

Macroeconomics – Political Science Forlì

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Office Hours:

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Website of the course: <http://macroeconomics-forli.weebly.com/>


Password: macroSID2019

Exercise Lesson:

5 March
12 March
9 April
30 April
14 May
28 May

Mid-term exams:

19 March
11 April
16 May



Macroeconomics

Exercise 4

(Ch. 6 and 10)

- The Open Economy (Ch. 6)
- Introduction to Economic Fluctuations (Ch. 10)

Chapter 6: The Open Economy

Key- concepts

- Trade balance and current accounts (saving vs. investments)
- Exchange rates (nominal vs. real, determinants of the exchange rates, effects on trade balance)
- Trade policy

The trade balance

GDP in the open economy: $Y = C^d + I^d + G^d + NX$

If national income is **larger** (**smaller**) than internal expenditure ($= C^d + I^d + G^d$), net exports will be **positive** (**negative**)

$$NX = Y - (C + I + G)$$

Net exports (NX) correspond to **trade balance**

- if $NX > 0$: the country incurs a **trade surplus**
- if $NX < 0$: the country incurs a **trade deficit**

Saving and investment

$$NX = Y - (C + I + G)$$

The above equation can be re-written as:

$$I + NX = Y - C - G$$

$$\Rightarrow S = I + NX$$

$$\Rightarrow S - I = NX$$

- If $S > I$, then $NX > 0$ (the country is an international lender)
- If $S < I$, then $NX < 0$ (the country is an international borrower)

Exercise 1

Consider a country in which consumption is $C=50$, investment is $I=20$ and public spending is $G=15$.

A) Suppose that private saving is $S_{pr}=25$, while taxation is $T=20$.

Compute the level of net exports as well as the resulting national income.

B) What will the answer to the previous question be, in case $S_{pr}=15$, while $T=10$?

Ex. 1 – (a)

Net exports, namely NX , correspond to $S - I$

National saving (S) is the sum of private saving ($S_{pr}=25$) and public saving ($S_{pub} = T - G$)

Since $T=20$ and $G=15 \Rightarrow S_{pub} = T - G = 20 - 15 = 5$

$\Rightarrow S = S_{pr} + S_{pub} = 25 + 5 = 30$

Given $I = 20$, net exports will be: $NX = S - I = 30 - 20 = 10 (> 0)$

The country of interest is a **net exporter**

National income is: $Y = C + I + G + NX = 50 + 20 + 15 + 10 = 95$

Ex. 2 – (b)

Net exports, namely NX , correspond to $S - I$

National saving (S) is the sum of private saving ($S_{pr}=25$) and public saving ($S_{pub} = T - G$)

Since $T=10$ and $G=15 \Rightarrow S_{pub} = T - G = 10 - 15 = -5$

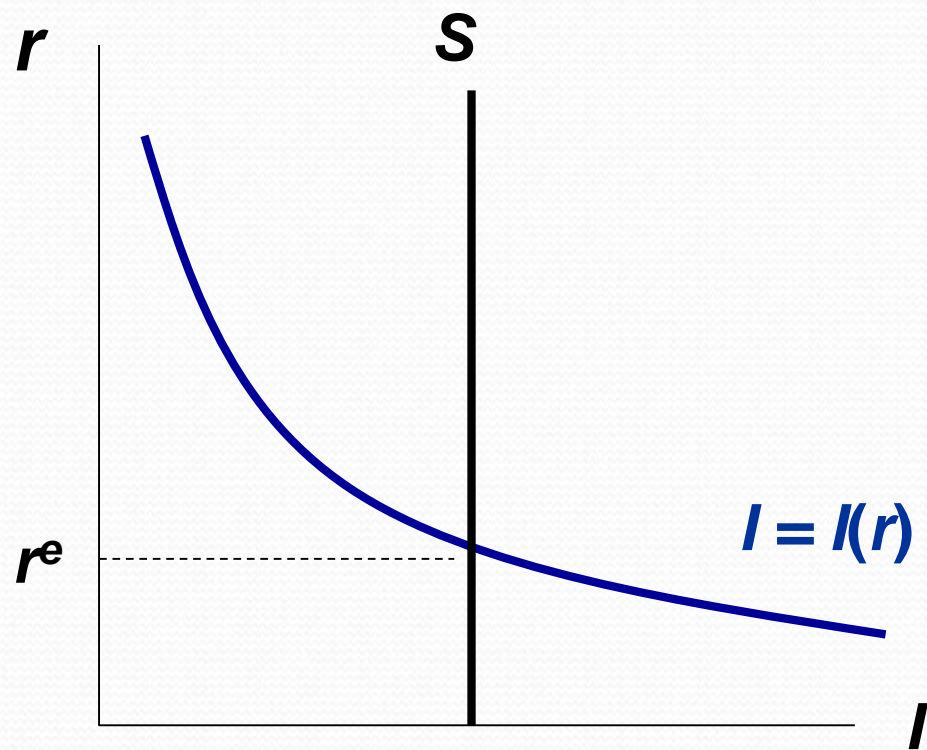
$\Rightarrow S = S_{pr} + S_{pub} = 15 + (-5) = 10$

Given $I = 20$, net exports will be: $NX = S - I = 10 - 20 = -10 (< 0)$

The country of interest is a **net importer**

National income is: $Y = C + I + G + NX = 50 + 20 + 15 + (-10) = 75$

Interest rates and trade balance (I)

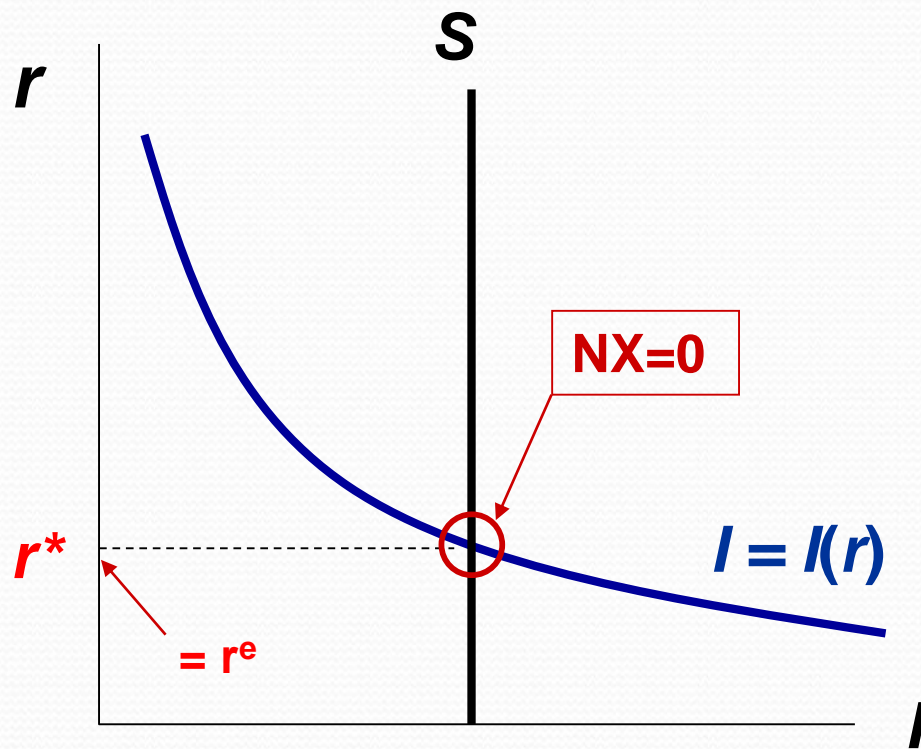


Remember the loanable funds market...

In a closed economy, the equilibrium interest rate is pinned down by the intersection between the investment demand curve (which is downward sloping, as I falls when $r \uparrow$) and the vertical line which stands for the (exogenous) national saving supply

$$NX = S - I$$

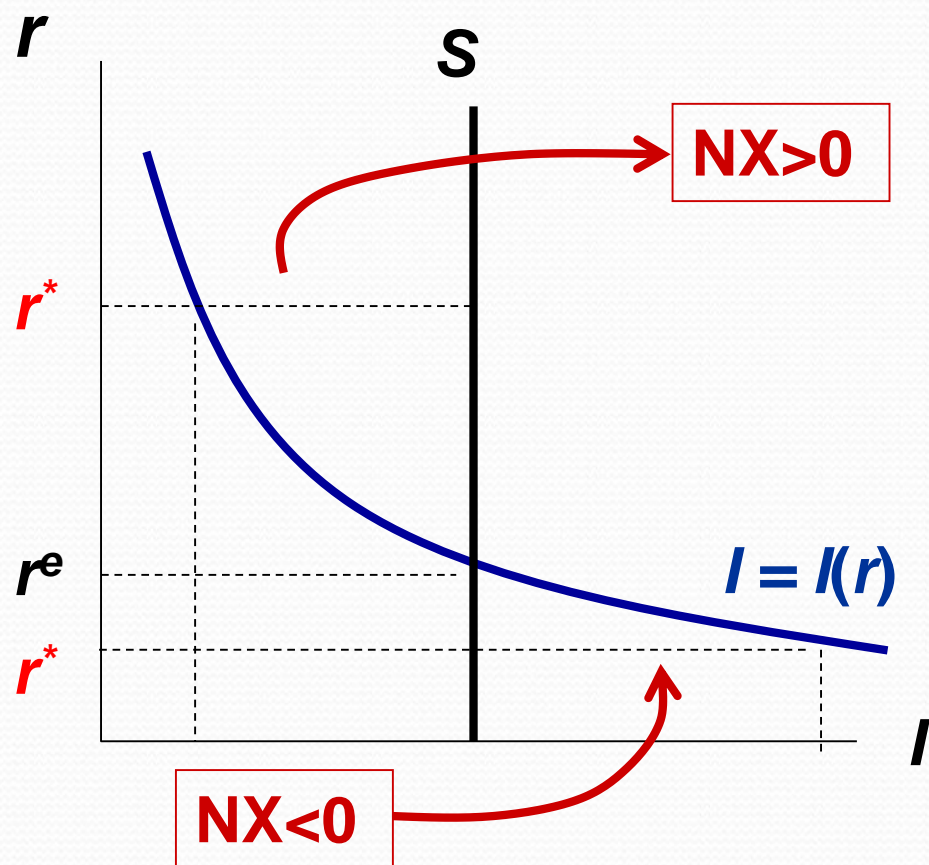
Interest rates and trade balance (II)



In a small, open economy with no restrictions on capital flows, the interest rate is equal to the international interest rate: $r=r^*$

If r^* corresponds to the autarky equilibrium interest rate, namely r^e , then trade is balanced: $NX=0$

Interest rate and trade balance (III)



If r^* is higher than the former autarky equilibrium interest rate r^e , then the country will be a lender in the international market ($S > I$) and therefore a net exporter (i.e. $NX > 0$)

