

# International Economics

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## Unit 3

Macroeconomic Policy in an Open  
Economy. Mundell-Fleming  
model

## Previous conclusion

The ultimate effects of a devaluation are in large part dependent upon the economic policies that accompany the devaluation.

## Economic objectives

- Internal Balance:
  - Price stability
  - Full employment
- External Balance:
  - Equilibrium in the BP

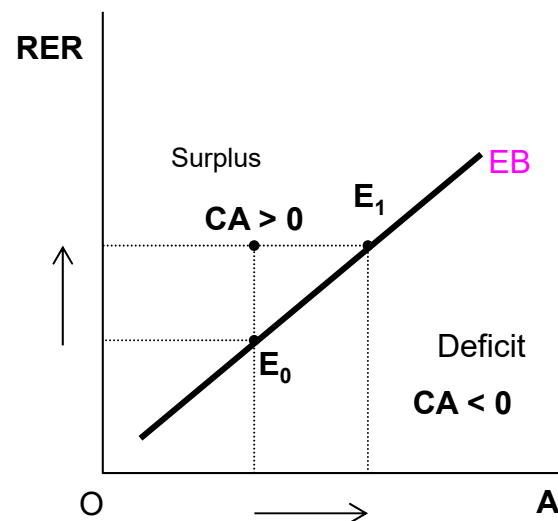
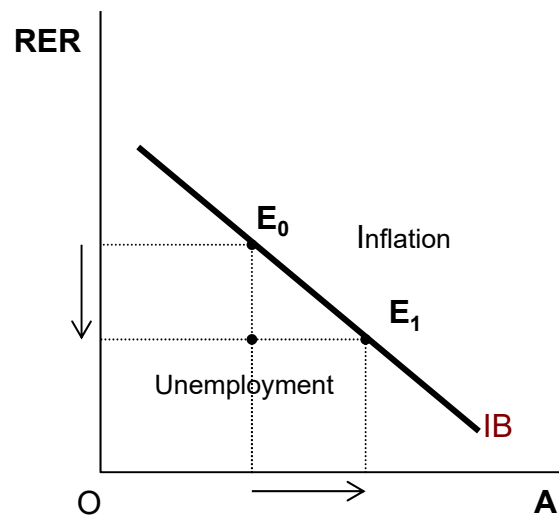
## Economic policies

- Aggregate supply policies
- Aggregate demand policies:
  - Expenditure changing policies. Aim to influence the level of AD
  - Expenditure switching policies. Aim to influence the composition of AD

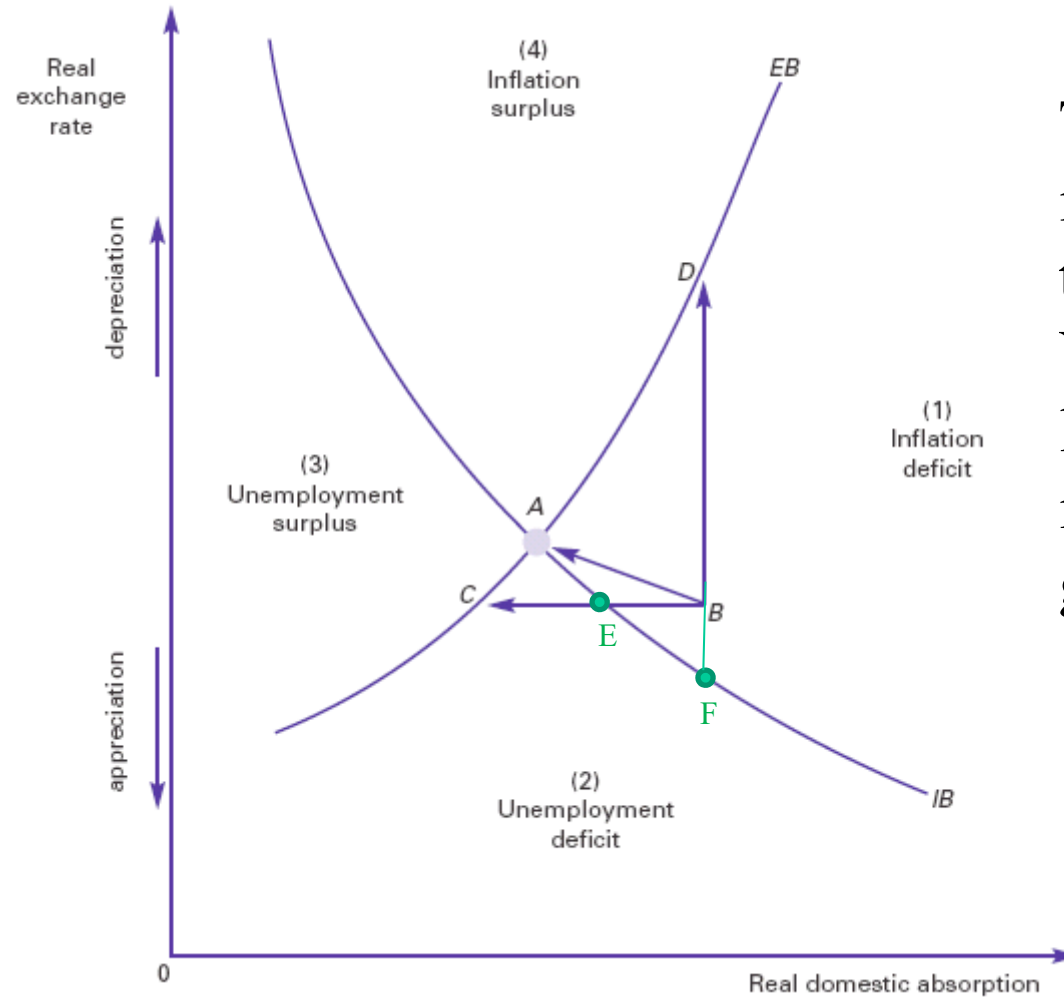
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# Internal and external equilibrium: the SWAN diagram



# The Swan diagram



Tinbergen's instruments-targets rule: You need at least n-instruments to get n-targets

## Mundell-Fleming model (IS-LM-BP model)

**Aim:** Analyze the effectiveness of fiscal and monetary policy

### Assumptions:

- Domestic and foreign prices are constant
- Unemployment
- International capital mobility

Economic relationships (Equations).

## The goods market

$$Y = C + I + G + X - M$$

$$S + M = I + G + X$$

$$S = S_a + sY$$

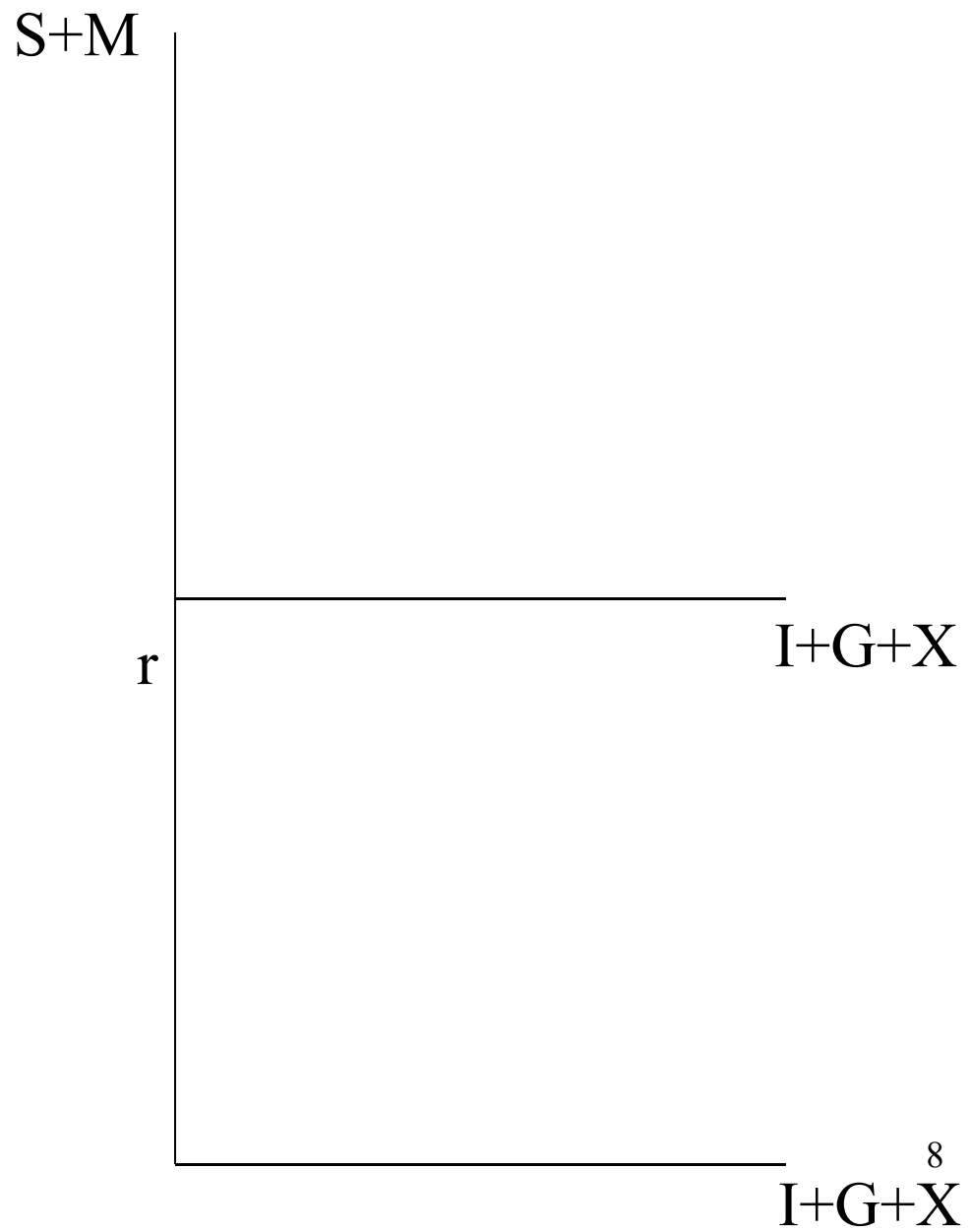
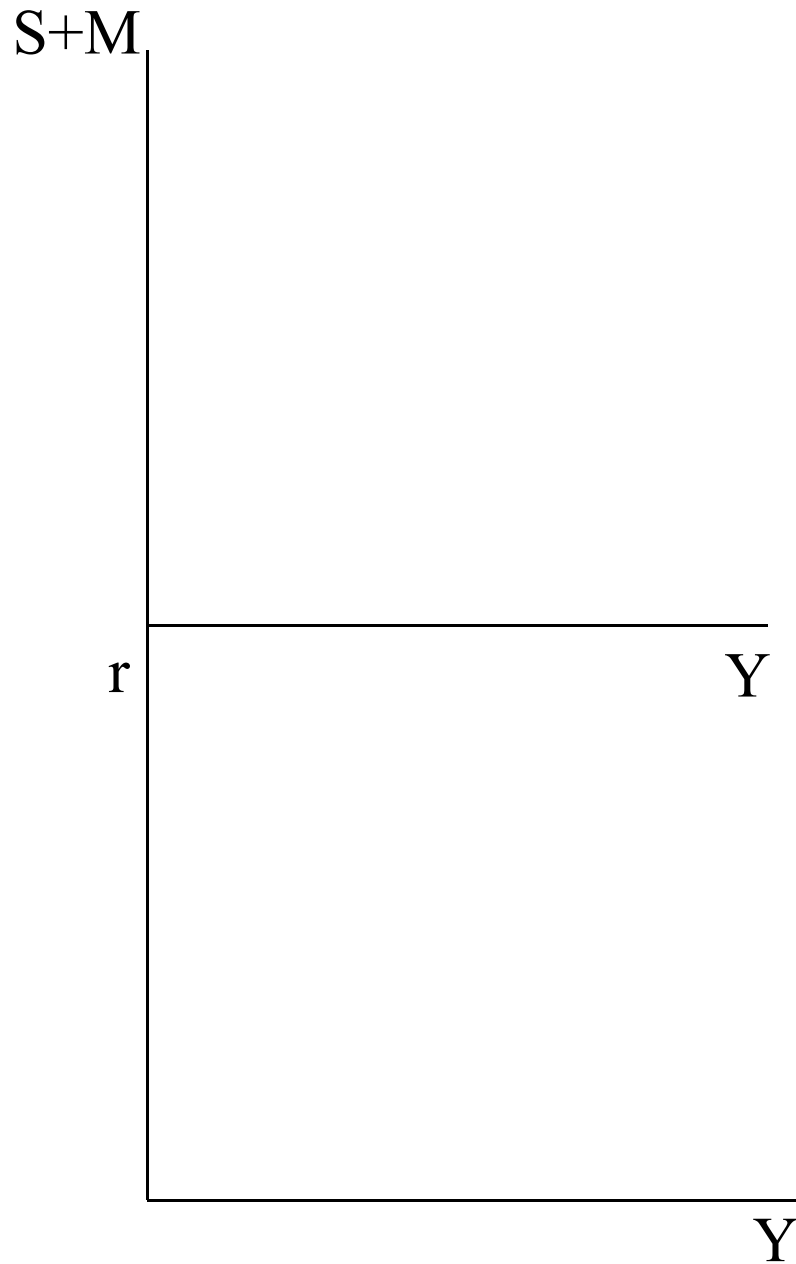
$$M = M_a + mY$$

$$I = I(r) \quad dI/dr < 0$$

$$I = I_a - br$$

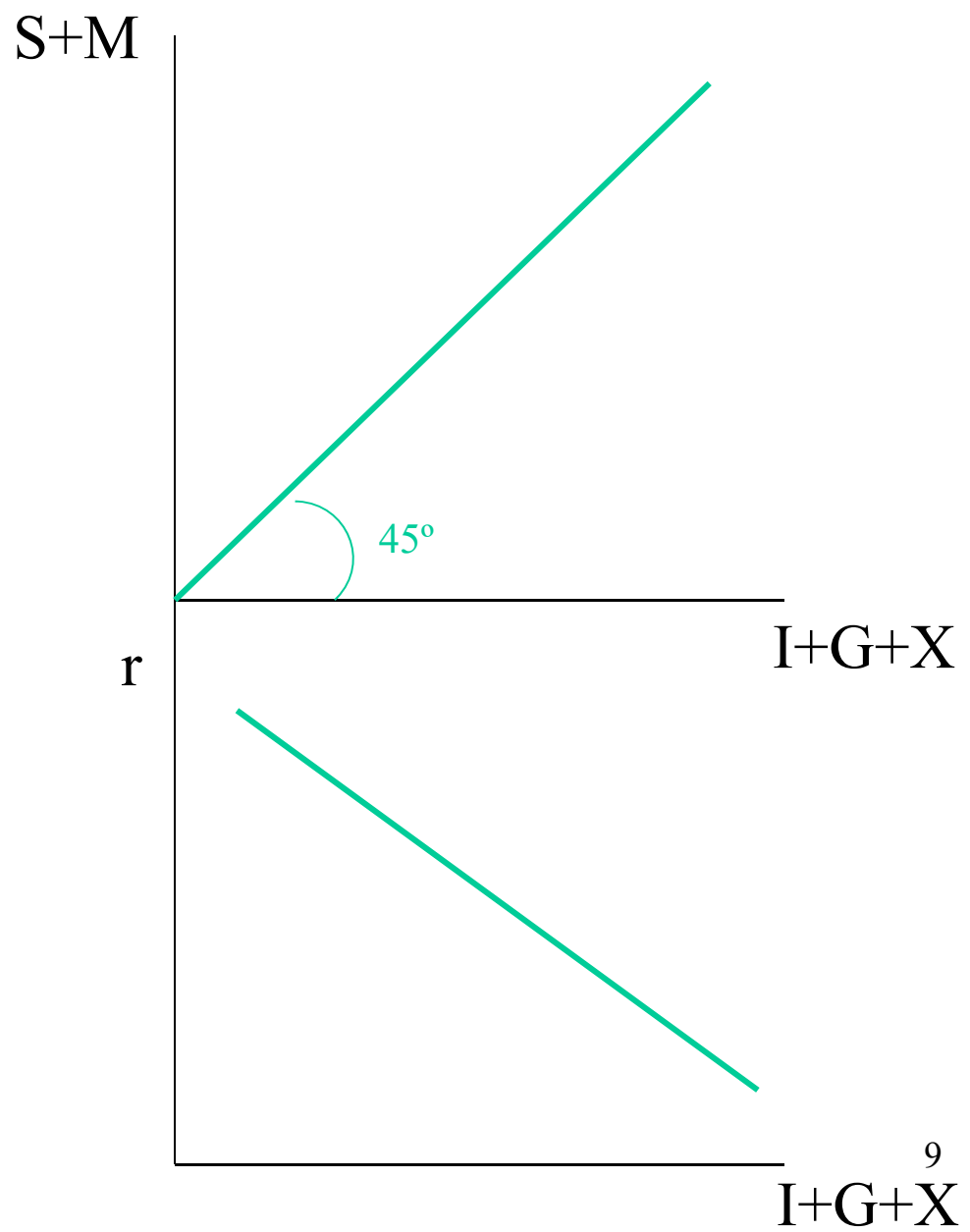
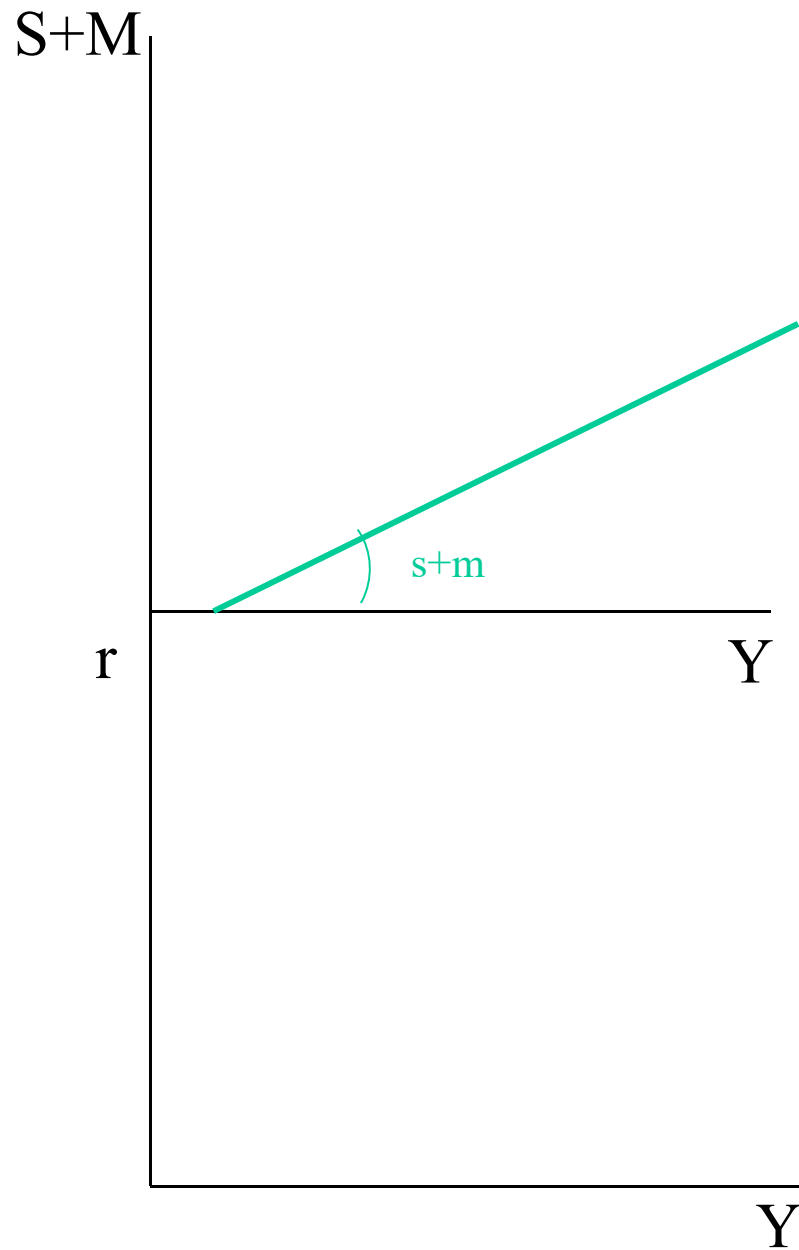
Exports and Government expenditure are considered to be autonomous  $G = G_a; X = X_a$

