

ECO 209Y

MACROECONOMIC THEORY AND POLICY

LECTURE 8:

THE OPEN ECONOMY WITH FIXED EXCHANGE RATES

OPEN ECONOMY UNDER FIXED EXCHANGE RATES

- Let's consider an open economy with *no capital mobility*
 - Therefore the *balance of payments* is equal to the *balance* in the *current account*
 - $BP = NX$
- Let's assume the following functions for *exports* (X) and *imports* (Q)
 - $X = \bar{X} + x (eP^f/P)$
 - $Q = \bar{Q} + mY - s (eP^f/P)$
 - $NX = \bar{X} - \bar{Q} + (x + s) (eP^f/P) - mY$
- For instance, an increase in the **RER** increases **NX** since Canadian goods become relatively less expensive and thus more competitive in the international market

THE BALANCE OF PAYMENT EQUILIBRIUM

- Since $CF = 0$, the *balance of payment* is in equilibrium when the *current account* is in equilibrium, i.e., when $NX = 0$:

$$NX = \bar{X} - \bar{Q} + (x + s)(eP^f/P) - mY = 0$$

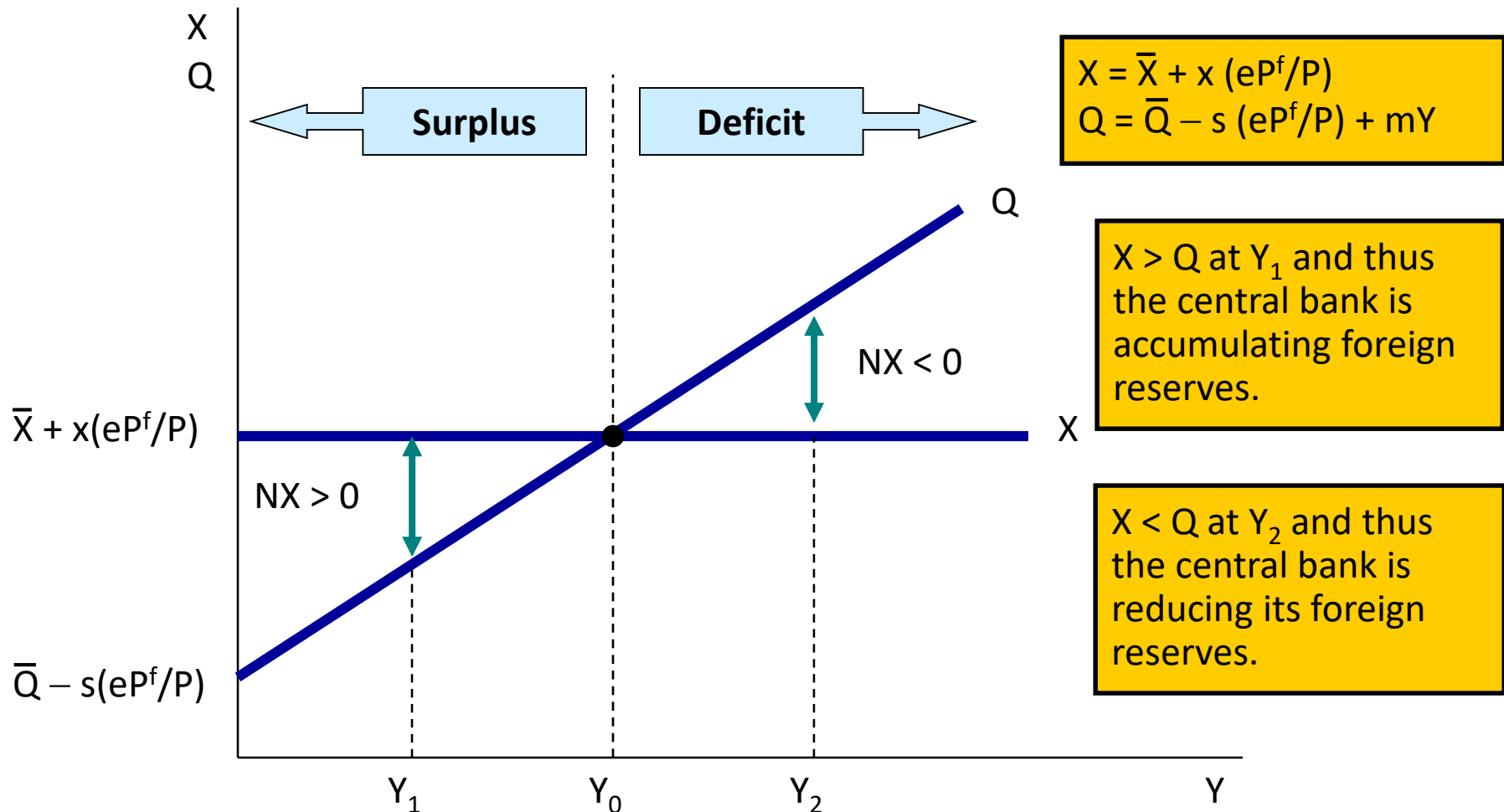
- Therefore, the current account is in equilibrium at a *unique* level of income:

$$Y_0 = [\bar{X} - \bar{Q} + (x + s)(eP^f/P)] / m$$

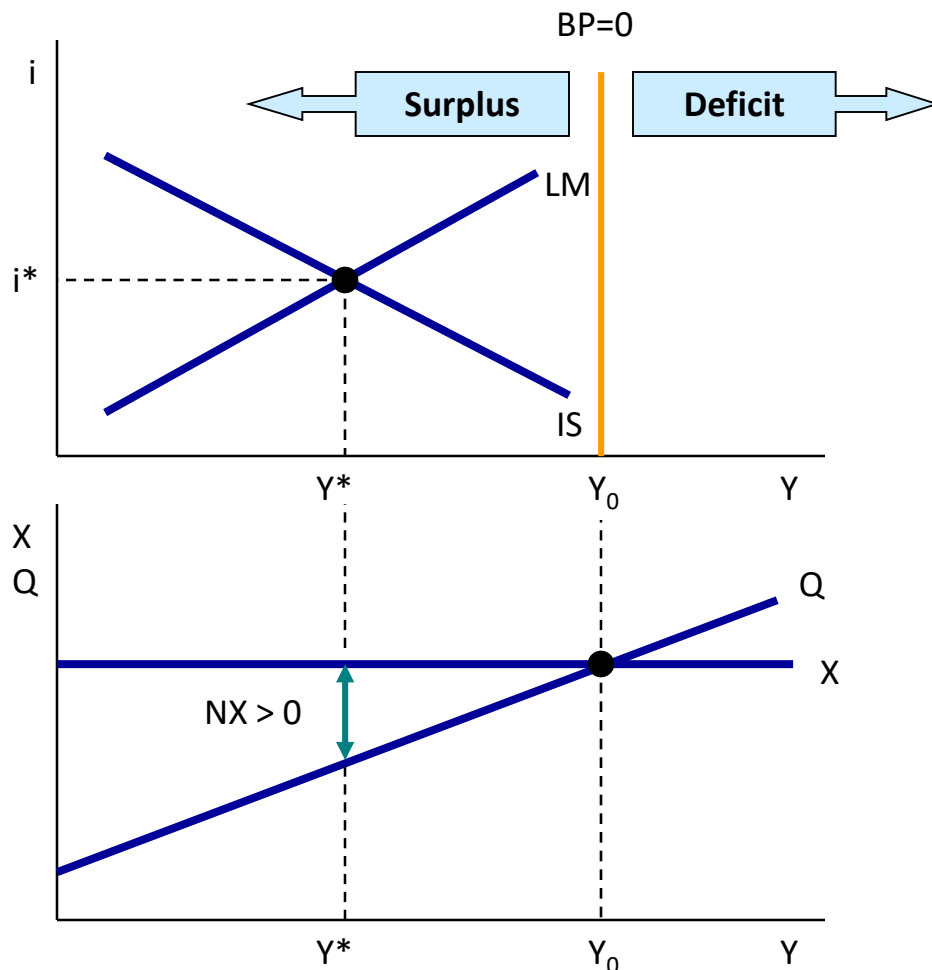
THE BALANCE OF PAYMENT EQUILIBRIUM (CONT'D)

- However, since we are assuming a *fixed exchange rate*, **BP** may not be in equilibrium when the economy is in equilibrium (i.e., **BP \neq 0** at **Y = Y***)
 - Indeed, at **Y***, the balance of payments could show a *deficit* (**BP < 0**) or a *surplus* (**BP > 0**)
- If the *balance of payments* is in disequilibrium, then the *exchange market* is also in disequilibrium
 - If **BP < 0**, then there is an *excess demand* (*deficit*) in the exchange market and foreign currency *reserves* fall
 - If **BP > 0**, then there is an *excess supply* (*surplus*) in the exchange market and foreign currency *reserves* rise

THE BALANCE OF TRADE EQUILIBRIUM

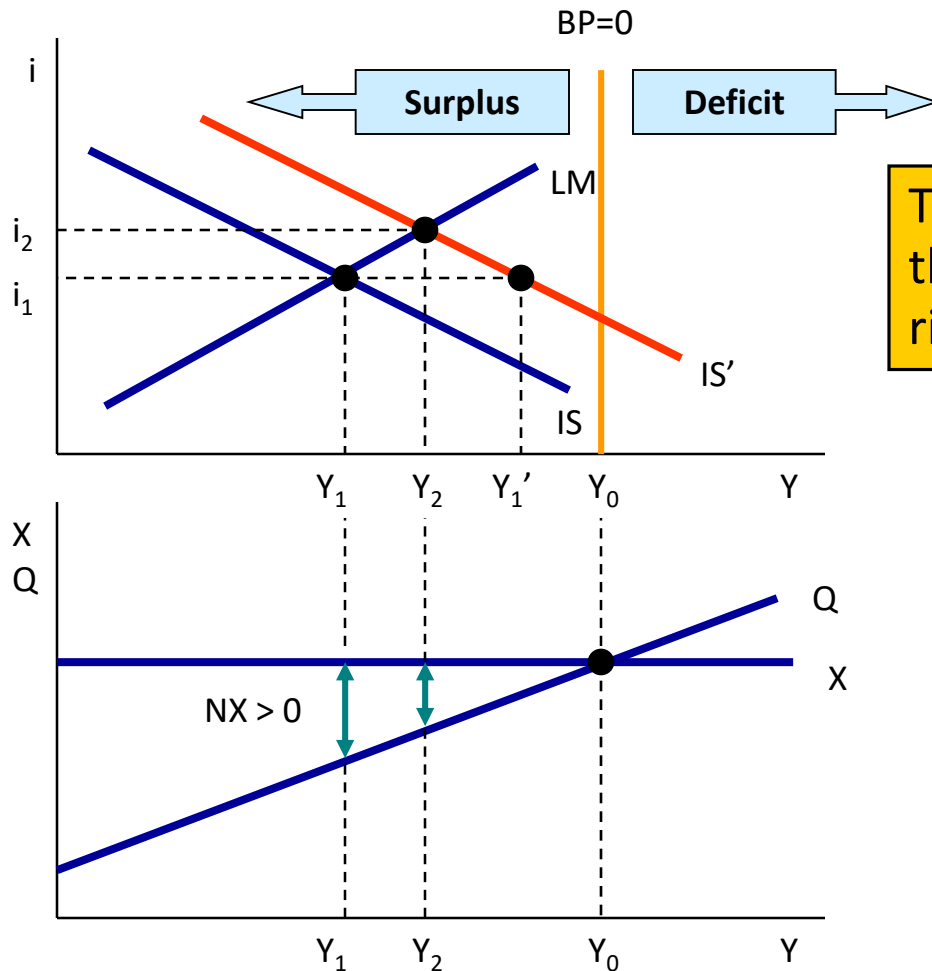


THE ECONOMY AND THE BALANCE OF TRADE EQUILIBRIUM



The balance of trade is running a surplus at the equilibrium level of income Y^* . Therefore, the Bank of Canada is accumulating foreign reserves.

THE EFFECT OF AN INCREASE IN $\bar{A}\bar{E}$



The increase in $\bar{A}\bar{E}$ causes the IS curve to shift to the right by $\alpha_{AE} \Delta \bar{A}\bar{E}$.

The increase in equilibrium income is equal to $\beta_{FP} \Delta \bar{A}\bar{E}$. As income increases, the surplus in the external sector decreases as Q rises while X remains constant.