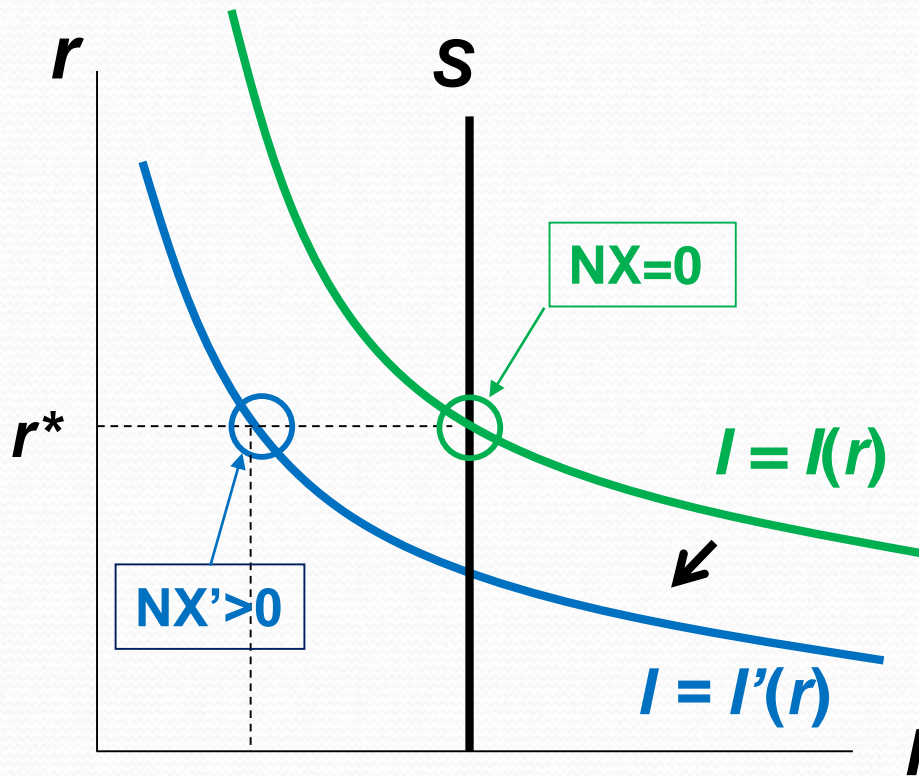
At the opposite, if r^* is lower than r^e , then the country will borrow from the international market ($S < I$) and therefore will be a net importer (i.e. $NX < 0$)

Exercise 2

Consider a country in which trade is initially balanced ($NX=0$)

- A) By using the model of the loanable funds market (with saving assumed to be exogenously given), show the effects on the trade balance of a *reduction in the demand for investment*
- B) Show the change in trade balance induced by a *restrictive fiscal policy* (i.e. public spending cuts or increased taxation)
- C) Show the change in trade balance induced by an *increase in the foreign amount of saving*, which lowers the international interest rate r^*

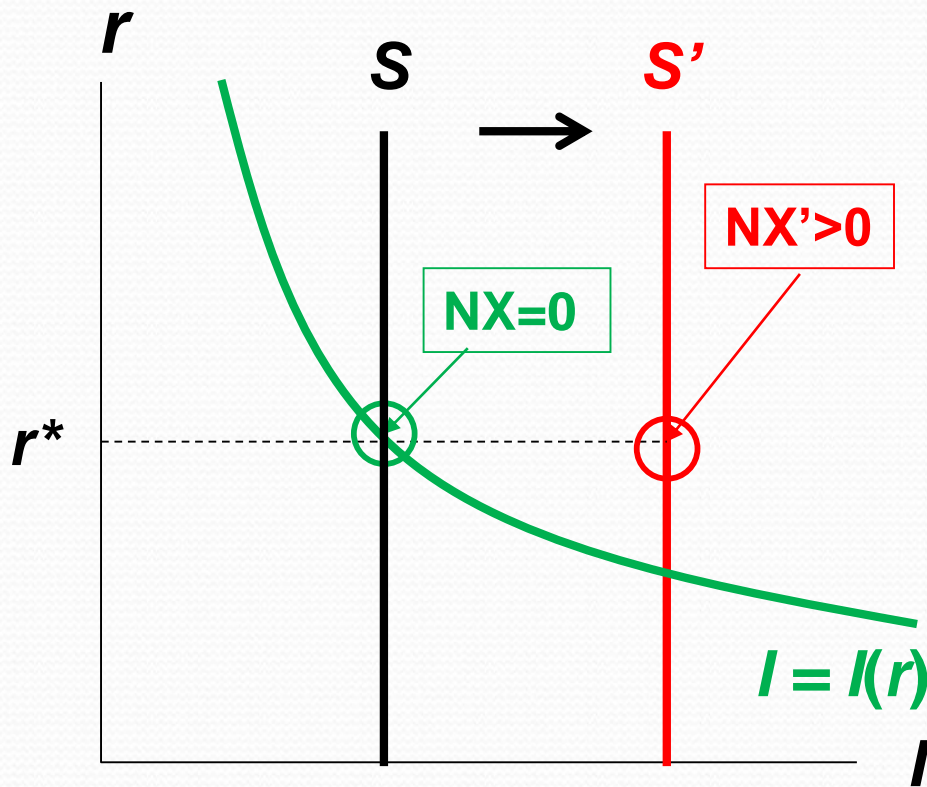
Ex. 2 – (a)



Given the reduction in the domestic demand for investment, at the international interest rate r^* , national saving now exceeds the domestic level of investment

The country will turn into an international lender, i.e. will «finance» foreign consumption by means of positive net exports

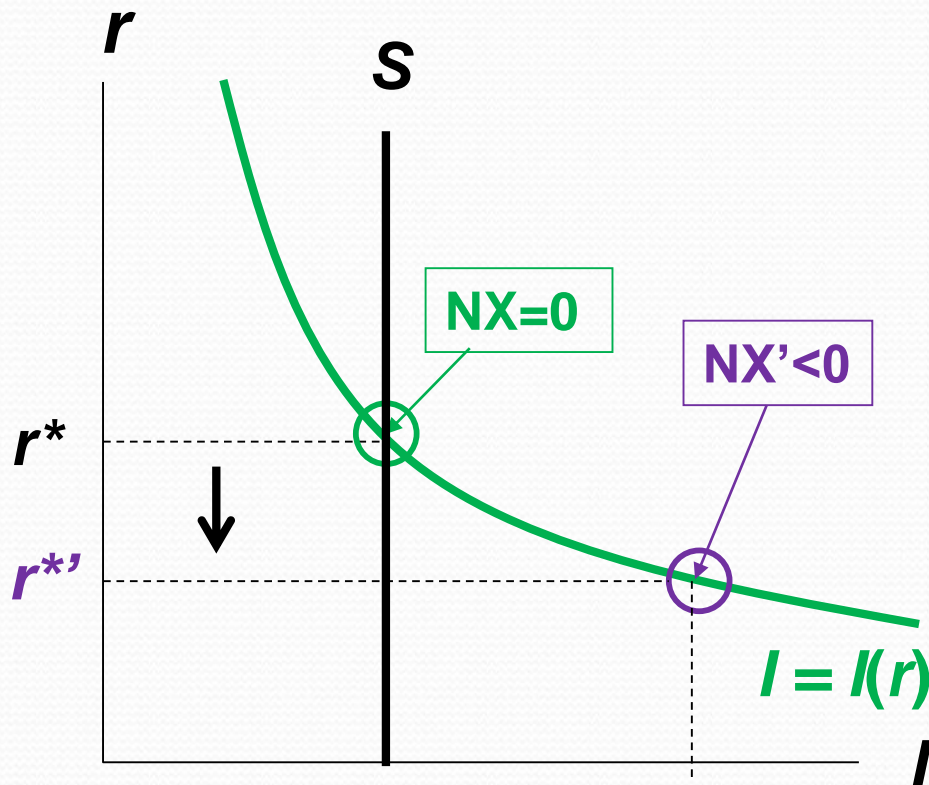
Ex. 2 – (b)



A restrictive fiscal policy increases public saving and lowers private saving but less than proportionally \Rightarrow the overall national saving rises

Now $S > I$: the existing surplus of saving can be lent in the international funds market, and implies **positive net exports**

Ex. 2 – (c)



In the rest-of-the-world saving rises: the increased supply of loanable funds will imply a decrease in the international interest rate r^*

In the country of interest, at the new rate $r^{*'} (with $r^{*'} < r^*$), national saving is lower than the domestic demand for investment: $S < I$$

The country is a net borrower from the international funds market, and therefore a **net importer** ($NX < 0$)

Exchange rates

The **nominal exchange rate** (namely e) is the **relative price** of the currencies of two different countries

Example: $e_{(\text{euro-to-dollar})} = 1,2 \Rightarrow 1\text{€} = 1,2 \$$

- If e rises, the euro **appreciates** against the dollar
- If e falls, the euro **depreciates** against the dollar

The **real exchange rate** (ε) is the **relative price** of goods in two different countries, i.e. the ratio between the price (in foreign currency) of national goods and the price of foreign goods

$$\Rightarrow \varepsilon = e \frac{P}{P^*}$$

$$\Delta\% \varepsilon = \Delta\% e + \Delta\% P - \Delta\% P^*$$

Exercise 3

Suppose that the euro-to-pound nominal exchange rate is $e=0.8$ (that is, $1\text{€} = 0.8 \text{ £}$) and the same sweater is sold for €20 in Italy and £ 19 in UK.

- A) A british tourist has a budget of £ 100 for shopping in Italy. How many euros will she get in exchange for her £ 100 ? What if she were converting £ 150, instead of £ 100?
- B) How much does it cost to the british tourist the purchase of the sweater in Italy, in terms of pounds?
- C) What is the real exchange rate between Italy and UK?

Ex. 3 - (a)

If $e=0.8$, then the following proportion applies:

$$€1 : £0.8 = € X : £100 ,$$

where X is the amount of euros that will be obtained in exchange for £100

$$\Rightarrow X = (£100 \cdot €1) / £0.8 = €125$$

If the amount of pounds to be converted is £150, then the proportion becomes:

$$€1 : £0.8 = € X : £150$$

$$\Rightarrow X = (£150 \cdot €1) / £0.8 = €187.5$$

Ex. 3 – (b) and (c)

If $e=0.8$, then the proportion that applies is:

$$€1 : £0.8 = €20 : Y$$

where Y is the amount of pounds that must be spent in order to obtain €20, i.e. the amount of euros needed for purchasing the sweater in Italy

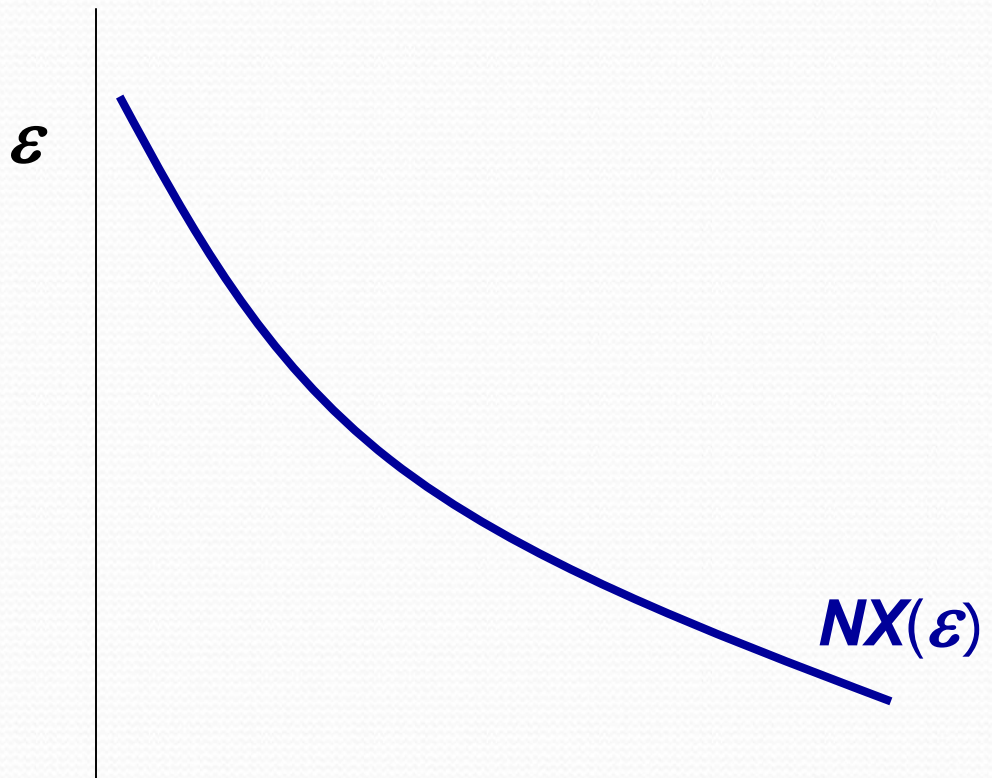
$$\Rightarrow X = (\text{€}20 \cdot \text{£}0.8) / \text{€} 1 = \text{£}16$$