# Derivation of the IS schedule

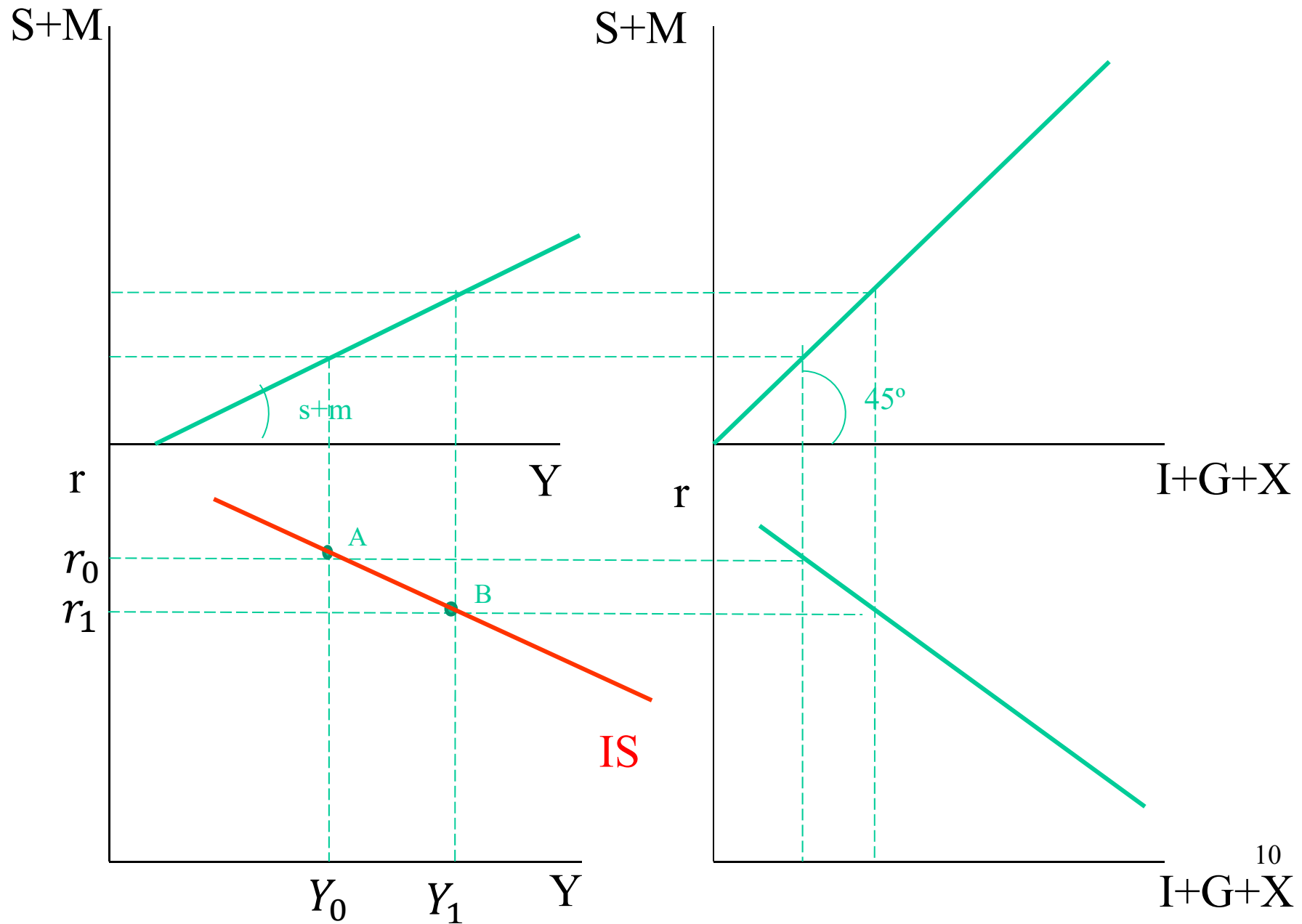




# Derivation of the IS schedule



# Derivation of the IS schedule



## Is the IS the same curve in a closed economy as in an open economy?

There are differences both in the position as in the slope  
Rearranging the previous equations:

$$Y = C_a + cY + I_a - br + G_a + X_a - M_a - mY$$

$$Y(1-c+m) = C_a + I_a - br + G_a + X_a - M_a$$

$$Y = 1/(s+m) * (A_a + CA_a - br) \quad (\text{IS for an open economy})$$

What is the difference in position?

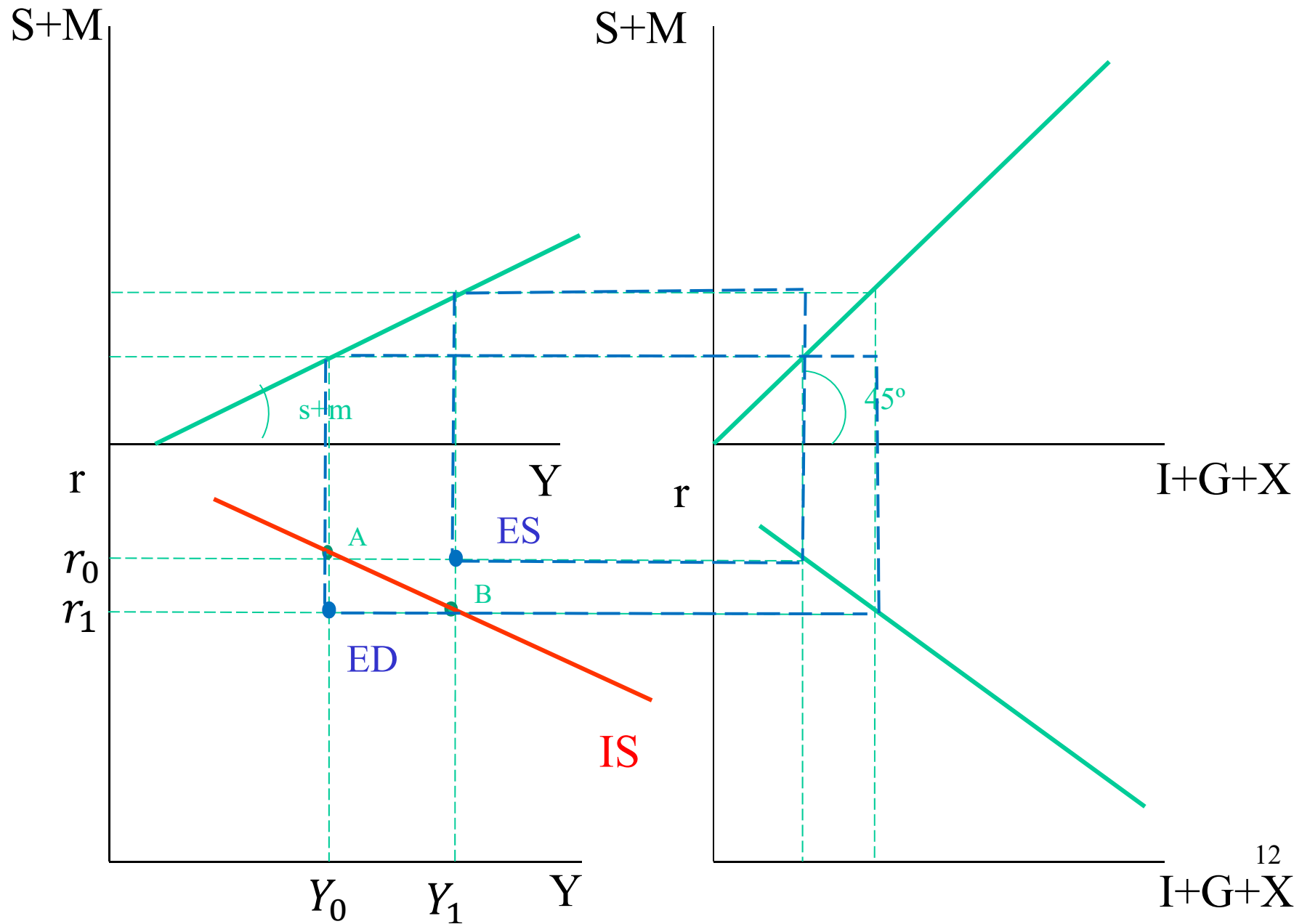
$CA_a$

What is the difference in slope?

IS slope (open econ.):  $-(s+m)/b$  IS slope (closed econ.):  $-s/b$

Conclusion: be careful, it is not the same, far from it

# Points above and below the IS schedule



## The money market

$$M_d = M_s$$

$$M_t = M_t(Y) \quad M_{sp} = M_{sp}(r)$$

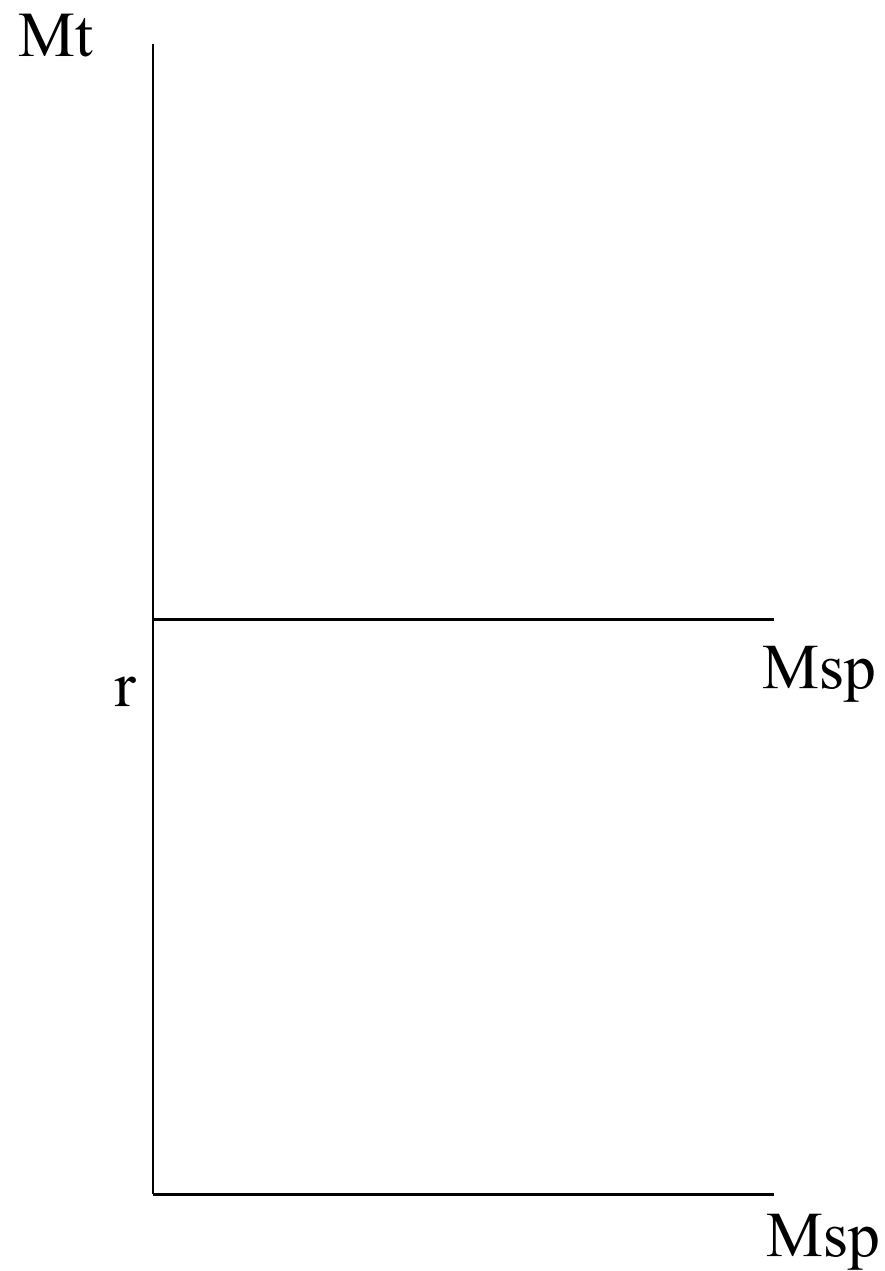
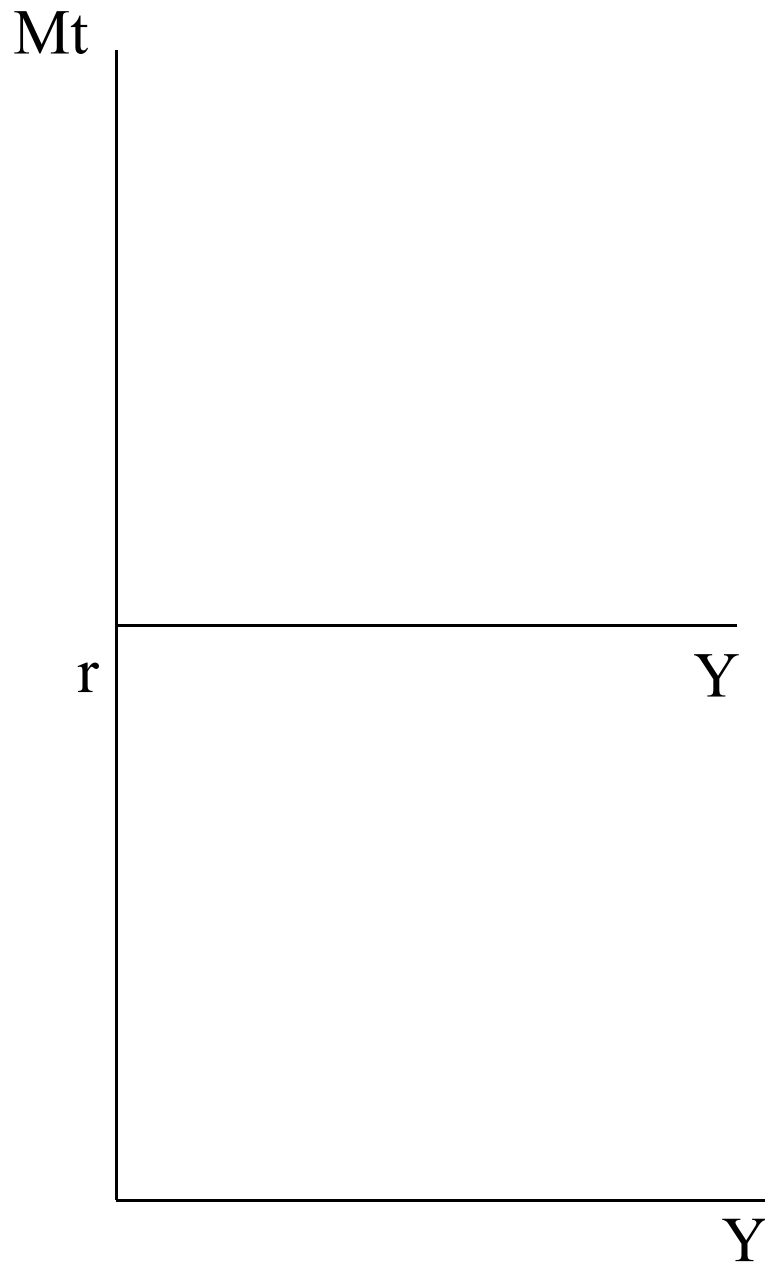
$$M_s = D + R (\phi = 1)$$

*D = Domestic asset (bond) holdings of the monetary authorities = Domestic credit*

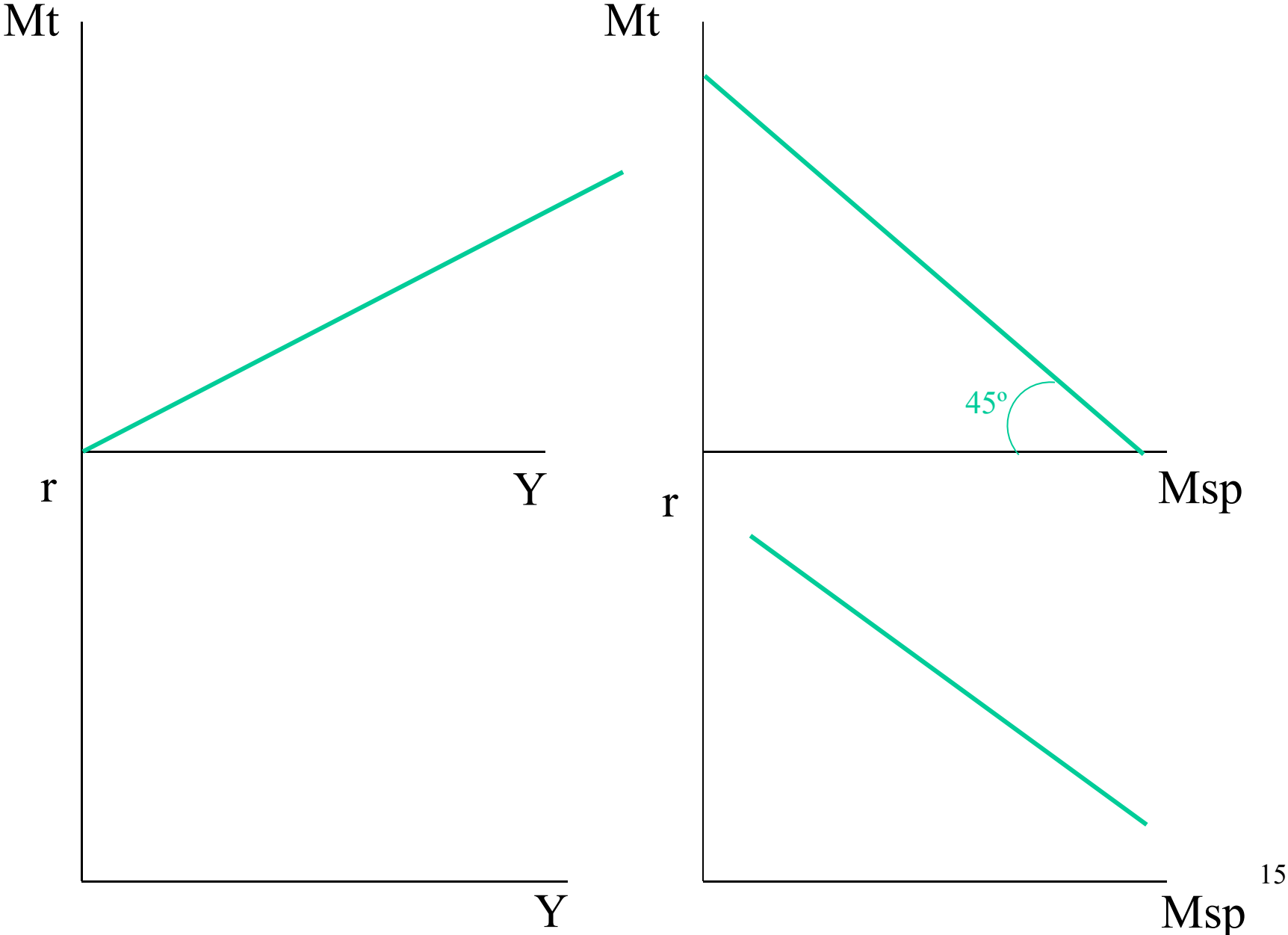
*R = Foreign asset holdings (Foreign exchange and any other internationally acceptable assets) of the monetary authorities, valued in domestic currency = International reserves*