INTERNAL AND EXTERNAL BALANCE

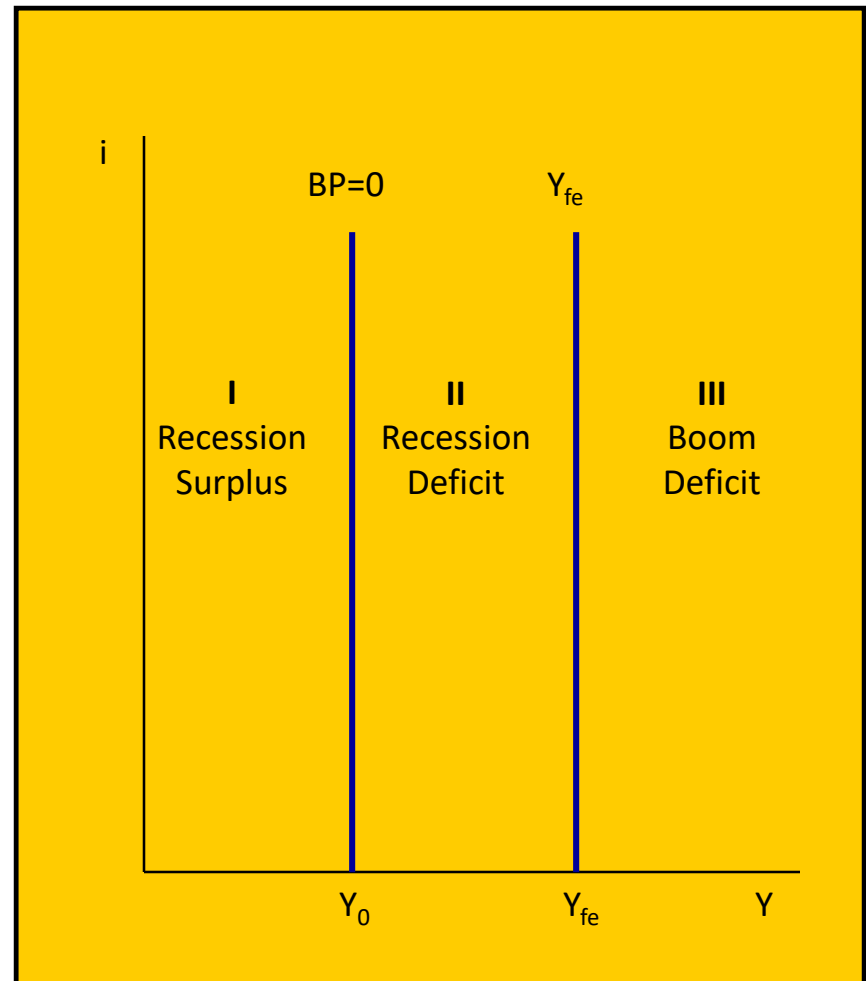
- We have seen that the economy could be in equilibrium (Y^*) while the external sector would be in disequilibrium
- At the same time, we have also seen that the equilibrium level of output could be below or above the full-employment level (Y_{fe})
- When the equilibrium level of output is at the full-employment level we say that there is *internal balance*
- When the foreign sector is in equilibrium, that is, when $BP = 0$, we say that there is *external balance*

INTERNAL AND EXTERNAL BALANCE (CONT'D)

- It seems desirable to try to achieve both *internal* and *external* balance
 - The benefits of achieving an internal balance are rather obvious
 - But why is external balance desirable?
- On the one hand, a country cannot run a balance of payments *deficit* indefinitely since it will eventually run out of foreign currency reserves
- On the other hand, a country should not run a balance of payments *surplus* indefinitely (and accumulate foreign currency reserves) because this would end up reducing consumption possibilities (and the standard of living)

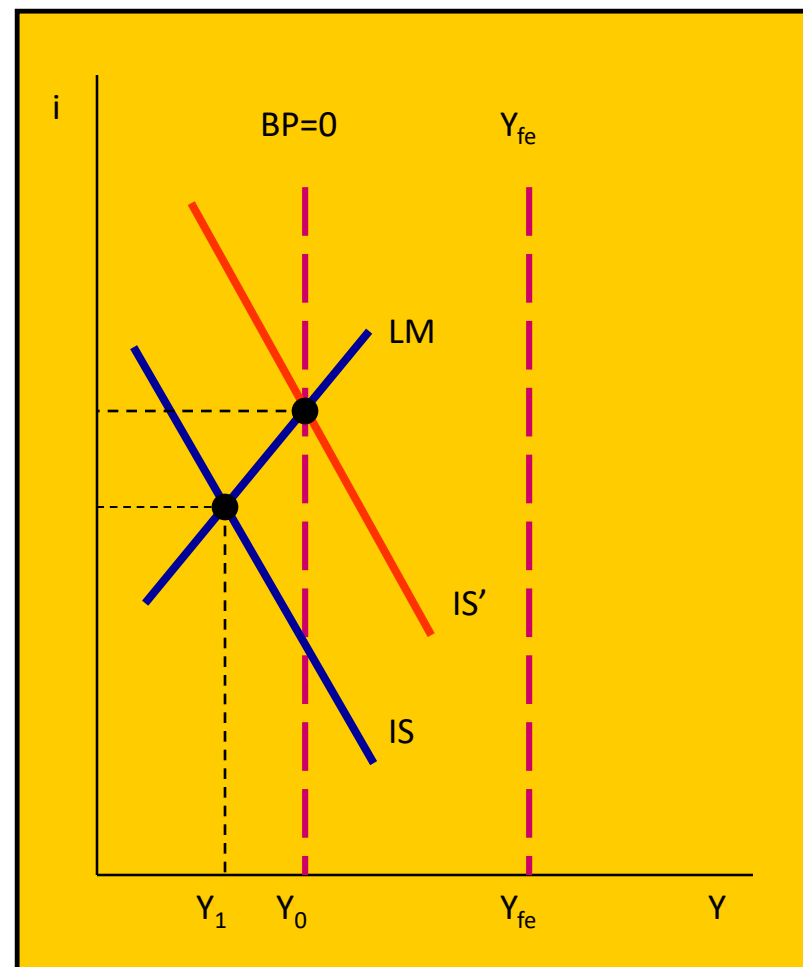
INTERNAL AND EXTERNAL BALANCE

- Suppose that **external** balance occurs at a lower level of output than **internal** balance
- Equilibrium output could occur in three different areas:
 - 1) at a level below the **external** balance level
 - 2) at a level between the **internal** and the **external** balance levels
 - 3) at a level above the **internal** balance level