- The price in foreign currency (pounds) of the sweater in Italy is **£ 16** ($= e \cdot P$)
- The price of the same sweater in UK is **£ 19** ($=P^*$)

\Rightarrow the real exchange rate (i.e. the relative price of the sweaters in the two countries) is: $\varepsilon = (e \cdot P) / P^* = \text{£} 16 / \text{£} 19 = 0.8421$

Exchange rates and trade balance (I)

The real exchange rate ε affects the trade balance

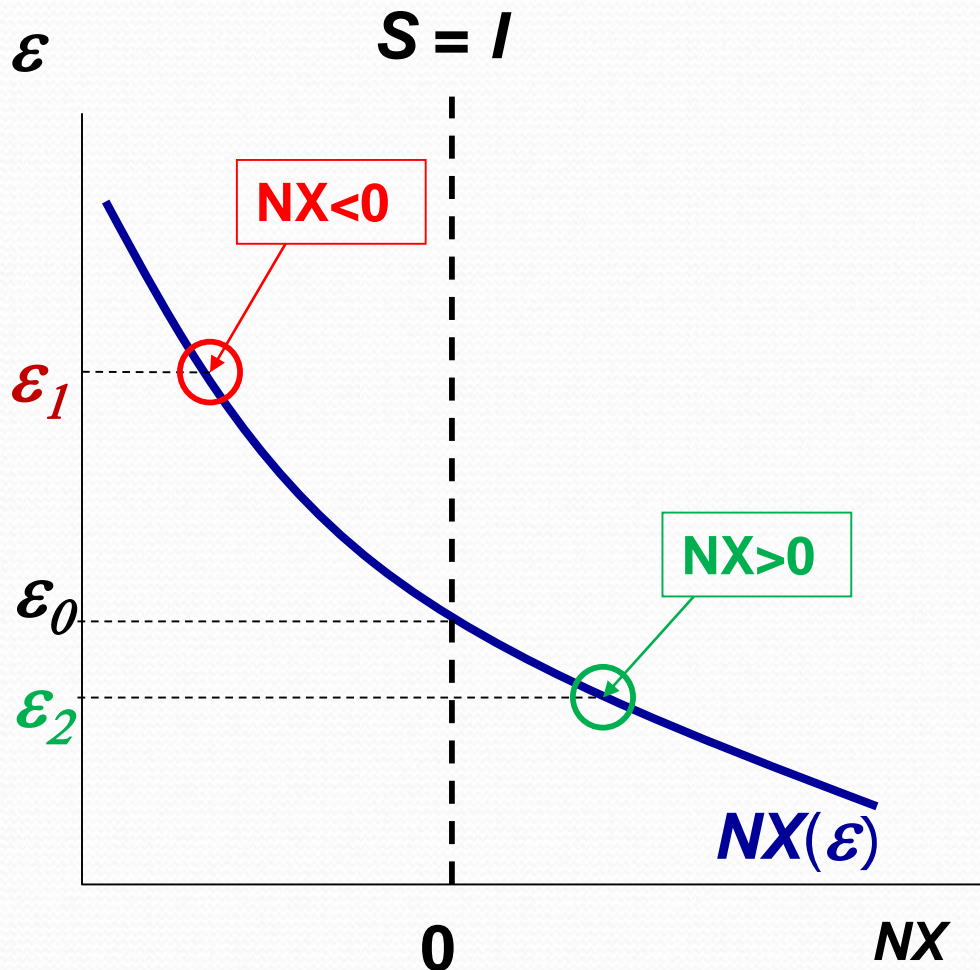


$\uparrow \varepsilon \Rightarrow$ national goods become relatively more *expensive* than foreign goods

Exports tend to fall, whereas imports tend to rise $\Rightarrow \downarrow NX$

NX can therefore be expressed as a negative function of ε

Exchange rates and trade balance (II)



If ε is *high* \Rightarrow national goods are relatively expensive and net exports tend to be negative ($NX < 0$)

If ε is *low* \Rightarrow national goods are relatively cheap and net exports tend to be positive ($NX > 0$)

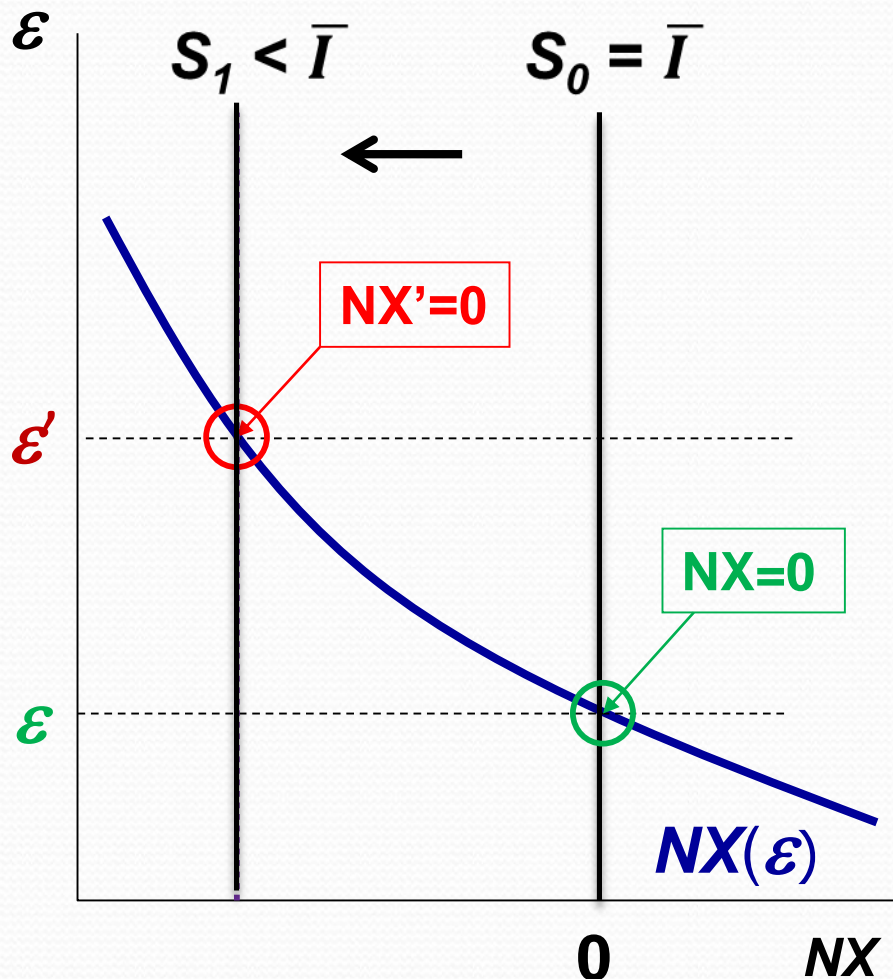
Exercise 4

Consider a country in which, at the current level of the real exchange rate, trade is balanced: $NX = 0$

Since $NX(\epsilon) = S - I$:

- A) Assess the impact on trade balance of an *expansionary fiscal policy* (such as a rise in G or a reduction in T).
- B) Assess the impact on the trade balance of an *increase in foreign saving*, which lowers the international interest rate.

Ex. 4 - (a)

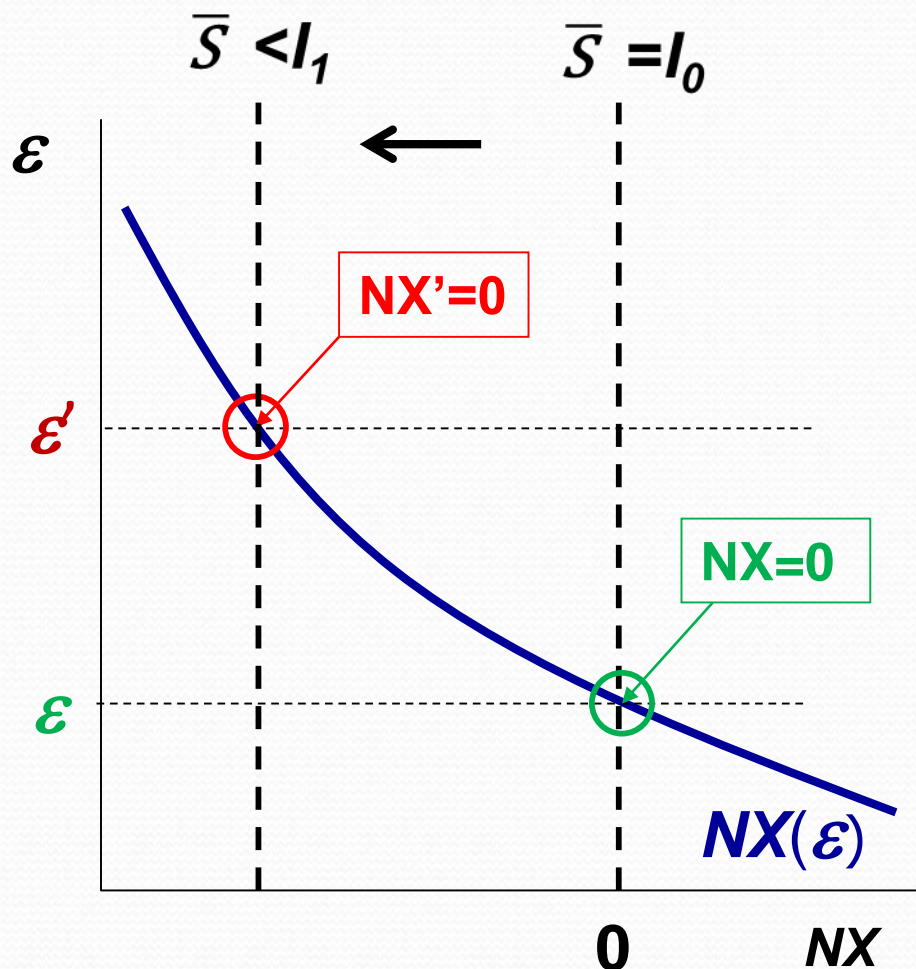


An expansionary fiscal policy reduces total national saving.