$$M_t + M_{sp} = M_s$$

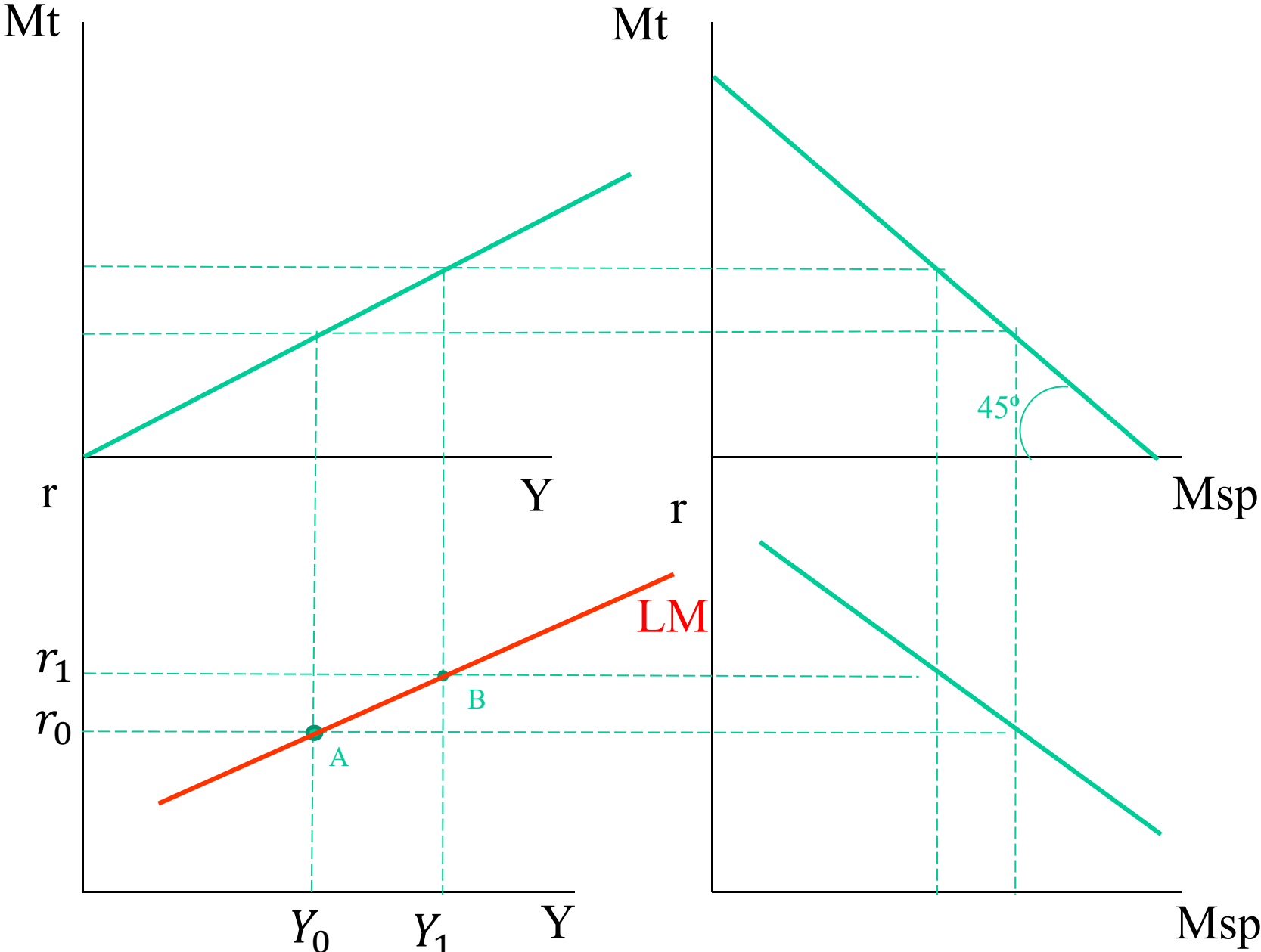
# Derivation of the LM schedule



# Derivation of the LM schedule

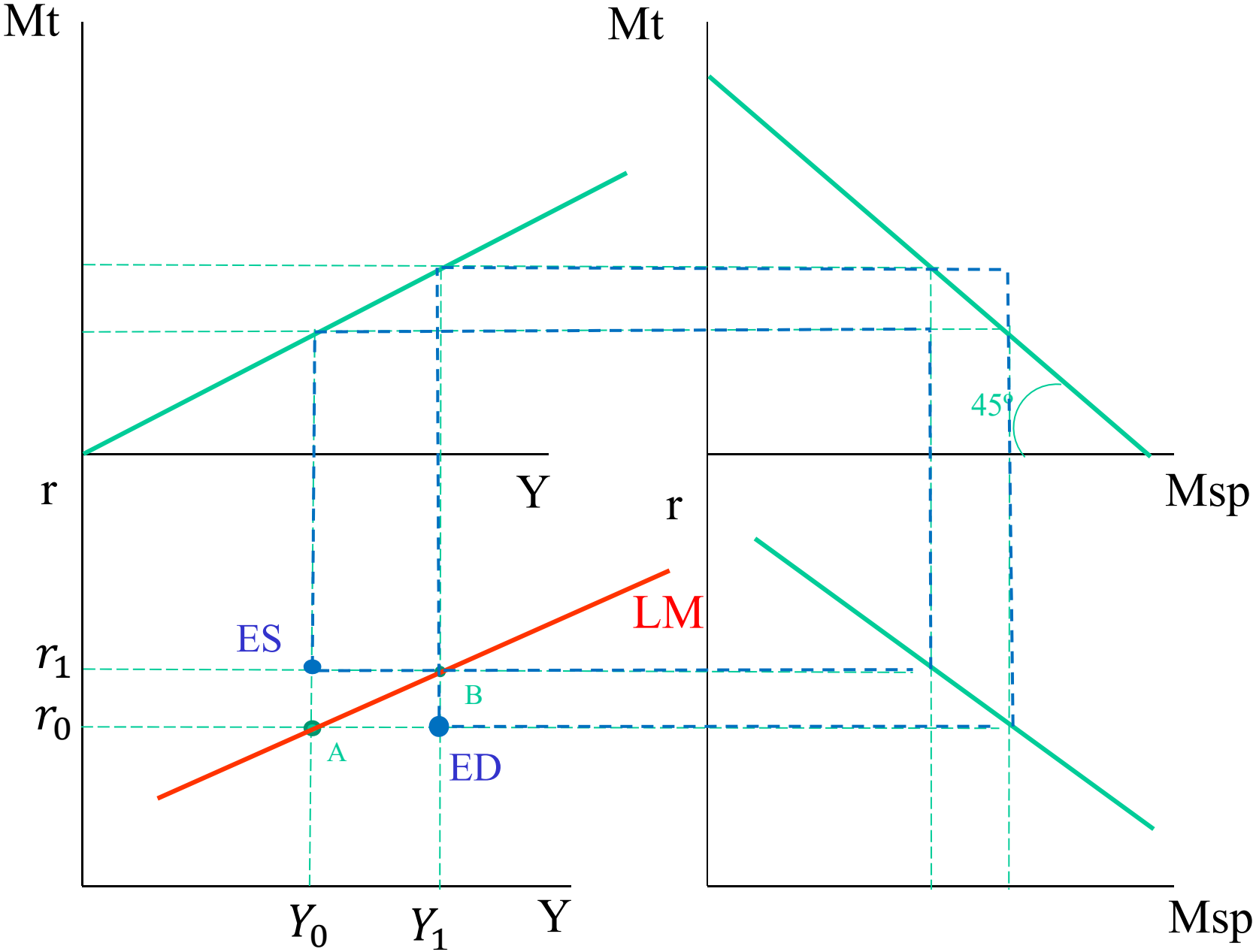


# Derivation of the LM schedule





# Points above and below the LM schedule



## The foreign sector

$$BP = CA + K = 0$$

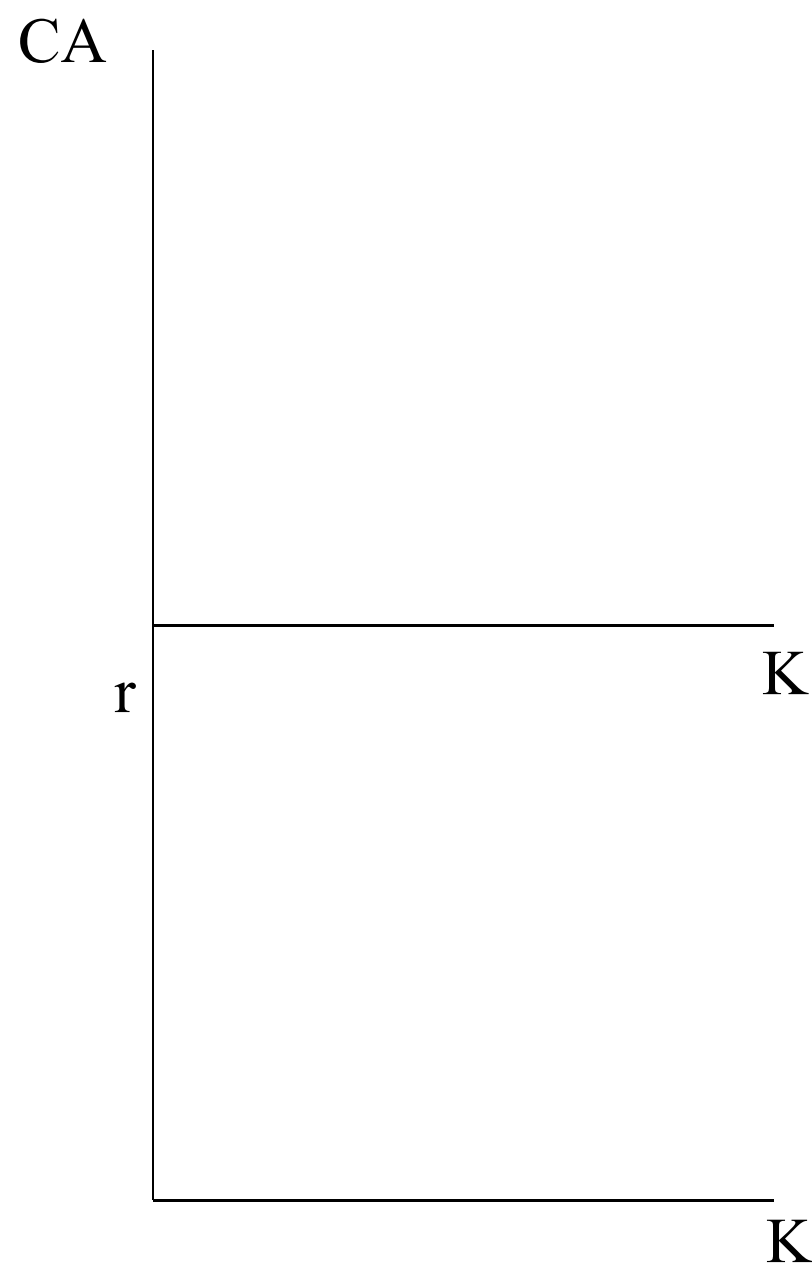
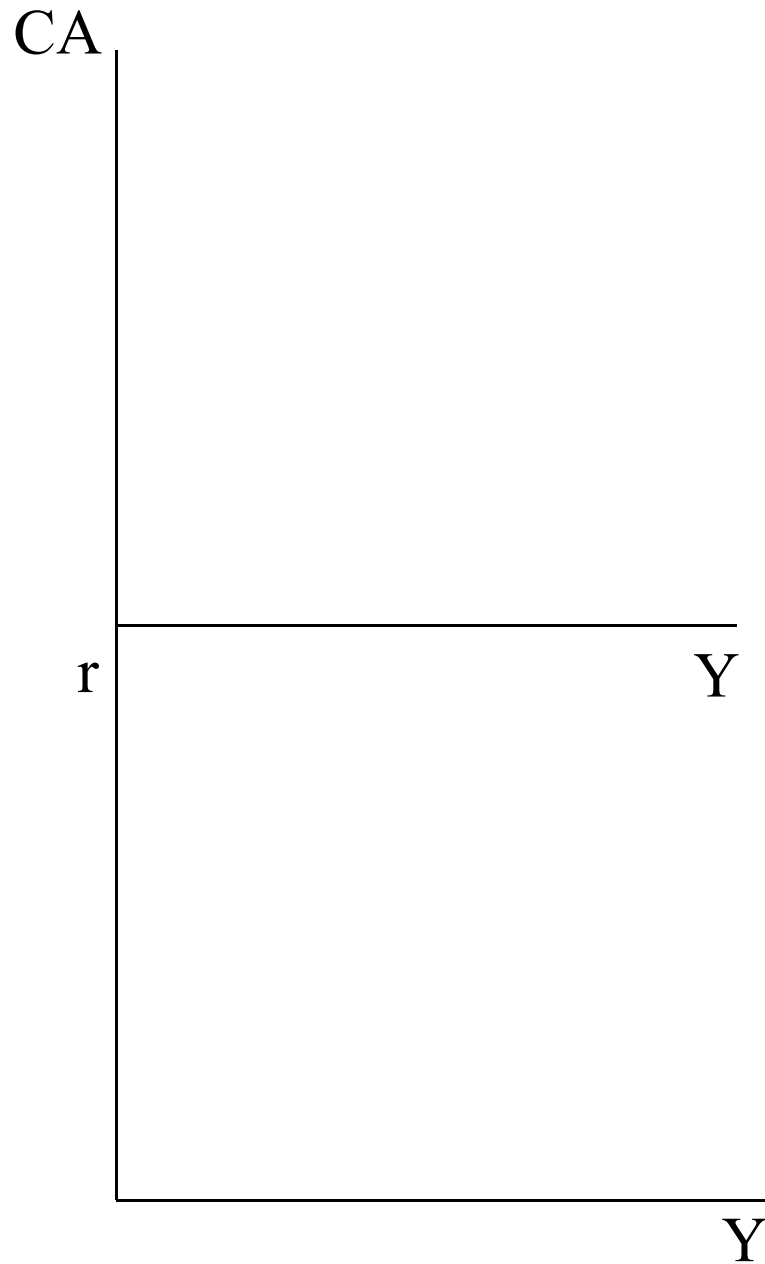
$$X - M + K = 0$$

$$M = M_a + mY$$

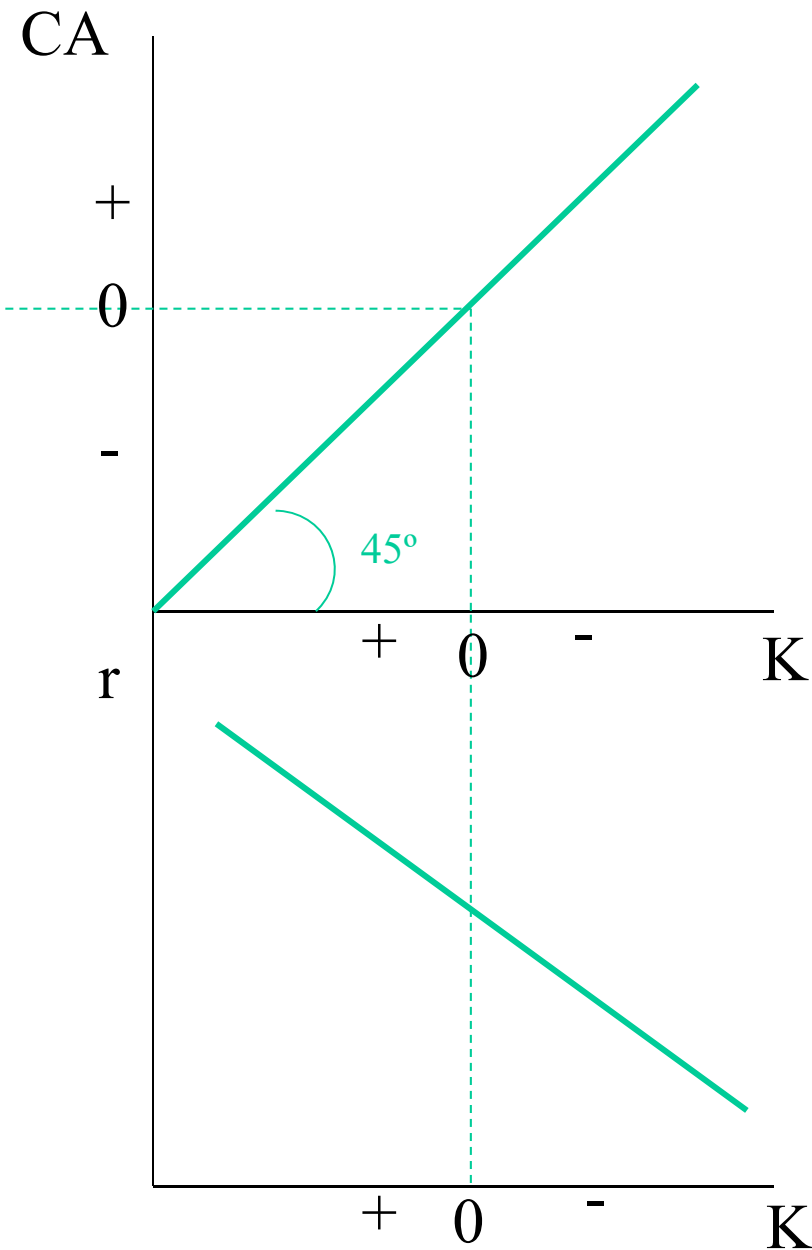
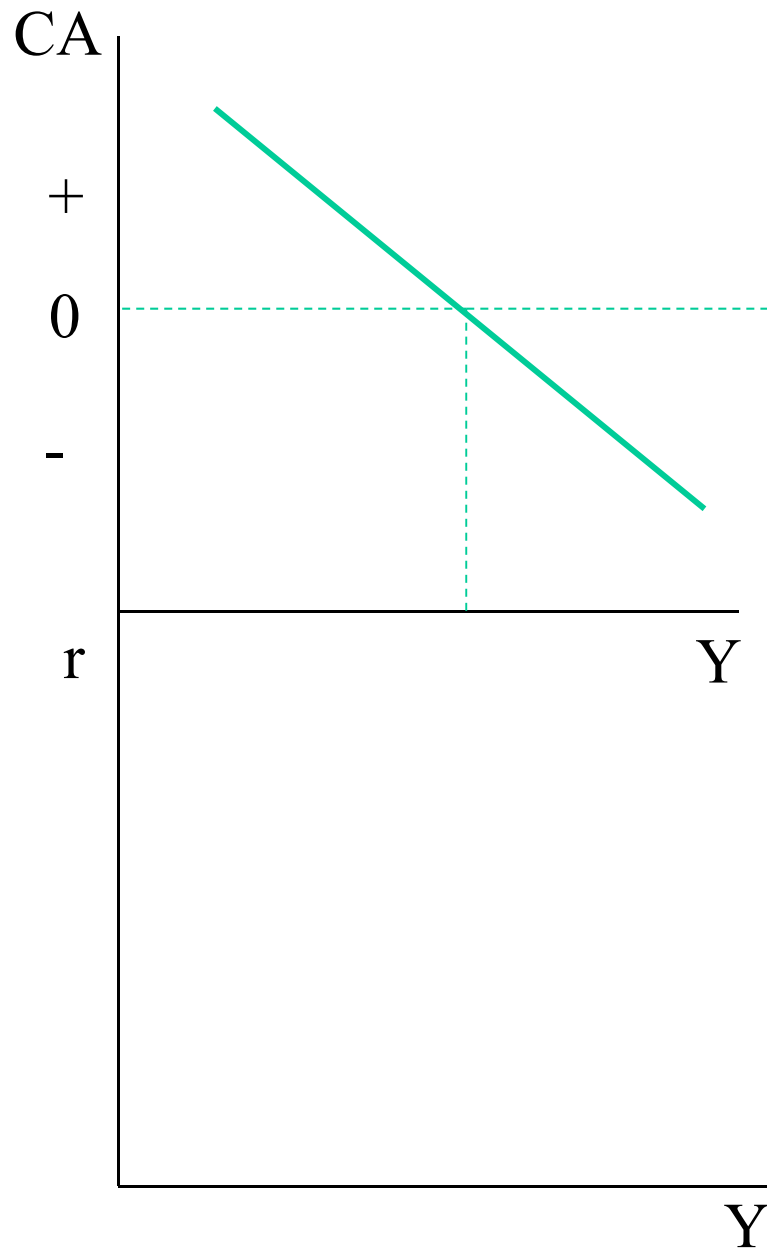
*X is exogenous*