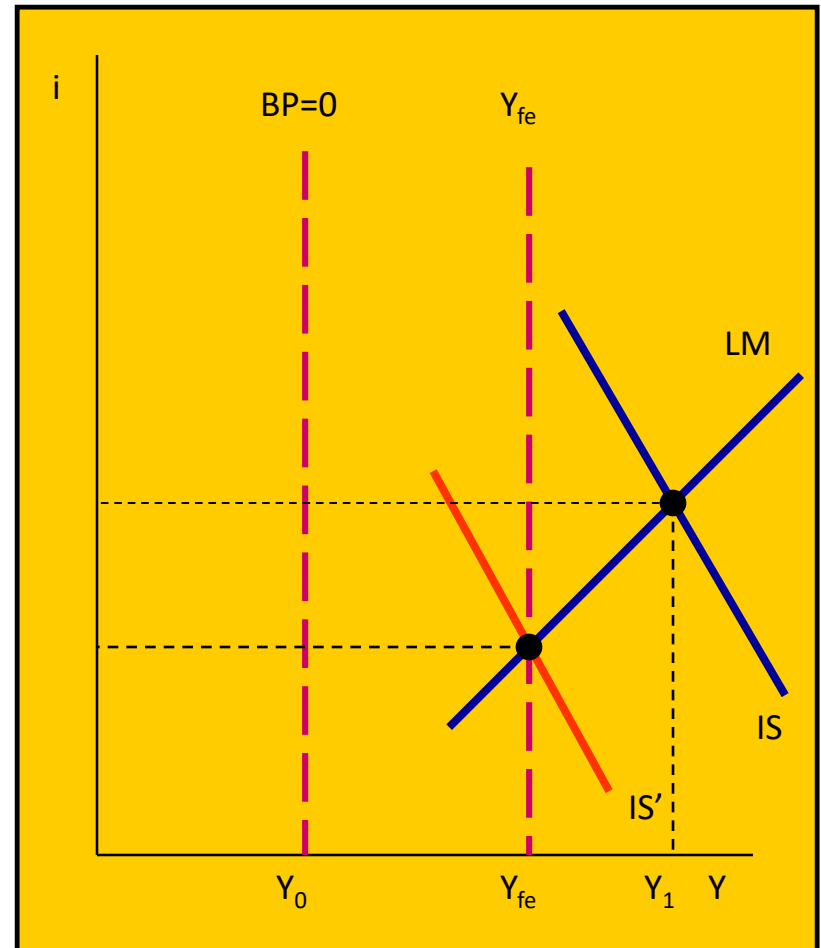
POLICY OPTIONS IN AREA I

- If equilibrium output falls within **Area I**, the economy is experiencing a recessionary gap and a trade surplus
- Here, the government should implement **expansionary** fiscal or monetary policy to reduce the recessionary gap and the trade surplus
- Suppose that the government increases its expenditure on goods and services
 - This would increase **Y** and decrease the trade surplus and the recessionary gap

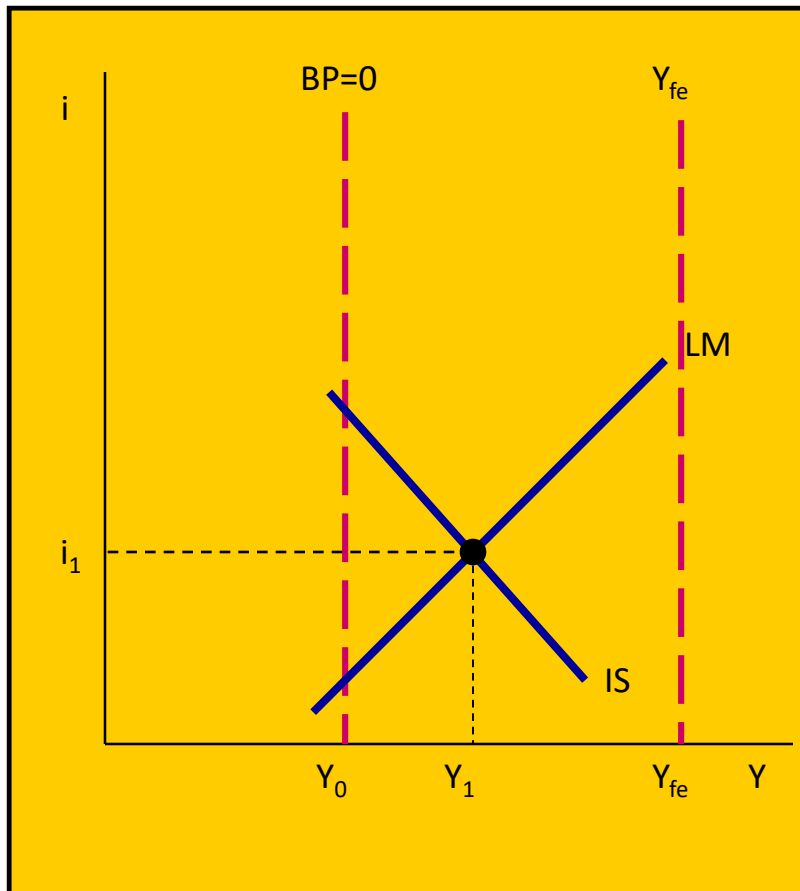


POLICY OPTIONS IN AREA III

- If equilibrium output falls within **Area III**, the economy is experiencing an inflationary gap and a trade deficit
- Here, the government should implement **contractionary** fiscal or monetary policy to reduce the inflationary gap and the trade deficit
- Suppose that the government decreases its expenditure on goods and services
 - This would decrease **Y** and decrease the trade deficit and the inflationary gap