At ϵ' , S is now lower than I (which is unaffected): the country turns into an international borrower and this causes an inward capital flow.

More foreign currency is exchanged into national currency: ϵ appreciates and net exports fall

Ex. 4 - (b)



A decrease in the international interest rate implies a higher demand for investment in the country of interest, whereas national saving is unaffected.

At ε' , I is now larger than S : the country borrows funds from the international market (an inward capital flow occurs)

More foreign currency is converted into national currency, and the exchange rate rises: ε appreciates and net exports fall

Trade policy

The government can alter the price of imported goods (or exported goods) in such a way to make national goods more convenient and/or foreign goods more expensive to be purchased

To accomplish this task, the government can use different tools: tariffs, quotas, export subsidies, etc..

In all these cases, net exports are expected to increase for any possible level of the real exchange rate, which means that the curve $NX(\epsilon)$ shifts upwards

Multiple choice quiz

1. A depreciation of the euro will have the following effects:

- a) European imports rise, while exports fall.
- b) Both European imports and exports rise.
- c) European exports rise, while imports fall.
- d) Both European imports and exports fall.

2. Suppose that the euro-to-dollar nominal exchange rate appreciates by 10%; if the inflation rate in the Eurozone is 2% while in the US is 5%, what is the change of the euro-to-dollar real exchange rate?

- a) It appreciates by 15%.
- b) It appreciates by 10%.
- c) It appreciates by 7%.
- d) It depreciates by 3%.

Recap of the most important equations we have seen so far

- **GDP – closed economy**

- Aggregate production function $Y = f(K,L)$
- Aggregate demand $C+I+G$
- Real GDP $Y = C+I+G$
- Nominal GDP PY

- **Money and inflation**

$$MV=PY$$

- **Unemployment**

$$U/L = s/(s+f)$$

- **Growth**

- Steady State condition $k^*/f(k) = s/\delta$
- Golden rule $PMK = \delta$

- **Real GDP – open economy** $Y = C+I +G+NX$

Ch. 10: Economic fluctuations

Key- concepts

- Aggregate Demand and Aggregate Supply
- Long vs. Short run and economic cycles
- Shocks and macroeconomic stabilization policies
- Stagflation

Aggregate Demand and Supply

- ***Aggregate Demand:***
shows the relationship between the price level and the amount of goods and services demanded in the economy
- ***Aggregate Supply:***
shows the relationship between the price level and the amount of goods and services produced in the economy
- ***Macroeconomic Equilibrium:***
Aggregate Demand = Aggregate Supply
- The components of Aggregate Demand and Aggregate Supply vary significantly over time

Short vs. long run

Economic Cycle: short-run fluctuation in the level of economic activity

	Short run	Long run
PRICES	STICKY They are stuck at a given level	FLEXIBLE They vary and are determined by the interaction of supply and demand
ECONOMIC THEORY	KEYNESIAN Y also depends on the level of the demand ⇒ Y is affected by: <ul style="list-style-type: none">• external shocks• macroeconomic policy	CLASSIC Y is determined by technology and input endowments only ⇒ variation in the level of the aggregate demand only affects prices, not Y

Can macroeconomic policies stabilize fluctuations?

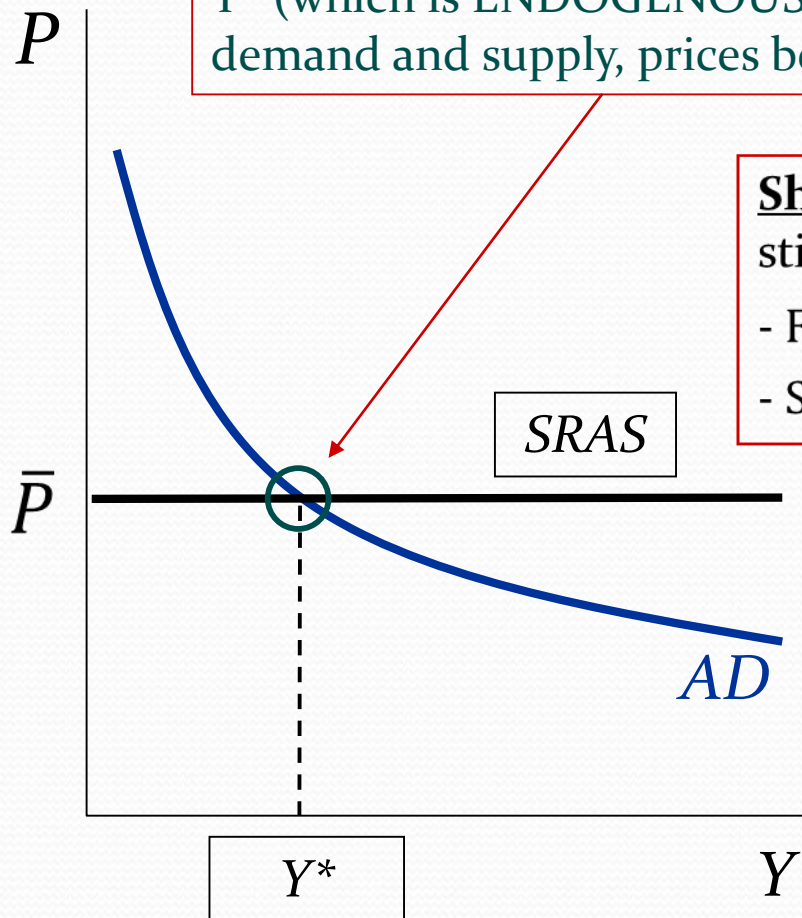
The AS-AD model

- This model allows for:
 - studying the relationship between *prices and quantities (the endogenous variables)* both in the short run and in the long run;
 - analysing the effects of *exogenous elements* such as:
 - stabilizing macroeconomic policies;
 - technology;
 - short-run price level;
 - long-run levels of production.

KEYNESIAN AS-AD model

SHORT RUN Equilibrium:

Y^* (which is ENDOGENOUS) is determined by the (short-run) demand and supply, prices being taken as flexible



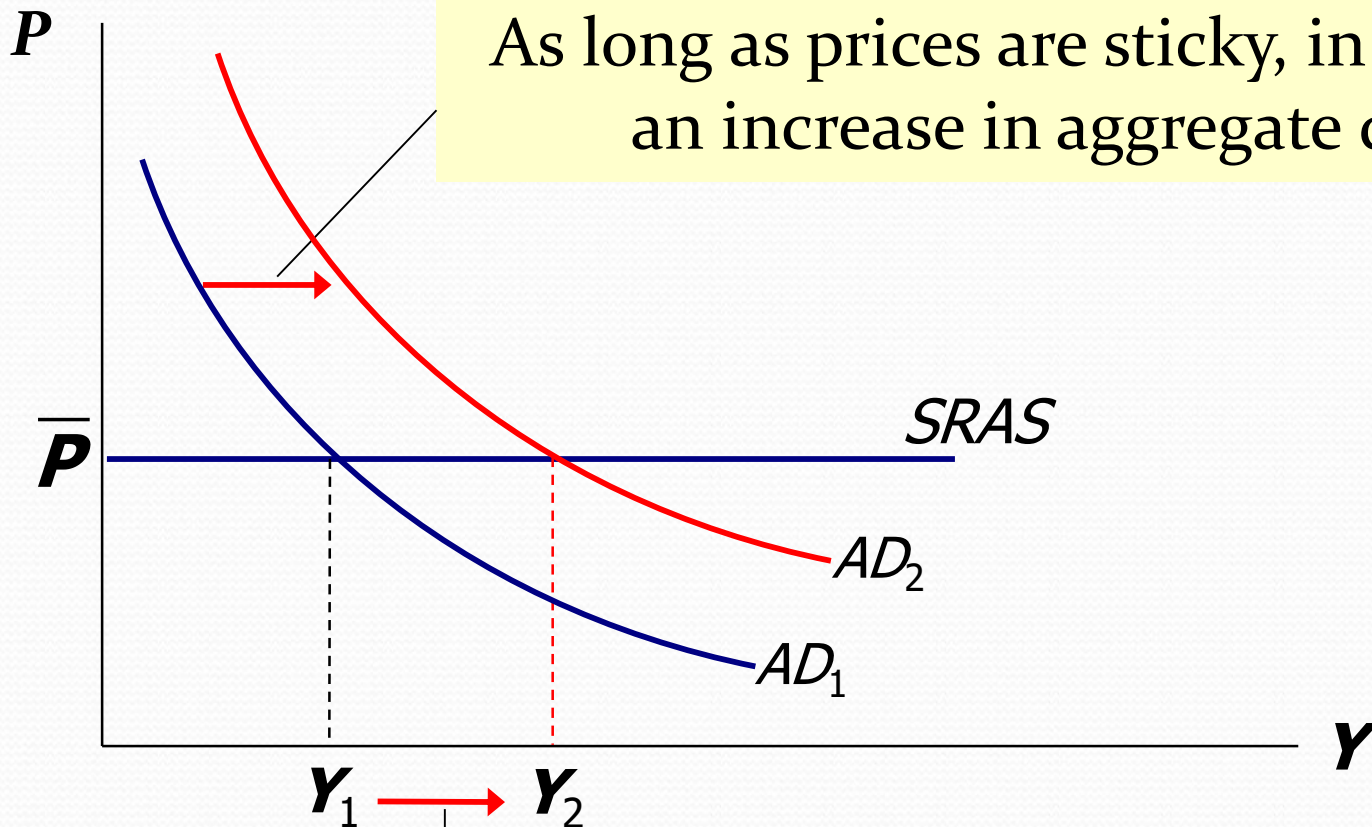
Short-Run Aggregate Supply (SRAS): P are sticky and fixed at a given level, denoted by \bar{P}

- Firms sell at price \bar{P} , whatever is Y
- SRAS is represented as a perfectly horizontal line

Aggregate Demand (AD): from the Quantity Theory of Money (v constant; M set by the Central Bank), one gets $Y = AD(P(-), M(+))$

- P is *endogenous*: ΔP implies moving along the curve
- M is *exogenous*: for any level of P , ΔM shifts the curve upwards or downwards and Y varies

