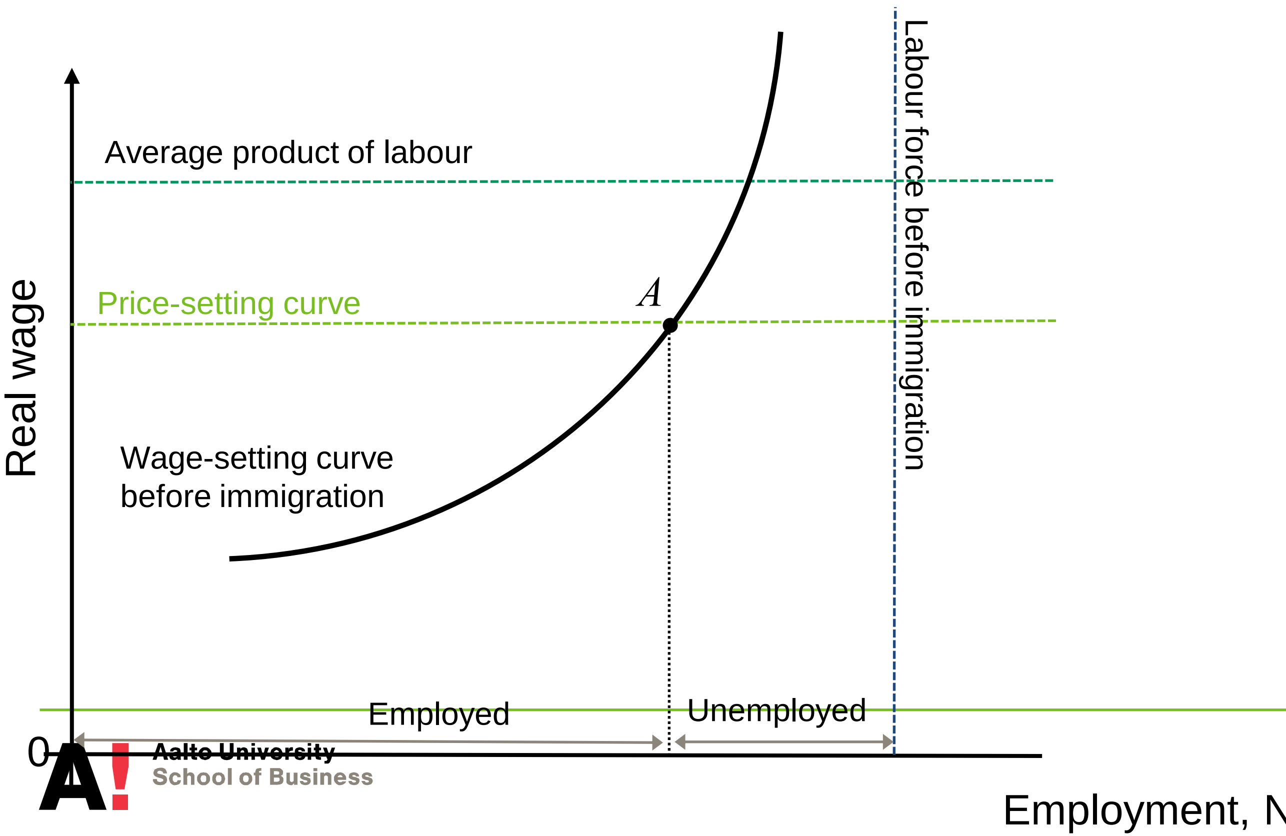
- **Real economies do not function so smoothly:**
  - Workers resist cuts to their nominal wage (lower morale, strikes)
  - Lower wages means people spend less → aggregate demand falls further
  - Falling prices across the economy may lead consumers to postpone their purchases in hope to get even better bargain later

