# Principles of Economics II

# Lecture 8: Unemployment and fiscal policy

*Fall 2021*

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# Outline

- **Introduction**
- **The Aggregate Demand function and the multiplier model**
- **Household wealth**
- **Investment**
- **The role of government**
- **Linking Aggregate Demand and unemployment**

# Introduction

# Context

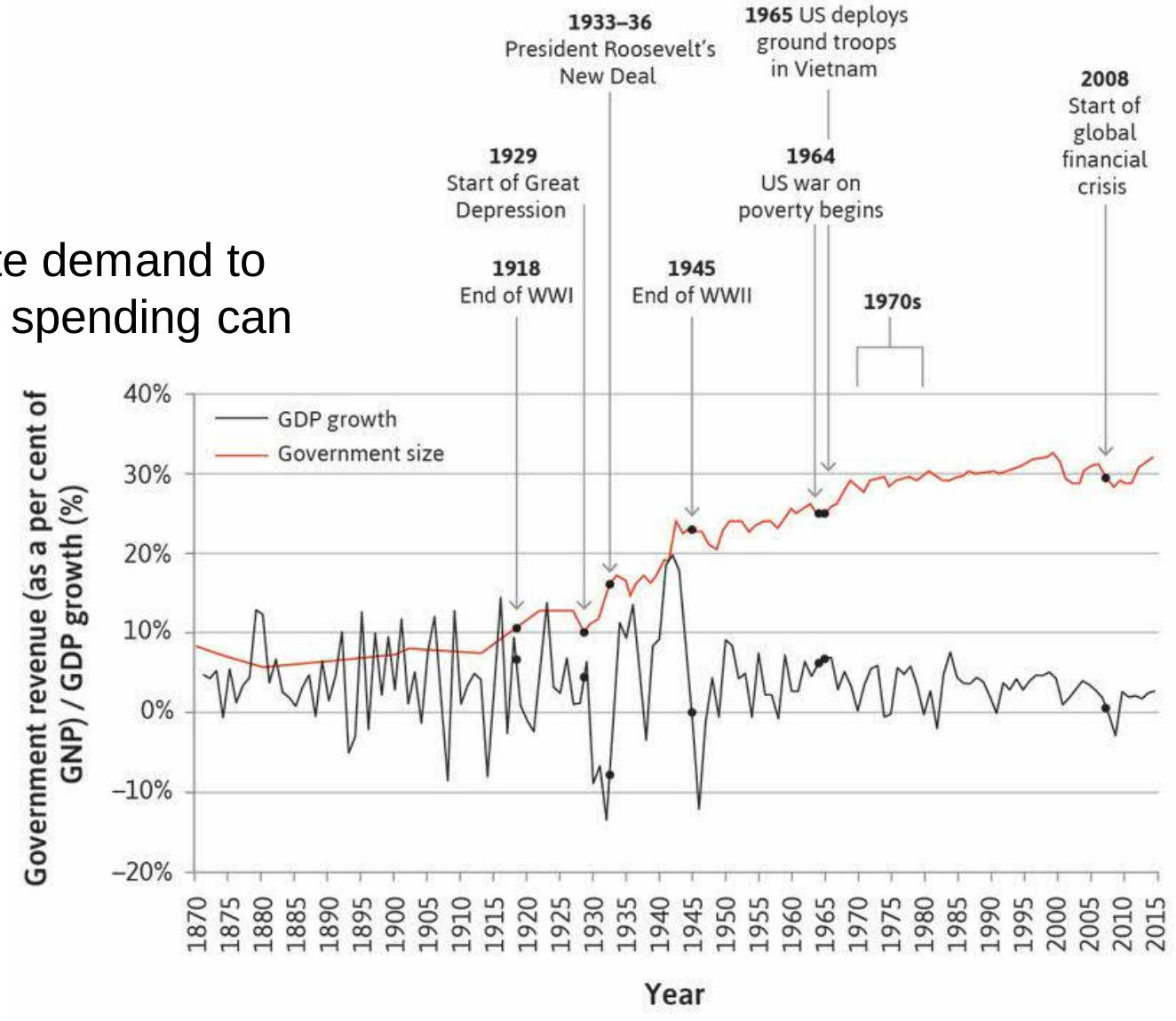
**Aggregate demand (GDP) can fluctuate due to consumption and investment decisions (Unit 13)**

**Sometimes the aggregate decisions of households and firms can destabilize the economy**

- How can the government stabilize the economy?
- Why might government policies be ineffective?
- How can we model the link between output and unemployment?

# Context

Use a model of aggregate demand to explain how government spending can stabilize the economy



# The Aggregate Demand function and the multiplier model

# Aggregate consumption function

**We begin with a simple model that excludes the government and foreign trade**

**In this model, there are two types of expenditure:**

- Consumption (C) and investment (I)

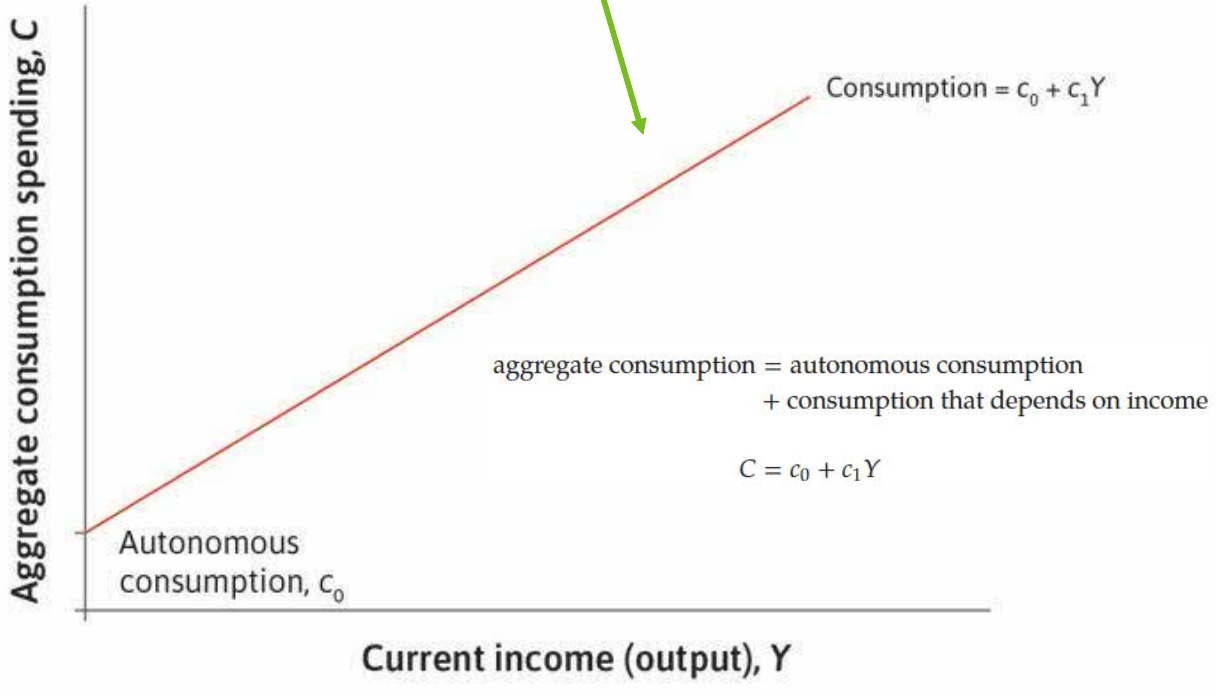
**We assume that aggregate consumption spending has two parts:**

- A fixed amount: How much people will spend, independent of their income (also known as autonomous consumption)
- A variable amount: This depends on current income

# Aggregate consumption function

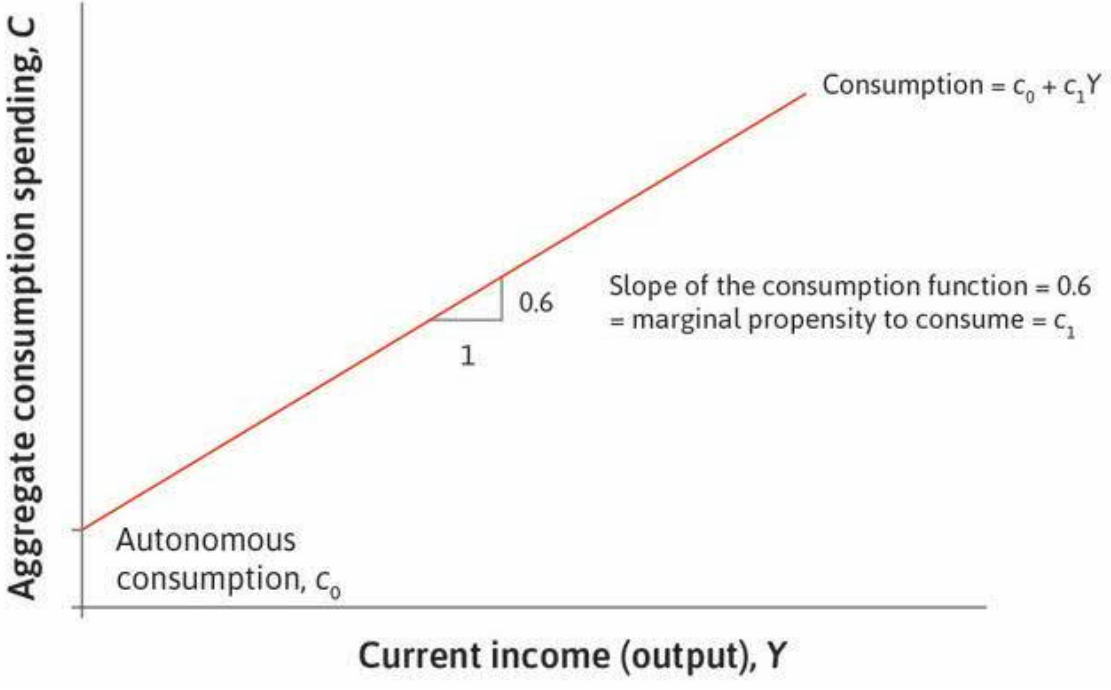
The part of consumption that depends on current income

The fixed amount households will spend that does not depend on their current level of income



# Aggregate consumption function

The term $c_1$ gives the effect of one additional unit of income on consumption, called the marginal propensity to consume (MPC)



# Aggregate consumption function

- **A steeper consumption line means a larger consumption response to a change in income**
- **A flatter line means that households are smoothing their consumption so that it does not vary much when their incomes change**
- **We assume that the marginal propensity to consume is positive, but less than one**
  - This means that only part of an increase in income is consumed; the rest is saved

# Aggregate consumption function

**We also assume that the marginal propensity to consume is fixed, although in reality there is heterogeneity among people**

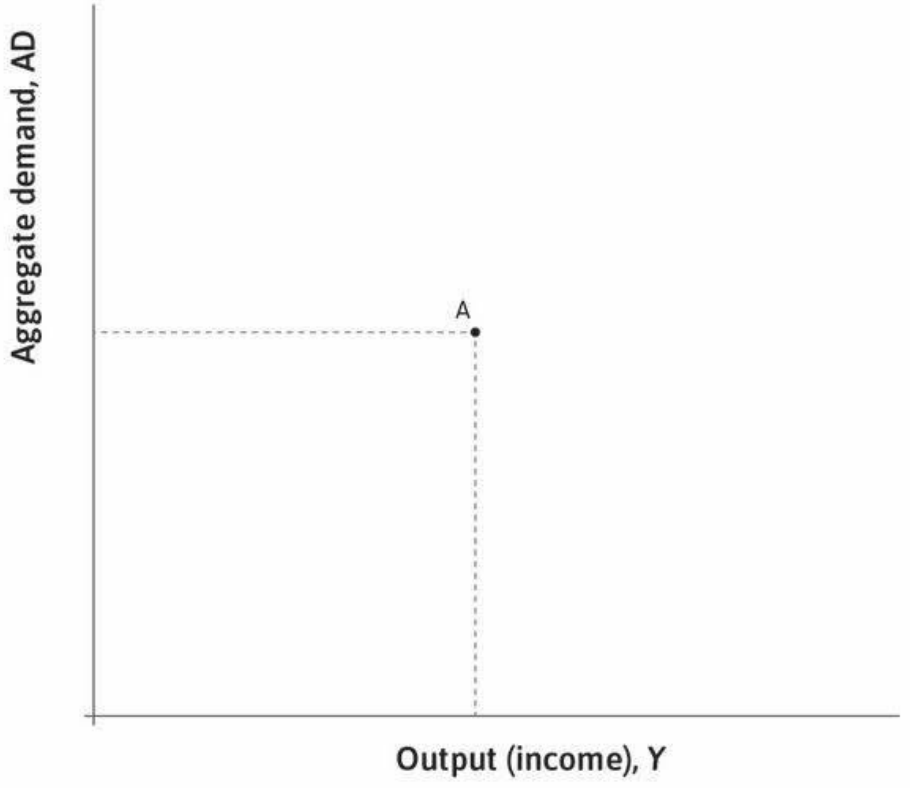
- Poor households with credit constraints react a lot to variation in current income, so their MPC is large
- For wealthy households, current income matters little for current consumption, so their MPC is small