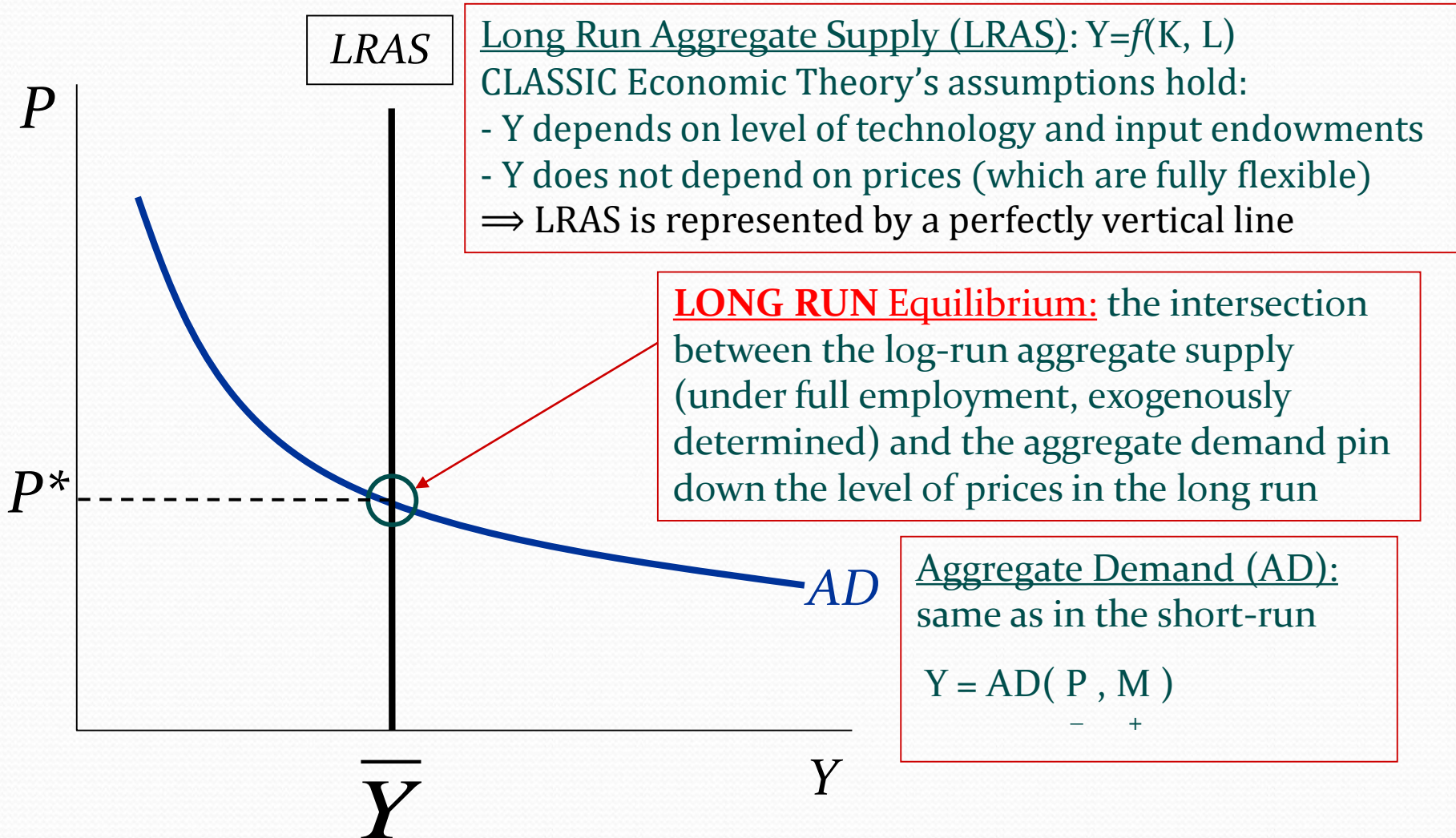
AS-AD Model: short-run effects



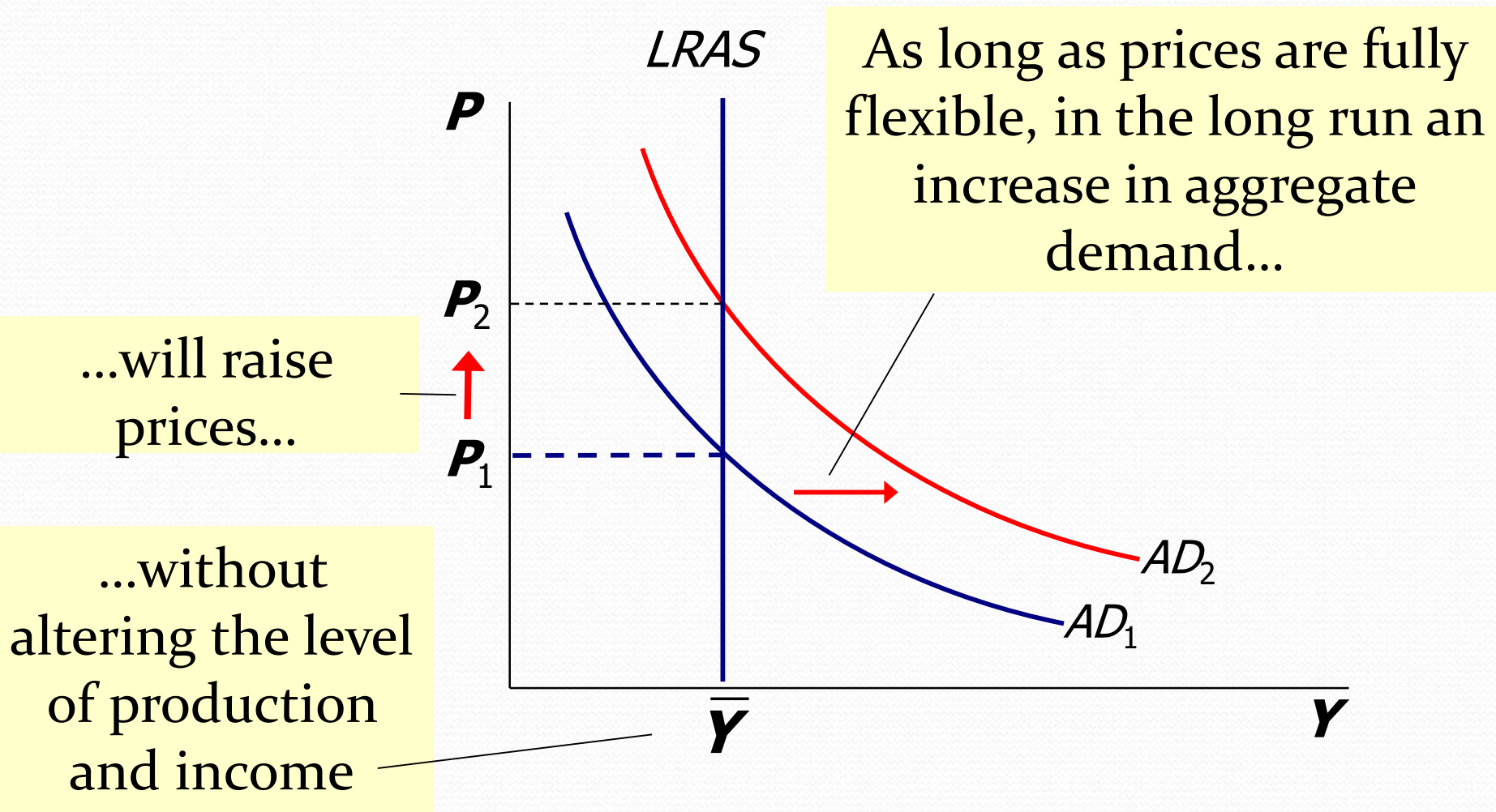
As long as prices are sticky, in the short-run an increase in aggregate demand..

...will increase aggregate production (and therefore national income)