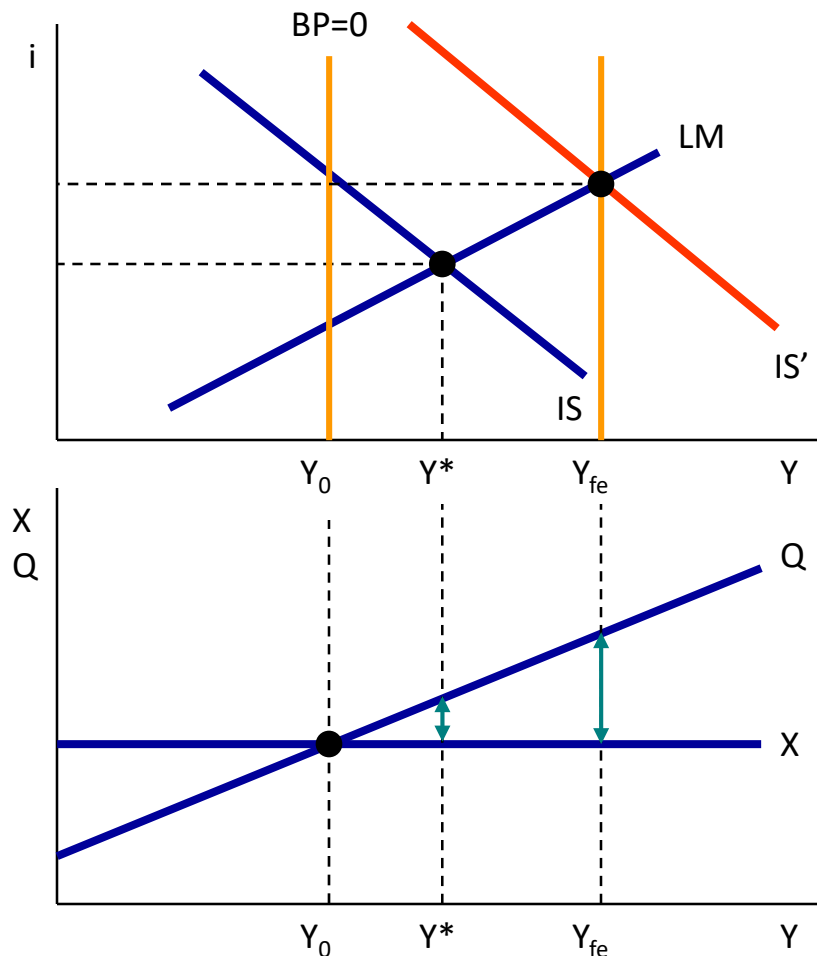


POLICY OPTIONS IN AREA II



- If equilibrium output falls within **Area II**, the economy is experiencing a recessionary gap and a trade deficit
- Here we have a **policy dilemma**:
 - **Expansionary** policy will achieve internal balance, but the trade deficit will increase
 - **Contractionary** policy will achieve external balance, but the recessionary gap will increase
- This occurs because we have two independent targets and only one policy instrument (aggregate demand policies)
- The solution then is to find **another policy instrument** that would **increase net exports** at each level of income
 - We will consider two different policies: 1) **tariffs** and 2) **devaluation**

POLICY OPTIONS IN AREA II



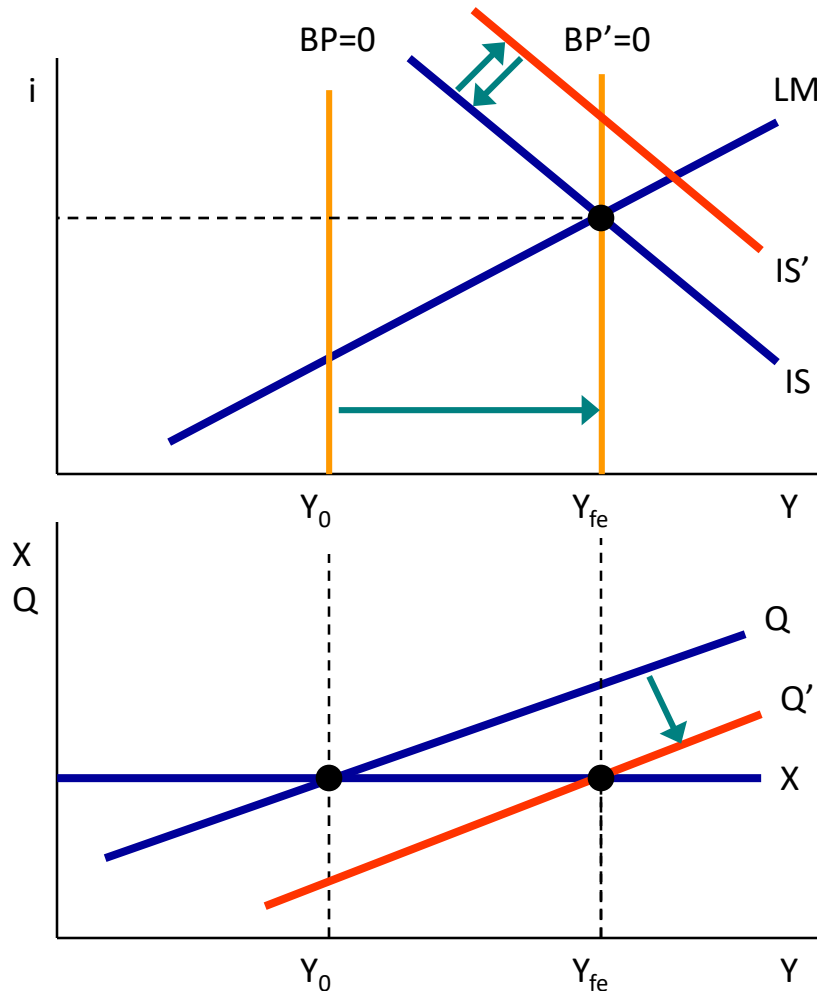
The balance of trade is running a deficit at the equilibrium level of income Y^* . Therefore, the Bank of Canada is losing foreign reserves.

Suppose that the government first implements expansionary fiscal policy to achieve internal balance, thus further increasing the deficit in the external sector.

The government must now implement a different policy to eliminate the deficit in the external sector.

POLICY OPTIONS IN AREA II:

IMPACT OF A TARIFF

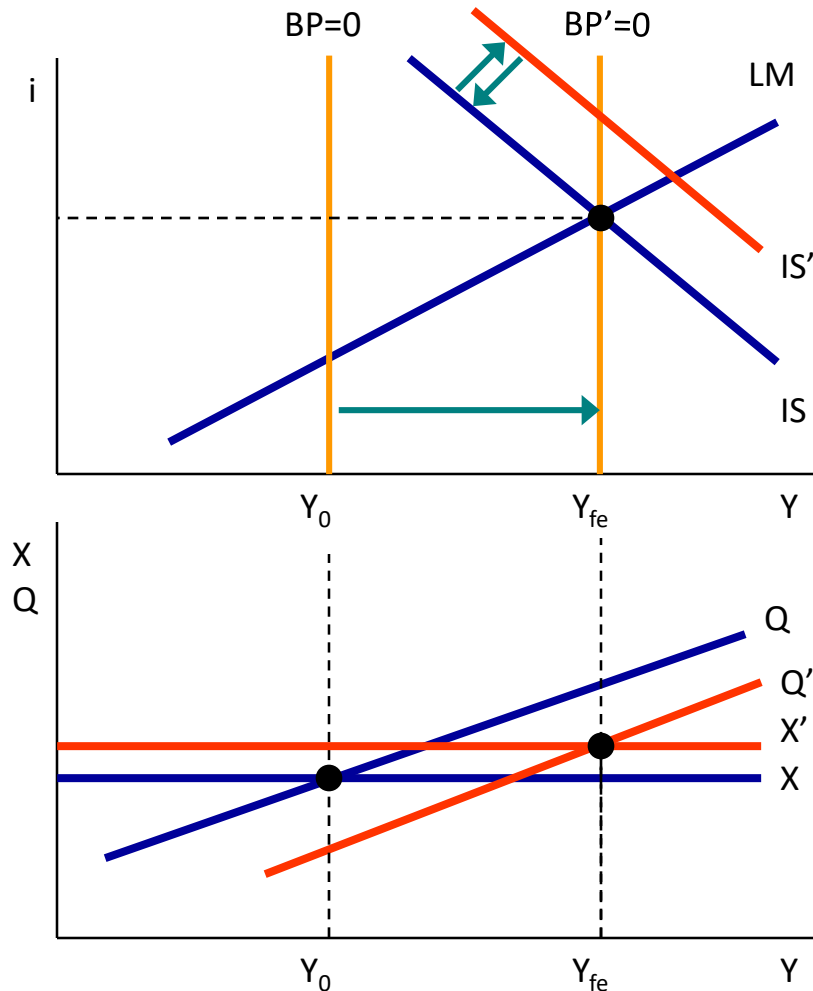


The economy has achieved internal balance but there is a deficit in the balance of trade.

The introduction of a tariff reduces imports at each level of income, that is, causes the Q curve to shift down to the right.

The increase in NX has an impact on AE , and thus the IS curve shifts out to the right. Therefore, the government should use contractionary policy at the same time that it introduces the tariff.

POLICY OPTIONS IN AREA II: IMPACT OF A DEVALUATION



The economy has achieved internal balance but there is a deficit in the balance of trade.

The devaluation of the Canadian dollar reduces Q and increases X at each level of Y , that is, it causes the X curve to shift up and the Q curve to shift down.

The increase in NX has an impact on AE , and thus the IS curve shifts to the right. Therefore, the government should use contractionary policy at the same time that it devalues the currency.

CAPITAL FLOWS

- We will **assume** that the foreign rate of interest (i^*) is given, and that
 - Capital will flow into Canada whenever $i > i^*$
 - Capital will flow out of Canada whenever $i < i^*$
 - When $i = i^*$, capital flow is zero (or rather, an investor would be indifferent between investing at home or abroad)
- Under these **assumptions**, the balance in the capital account is given by the equation:

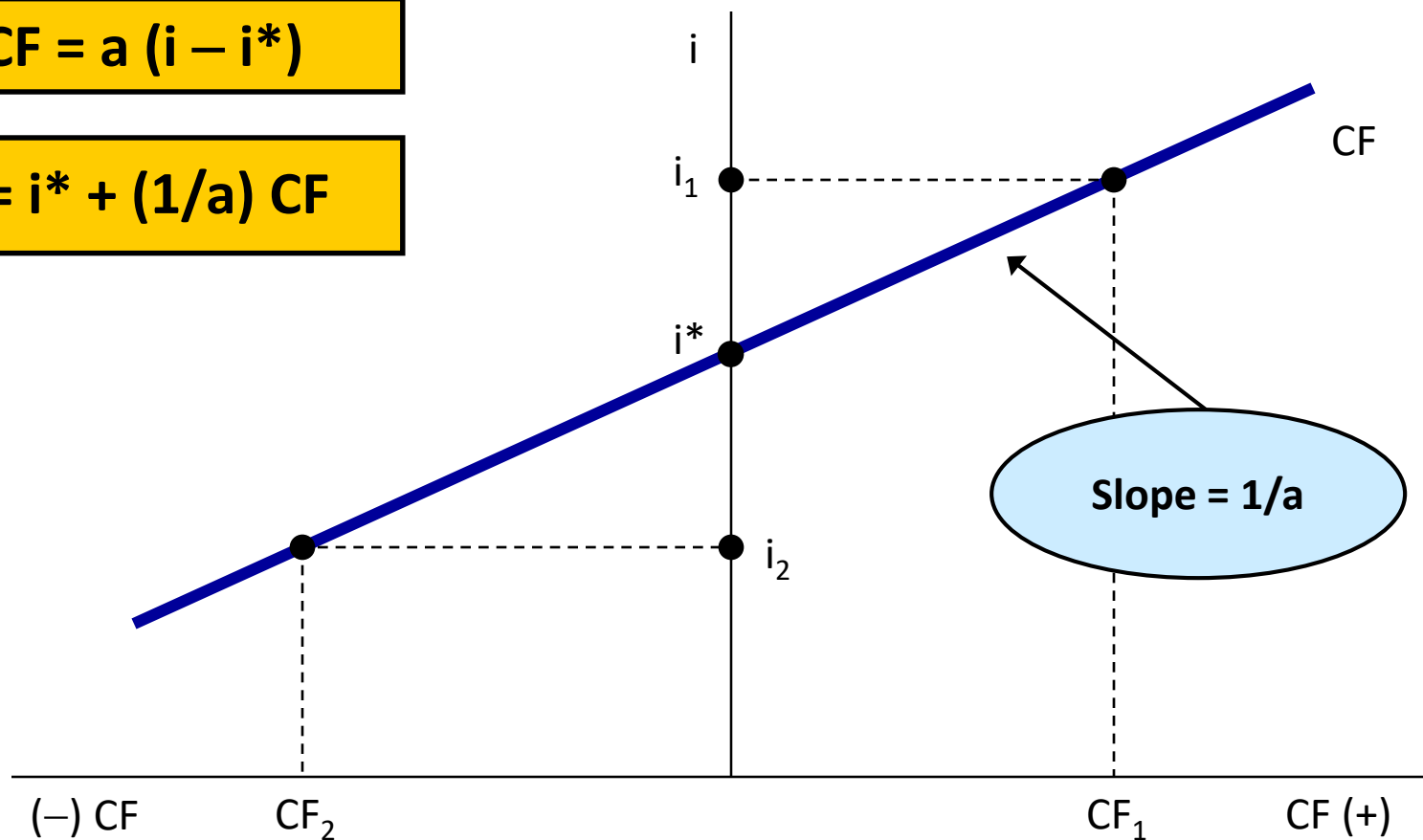
$$CF = a (i - i^*) \quad \text{or} \quad i = i^* + (1/a) CF$$

where a measures the sensitivity of capital flows to the interest rate differential or the **degree of capital mobility**