**Expectations about future income are reflected in autonomous consumption**

# Aggregate demand

Point A is called a goods market equilibrium

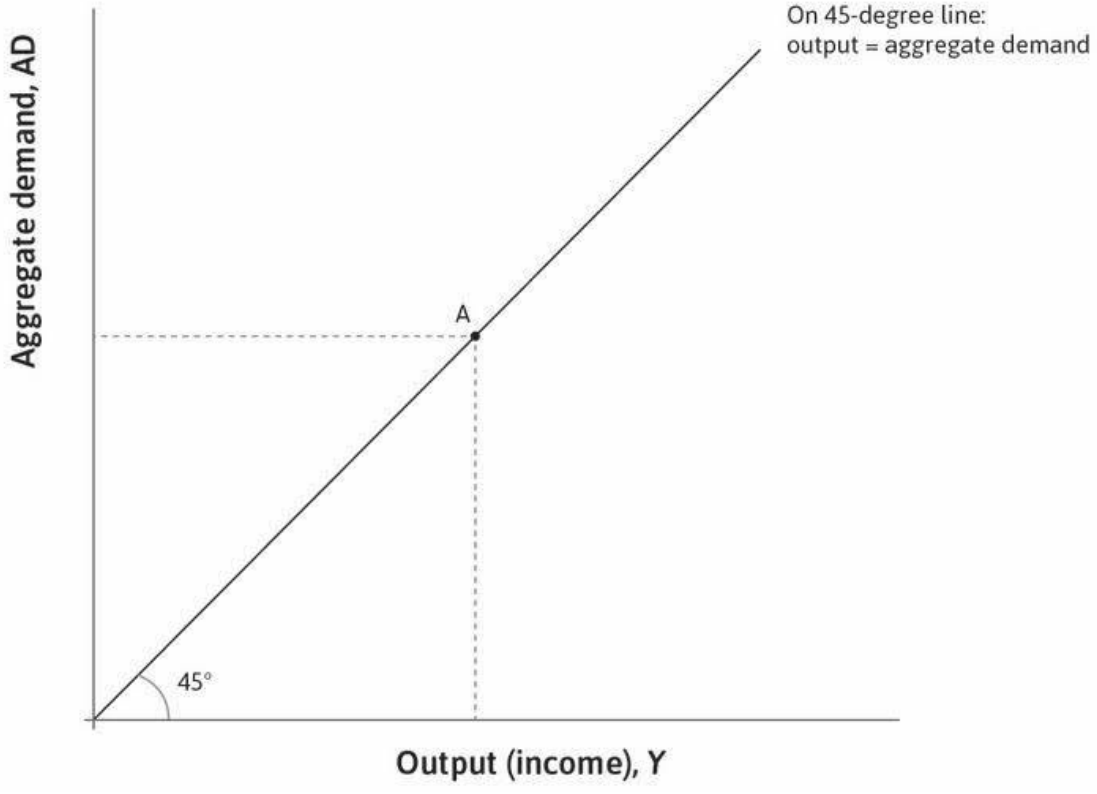
The economy will continue producing at this output level unless something changes spending behaviour



# Aggregate demand

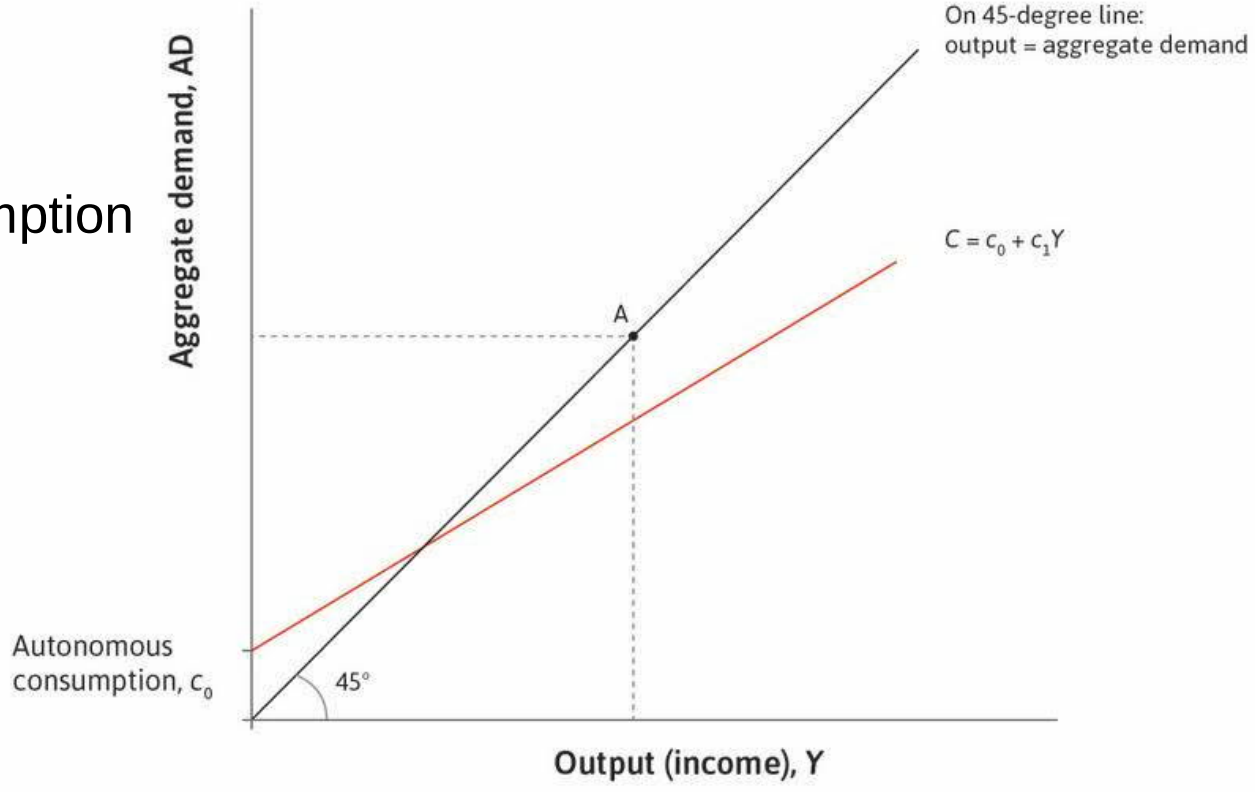
The 45-degree line from the origin of the diagram shows all the combinations in which output is equal to aggregate demand, meaning the economy is in goods market equilibrium

But at which point is the economy going to be?



# Aggregate demand

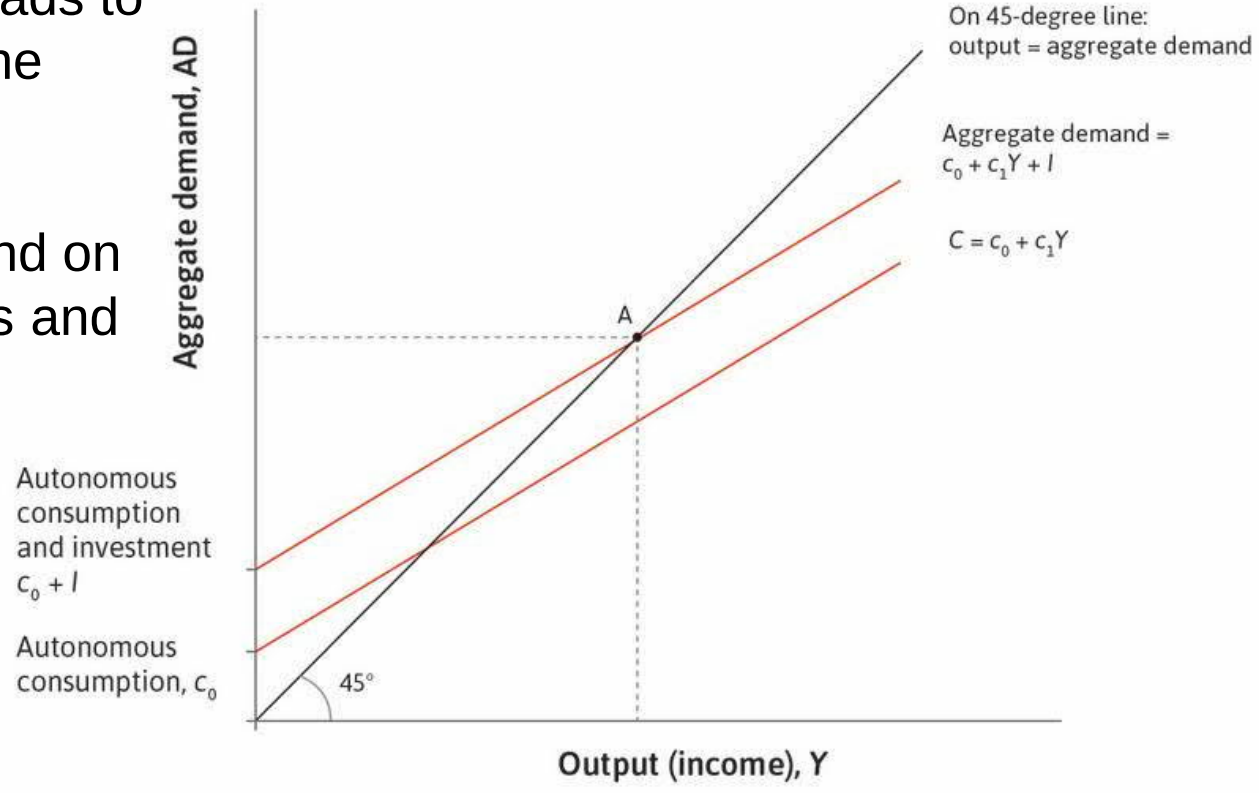
The first component of aggregate demand is consumption, which is represented by the consumption line introduced earlier



# Aggregate demand

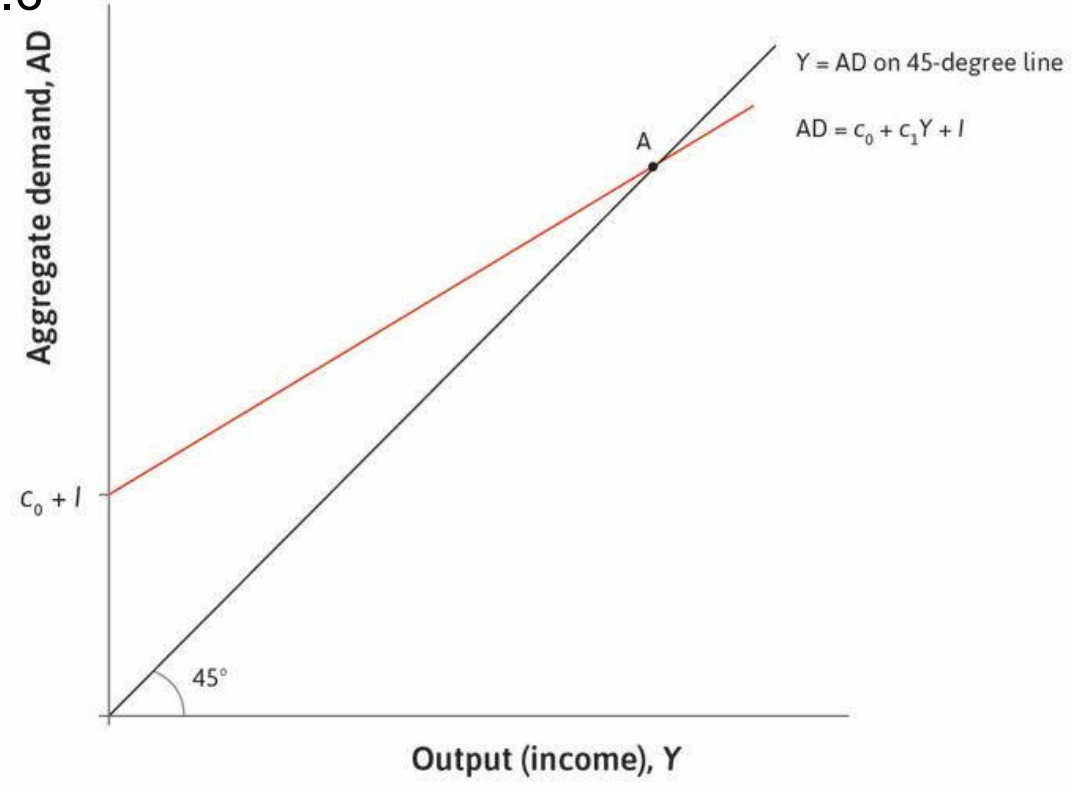
Adding investment to the consumption line simply leads to a parallel upward shift of the aggregate demand line

Investment does not depend on output, but on expectations and interest rate



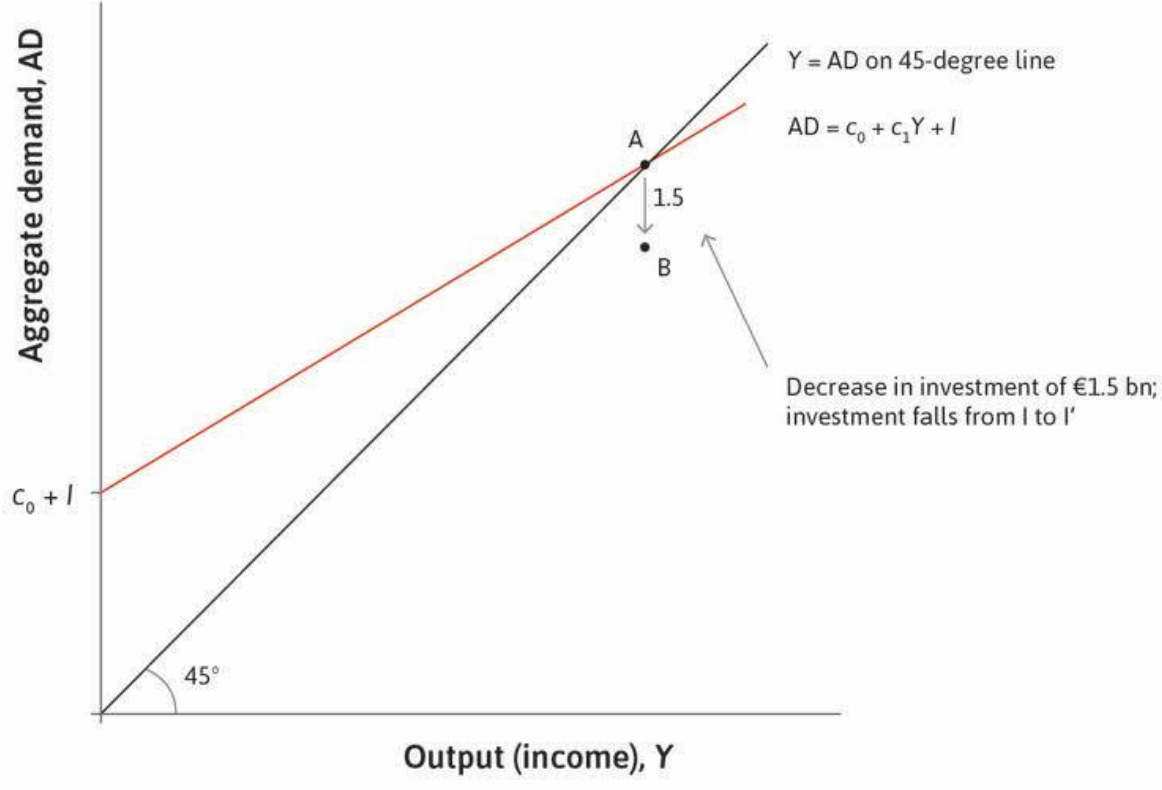
# Multiplier process – €1.5 billion reduction in investment