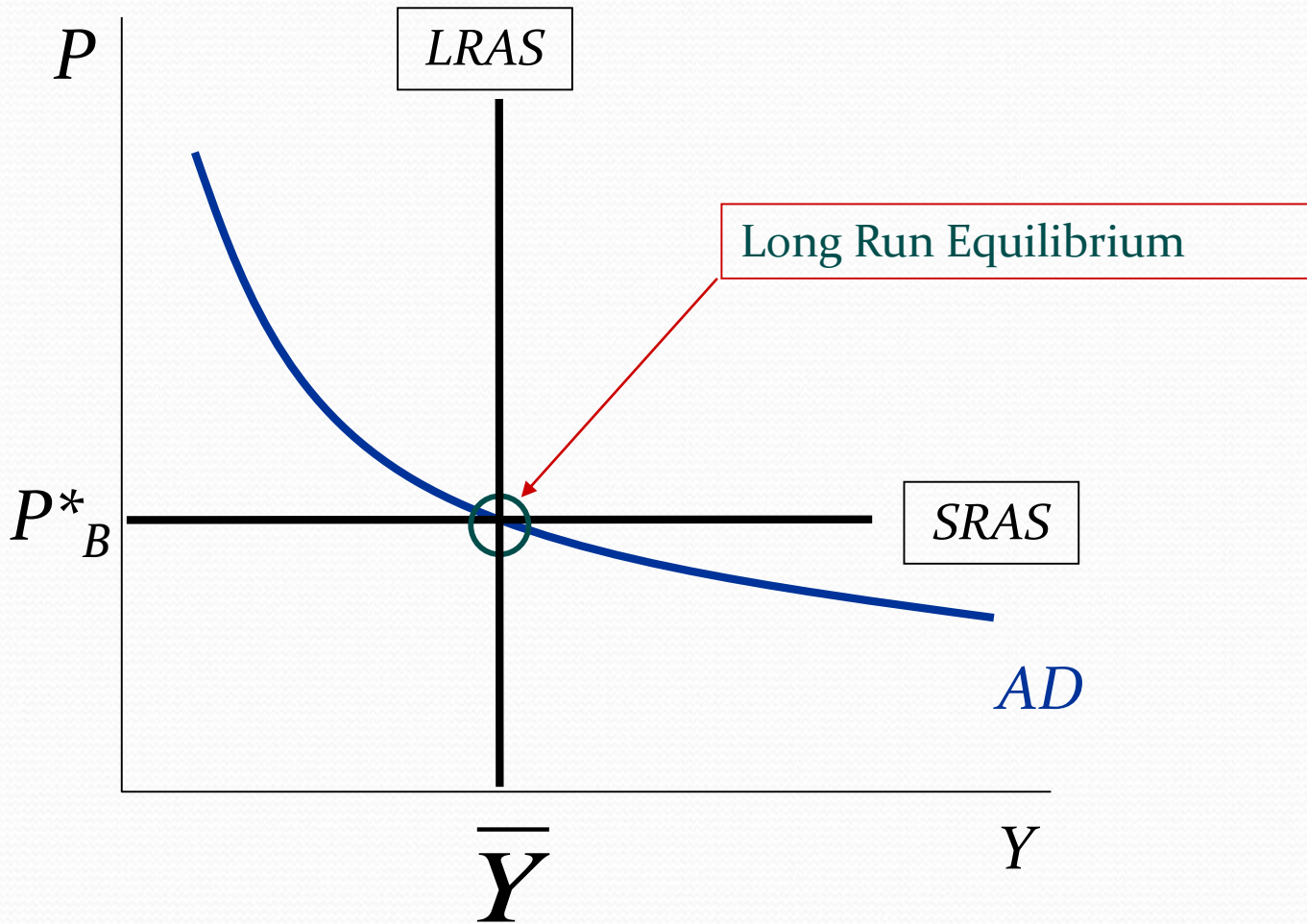
CLASSIC AS-AD Model



AS-AD Model: long-run effects



AS-AD Model: the long run



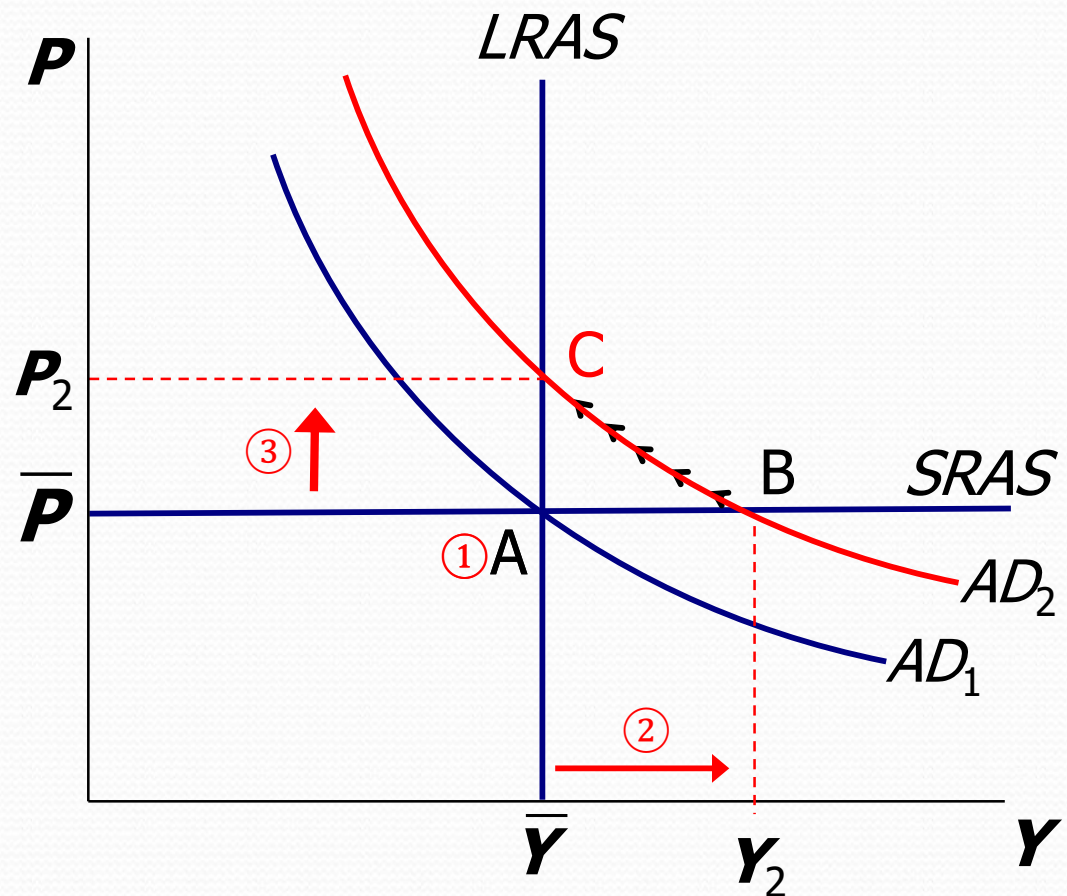
From the short to the long run

A = Initial equilibrium

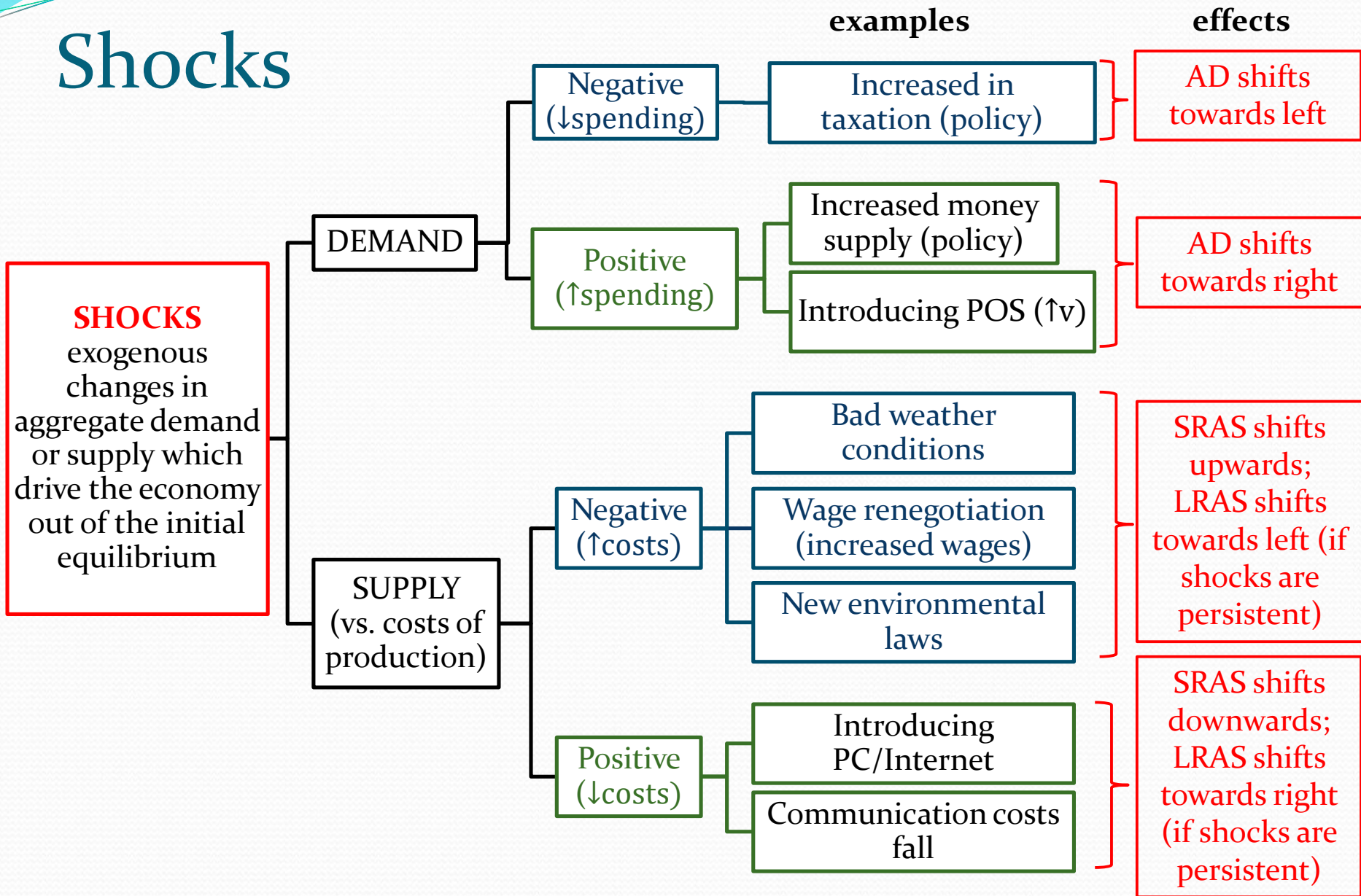
If Aggregate Demand rises:

B = Short run equilibrium

C = Long run equilibrium



Shocks



Stagflation and stabilization policies

- ***Stagflation***

Increase in prices associated with a reduction in the level of production

- ***Stabilization policies (which impact on AD)***

In order to neutralize the effects of the shocks and bring the economy back to the initial equilibrium, the government can use:

- fiscal policy (ΔG and ΔT)
- monetary policy (ΔM and Δi)

Multiple Choice

- 3. By starting from the quantity theory of money, what are the assumptions that must be introduced in order to derive the equation of the aggregate demand curve?**
- a) The transaction velocity of money is constant and prices are sticky.
 - b) The transaction velocity of money is constant and the money supply is set by the Central Bank.
 - c) The money supply is set by the Central Bank and prices are sticky.
 - d) No further assumptions are needed.
- 4. The long-run aggregate supply, namely LRAS, is represented as...**
- a) a perfectly vertical line.
 - b) a perfectly horizontal line.
 - c) a downward sloping curve.
 - d) an upward sloping curve.

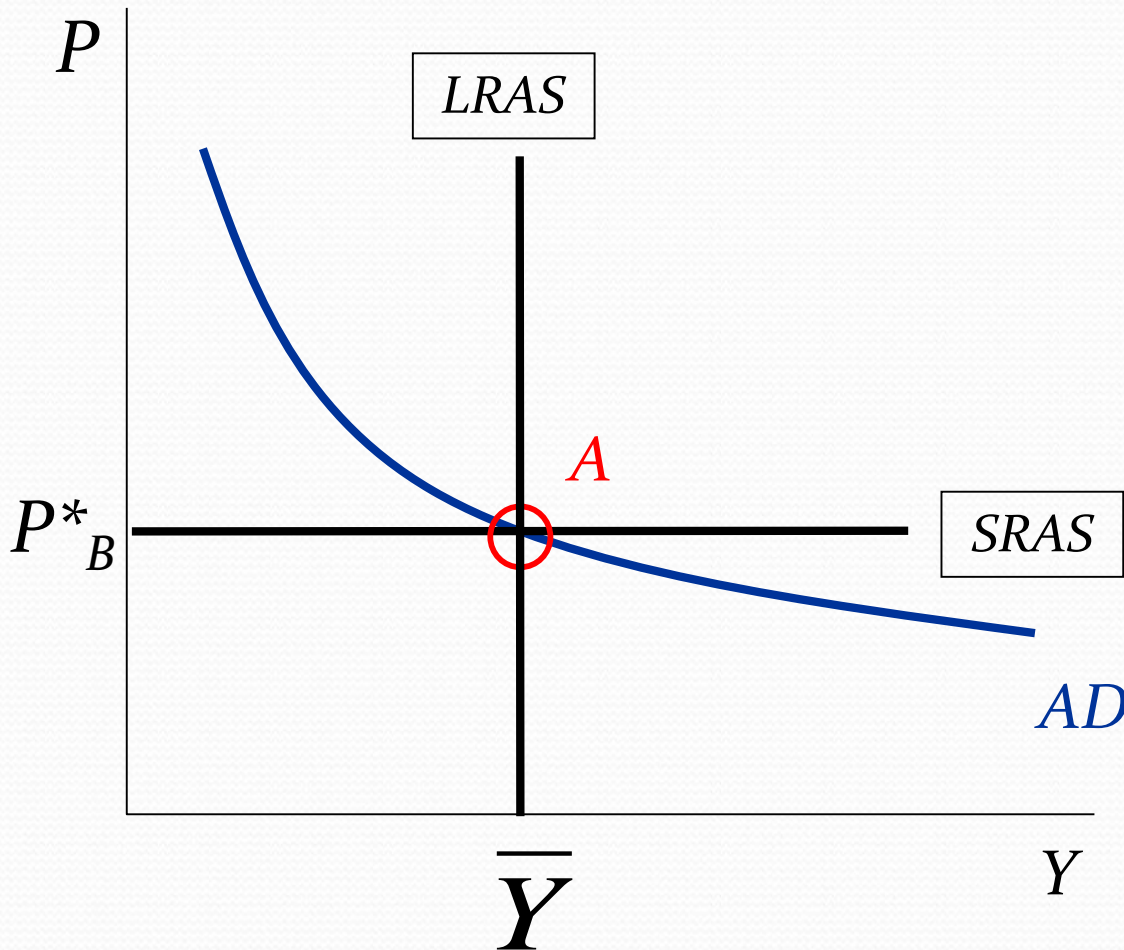
Multiple Choice

5. Which one of the following statements is NOT correct?
- a) The aggregate volume of production under full employment is constant, and determined by the input endowment and the state of technology.
 - b) In the long run, the economy tends to achieve the level of production of full employment.
 - c) The short run is that particular time span over which the economy experiences a recession.
 - d) The short run can potentially last many years.

Exercise 6

- a) Draw a graph of the AS-AD model and identify the short-run and long-run equilibrium.
- b) A decrease in the consumer confidence about the future can lower the aggregate level of consumption. Can you represent this in the context of the AS-AD model? What are the short-run and the long-run effects of this shock?
- c) What kind of policies could offset the lack of consumer confidence? Explain why.