Role of government policy

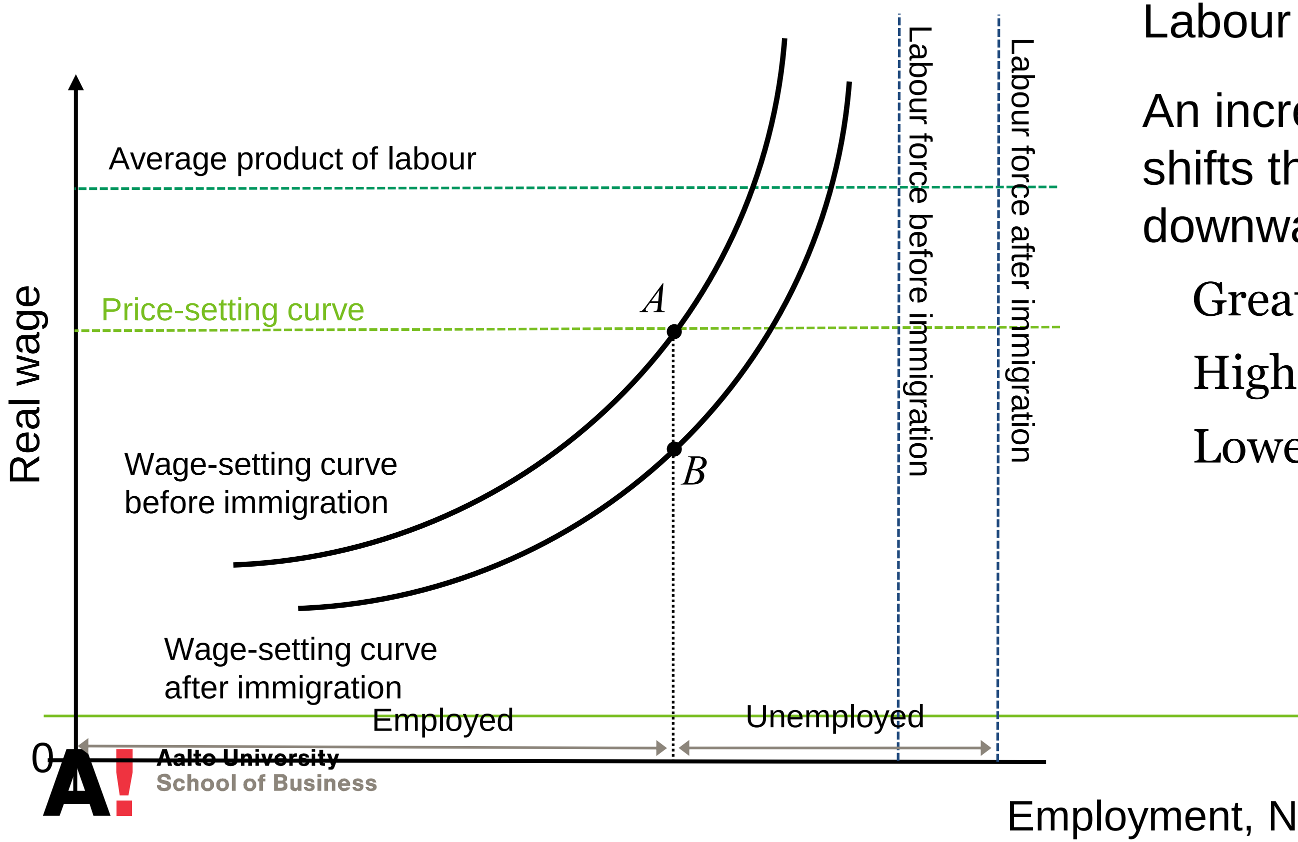
The government could increase its own spending to expand aggregate demand through monetary or fiscal policy