The economy starts at point A, in goods market equilibrium
We assume that MPC is 0.6



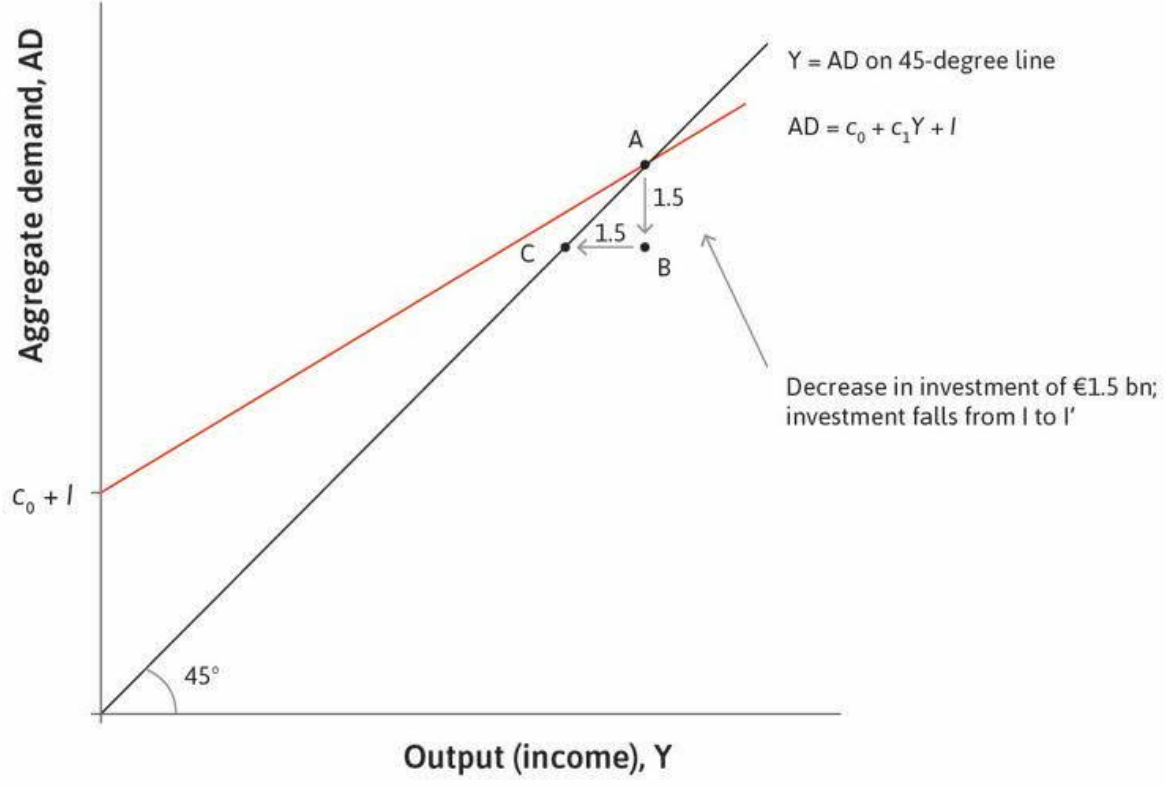
# Multiplier process

The fall in investment cuts aggregate demand by €1.5 billion, and the economy moves vertically downward from point A to point B.



# Multiplier process

With demand lower, firms cut back production and reduce employment. With output and employment lower, incomes fall by €1.5 billion. This is the move from B to C.

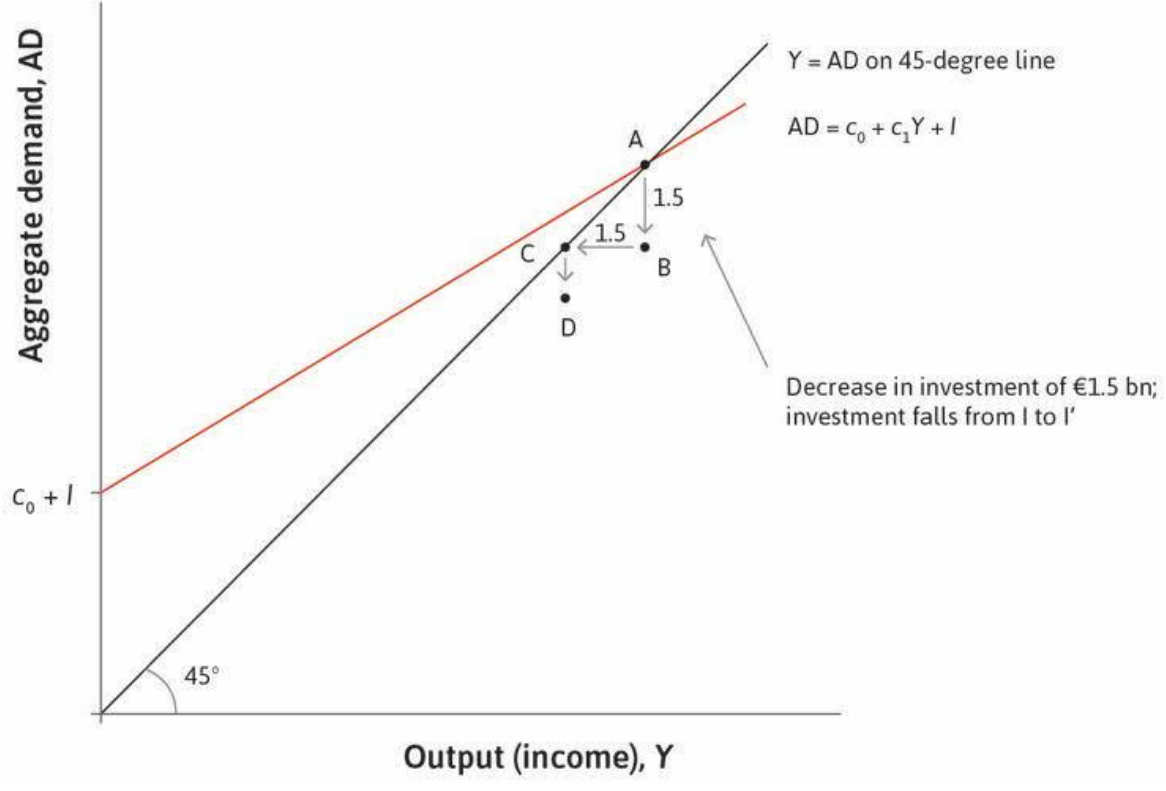


# Multiplier process

Once households' incomes fall, they reduce their consumption, because they may be credit-constrained

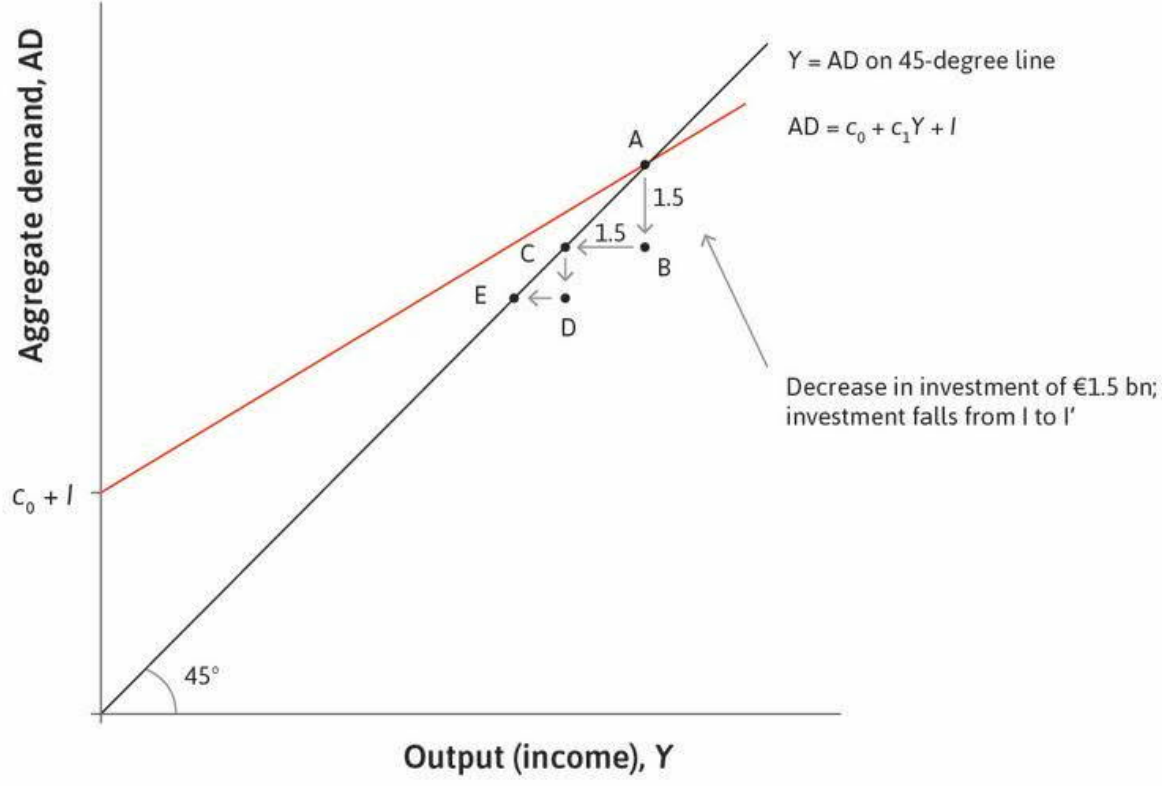
The consumption equation tells us that this kind of behaviour initially leads to a fall in aggregate consumption of 0.6 times the fall in income

This is the distance from point C to point D



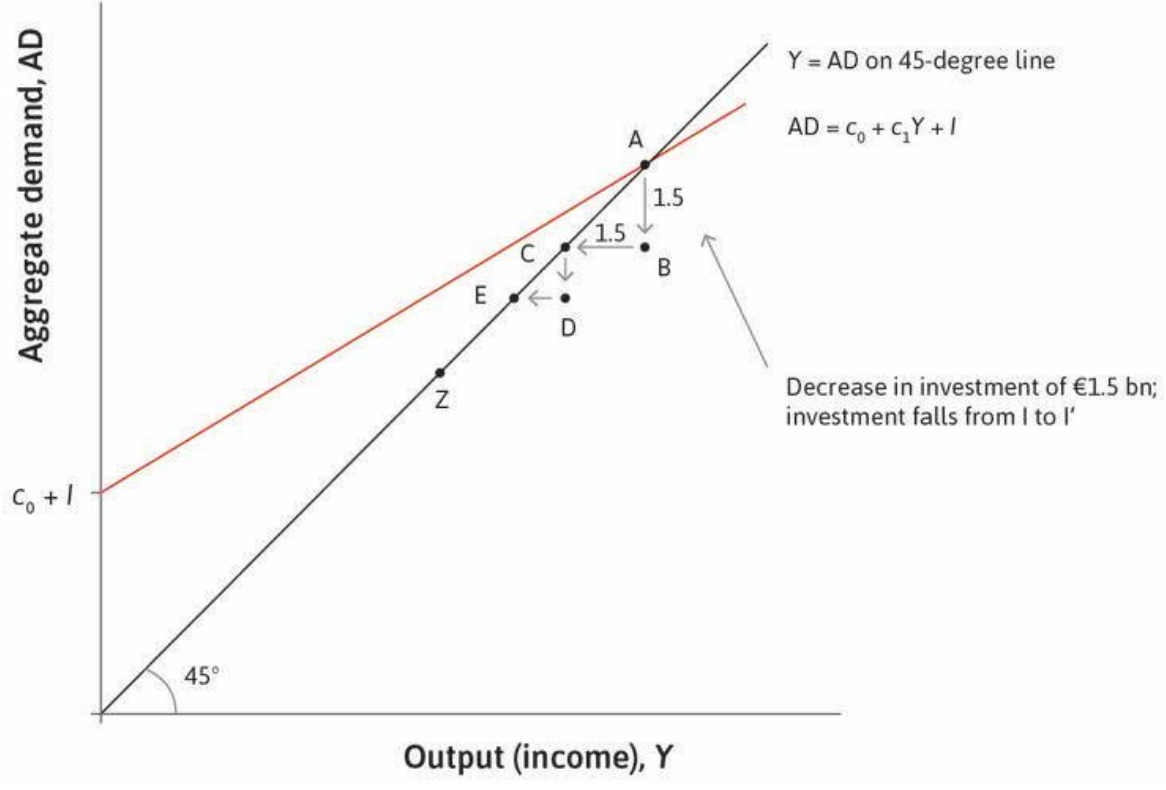
# Multiplier process

Firms respond by cutting production, output falls, and the economy moves from point D to point E