Ex. 6 – (a)



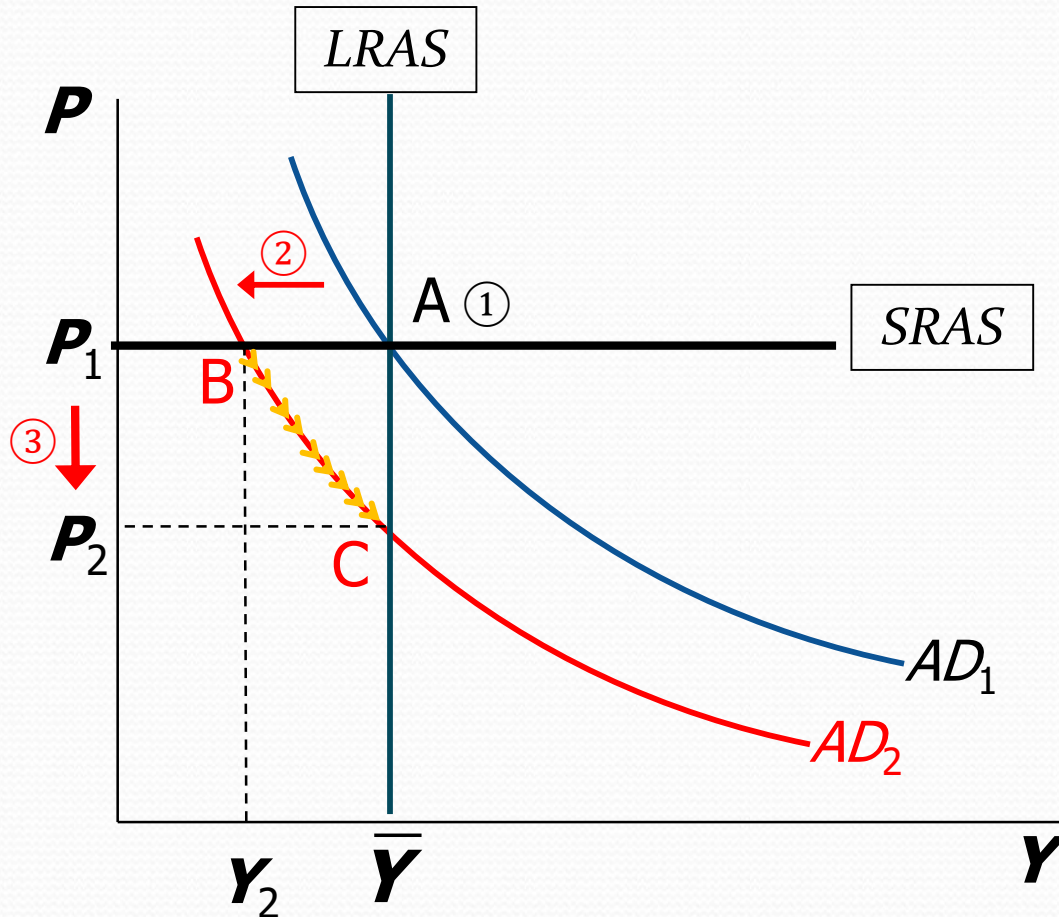
AD represents the negative relationship between the overall quantity of goods demanded by consumers and the price level, which can be derived from the quantity theory of money (v constant and M is exogenously given)

$SRAS$: under sticky prices, firms sell the output they had produced independently of what the price level actually is (AS is a horizontal line)

$LRAS$: under flexible prices, the volume of output only depends on real variables

A : equilibrium point $AD=AS$

Exercise 6 – (b)

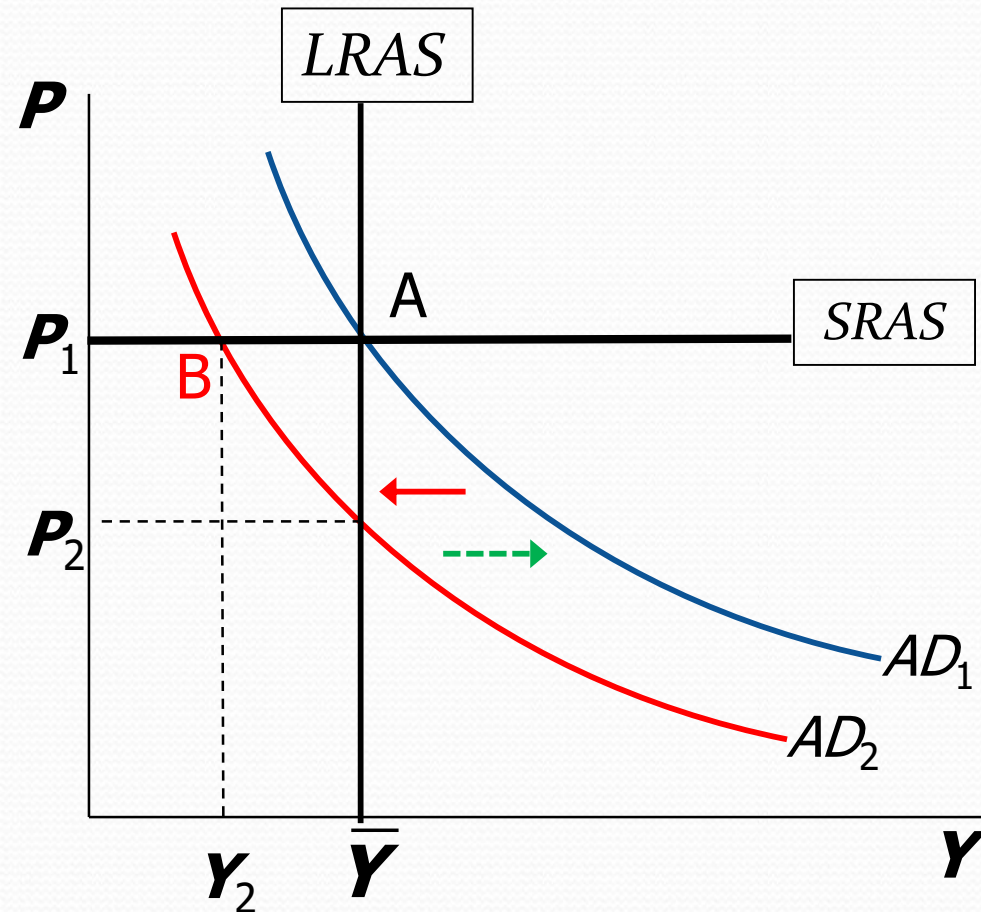


If consumer confidence falls, the aggregate demand curve shifts towards the left (from AD_1 to AD_2)

- In the SHORT RUN... since prices are sticky, the equilibrium moves to point B: the new level of production (Y_2) is lower than the level of full employment
- In the LONG RUN... as prices are flexible, the economy tends to come back to the original level of production (i.e. the level of full employment), by means of a reduction in prices.

The new equilibrium is represented by point C.

Ex. 6 – (c)



To offset the fall in consumer confidence, and therefore the shift towards the left of the aggregate demand curve, the government can use monetary or fiscal policy, in such a way to bring the AD curve back to its original position, and restore the initial equilibrium (point A).

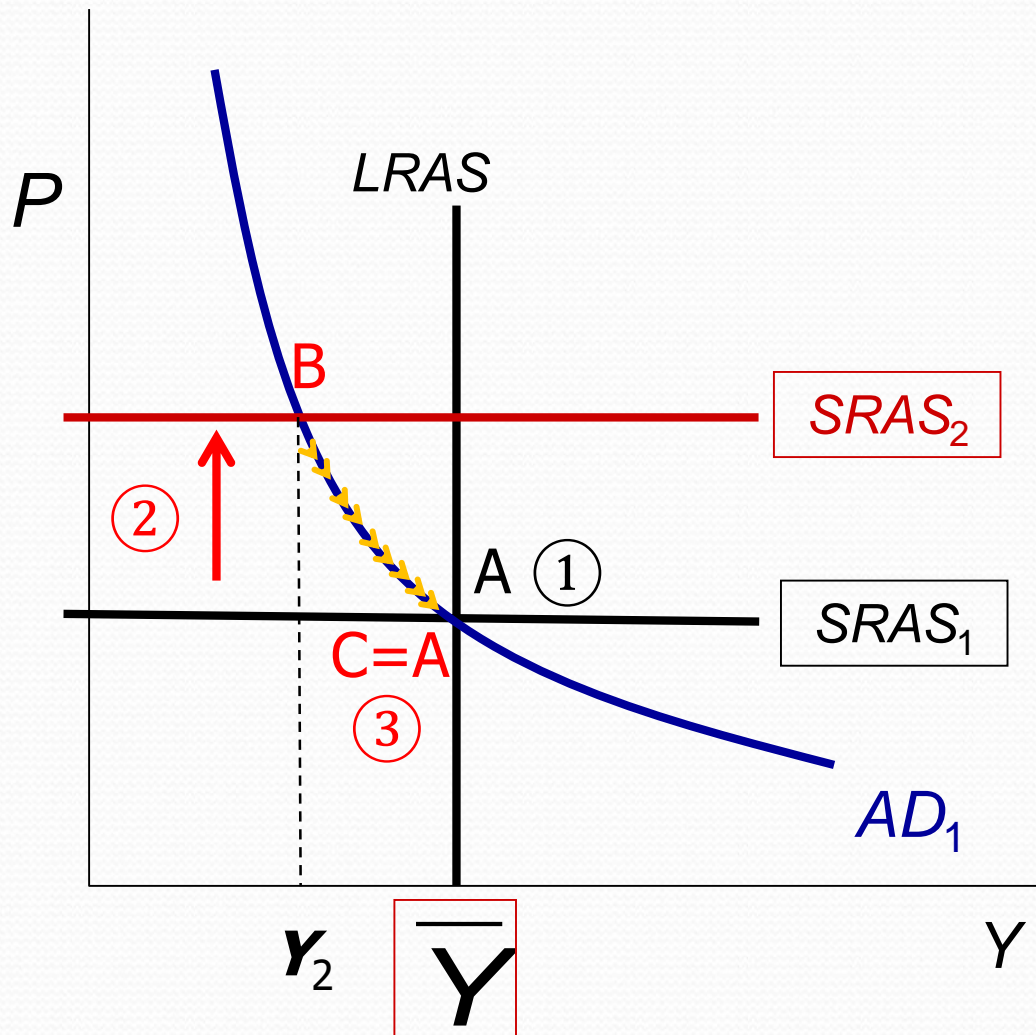
This can be done, for instance:

- by raising the money supply (expansionary monetary policy)
- by lowering taxes (expansionary fiscal policy)

Exercise 7

- a) Consider a severe heat wave, such that a huge number of crops are destroyed, at least for this year. How would you represent this climate shock in the context of the AS-AD model? What are the short run and the long run effects on prices and production?
- b) Is it possible to use monetary and/or fiscal policy to offset the effects of this shock? Explain why.
- c) How would your answers to points **a** and **b** change, if the heat wave were just the signal of a permanent climatic change, with temperatures that get permanently higher?