$$K = K(r - r^*) \quad K = K(r)$$

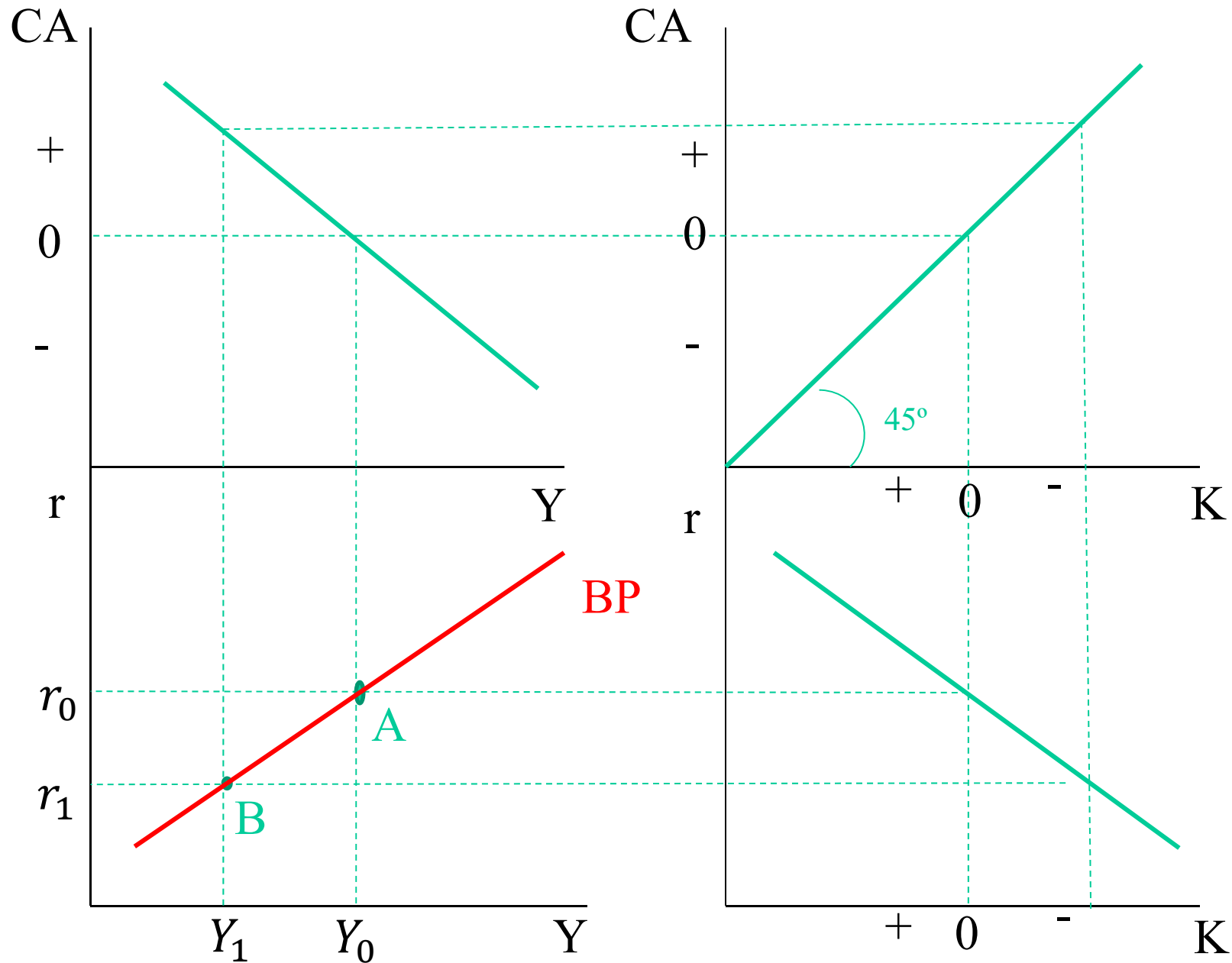
# Derivation of the BP schedule



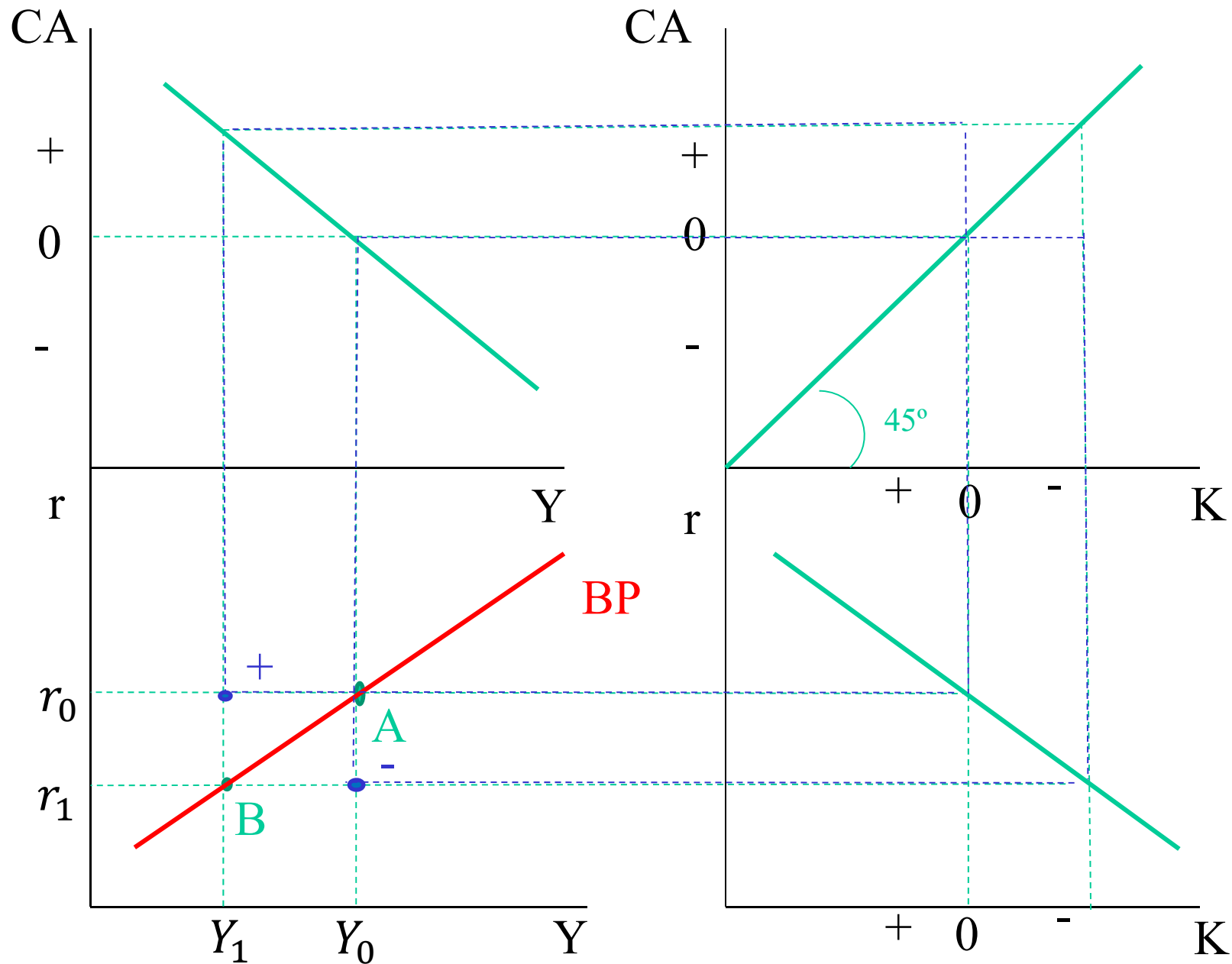
# Derivation of the BP schedule



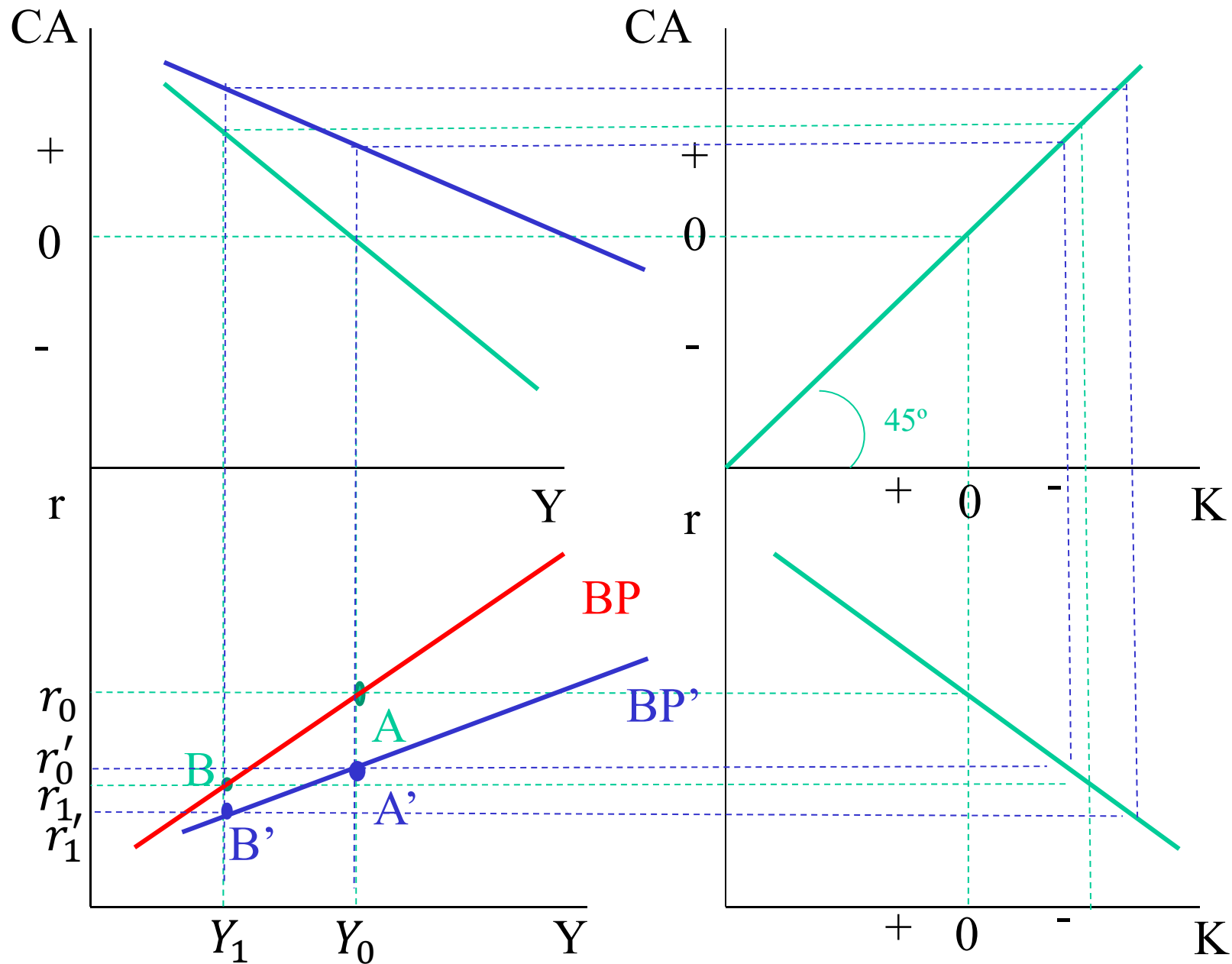
# Derivation of the BP schedule



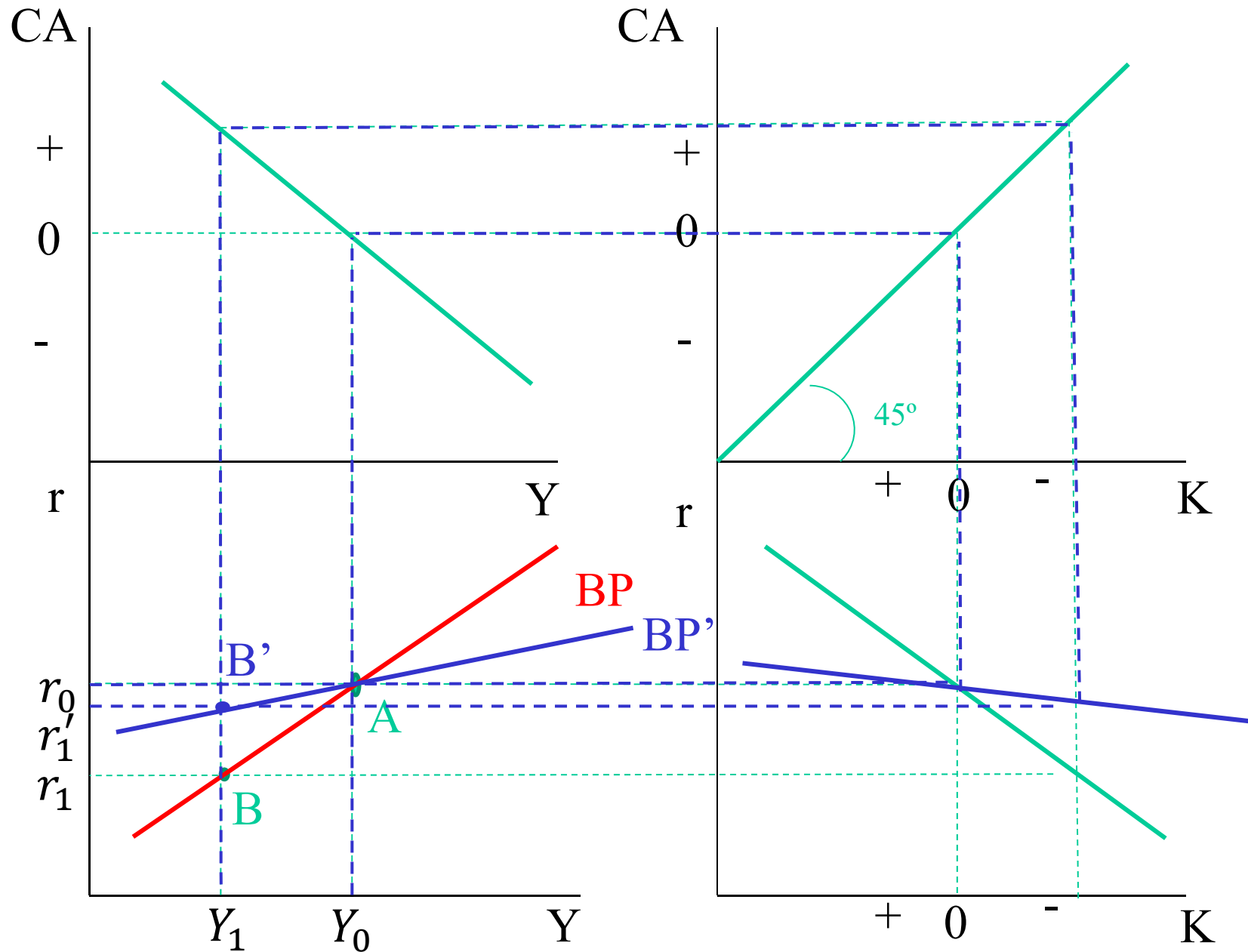
# Points above and below the BP schedule