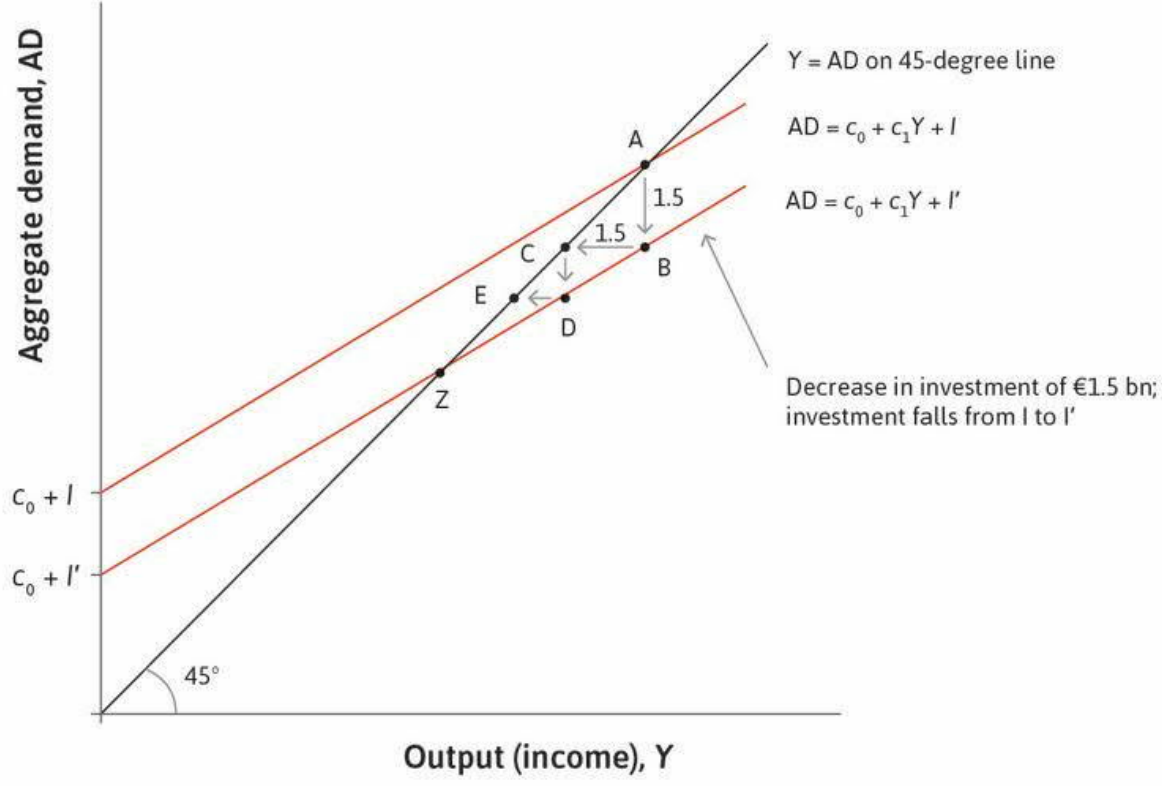
# Multiplier process

The process will go on until the economy reaches point Z



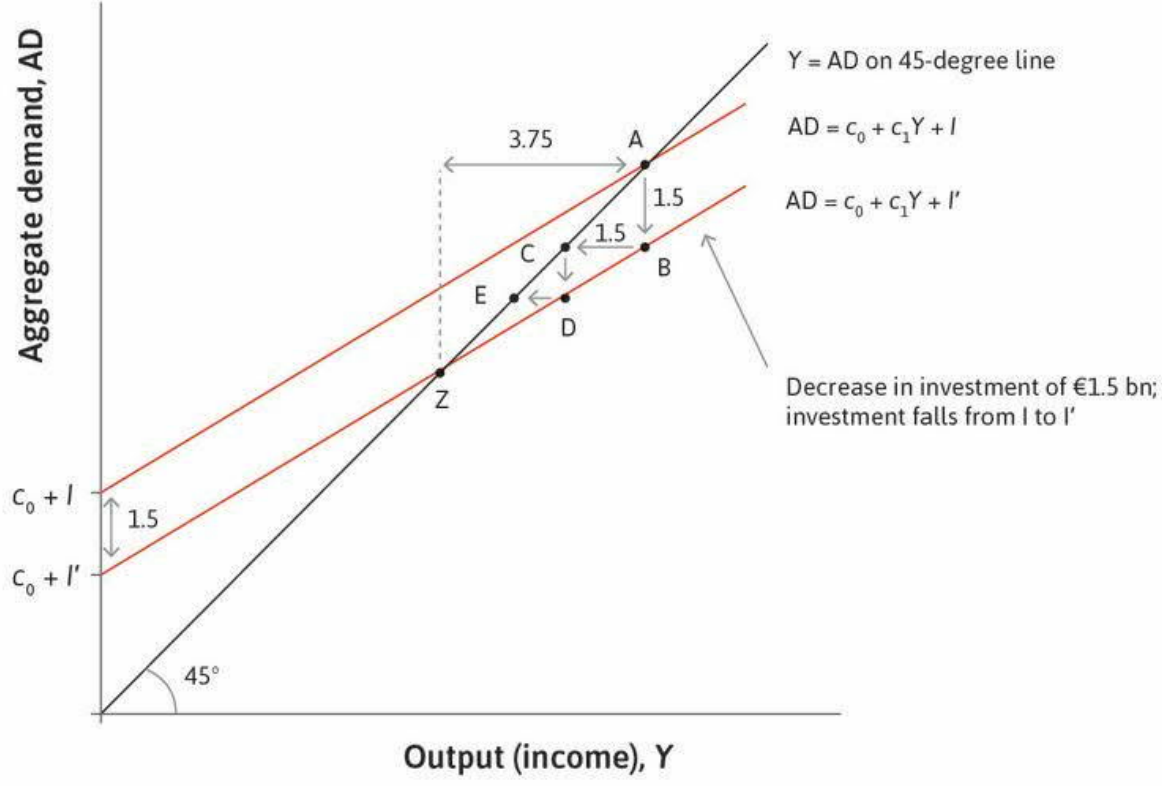
# Multiplier process

The new aggregate demand line goes through point Z and shows the new goods market equilibrium of the economy following the investment shock



# Multiplier process

The total fall in output exceeds the initial size of the decline in investment; output has fallen by €3.75 billion



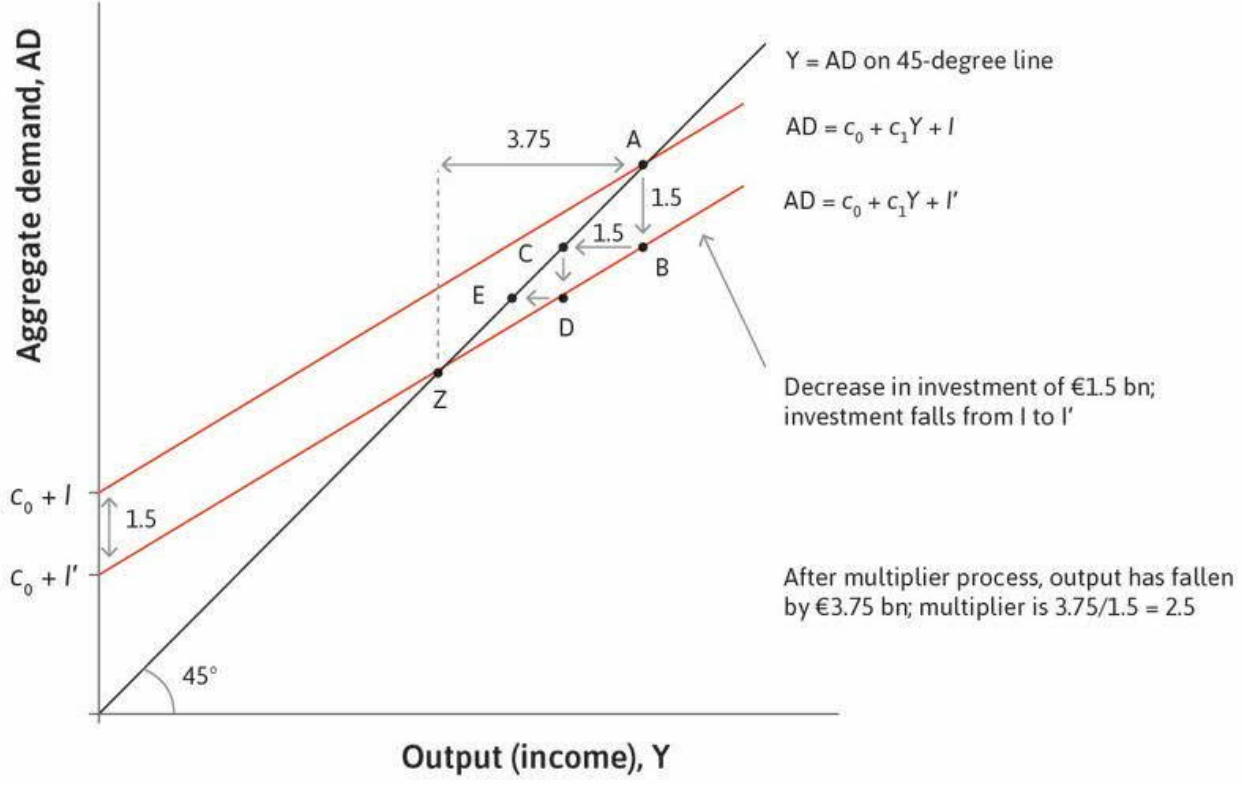
# Multiplier process

The total change in output is 2.5 times larger than the initial change in investment => the multiplier is equal to 2.5

$Y = c_0 + c_1Y + I$
$(1–c_1)Y = c_0 + I$

$Y = 1/(1–c_1)*(c_0 + I)$

$\Delta Y = k*\Delta I$



# Multiplier process summary

**A fall in demand leads to a fall in production and an equivalent fall in income:**

- This leads to a further (smaller) fall in demand, which leads to a further fall in production, and so on

**The multiplier is the sum of all these successive decreases in production:**

- Eventually, output has fallen by a larger amount than the initial shift in demand. Output is a multiple of the initial shift.

**Production adjusts to demand:**

- Firms supply the amount of goods demanded at the prevailing price. When demand falls, firms adjust production down. The model assumes that they do not adjust their prices.

# Household wealth

# Household wealth and precautionary saving

**In Unit 10 we introduced the concept of wealth by comparing it with the volume of water in a bathtub**

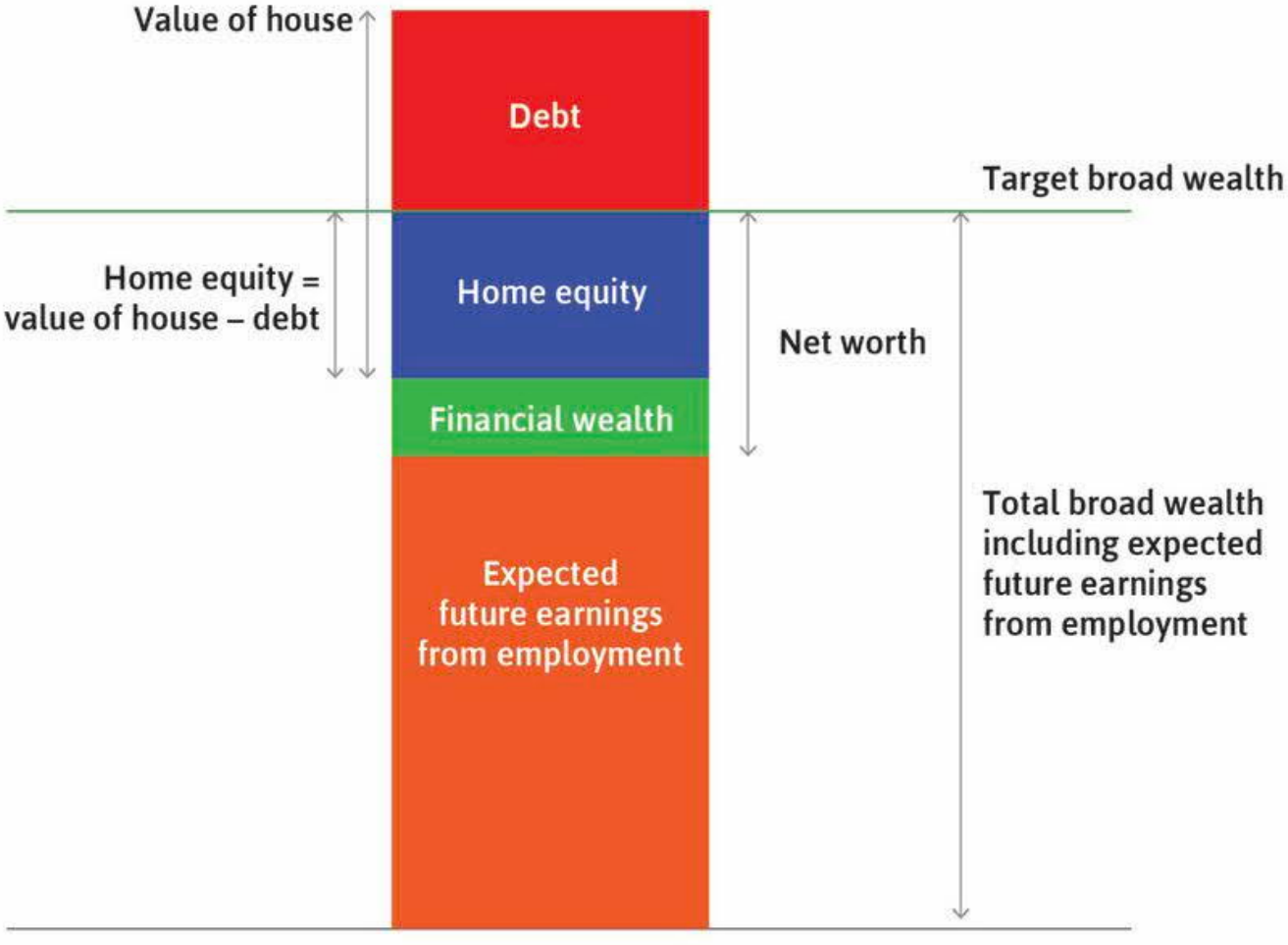
- At that time we focused on material wealth

**Now we extend the concept of wealth to broad wealth so as to include the household's expected future earnings from employment, known as the value of its human capital human**

**What happens to household consumption if households have a target wealth they want to maintain?**

- The level of wealth that a household aims to hold, based on its economic goals (or preferences) and expectations