Ex. 7 – (a)

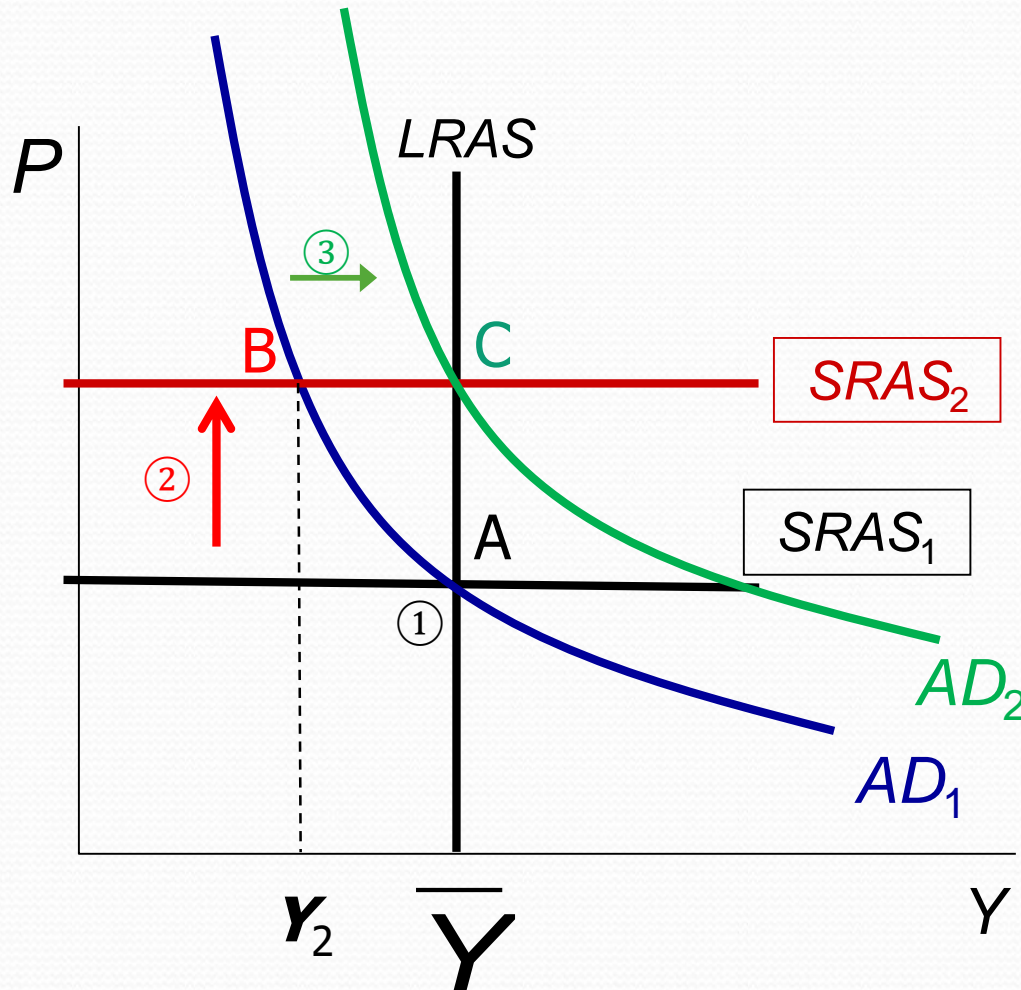


The economy is initially in point A, then the level of production falls below the level of full employment. Indeed, crop losses due to bad weather conditions (negative supply shock) generate an excess demand.

Prices are set at a higher level than before and the SRAS shift upwards: the new equilibrium is B (recession)

In the long run, agricultural production is restored as weather conditions come back to normal: prices and output return back to their levels in A

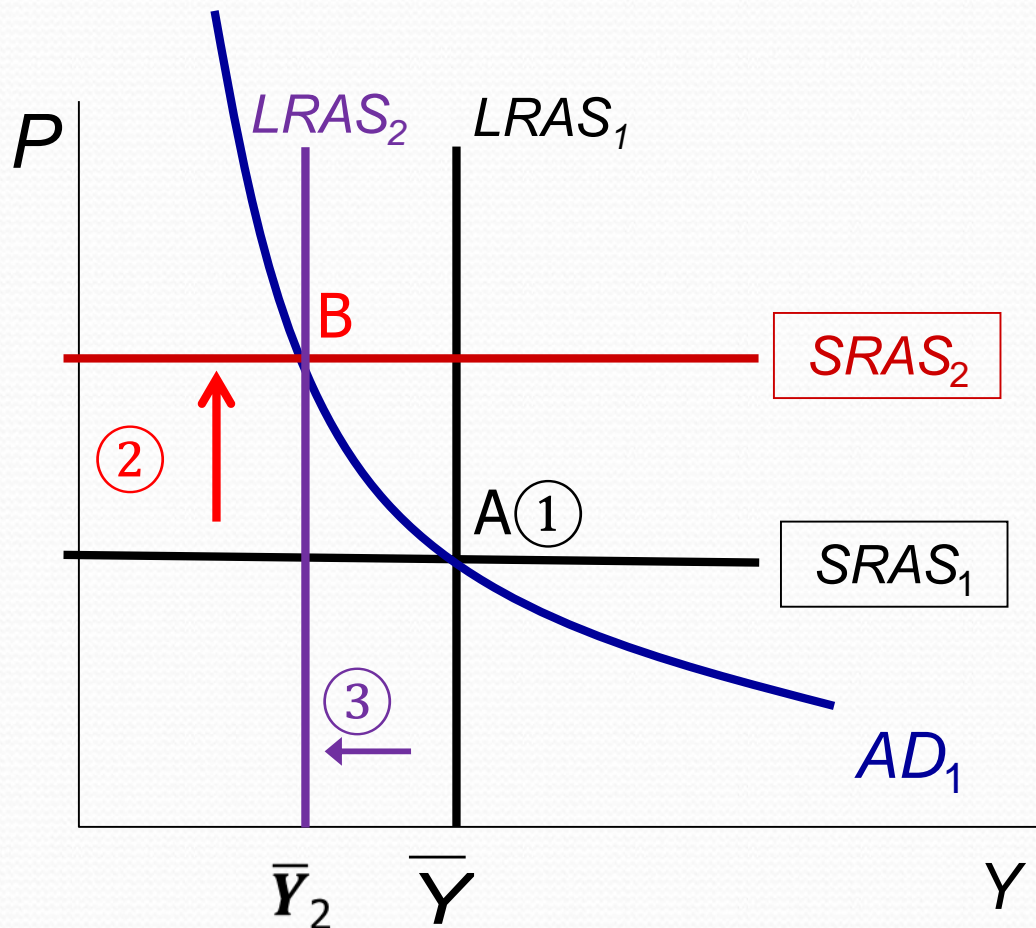
Ex. 7 – (b)



To offset, at least in part, the effects of the negative supply shock, the government can stimulate the aggregate demand, by means of both monetary and fiscal policies (expansionary policies) which shifts AD to the right.

With this intervention, the short run equilibrium will be C, instead of B. The price level would be the same (at the higher level), but at least recession would be avoided: Y is stabilized.

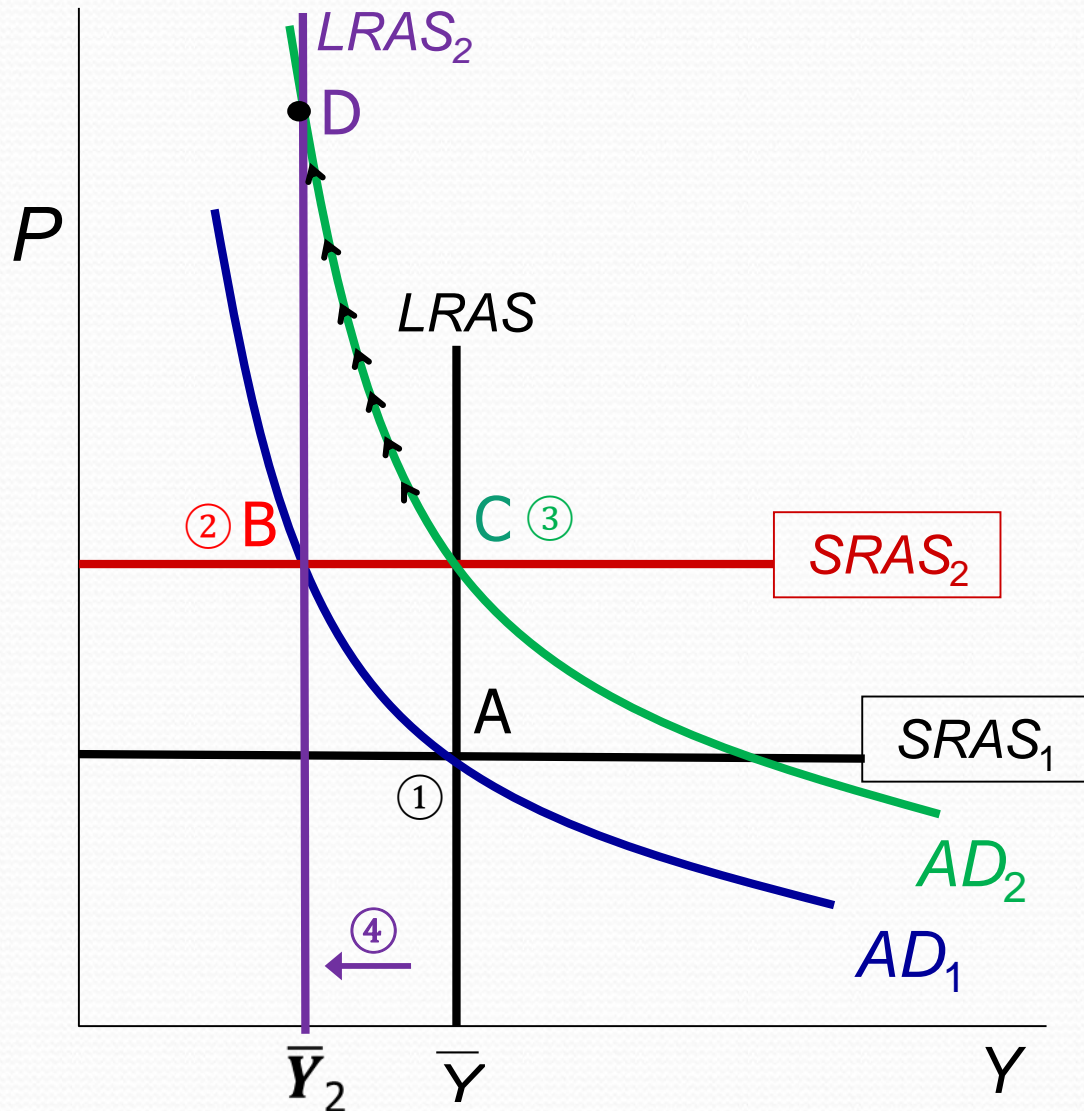
Ex. 7 – (c)



If it were NOT possible to restore the agricultural production (like in the case of permanent climatic changes), the LRAS would shift towards the left and point B would become the long run equilibrium.

The level of prices would be higher than in the original equilibrium, while the level of production would be permanently lower (the new level of full employment is lower than before)

Ex. 7 - (d)



If the supply shock were permanent, the macroeconomic stabilization undertaken by the government would result in a further increase in prices, implying a long run equilibrium given by point D

Multiple Choice

6. Which of the following situations may give rise to stagflation?

- a) A negative demand shock.
- b) A positive demand shock.
- c) A negative supply shock.
- d) A positive supply shock.