## Slope of the BP curve. A decrease in 'm'



# Slope of the BP curve. An increase in mobility of capitals

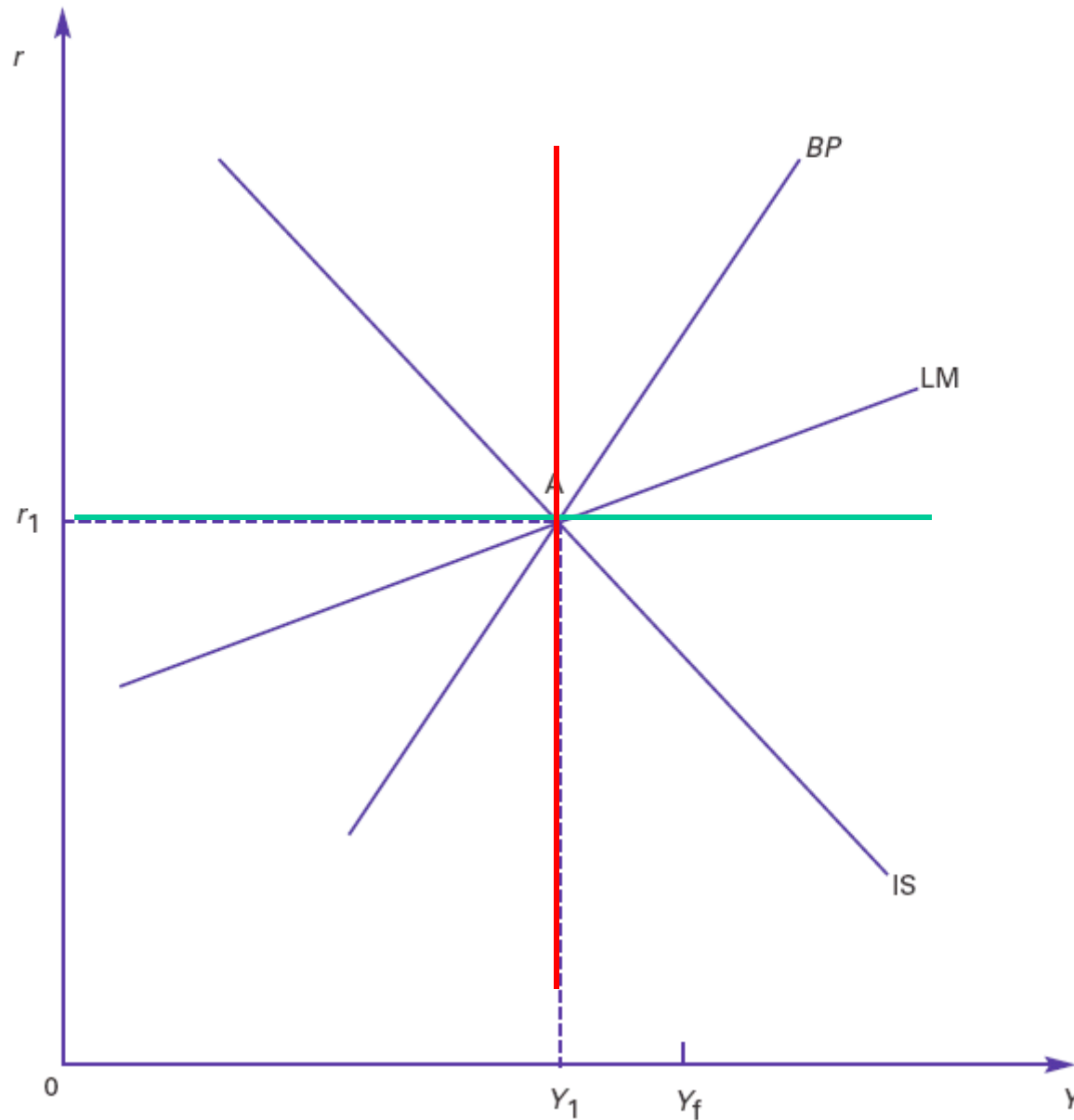




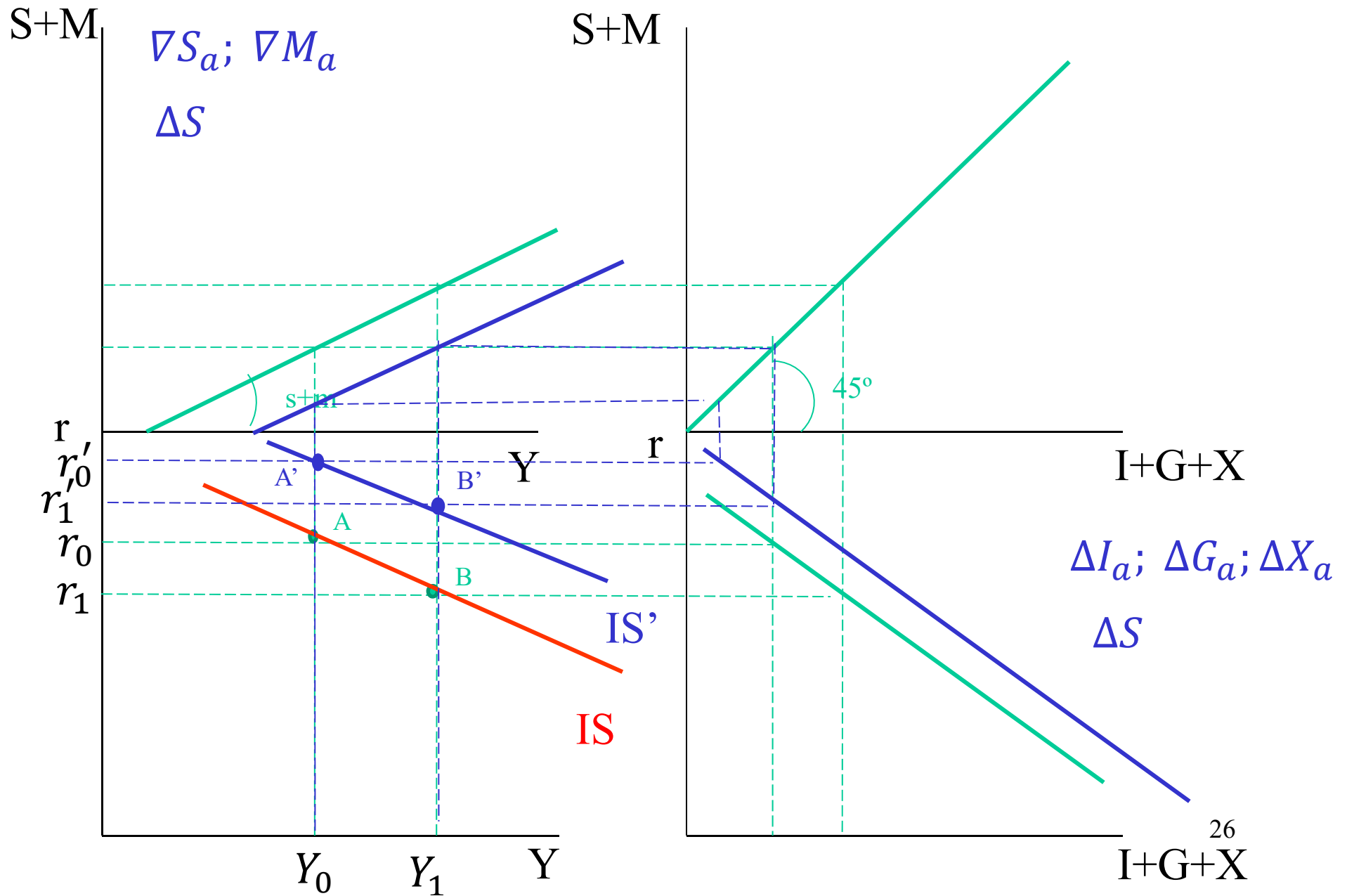
# Equilibrium of the model

Red line:  
Null  
mobility of  
capitals

Green line:  
Perfect  
mobility of  
capitals

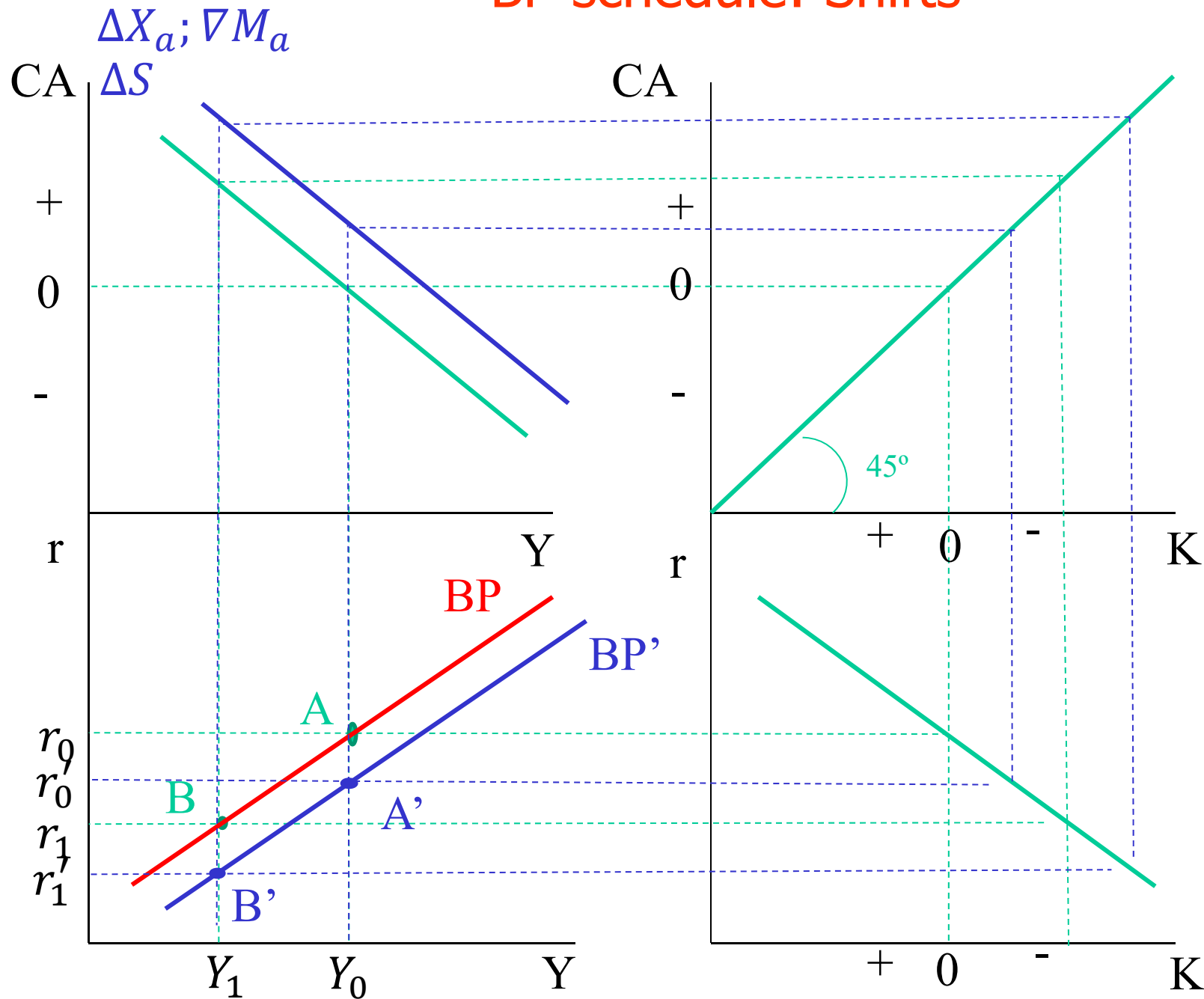


# IS schedule: Shifts





# BP schedule: Shifts



## Monetary policy (Example of expansionary MP)

- The Central Bank purchases bonds from the public and injects newly created money. LM to the right
- Prices of bonds go up
- Interest rates go down
- Investment, consumption and income increase
- BP goes into deficit or the domestic currency depreciates

## Fiscal policy (Example of expansionary FP)

- G increases (The government pays for this increase by selling bonds) and this increases income. IS to the right
- Price of bonds go down
- Interest rates go up
- Investment, consumption and income decrease
- Final result on Y: increases but by less than the increase in G
- The CA deteriorates and the K improves: BP changes? Exchange rates?

As we will see, the exchange rate regime turns out to be crucial to understand the behaviour of the economy

## Monetary policy (Example of expansionary MP)

*Central bank buys bonds  $\rightarrow \Delta M_h \rightarrow \Delta M_s \rightarrow$  rightward shift of LM*

*Bonds purchase  $\rightarrow \Delta P_b \rightarrow \nabla r \rightarrow \Delta I \rightarrow \Delta Y$*

$$BP \left\{ \begin{array}{l} \Delta Y \rightarrow \Delta M \rightarrow \nabla CA \rightarrow \nabla BP \\ \nabla r \rightarrow \nabla K \end{array} \right.$$

Under a fixed exchange rate regime:

*$\nabla BP \rightarrow$  devaluation pressures  $\rightarrow$  The central bank 'plays' (commitment)  
 $\rightarrow$  To keep the exchange rate the central bank increases the supply of \$  
 $\rightarrow$  the country loses reserves  $\rightarrow \nabla M_h \rightarrow \nabla M_s \rightarrow$  LM shifts backwards*

Under a floating exchange rate regime:

$$\Delta S \rightarrow \left\{ \begin{array}{l} \Delta X, \nabla M \rightarrow \text{Rightward shift IS} \\ \Delta X, \nabla M \rightarrow \text{Rightward shift BP} \\ \text{If } S \text{ affects } P \rightarrow \Delta P_I \rightarrow \nabla M_s \text{ in real terms} \rightarrow \text{Leftward shift LM} \end{array} \right.$$

## Fiscal policy (Example of expansionary FP)

*Government increases public expenditure  $\rightarrow \Delta G \rightarrow$  rightward shift of IS*

$$\Delta G \rightarrow \left\{ \begin{array}{l} \Delta Y \\ \text{It is financed by bonds sale} \rightarrow \nabla Pb \rightarrow \Delta r \rightarrow \nabla I \rightarrow \nabla Y \rightarrow \Delta Y \end{array} \right.$$

$$BP \left\{ \begin{array}{l} \Delta Y \rightarrow \Delta M \rightarrow \nabla CA \\ \Delta r \rightarrow \Delta K \end{array} \right. \rightarrow BP \text{ depends } \left\{ \begin{array}{l} \nabla BP \text{ (low mobility)} \\ \Delta BP \text{ (high mobility)} \end{array} \right.$$

Let's consider high mobility (for low mobility, see the previous slide)

Under a fixed exchange rate regime:

*$\Delta BP \rightarrow$  revaluation pressures  $\rightarrow$  The central bank 'plays' (commitment)*

*$\rightarrow$  To keep the exchange rate the central bank increases the demand for \$*

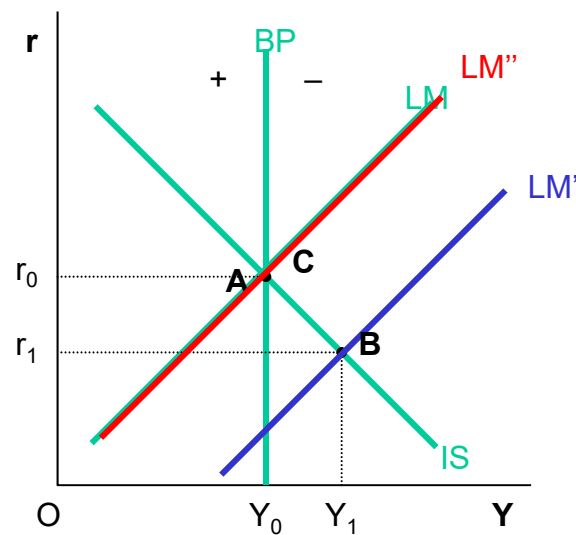
*$\rightarrow$  the country increases its reserves  $\rightarrow \Delta Mh \rightarrow \Delta Ms \rightarrow$  LM shifts rightwards*

Under a floating exchange rate regime:

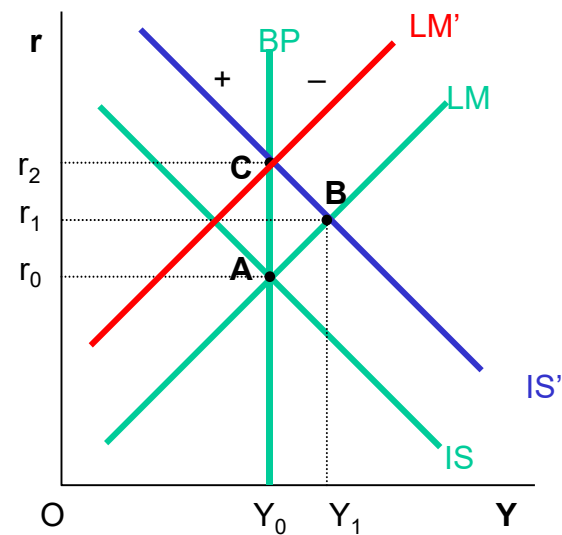
$$\nabla S \rightarrow \left\{ \begin{array}{l} \nabla X, \Delta M \rightarrow \text{Leftward shift IS} \\ \nabla X, \Delta M \rightarrow \text{Leftward shift BP} \\ \text{If } S \text{ affects } P \rightarrow \nabla P_1 \rightarrow \Delta Ms \text{ in real terms} \rightarrow \text{Rightward shift LM} \end{array} \right.$$

# Monetary policies (MP) and fiscal policies (FP): different setting

No capital mobility and fixed exchange rates



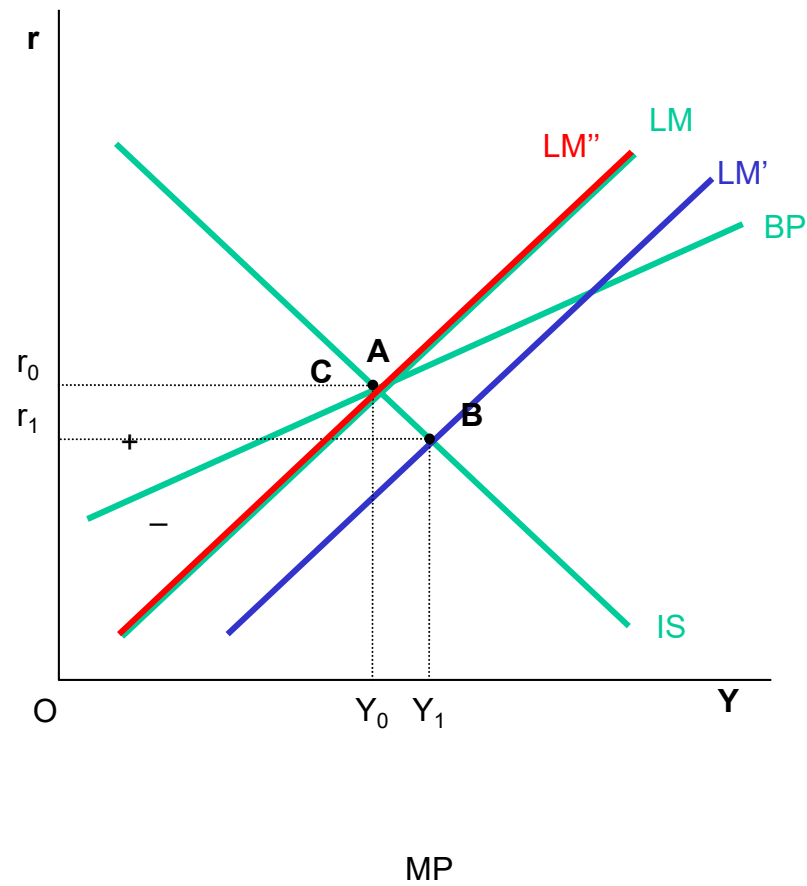
MP



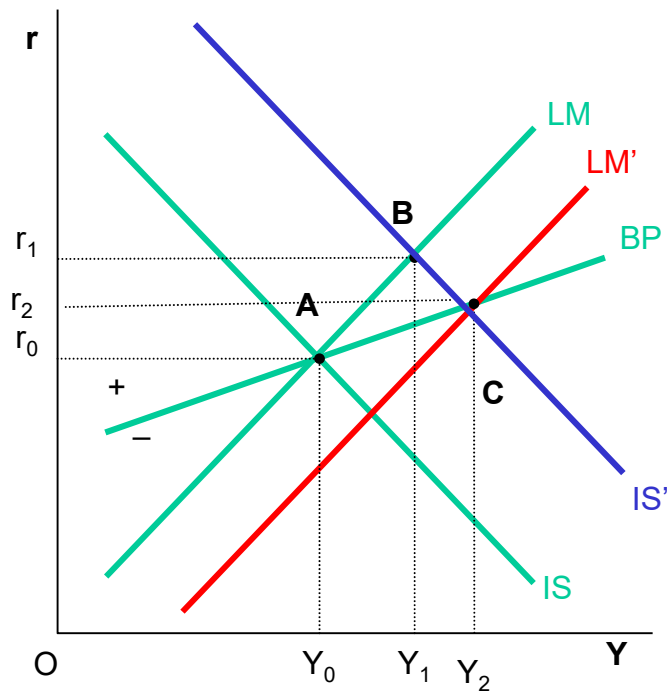
FP



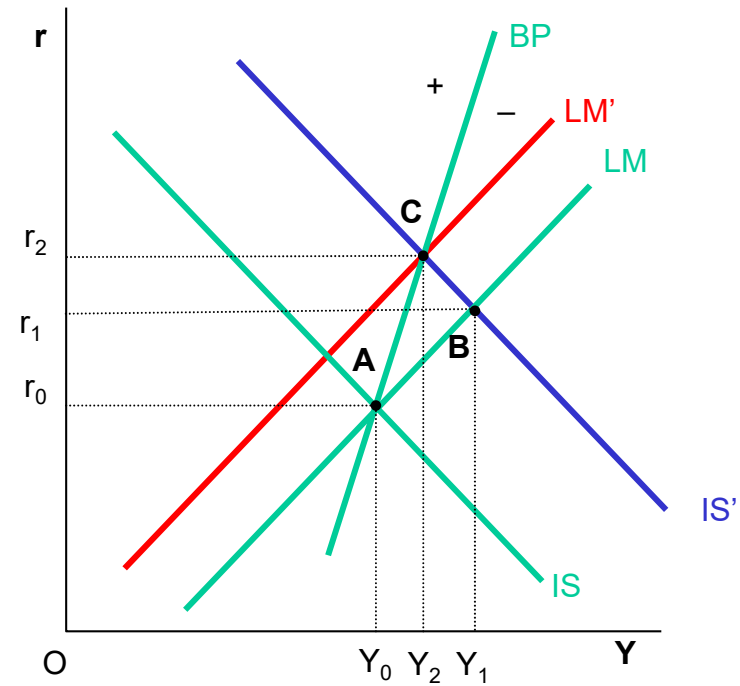
# Imperfect capital mobility and fixed exchange rates