# Household wealth including human capital

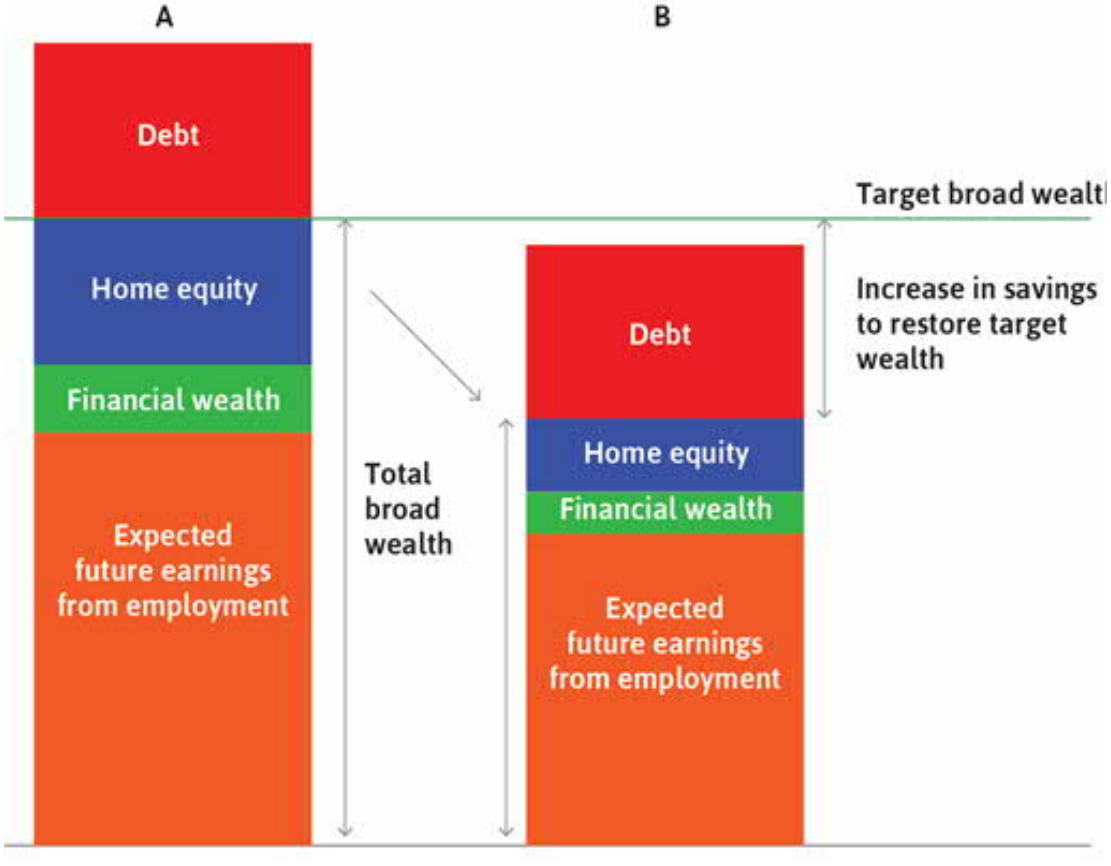


# Household wealth

Imagine an economic downturn that changes households' beliefs about their future incomes and also reduces asset values

Households is now below it's target wealth

Precautionary saving = An increase in saving to restore wealth to its target level



# Consumption and the housing market

**Changes in house prices may affect consumption through two channels:**

- Via change in household wealth (home equity)
- Via change in credit constraints: lower house value makes it more difficult to borrow (greater credit constraint)

# Investment

# How do firms make investment decisions?

**Think of the manager or owner of a firm deciding what to do with their accumulated profits. There are four choices:**

- Dividends: Allocate the funds to managerial or employee salaries, or to dividends for owners
- Saving: Buy an interest-bearing financial asset such as a bond, or retire (pay off) existing debt
- Investment abroad: Build new productive capacity in another country
- Investment at home: Build new capacity in the home country

**The fourth choice is called investment in our model**

# How do firms make investment decisions?

**Owner's options:**

- The owner has the choice to consume now or consume later: Taking the revenue as dividends means the owner can, if desired, simply consume the extra income now.
- If the decision is to consume later: The owner can either save (lend by buying a financial asset such as a bond or retire debt) or invest in a new project.
- If the decision is to invest: Whether the owner does it in the home country or abroad will depend on the expected rate of profit for the potential investment projects in the two locations.

# How do firms make investment decisions?

**Firms' decision about what to do with its profits depends on**

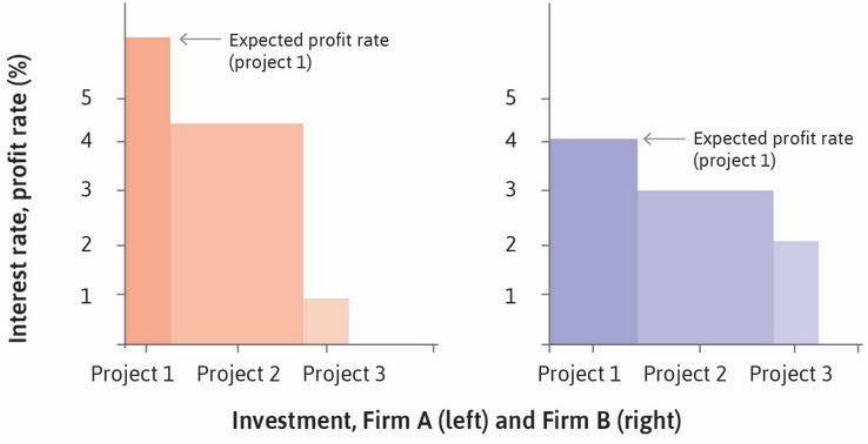
- Owner's discount rate ($\rho$), interest rate on assets ($r$) and net profit rate on investment ($\Pi$)

**Decision rule**

- Consume the extra income (dividends) if $\rho > r \geq \Pi$
- Save the extra income/repay debts if $r > \rho \geq \Pi$
- Invest (at home or abroad) if $\Pi > \rho \geq r$

**A lower interest rate makes investment more likely**

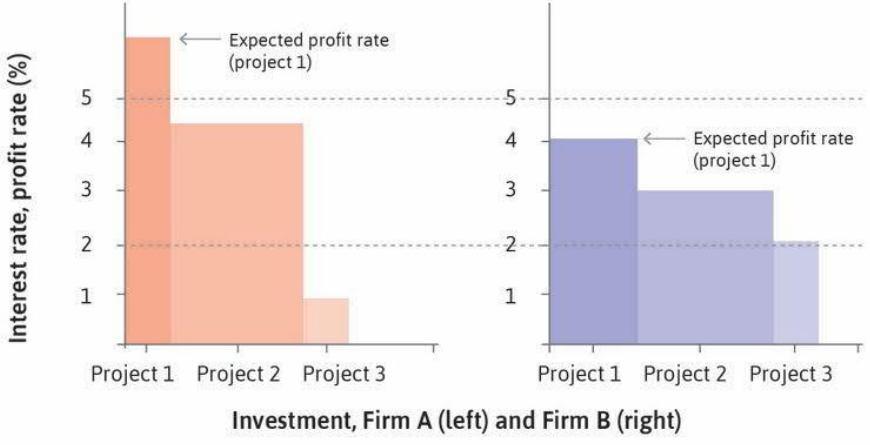
# Investment in an economy with two firms



# Investment in an economy with two firms

If the interest rate remains at 5%, Firm A goes ahead with project 1 and Firm B does not invest at all

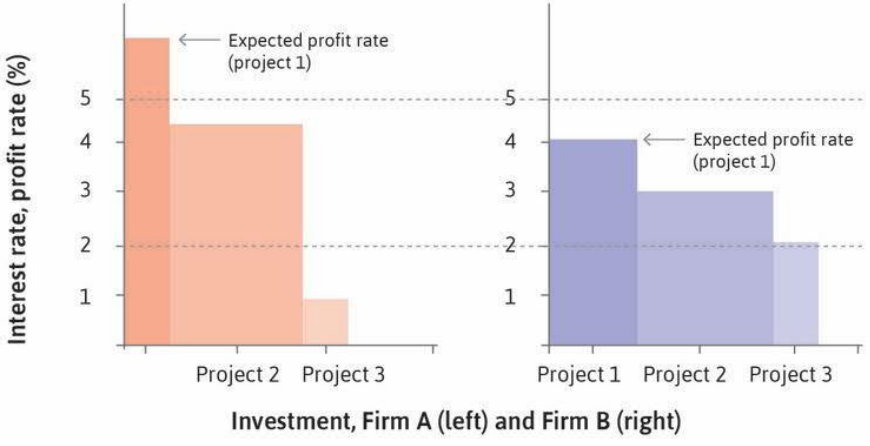
But if the interest rate was 2%, A would undertake projects 1 and 2 and B would undertake all three of its projects



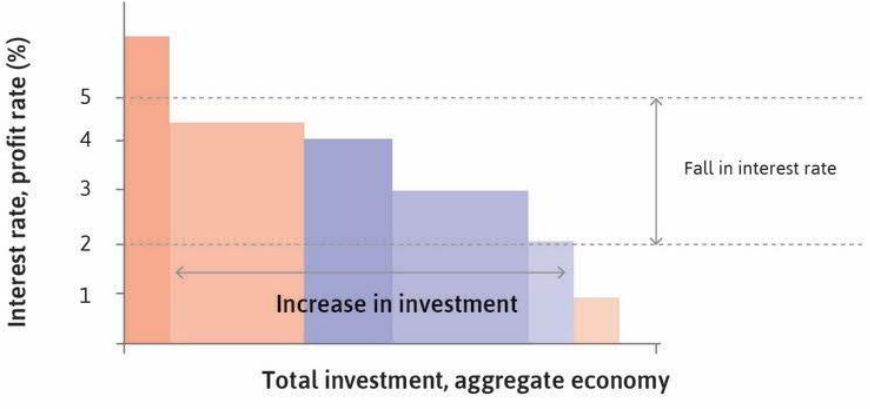
# Investment in an economy with two firms

Investment in the economy increases after a fall in the interest rate

Five projects go ahead, instead of just one



Investment, Firm A (left) and Firm B (right)

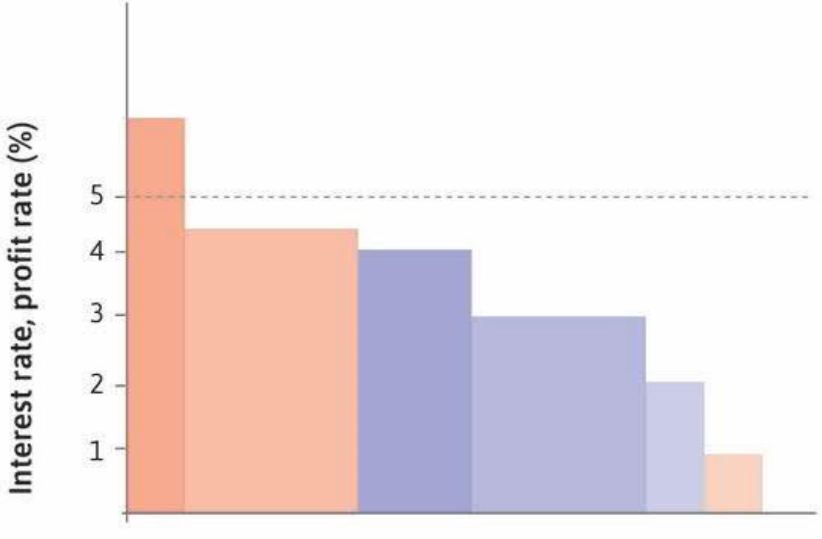


Total investment, aggregate economy

# Investment in an economy with two firms

How about profits expectations?

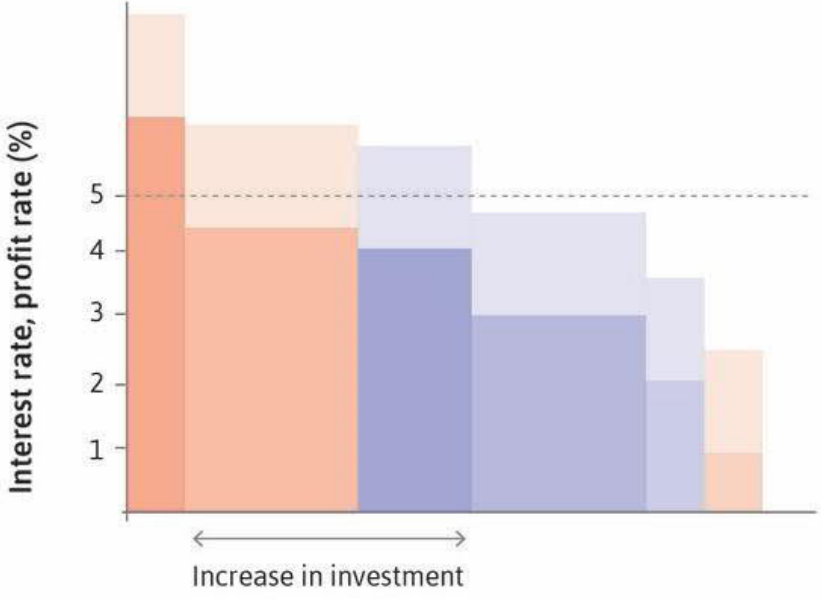
With the interest rate equal to 5%, only one project will go ahead



# Investment in an economy with two firms

The improvement in supply conditions increases the expected rate of profit for each project

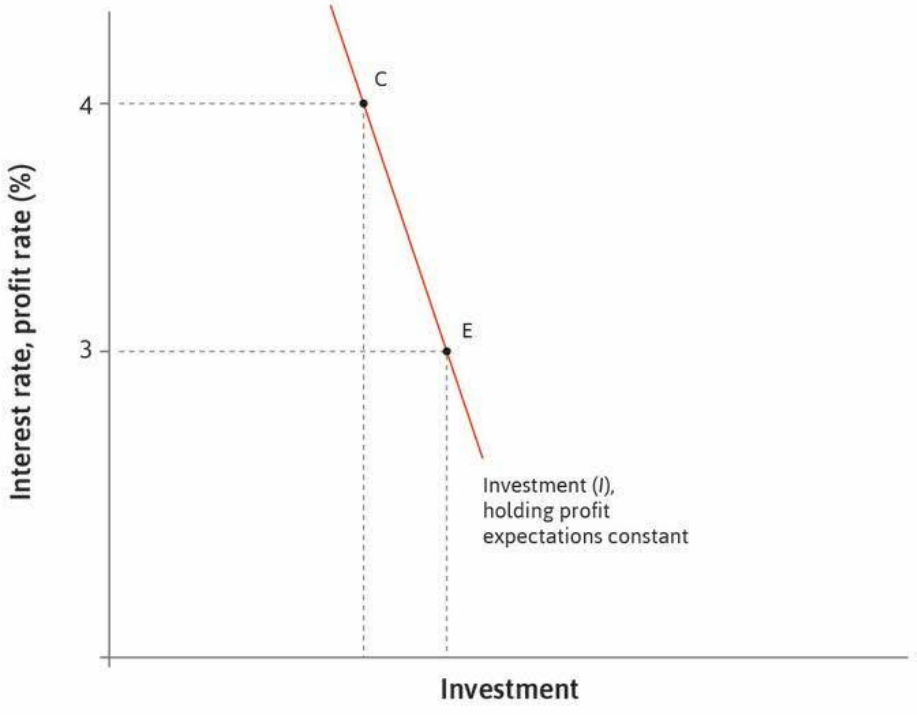
For the same interest rate, investment rises: two more projects go ahead