Effect of immigration on wages and employment



Effect of immigration on wages and employment

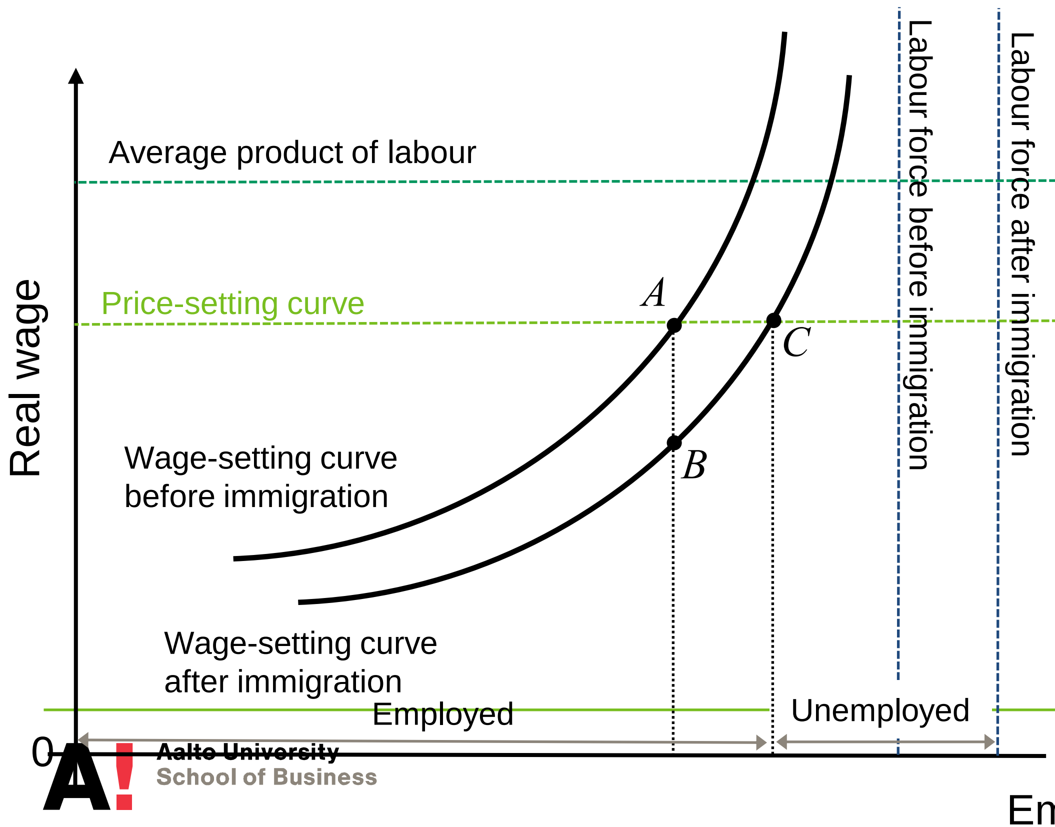


Labour supply shifts to the right

An increase in labour supply shifts the wage-setting curve downward:

- Greater pool of unemployed
- Higher employment rents
- Lower cost of effort

Effect of immigration on wages and employment



Reduction in wage reduces marginal cost

If demand stays the same, firms hire more workers

Employment expands so that the economy is again at the intersection of the PS and the new WS curve

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Other explanations for equilibrium unemployment

- **Search models**
  - It takes time and effort to find a new job
  - Peter Diamond, Dale Mortensen and Christopher Pissarides were awarded the Nobel Prize for their work in 2010
- **Union models**
  - Unions set wages and may set higher in order to benefit some workers but lead to unemployment for others

Summary

- **Behaviour of firms sets wages and employment in an economy**
  - The wage-setting curve tracks the combinations of wages and unemployment feasible with workers' effort
  - The price-setting curve determines the real wage corresponding to profit-maximising price
- **There will always be involuntary unemployment**
  - Incomplete contracts
  - Compare to the competitive model

Summary

- **We have devoted an entire unit to the labour market for two reasons:**
  - Its functioning is very important for how well the economy serves the interests of the population
  - It is different enough from the way that many familiar markets work that it is essential to know these differences to understand how the economy works
  - We will also be using this model when we think about unemployment and fiscal and monetary policy

Differences between the labour market and competitive (goods) markets

Market	Bread: a market clearing equilibrium of price-takers	Baristas: price-setting by employers and equilibrium unemployment
Buyers	Individual consumers	Firms (employers)
Sellers	Firms (shops)	Individual workers
What is sold?	A loaf of bread	The worker's time
What does the buyer want?	A loaf of bread	The employee's effort on the job; not the worker's time
Competition among sellers?	*Yes*: There are many bakeries competing to sell bread.	*Yes*: There are many actual or would-be baristas competing to sell their time.
Is the contract complete?	*Yes*: If the bag labeled bread did not contain bread, you get your money back.	*No*: The firm's profits depend on the worker's effort per hour/week/month worked, which is not in the contract.
Price-taking buyers?	*Yes*: Individual buyers cannot bargain for a lower price than others are willing to pay (and would not want to pay more).	*No*: The buyer (the firm) sets the wage to minimize the cost of getting the worker to work; it cannot benefit by offering the lowest wage at which the worker (the seller) would accept the job.
Is there excess supply or demand in equilibrium?	*No*: The market clears. Sales take place at the lowest price the seller would accept.	*Yes*: Firms offer a wage higher than the worker's reservation wage (minimum price the seller would accept) to maximize their profits.

Next lectures

- Market failure: Sources and solutions
- The role of private bargaining and government policy