# Imperfect capital mobility and fixed exchanges rates



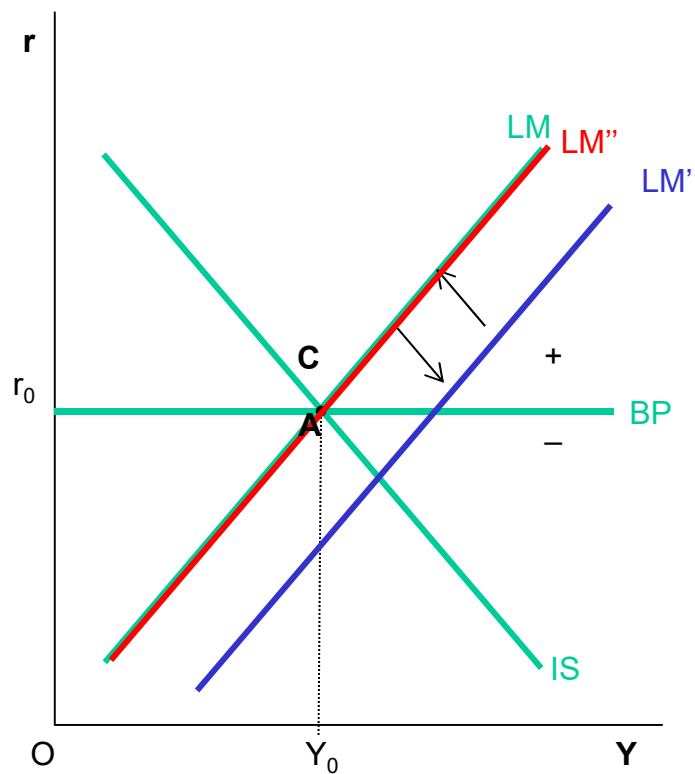
High capital mobility



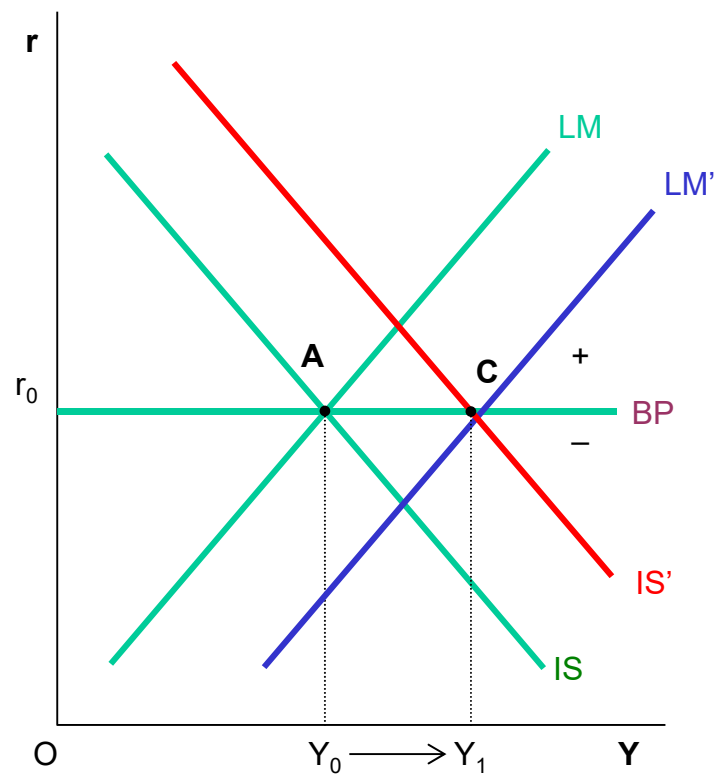
Low capital mobility

FP

# Perfect capital mobility and fixed exchange rates

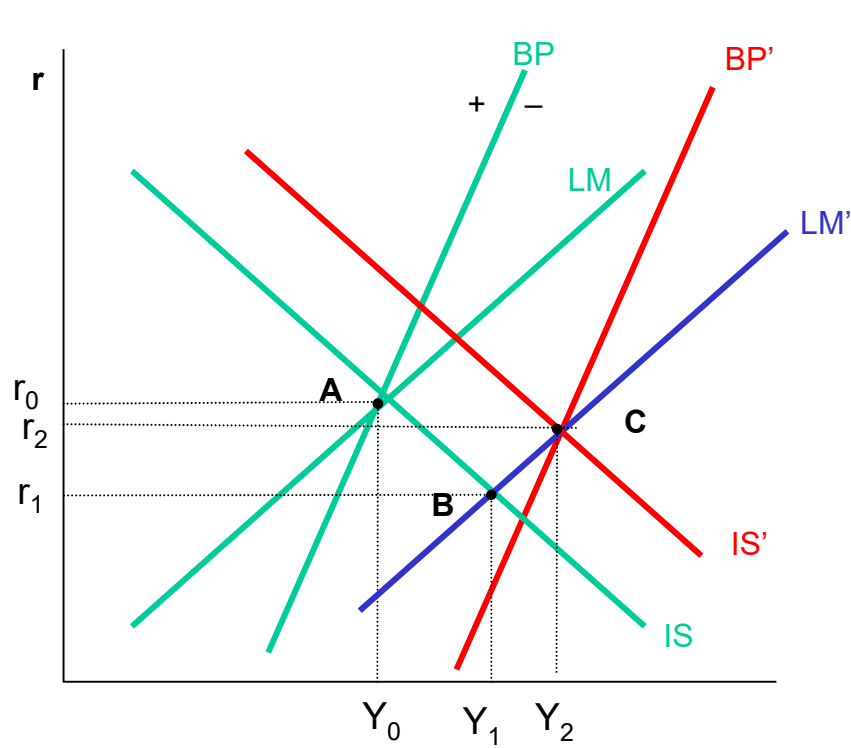


MP

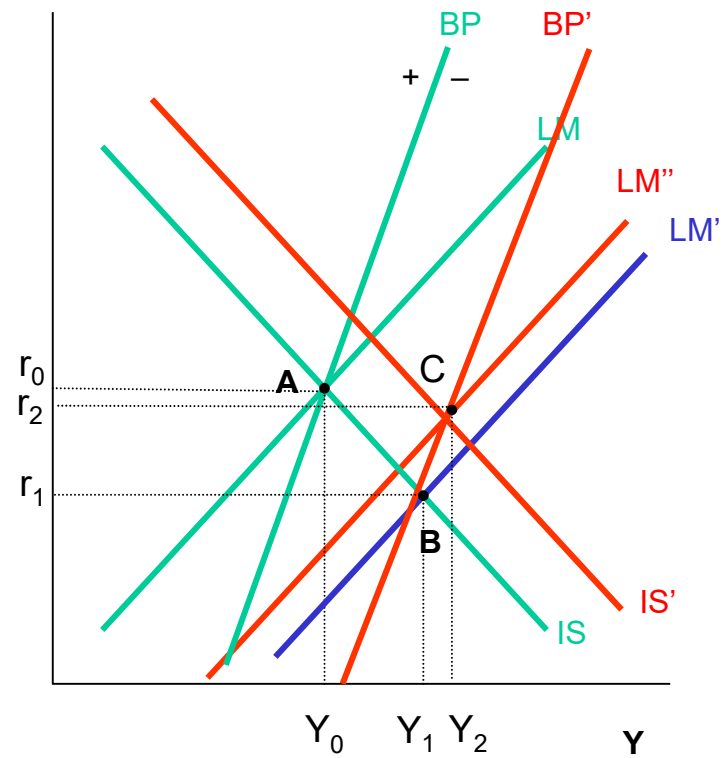


FP

# Imperfect capital mobility and floating exchange rates



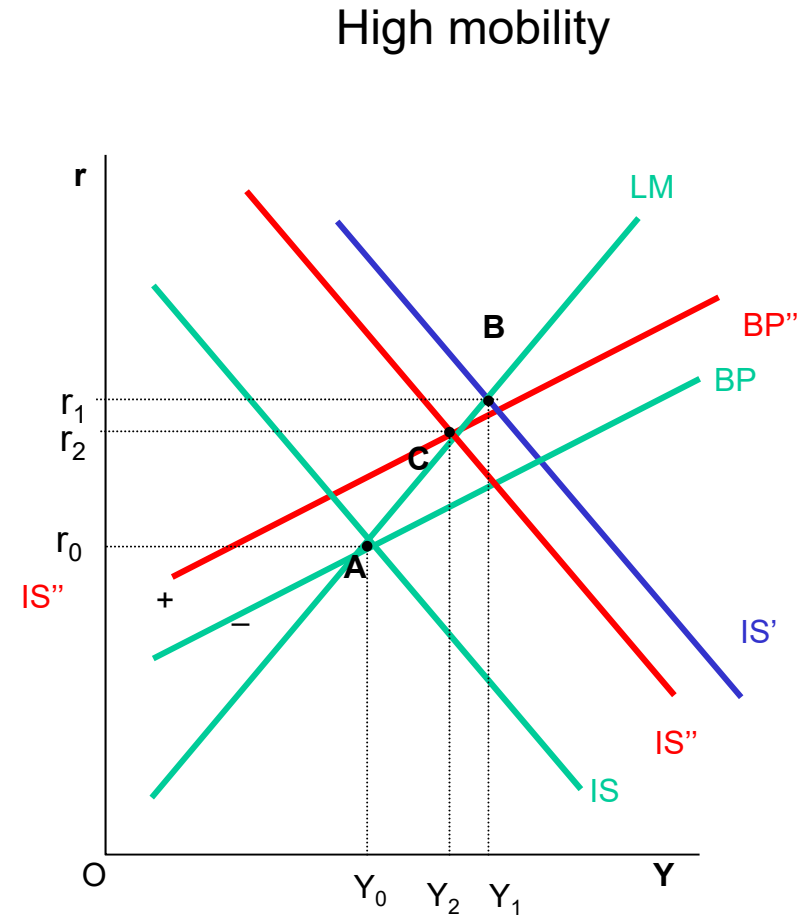
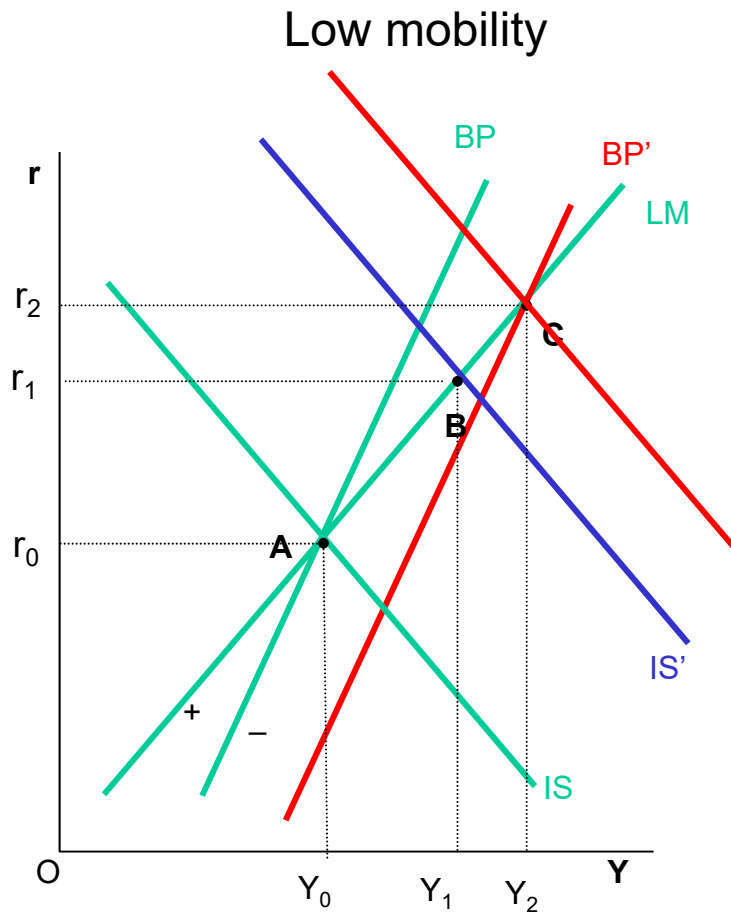
Negligible effect of S on LM



Non-negligible effect of S on LM

MP

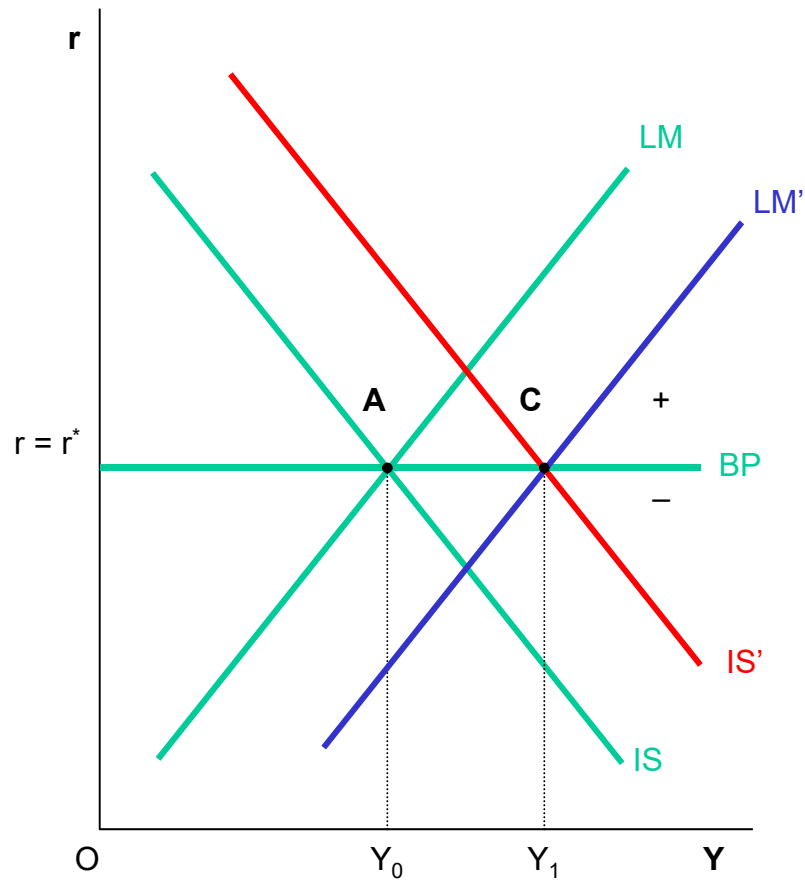
# Imperfect capital mobility and flexible exchange rates



Negligible effect of S on LM

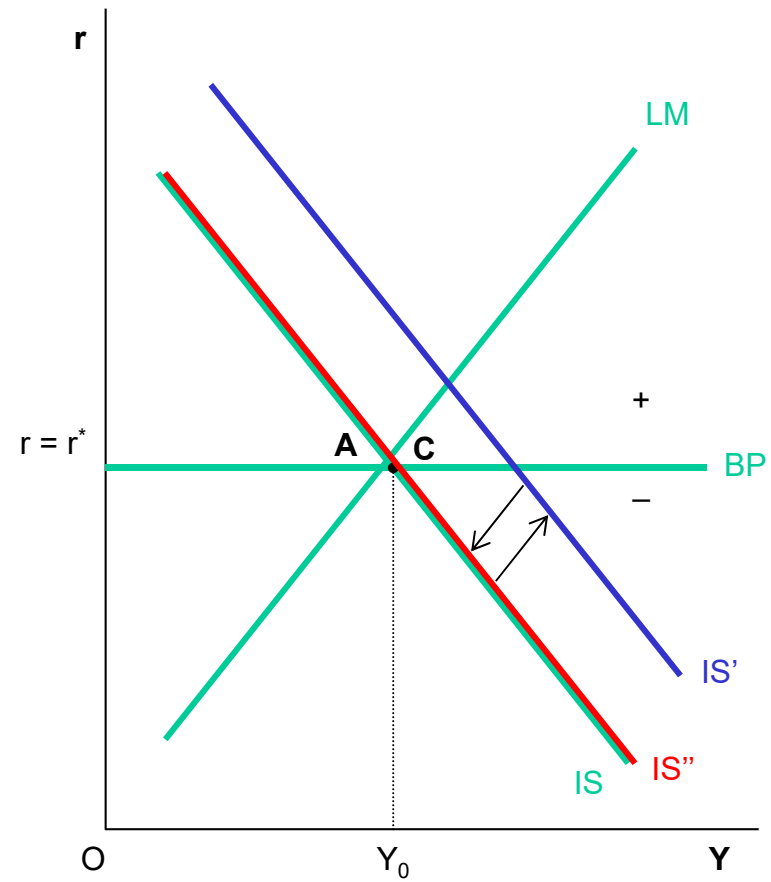
FP

# Perfect capital mobility and floating exchange rates



Negligible effect of S on LM

MP



FP

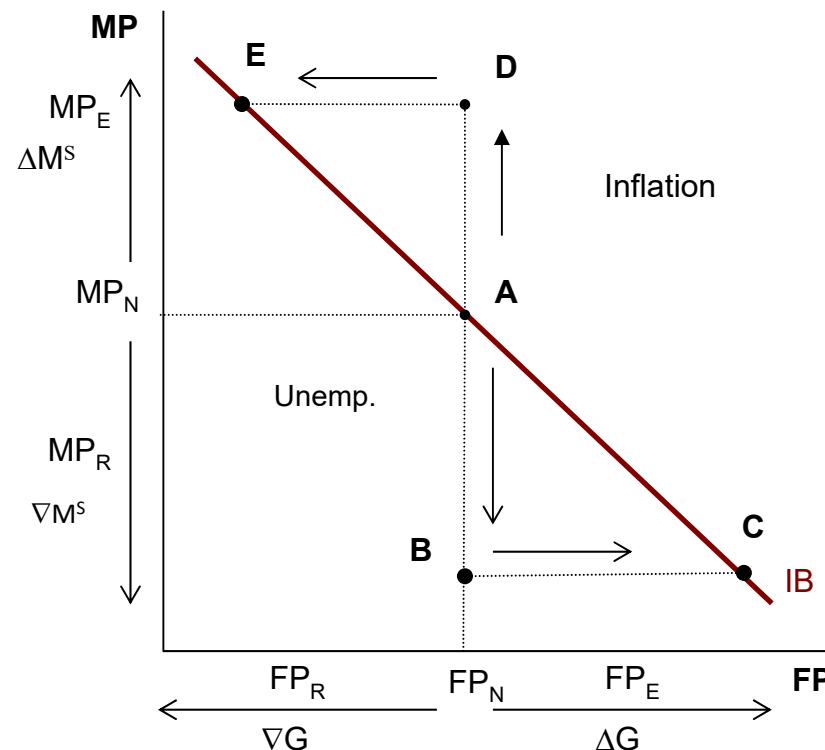
## Monetary and fiscal policies: Summary

ER regime	Degree of K mobility	Monetary Policy		Fiscal Policy	
		SR	LR	SR	LR
Fixed ER	NKM	E	I	E	I (Crowding out)
	IKM	E	I	E	E (the more effective the flatter the BP curve)
	PKM	I (totally)		E (totally)	
Floating ER	IKM	E S increases	E S increases	E	E  (the more effective the steeper the BP curve) S increases if BP slope > LM slope. S decreases if BP slope < LM slope
	PKM	E S increases		I (totally) S decreases	

Notes: E: Effective; I: Ineffective; N(I/P)KM: Null(Imperfect/Perfect) capital mobility

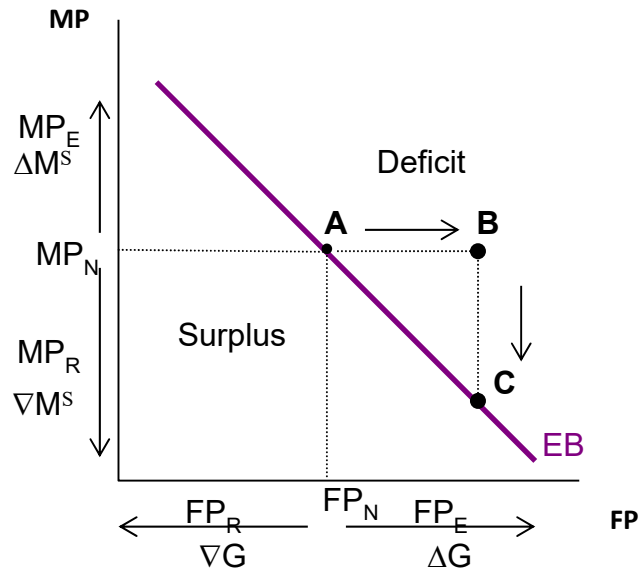
## The principle of effective market classification: the assignment problem

Conclusion: under a fixed exchange rate regime, monetary policy is the most effective instrument to control external balance, while fiscal policy is the best one at affecting output, so this is the appropriate pairing of instruments and targets

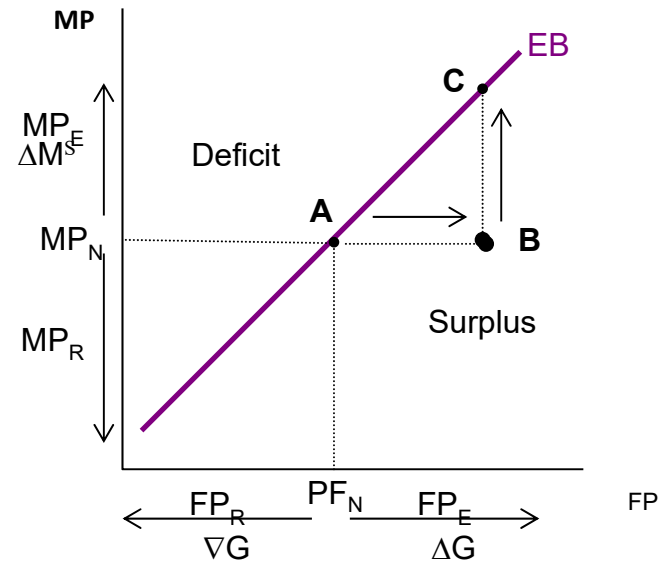




# The assignment problem

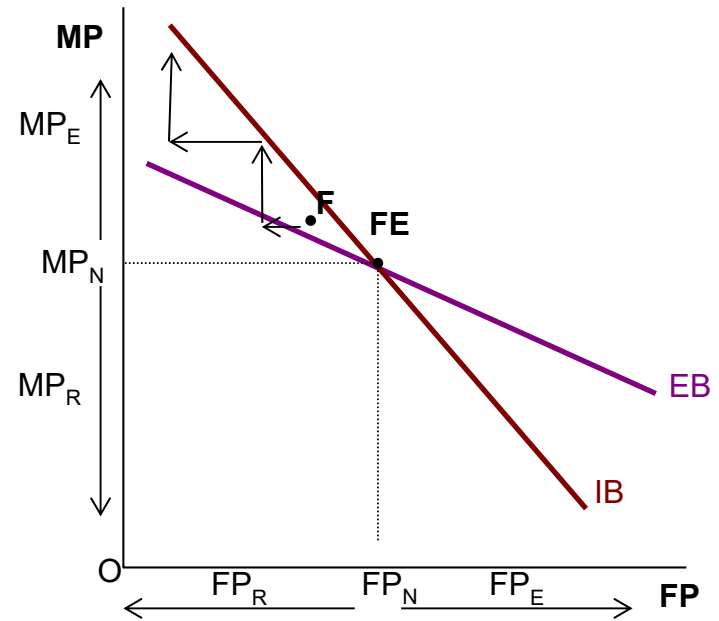
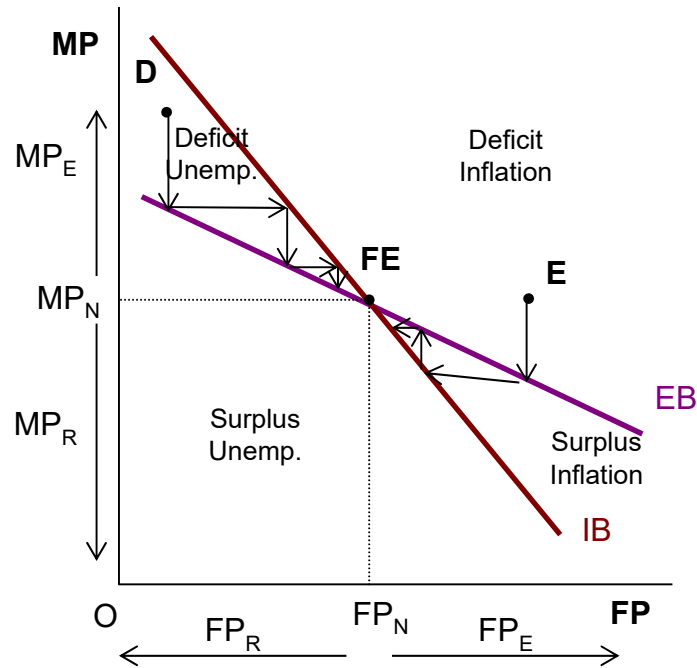