# Aggregate investment function

In an economy with many thousands of firms, all their potential investment projects are represented by a downward-sloping aggregate investment function

In response to a fall in the interest rate, investment increases from C to E

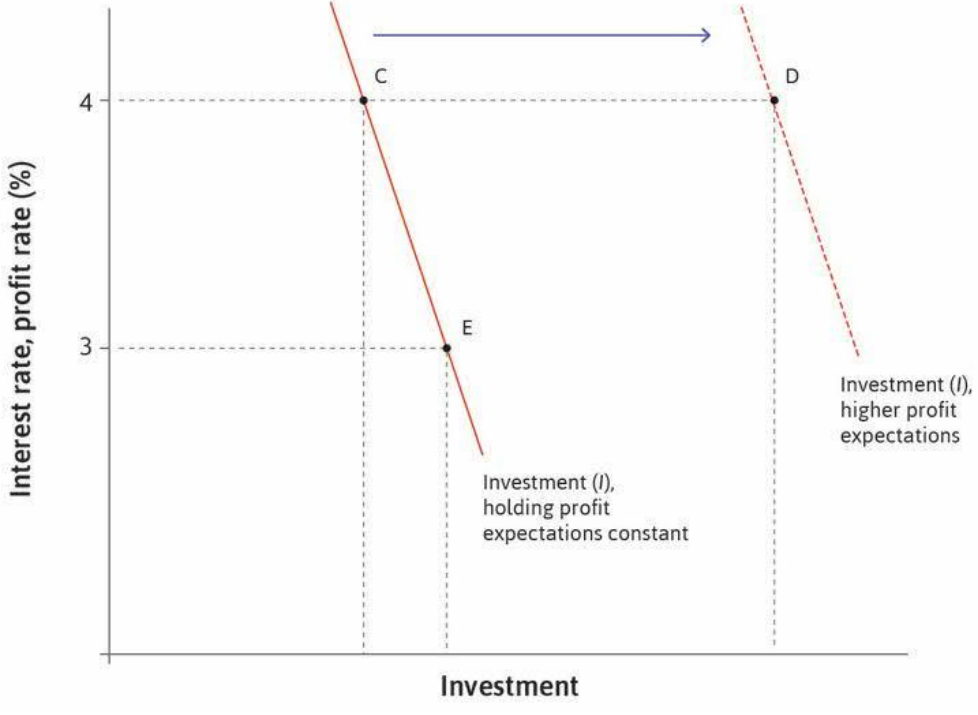


# Aggregate investment function

An increase in profit expectations shifts the investment function to the right: if the interest rate is held constant at 4%, investment increases from C to D

Empirically, investment is not very sensitive to interest rate

Instead, the shift factors are much more important



# The role of government

# Adding government to aggregate demand

- **Now we add governments and central banks to the model so that we can show how they can stabilize (or destabilize) the economy after a shock**
- **As before, we assume that firms are willing to supply any amount of goods demanded, so output = aggregate demand**
- **Government enters AD via**
  - Government spending: exogenous; shifts AD curve upwards
  - Consumption: household's MPC is out of disposable income (1–t)Y
  - Investment: depends on the interest rate and after-tax rate of profit

# Net exports and aggregate demand

**The amount of exports is taken as exogenous**

- Depends on the demand on exported goods

**The amount of imports depends on domestic income**

**Marginal propensity to import (m) = The fraction of each additional unit of income that is spent on imports (mY)**

# Multiplier model again

**We have: $AD = c_0 + c_1(1–t)Y + I + G + X – mY$**

**Both taxes and imports reduce the size of the multiplier**

- Recall that the multiplier tells us the amount by which an increase in spending (a rise in autonomous consumption, investment, government spending, or exports) raises GDP in the economy

**Like saving, taxation and imports are referred to as leakages from the circular flow of income**

- The result is to reduce the indirect effects of an autonomous change in spending on aggregate demand, output, and employment

# Multiplier model again

**Starting with AD = Y = $c_0$ + $c_1$(1–t)Y + I(r) + G + X – mY, we can again solve for output and the multiplier:**

$$Y = c_0 + c_1(1-t)Y + I(r) + G + X - mY$$

$$Y(1 - c_1(1-t) + m) = c_0 + I(r) + G + X$$

$$Y = \underbrace{\frac{1}{(1 - c_1(1-t) + m)}}_{\text{multiplier}} \times \underbrace{(c_0 + I(r) + G + X)}_{\text{demand that doesn't depend on income}}$$

$$\frac{1}{(1 - c_1(1-t) + m)} < \frac{1}{(1 - c_1)}$$

$$1 - c_1(1-t) + m > 1 - c_1$$

# Multiplier model again

**To summarize:**

- A higher marginal propensity to import reduces the size of the multiplier: This makes the aggregate demand curve flatter
- An increase in exports shifts the aggregate demand curve up in the multiplier diagram
- An increase in the tax rate reduces the size of the multiplier: This makes the aggregate demand curve flatter

# Stabilizing the economy

**The government stabilises fluctuations in several ways:**

- Government spending is large and exogenous
- Higher tax rate lowers the multiplier
- Unemployment insurance helps households smooth consumption (Failure of private market because of correlated risk, hidden actions, hidden attributes)
- Deliberate intervention via fiscal policy

**The unemployment benefit scheme and proportional tax rate are automatic stabilizers**

- They automatically offset an expansion or contraction of the economy

# The paradox of thrift

**In a recession, faced with a household budget deficit, a family worried about their falling wealth cuts spending and saves more**

- A single household can increase its savings if it anticipates bad luck, and the saving will be there if it is
- If every household does this when the economy is in a recession, this behaviour causes the bad luck: more people lose their jobs

**The paradox of thrift: the aggregate attempt to increase savings leads to a fall in aggregate income and saving**

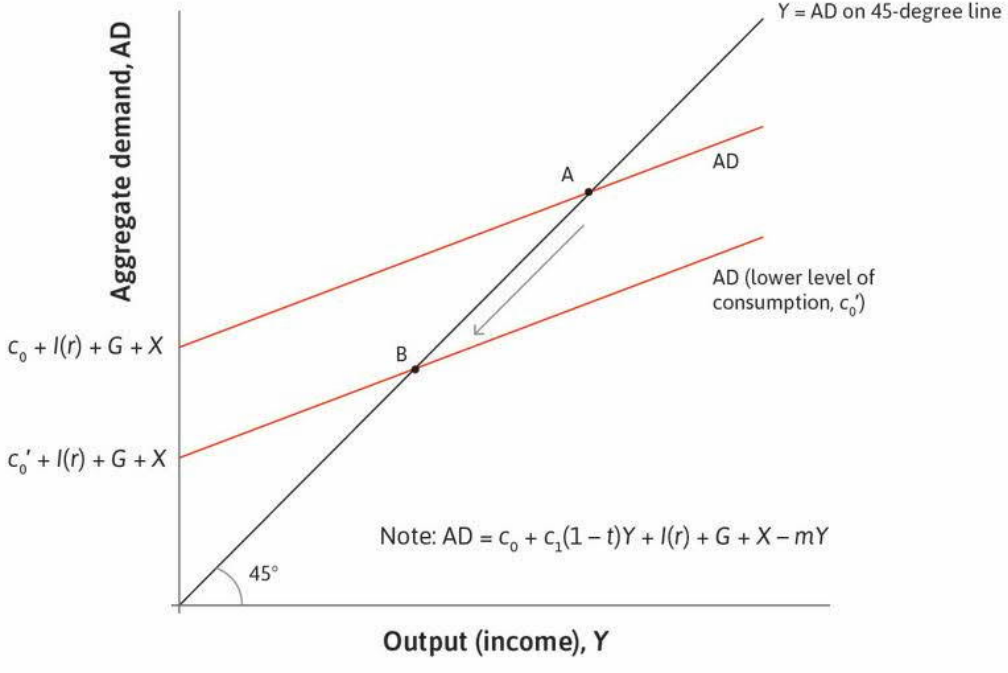
**Fallacy of composition: what is true for one part of the economy (a single household) is not true of the whole economy**

# What can the government do?

The economy starts at point A, in goods market equilibrium, at which aggregate demand is equal to output

The economy moves into recession after a fall in consumer confidence, reducing $c_0$.

The aggregate demand line shifts downward and the economy moves from point A to point B.

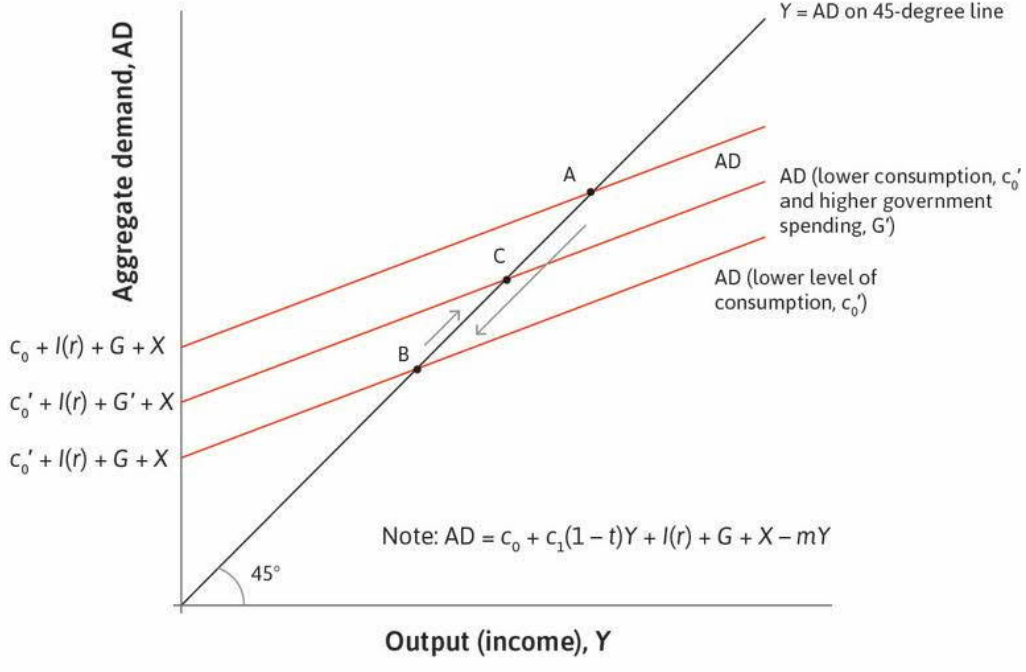


# What can the government do?

Fiscal stimulus: a rise in G

Suppose that the government then increases spending, from G to G′, in order to counteract the decline in aggregate demand

AD shifts back up and the economy moves to point C



# Financing fiscal stimulus

- **Budget balance = T–G**
- **Fiscal stimulus will result in a negative budget balance (government budget deficit)**
- **If it is not reversed after the recession, it will increase government debt**
- **A government budget surplus is when tax revenue is greater than government spending**

# How can the government amplify fluctuations?

**Sometimes a government chooses to raise taxes or cut spending during a recession because it is concerned about the effect of a recession on its budget balance**

- Budget in balance: G = T
- Budget deficit: G > T
- Budget surplus: G < T

**The worsening of the government's budgetary position in a recession is part of its stabilizing role**

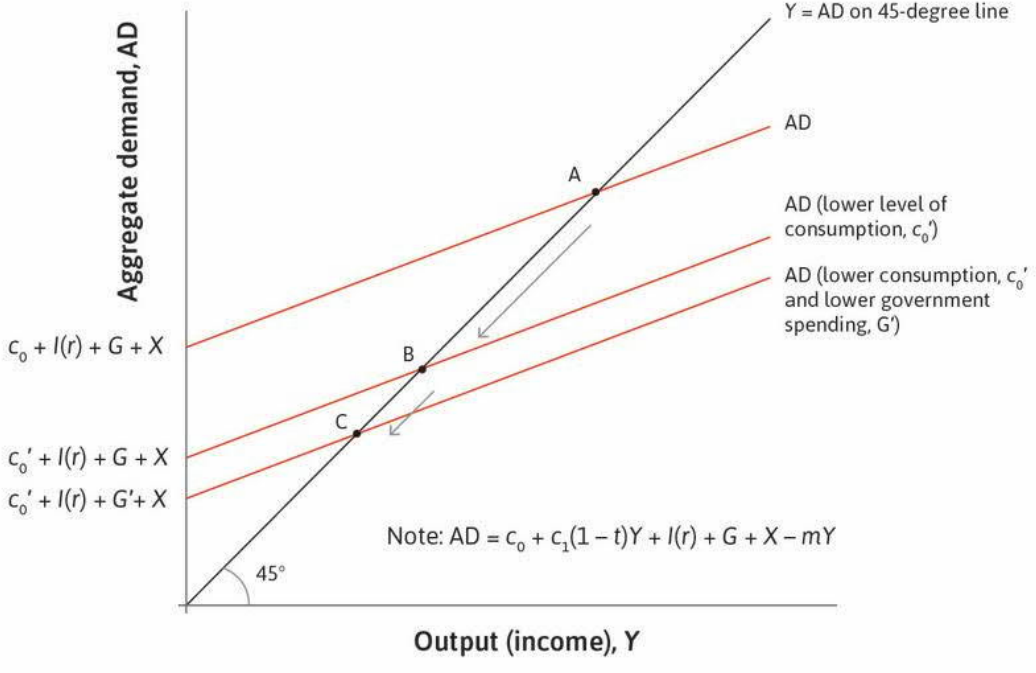
- When the government chooses to override the stabilizers to reduce its deficit, this may amplify fluctuations in the economy

# Austerity policy

**Austerity policy** can reinforce a recession by further reducing aggregate demand

Suppose that the government then reduces spending from *G* to *G′*, in a bid to offset the deterioration of its budget balance

The recession then feeds back to raise government transfers and reduce tax revenue



# Positive/Negative Feedback Mechanisms

| | DAMPENING MECHANISMS OFFSET SHOCKS (STABILISING) | AMPLIFYING MECHANISMS REINFORCE SHOCKS (MAY BE DESTABILISING) |
|---|---|---|
| PRIVATE SECTOR DECISIONS | Consumption smoothing | Credit constraints limit consumption smoothing<br><br>Rising value of collateral (house prices) can increase wealth above the target level and raise consumption<br><br>Rising capacity utilisation in a boom encourages investment spending, adding to the boom |
| GOVERNMENT AND CENTRAL BANK DECISIONS | Automatic stabilisers (e.g. unemployment benefit)<br><br>Stabilisation policy (fiscal or monetary) | Policy mistakes, such as limiting the scope of automatic stabilisers in a recession or running deficits during low demand periods, while not running surpluses during booms |

# Multiplier in practice

**In our model of aggregate demand, the multiplier depended only on the marginal propensity to consume, the marginal propensity to import, and the tax rate**

**In reality, it also depends on:**

- Rate of capacity utilisation (the phase of the business cycle): with fully employed resources, an increase in government spending would crowd out private spending
- Expectations of the private sector: the multiplier could be negative if rising fiscal deficit erodes consumer confidence

# The governments finances

**Primary budget deficit = G –T**

- procyclical
- The government must borrow to cover the gap between spending and revenue, by issuing bonds

**Government debt = sum of all the bonds sold over time to finance budget deficit – matured bonds (repaid debt)**

**Sovereign debt crisis = a situation in which government bonds come to be considered risky (default risk)**

# Government debt

**A large stock of debt relative to GDP can be a problem because the government must pay interest on its debt**

**However, there is no point at which the government has to pay off all its stock of debt—it can roll it over instead by issuing new bonds.**

- An ever-increasing debt ratio is unsustainable, but there is no rule that says exactly how much debt is problematic

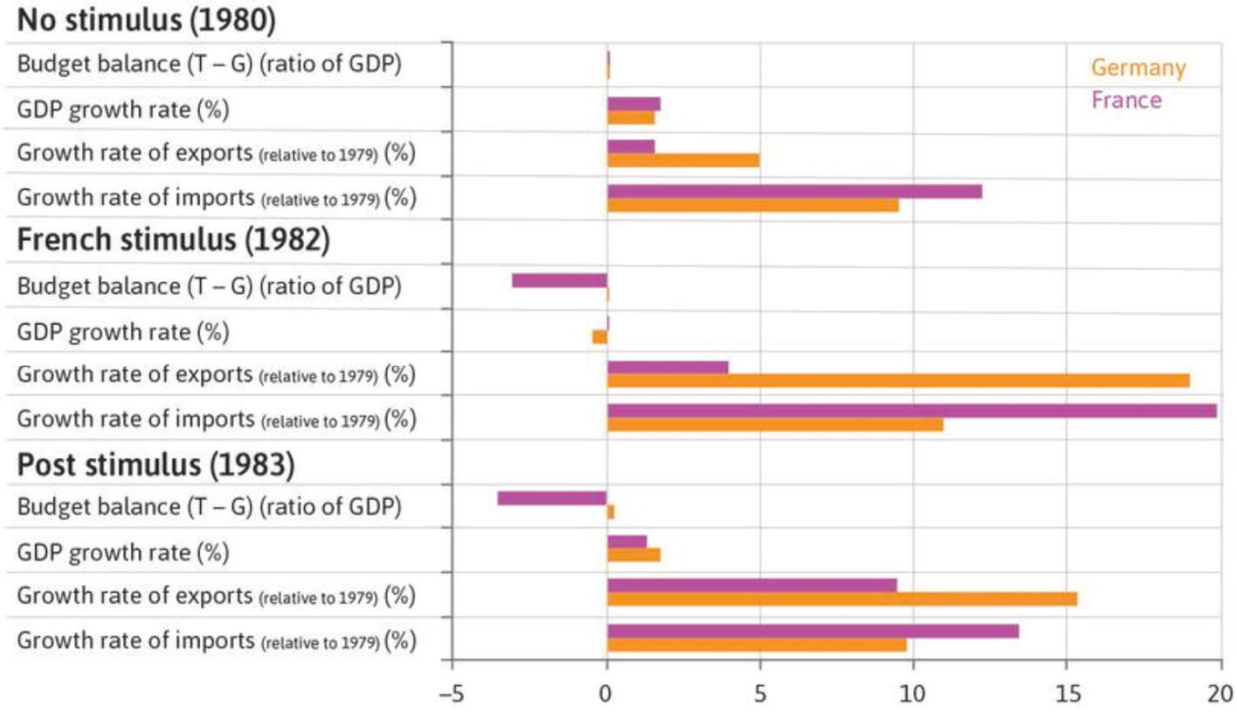
# Government debt

The level of indebtedness of a government is measured relative to the size of the economy (**debt-to-GDP** ratio)

Indebtedness can fall

- if the primary budget balance is positive
- if GDP is growing faster than government debt
- if inflation is high (real value of debt falls)

# Foreign markets and fiscal policy



# Empirical evidence on the multiplier

# General equilibrium effects of cash transfers: experimental evidence from Kenya

Dennis Egger Johannes Haushofer Edward Miguel
Paul Niehaus Michael Walker*

November 21, 2019

**Abstract**

How large economic stimuli generate individual and aggregate responses is a central question in economics, but has not been studied experimentally. We provided one-time cash transfers of about USD 1000 to over 10,500 poor households across 653 randomized villages in rural Kenya. The implied fiscal shock was over 15 percent of local GDP. We find large impacts on consumption and assets for recipients. Importantly, we document large positive spillovers on non-recipient households and firms, and minimal price inflation. We estimate a local fiscal multiplier of 2.6. We interpret welfare implications through the lens of a simple household optimization framework.



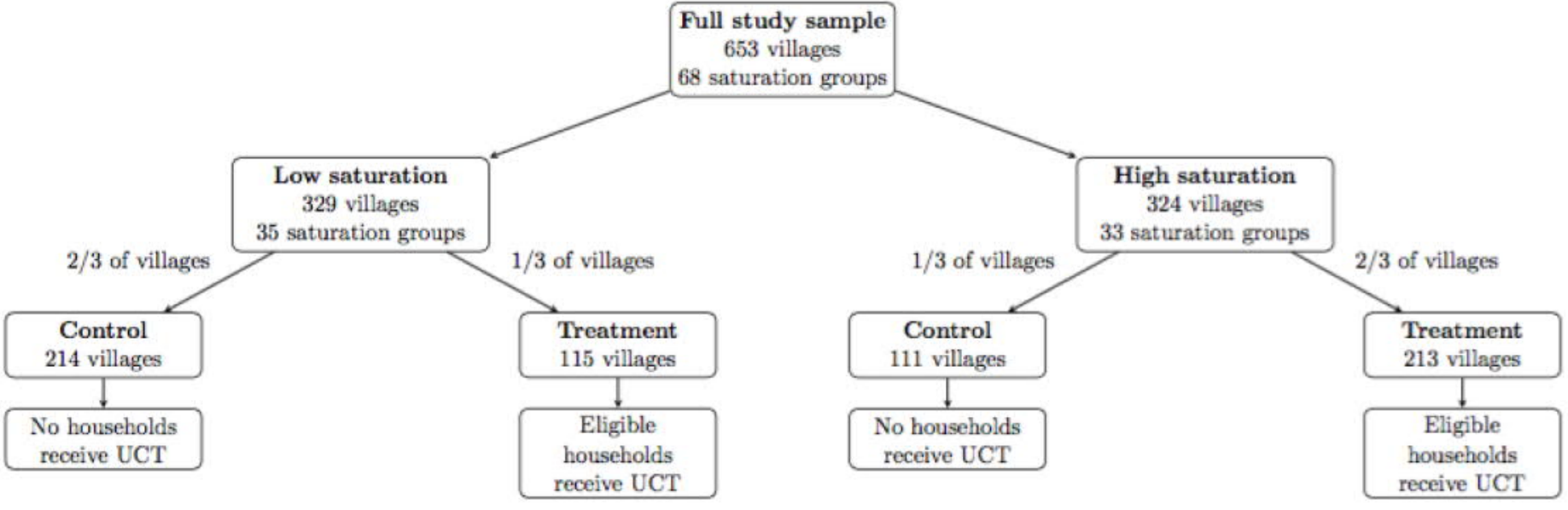
Link: https://www.poverty-action.org/publication/general-equilibrium-effects-cash-transfers-experimental-evidence-kenya

# Research design

**A large-scale experiment in rural Kenya**

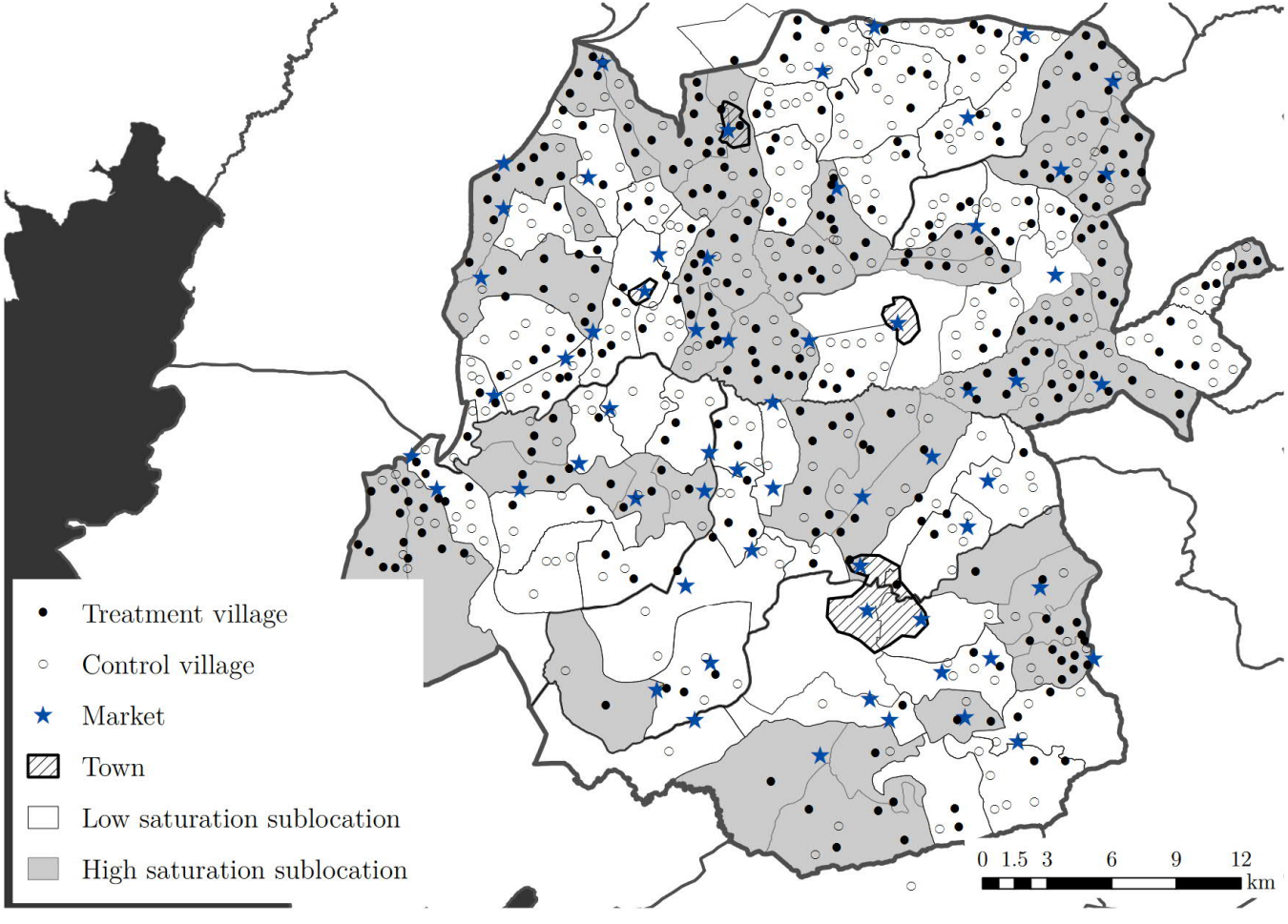
- Provided one-time unconditional cash transfers worth roughly $1000 (distributed by the NGO GiveDirectly) to over 10,500 poor households in a sample of 653 villages with population of 280,000
- The implied fiscal shock was large, as the cash transfers amounted to over 15% of local GDP during the peak 12 months of the program

# Research design




Eligibility: poor households

# Research design



# Results – treated households

**Large direct impacts on households that received transfers**

- Increases in consumption expenditures and holdings of durable assets eighteen months after the start of transfers
- No meaningful changes in labor supply among treated households

**Enterprises in areas that receive more cash transfers also experience meaningful gains in total revenues**

- Sales increased without noticeable changes in firm investment behavior suggesting a demand-led rather than an investment-led expansion in economic activity

# Results – untreated households

**Untreated households**

- Large consumption expenditure gains: their annualized consumption expenditure is higher by 13% eighteen months after transfers began, roughly comparable to the gains contemporaneously experienced by the treated households
- Increased spending is not financed by dissaving, but more likely results in part from the income gains experienced by local firms' owners and workers
- Non-recipients' income gain is driven largely by increases in wage labor earnings, consistent with increases in enterprise wage bills

**No or small effects on the price level => real gains**

# Results – local fiscal multiplier

**Compute a local fiscal multiplier, taking advantage of the fact that they**

- Observe consumption expenditures of representative samples of both treated and untreated households and investment by firms

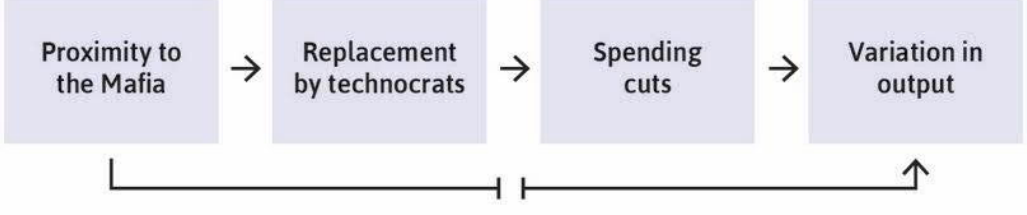
**Using this expenditure-based approach, estimate a local fiscal multiplier of 2.6**