Low mobility



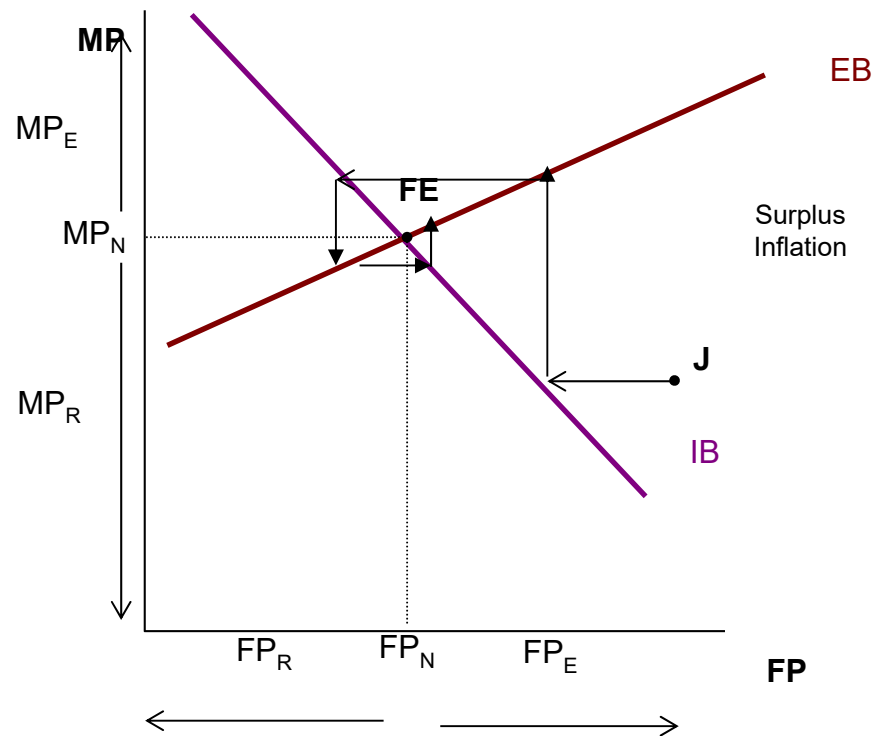
High mobility

# The assignment problem



Low mobility

# The assignment problem



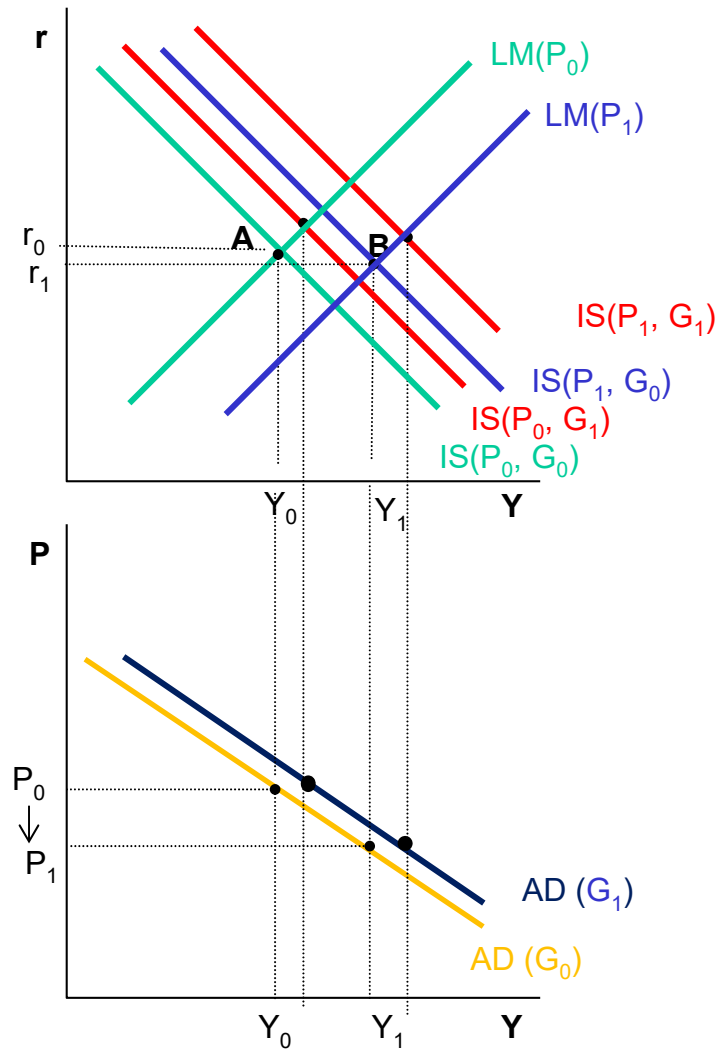
High mobility

## Limitations of the Mundell-Fleming model

1. Marshall-Lerner condition
2. Interaction of stocks and flows
3. Neglect of long run budget constraints
4. Aggregate supply curve is horizontal
5. Treatment of capital flows
6. Monetary and fiscal policies are not that flexible
7. Exchange rate expectations

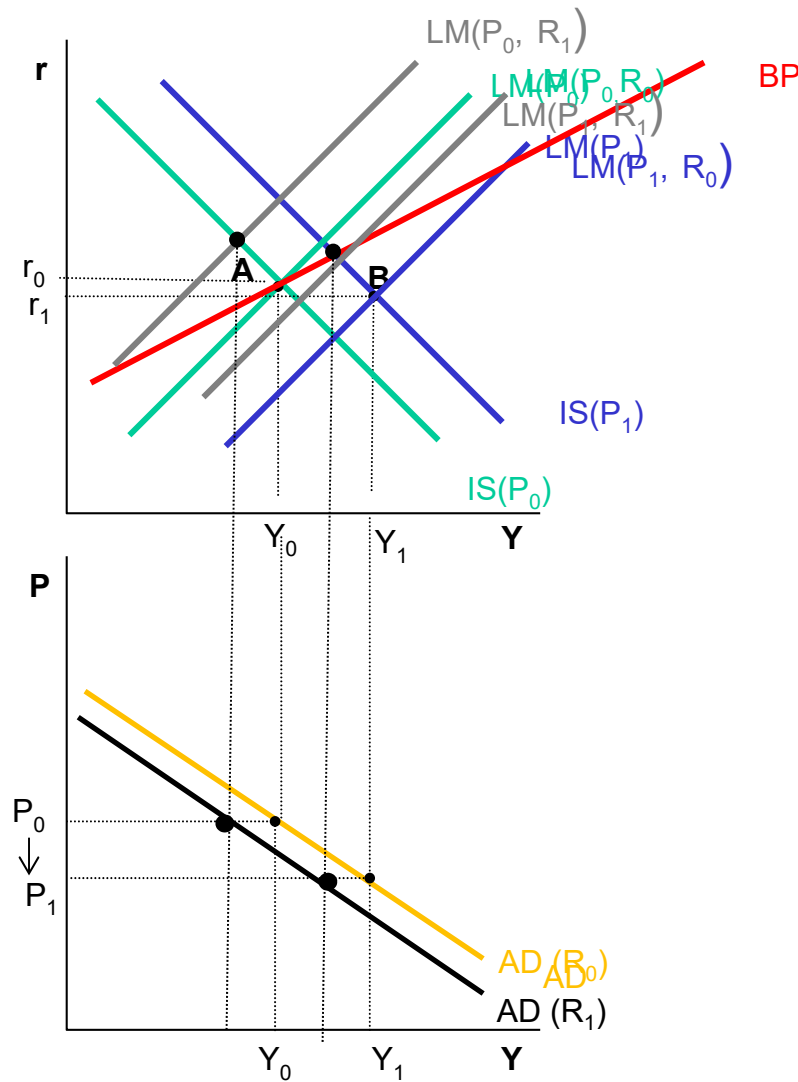
# AD-AS model in an open economy

## AD and fixed exchange rates



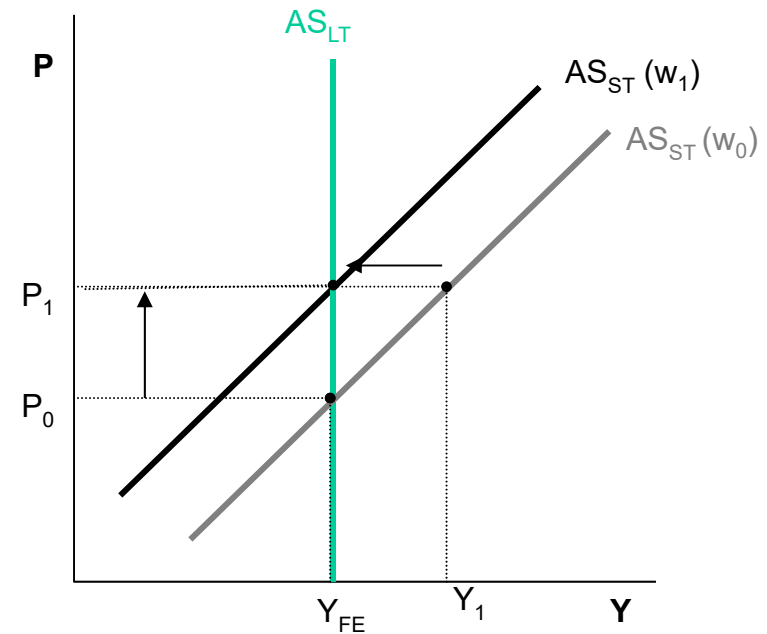
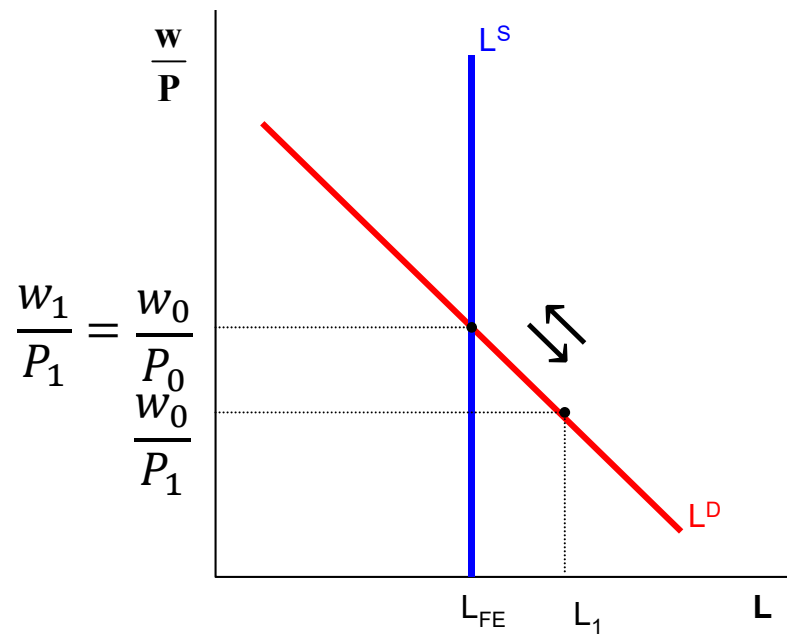
# AD-AS model in an open economy

AD and fixed exchange rates: Let's consider the BP curve



# AD-AS model in an open economy

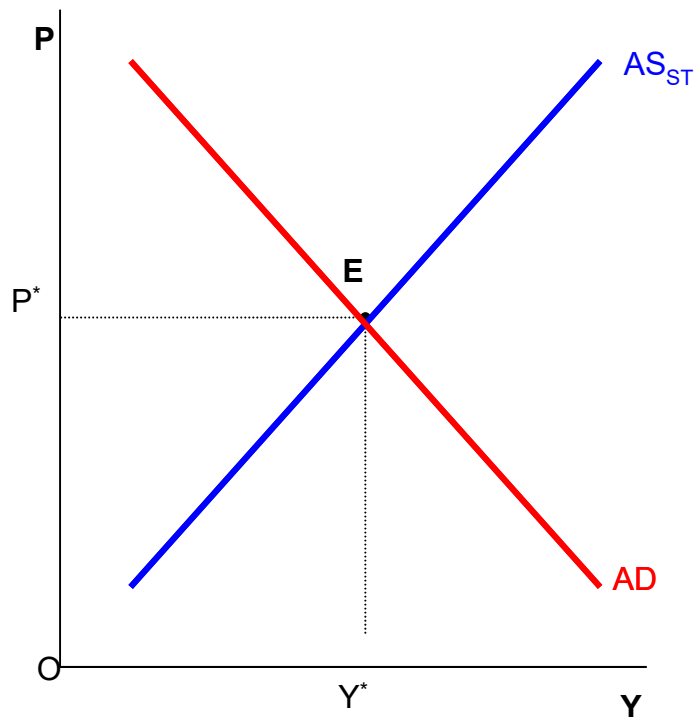
## AS and fixed exchange rates



$Y = f(K, L)$ , being  $K$  constant,  $Y = f(L)$

## AD-AS model in an open economy

### ST equilibrium

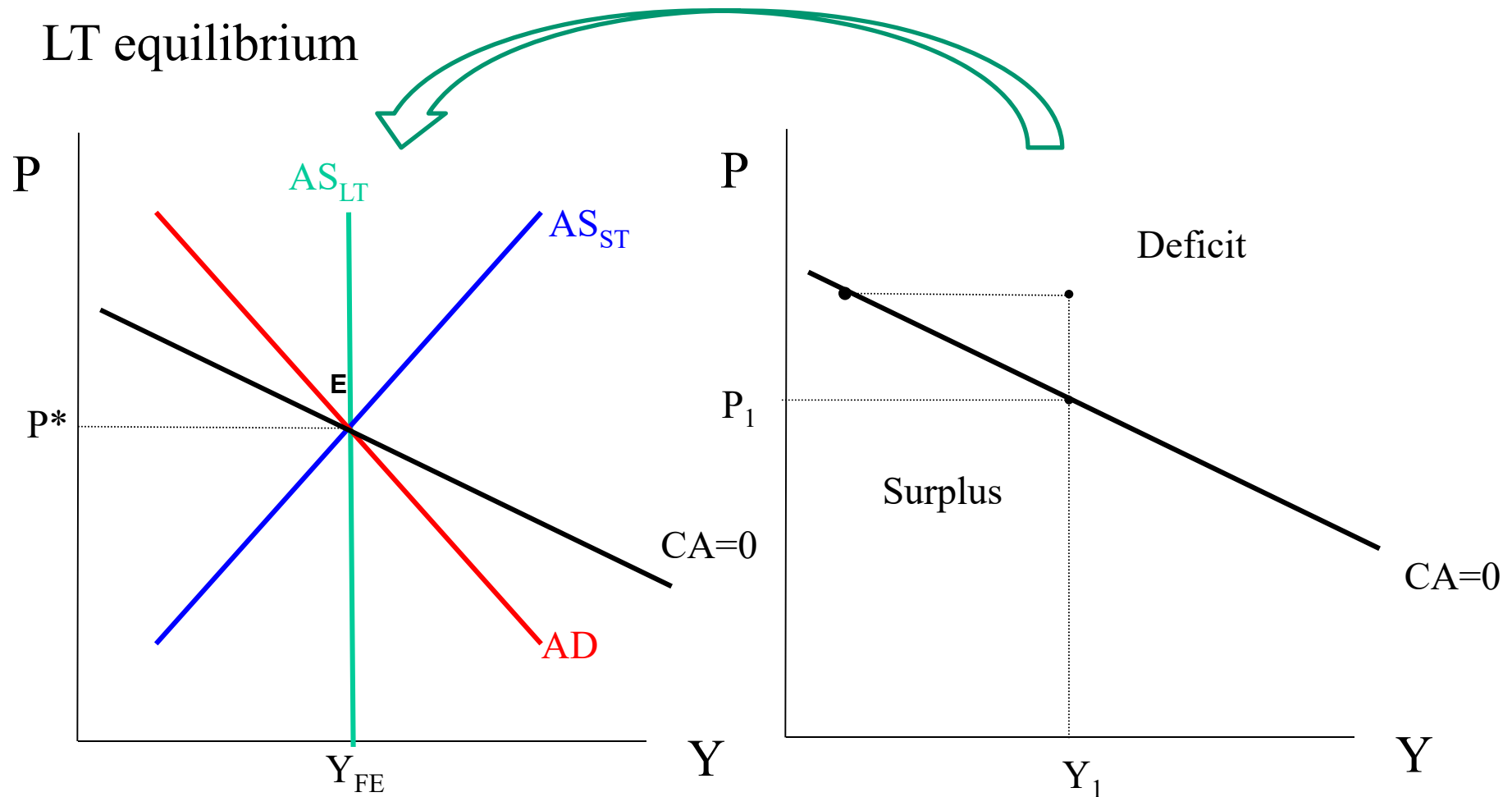


This equilibrium implies:

- Equilibrium in the goods market
- Equilibrium in the money market
- Equilibrium in the labor market (meaning that the demand determines the level of labor)



## AD-AS model in an open economy

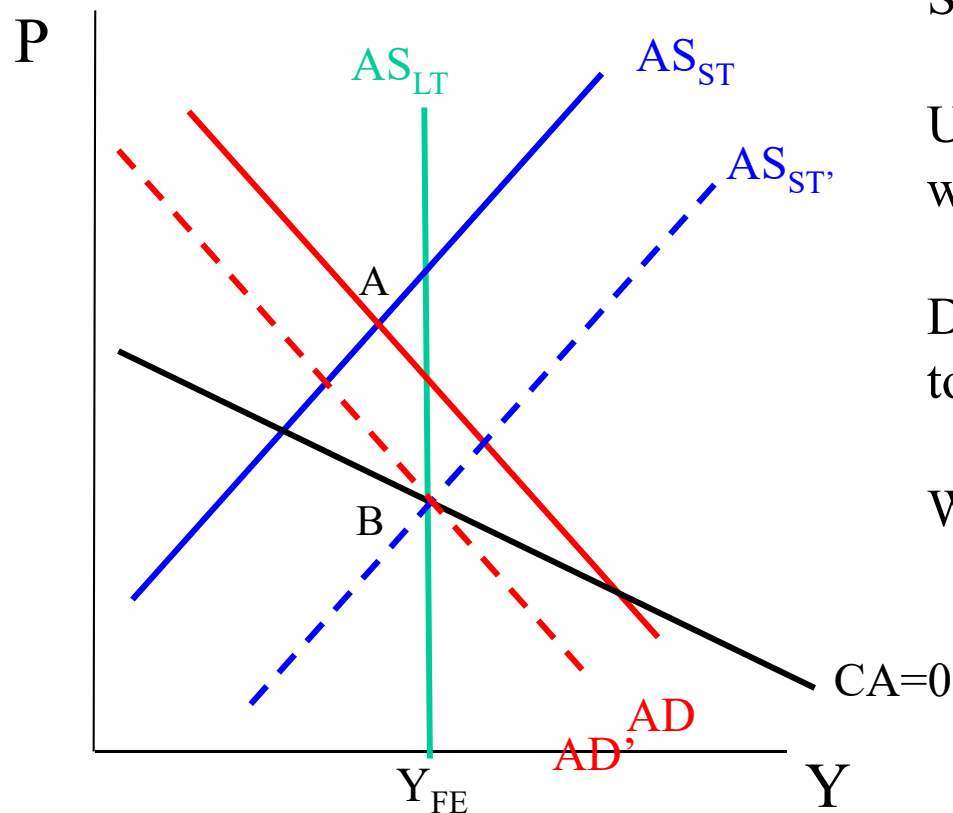


Long term equilibrium. Additionally:

- Full employment
- BP (let's consider CA) should be in equilibrium

## AD-AS model in an open economy

Is there an automatic adjustment process?



Short-term equilibrium (Point A)

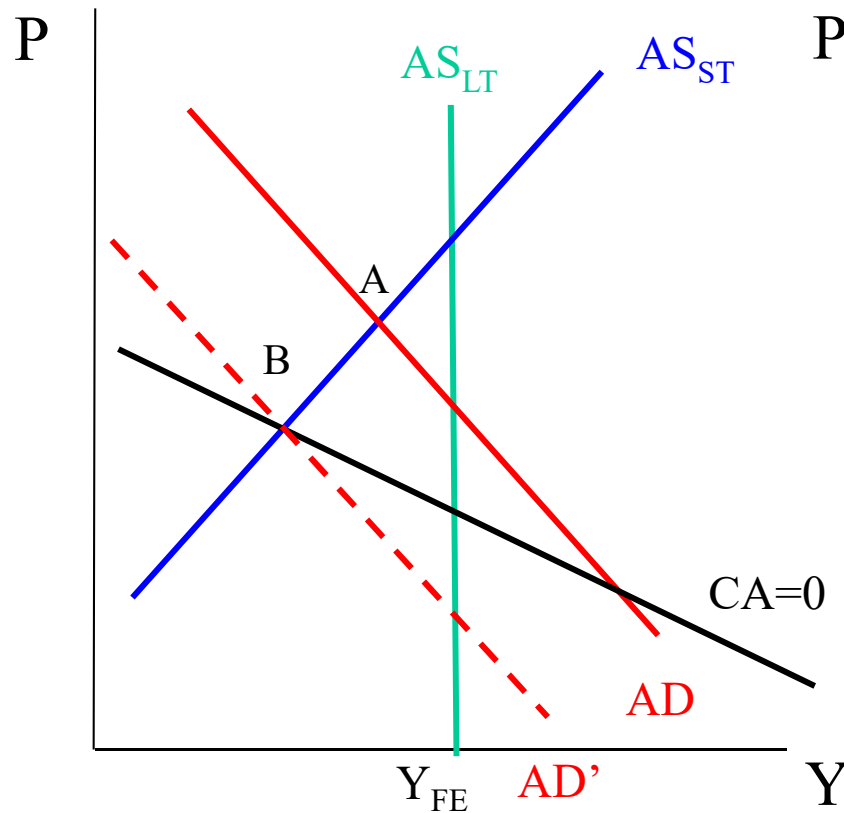
Unemployment  $\rightarrow$   $\nabla$  nominal/real wages  $\rightarrow AS_{ST}$  shifts to the right

Deficit  $\rightarrow$   $\nabla$  reserves/Ms  $\rightarrow AD$  shifts to the left

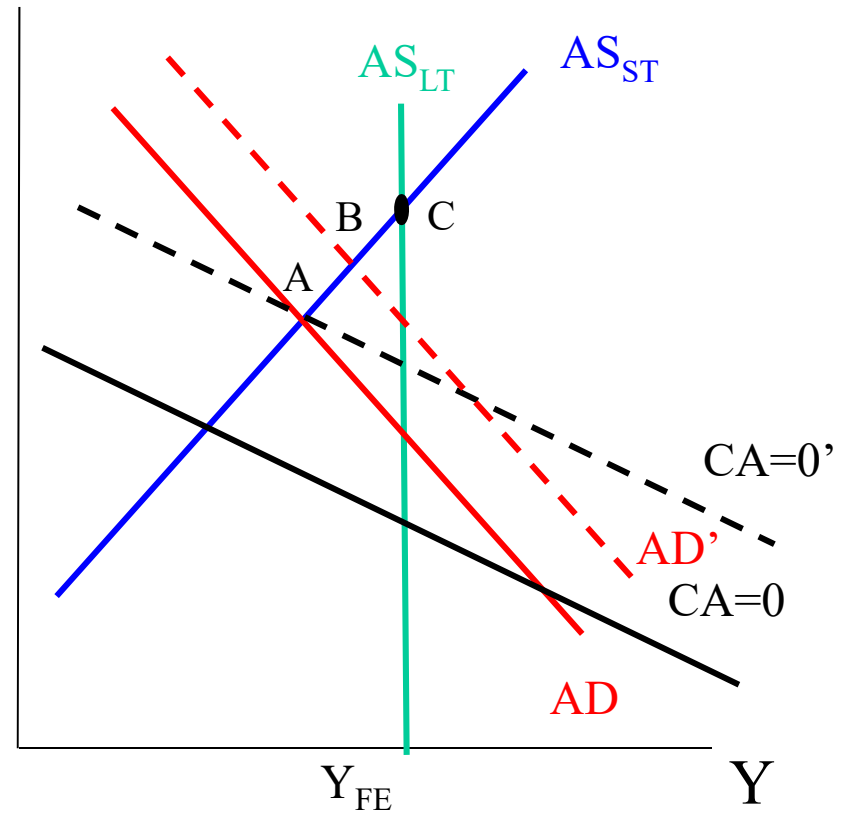
We can get Point B, but...