- Real output increased, and yet there is at most limited evidence of increases in the employment of land (which is in fixed supply), labor, or capital
- How is this possible?
- “Slack” in the utilization of these factors in at least some enterprises

# Natural experiments – the mafia

**Usually, stimulus is not randomly allocated**

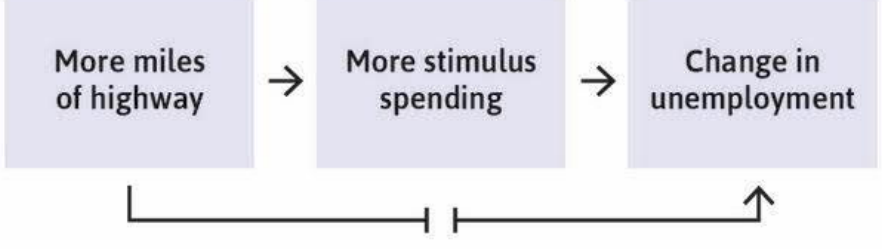
- Mafia-related dismissals of local politicians to isolate the variation in public spending not caused by variations in output
- Because there is no direct causal link from proximity to the Mafia to the variation in output, proximity to the Mafia can be used to uncover the causal effect of a change in public spending on output
- Technocrats cut local spending by 20% on average
- Using this method, the researchers were able to estimate multipliers of 1.5 at the local level



# Natural experiments – highway spending in the US

**Some of the spending in the US stimulus program was distributed to US states using a formula that was unrelated to the severity of the recession experienced in each state**

- Some road-repair expenditures funded by the stimulus package were based on the length of highway in each state
- The studies using this approach estimated a multiplier of 2, and suggest that the American Recovery and Reinvestment Act created between 1 million and 3 million new jobs



# Linking aggregate demand and unemployment

# Aggregate demand and unemployment

**We now have two models for thinking about total output, employment, and the unemployment rate in the economy:**

- The supply side supply side (labour market) model: One model, set out in Unit 9, is of the supply side of the economy and focuses on how labour is employed to produce goods and services. This is the labour market model.
- The demand side demand model: The other is of the demand side of the economy and explains how spending decisions generate demand for goods and services and, as a result, employment and output. This is the multiplier model.

# Aggregate demand and unemployment

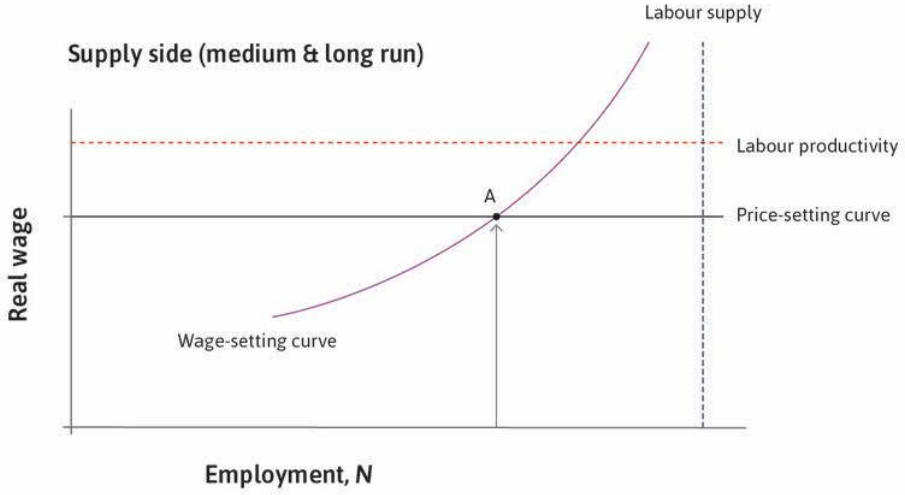
**In our study of business cycle fluctuations using the multiplier model, we have made several *ceteris paribus* assumptions**

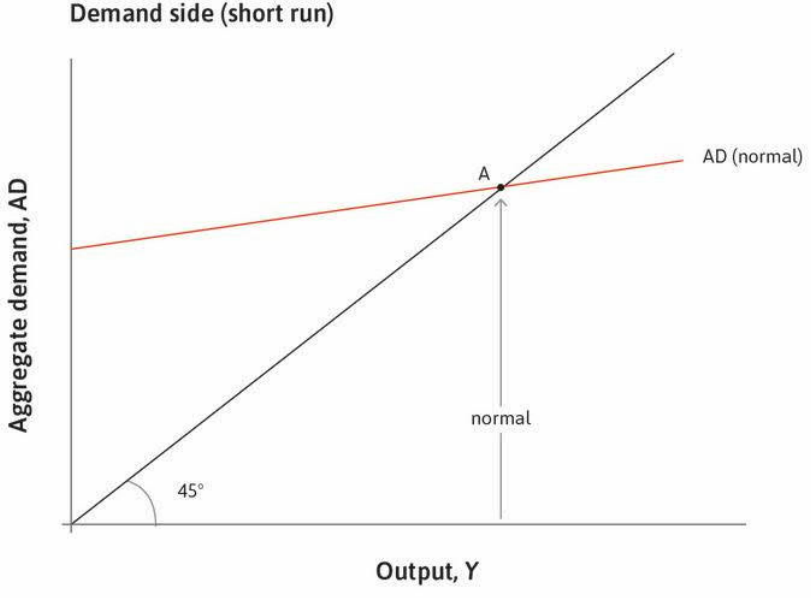
- We have assumed that prices, wages, the capital stock, technology, and institutions are constant
- We use the term short run to refer to these assumptions
- The purpose of the model is to predict what happens to output, aggregate demand, and employment when there is a demand shock (a shock to investment, consumption or exports), or when policymakers use fiscal policy or monetary policy to shift the aggregate demand curve

## Labour market equilibrium:

The economy is initially at labour market equilibrium at point A with unemployment of 5%

The level of aggregate demand must be as shown by the aggregate demand curve labelled ‘normal’

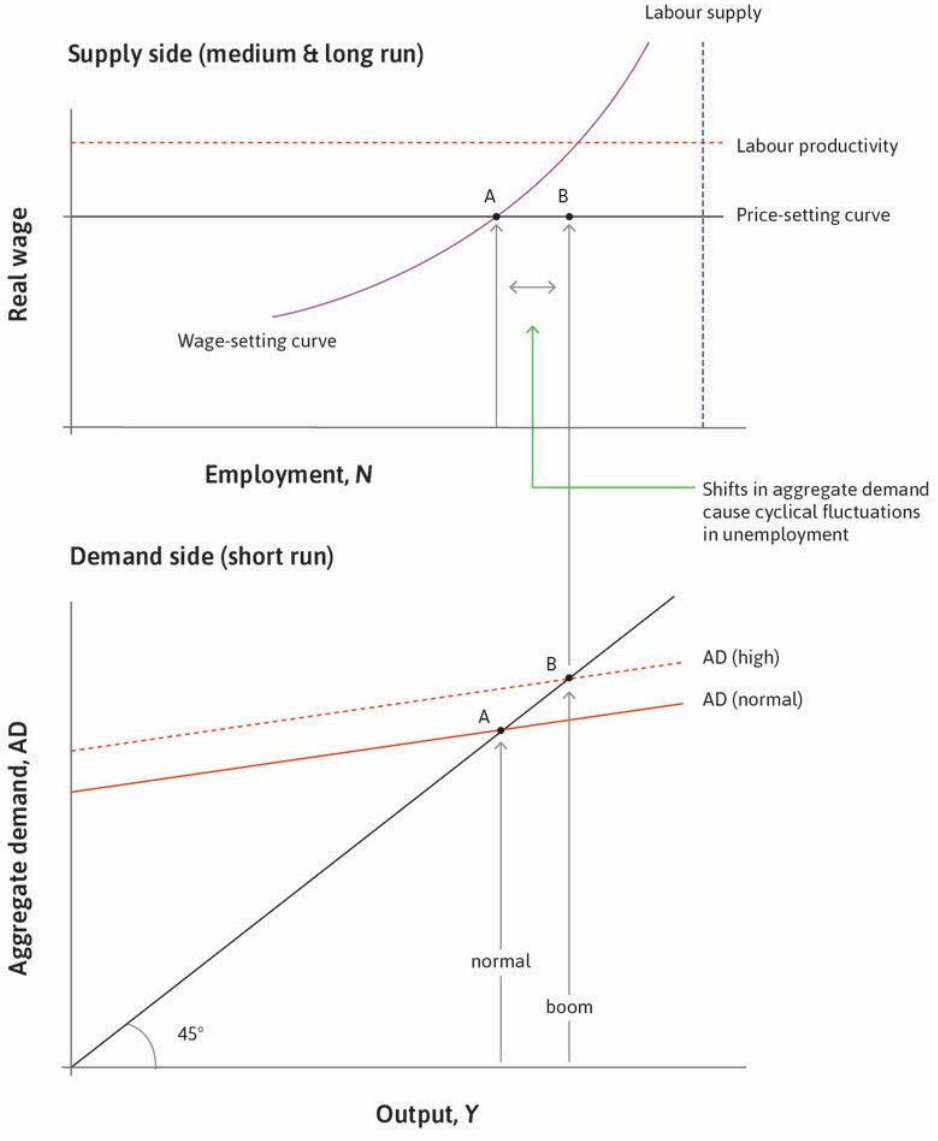


## A boom:

Consider a rise in investment that shifts the aggregate demand curve up to AD (high), so that output and employment rise

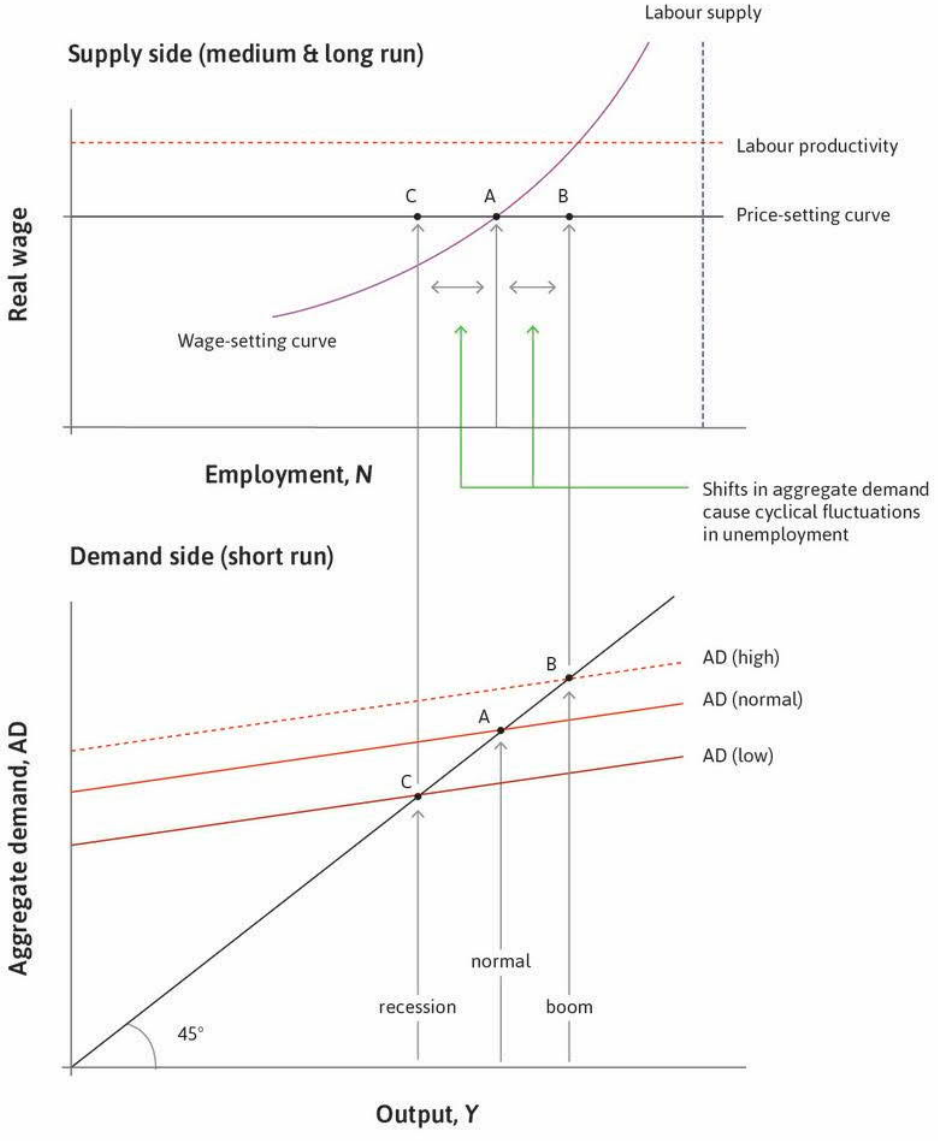
The economy is at B: with the boom, unemployment falls below 5%. The additional employment is called cyclical employment



## A slump:

If the aggregate demand curve shifts down, then through the multiplier process, output and employment fall to C

Unemployment rises above 5%. The additional unemployment is called cyclical unemployment



# Models to study the aggregate economy

| Unit | Run | What is exogenous? | What is endogenous | Problem to be addressed | Appropriate policies | Model to use |
|---|---|---|---|---|---|---|
| 13, 14 | Short | Prices, wages, capital stock, technology, institutions | Employment, demand, output | Demand shifts affect unemployment | Demand side | Multiplier |
| 14, 15 | Medium | Capital stock, technology, institutions | Employment, demand, output, prices, wages | Demand and supply shifts affect unemployment, inflation and equilibrium unemployment | Demand side, supply side | Labour market; Phillips curve |
| 16 | Long | Technology, institutions | Employment, demand, output, prices, wages and capital stock | Shifts in profit conditions and changes in institutions affect equilibrium unemployment and real wages | Supply side | Labour market model with firm entry and exit |

# Summary

**The aggregate demand function and its components:**

- AD = C + I + G + NX

**Shocks to aggregate demand are amplified by the multiplier**

**Government can stabilise economic fluctuations**

- Automatic stabilisers
- Fiscal stimulus – offset decline in aggregate demand from the private sector
- Austerity policies amplify the negative demand shock

**Fiscal stimulus in a recession must be reversed in a boom to prevent government debt from escalating (sovereign debt crisis)**