# AD-AS model in an open economy

Can we help the adjustment process?



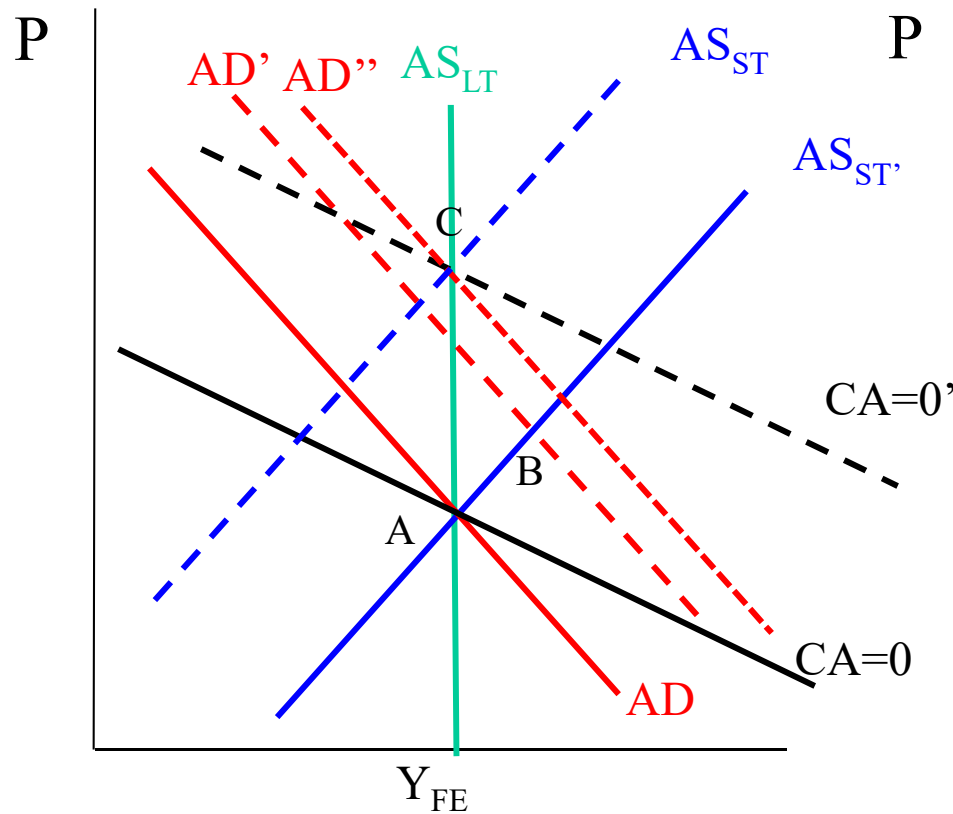
A restrictive demand policy



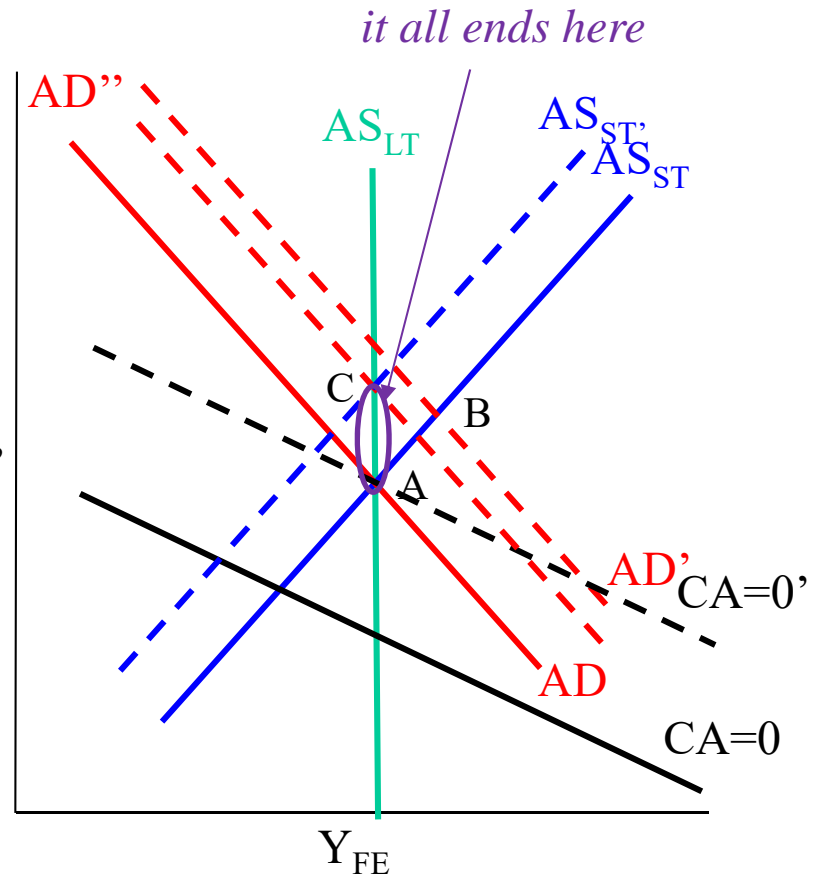
Devaluation

# AD-AS model in an open economy

Effects of a devaluation: short-term and long-term



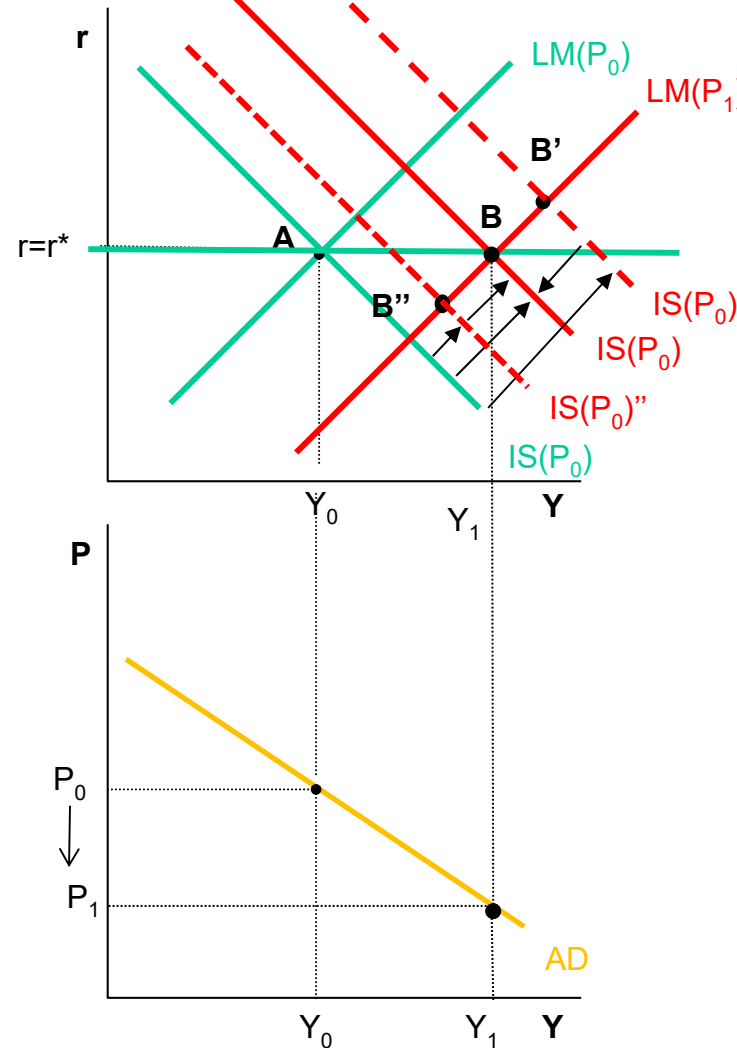
Starting from full equilibrium



Starting from deficit

# AD-AS model in an open economy

## AD and floating exchange rates

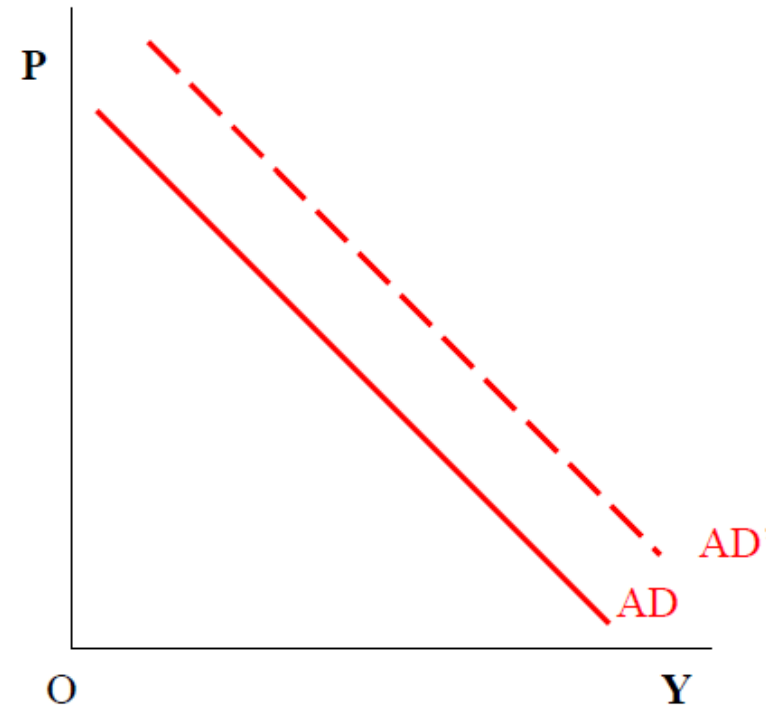


Main differences:

- Any point of the AD curve represents a situation of equilibrium in the external market
- Exchange rate is changing along the AD curve, but we don't know in which direction

## AD-AS model in an open economy

Are demand policies effective?  
 To do so, any expansionary demand policy should cause a rightward shift in the AD curve



What about monetary policies?

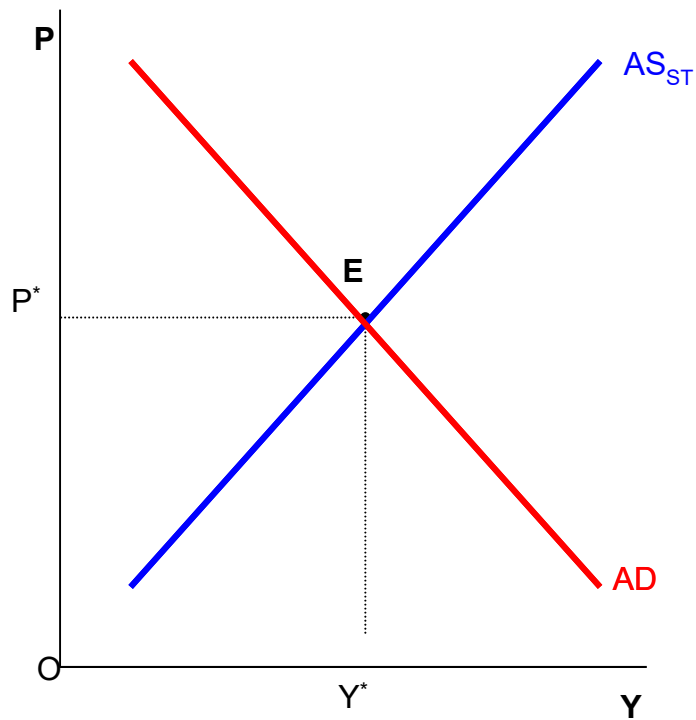
$\Delta M_s \rightarrow \begin{cases} LM \text{ shifts to the right} \\ \text{bonds purchase} \rightarrow \Delta P_b \rightarrow \nabla r \rightarrow \Delta S \rightarrow IS \text{ to the right} \end{cases} \rightarrow AD \text{ shifts to the right} \rightarrow MP \text{ are effective}$

What about fiscal policies?

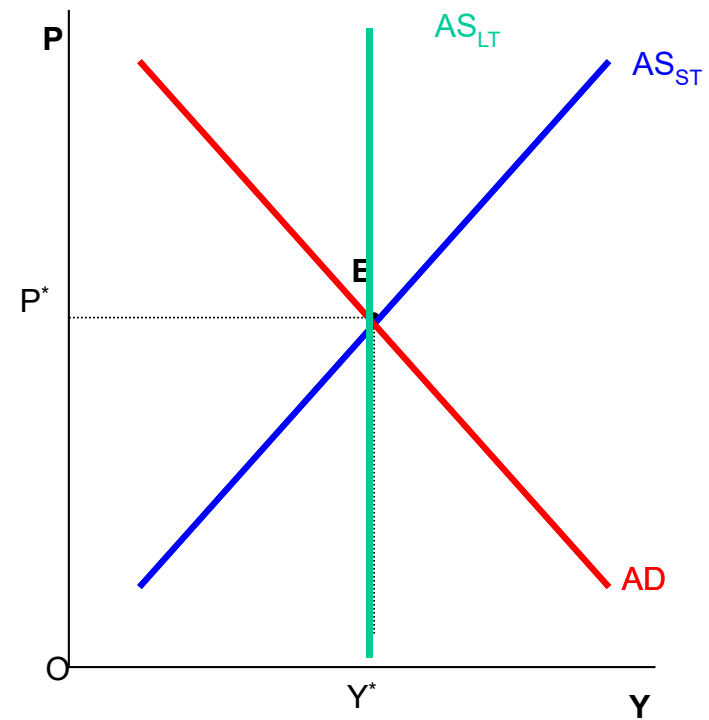
$\Delta G \begin{cases} \rightarrow IS \text{ shifts to the right} \\ \rightarrow \Delta r \rightarrow \nabla S \rightarrow IS \text{ shifts to the left} \end{cases} \rightarrow AD \text{ does not shift} \rightarrow FP \text{ are not effective}$

# AD-AS model in an open economy

ST equilibrium

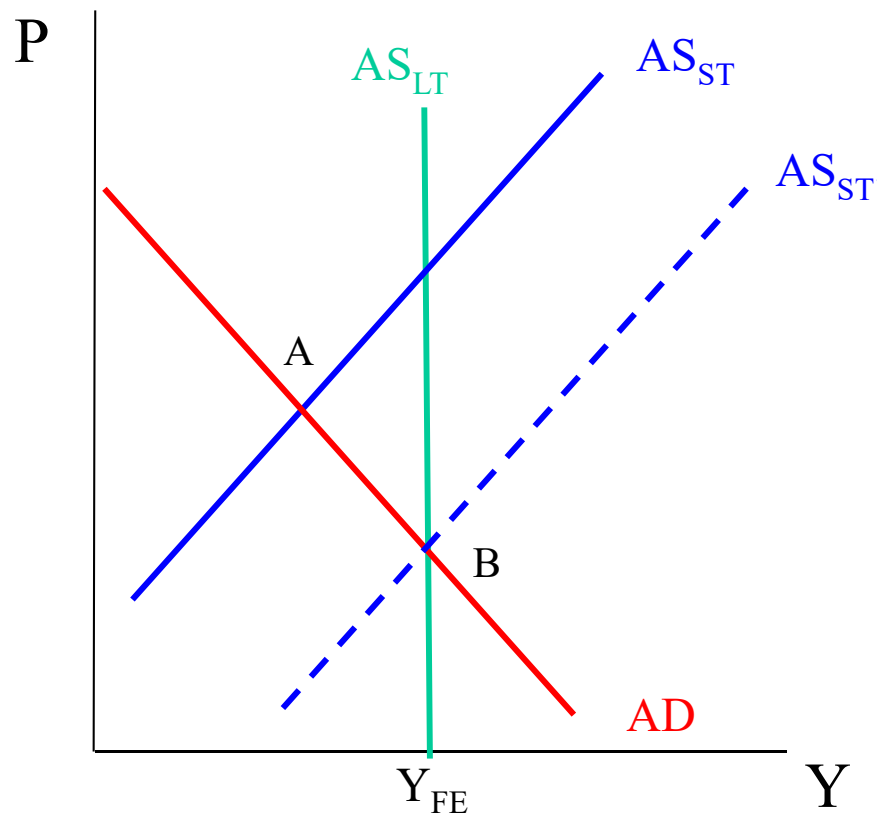


LT equilibrium



## AD-AS model in an open economy

Is there an automatic adjustment process?



Short-term equilibrium (Point A)

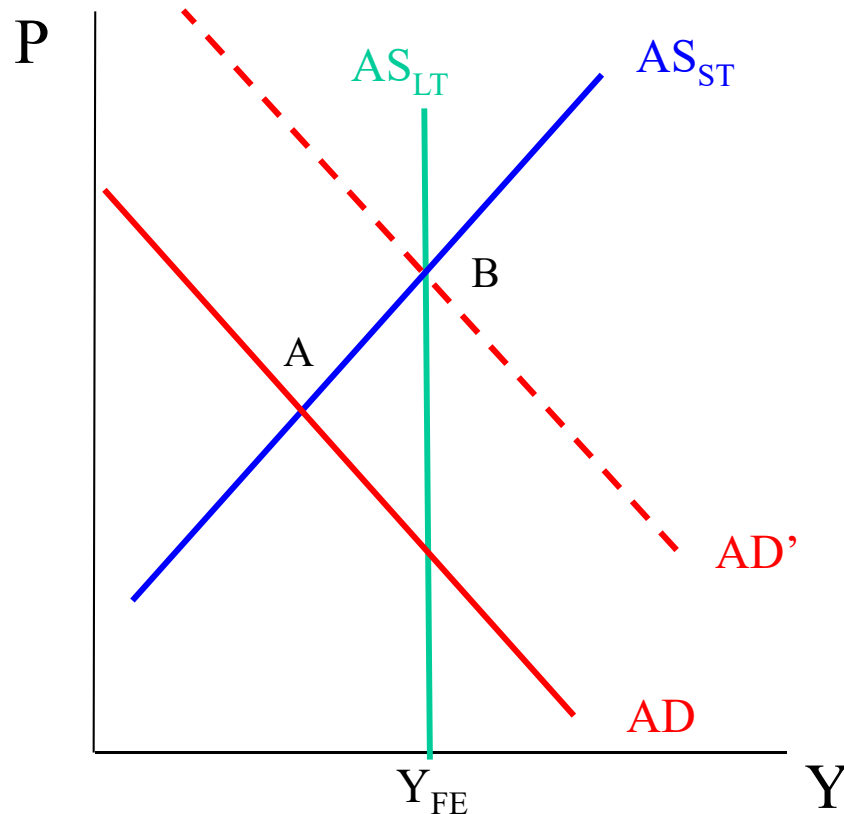
Unemployment  $\rightarrow$   $\nabla$  nominal/real wages  $\rightarrow$  AS<sub>ST</sub> shifts to the right

We can get Point B



## AD-AS model in an open economy

Can we help the adjustment process?



Short-term equilibrium (Point A)

Expansionary monetary policy  $\rightarrow$  AD shifts to the right

We can get Point B