CAPITAL FLOWS

$$CF = a (i - i^*)$$

$$i = i^* + (1/a) CF$$



THE BALANCE OF PAYMENTS AND CAPITAL FLOWS

- The overall balance of payments (**BP**) now becomes:

$$\mathbf{BP = NX + CF}$$

$$= \bar{X} - \bar{Q} - mY + (x + s)(eP^f/P) + a(i - i^*)$$

$$= [\bar{X} - \bar{Q} + (x + s)(eP^f/P) - ai^*] - mY + ai$$

$$= \overline{BP} - mY + ai$$

where $\overline{BP} = \bar{X} - \bar{Q} + (x + s)(eP^f/P) - ai^*$

- If we set **BP = 0**, we obtain the combinations of interest rate (**i**) and income (**Y**) for which there is balance of payments equilibrium:

$$\mathbf{BP = \overline{BP} - mY + ai = 0}$$

THE BALANCE OF PAYMENTS

- As we have seen, equilibrium in the external sector means that:

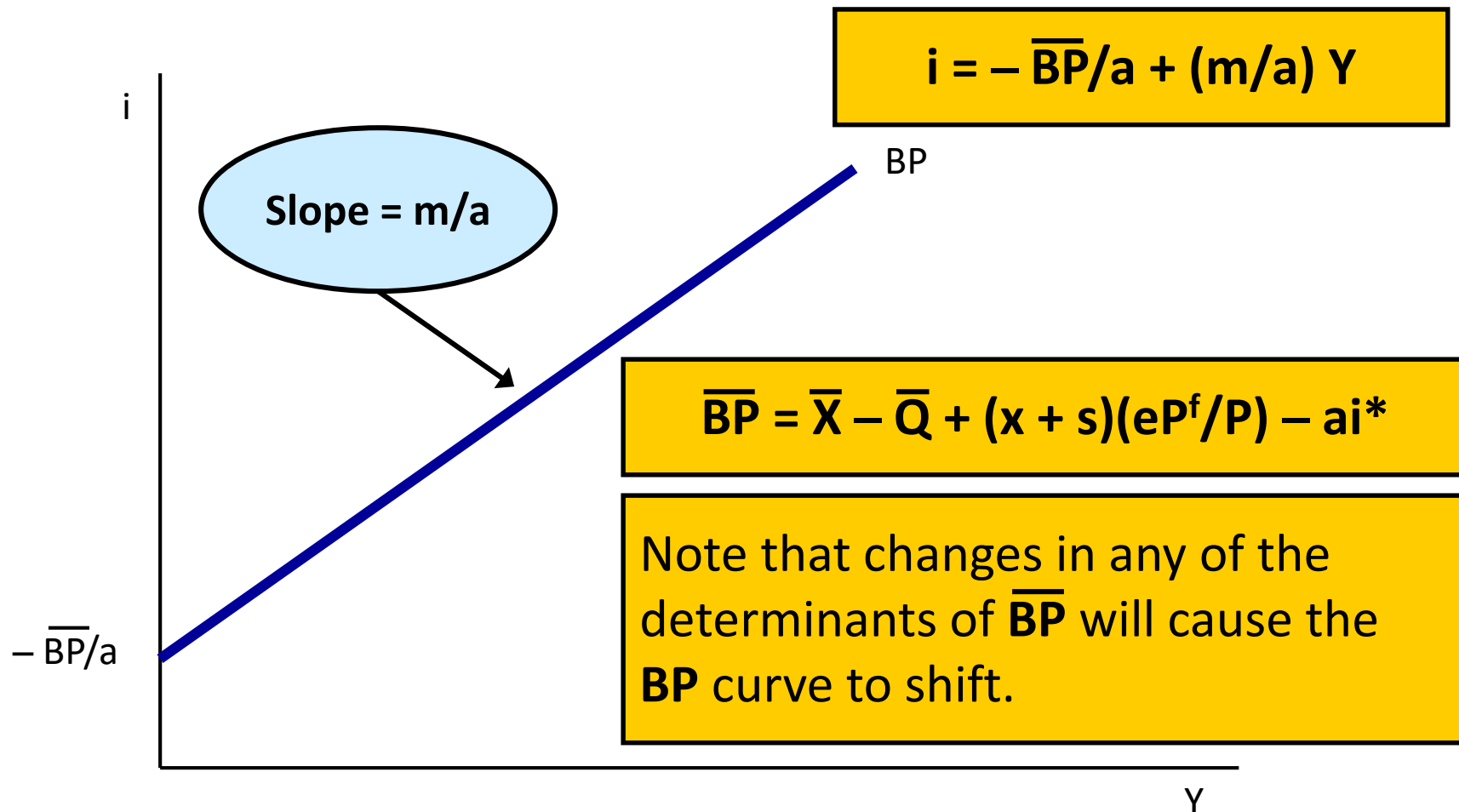
$$BP = \overline{BP} - mY + ai = 0$$

where $\overline{BP} = \overline{X} - \overline{Q} + (x + s)(eP^f/P) - ai^*$

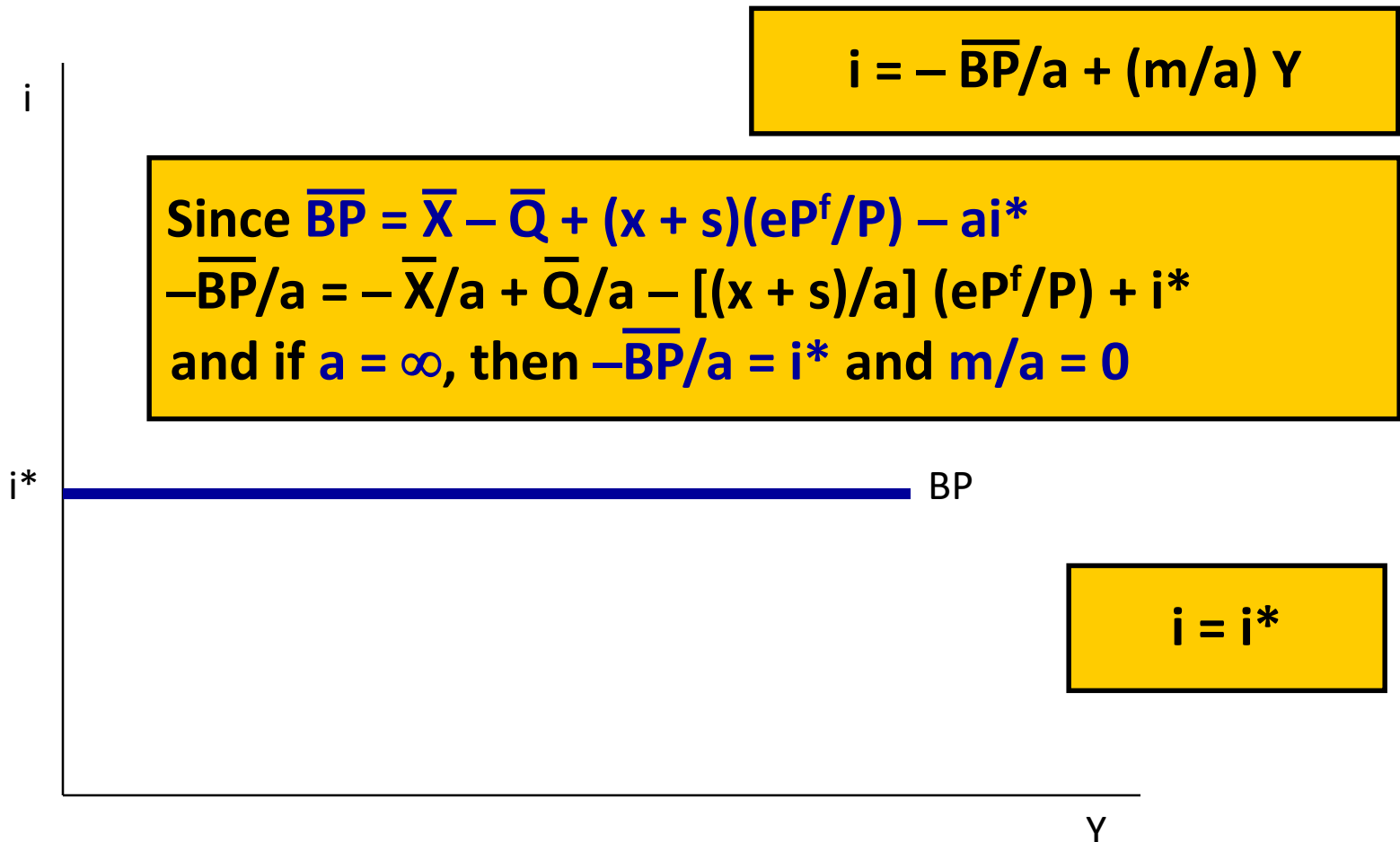
- Therefore, we obtain a relationship between i and Y showing *external balance* (the *BP curve*):

$$i = -\overline{BP}/a + (m/a)Y$$

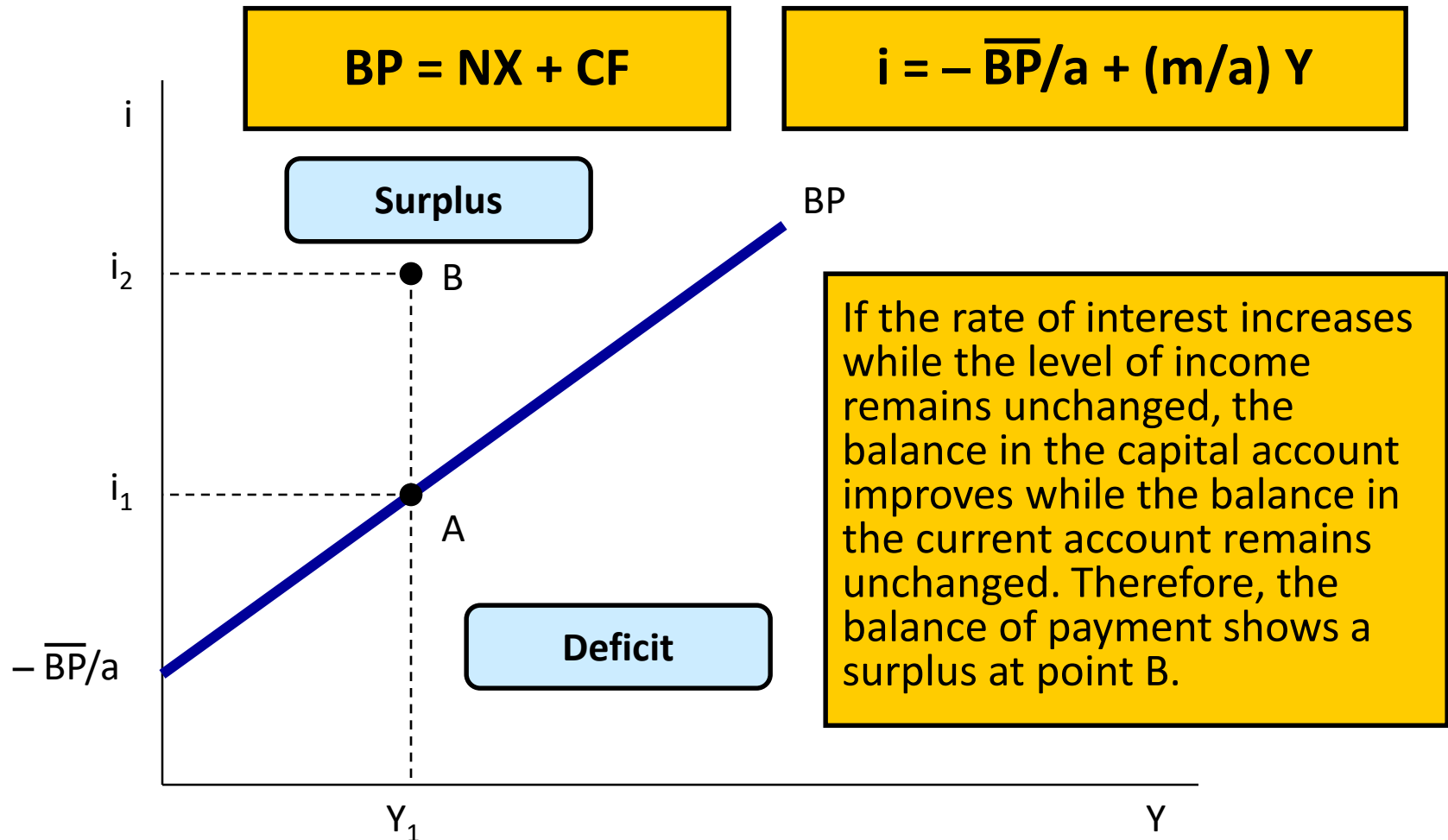
THE BP CURVE



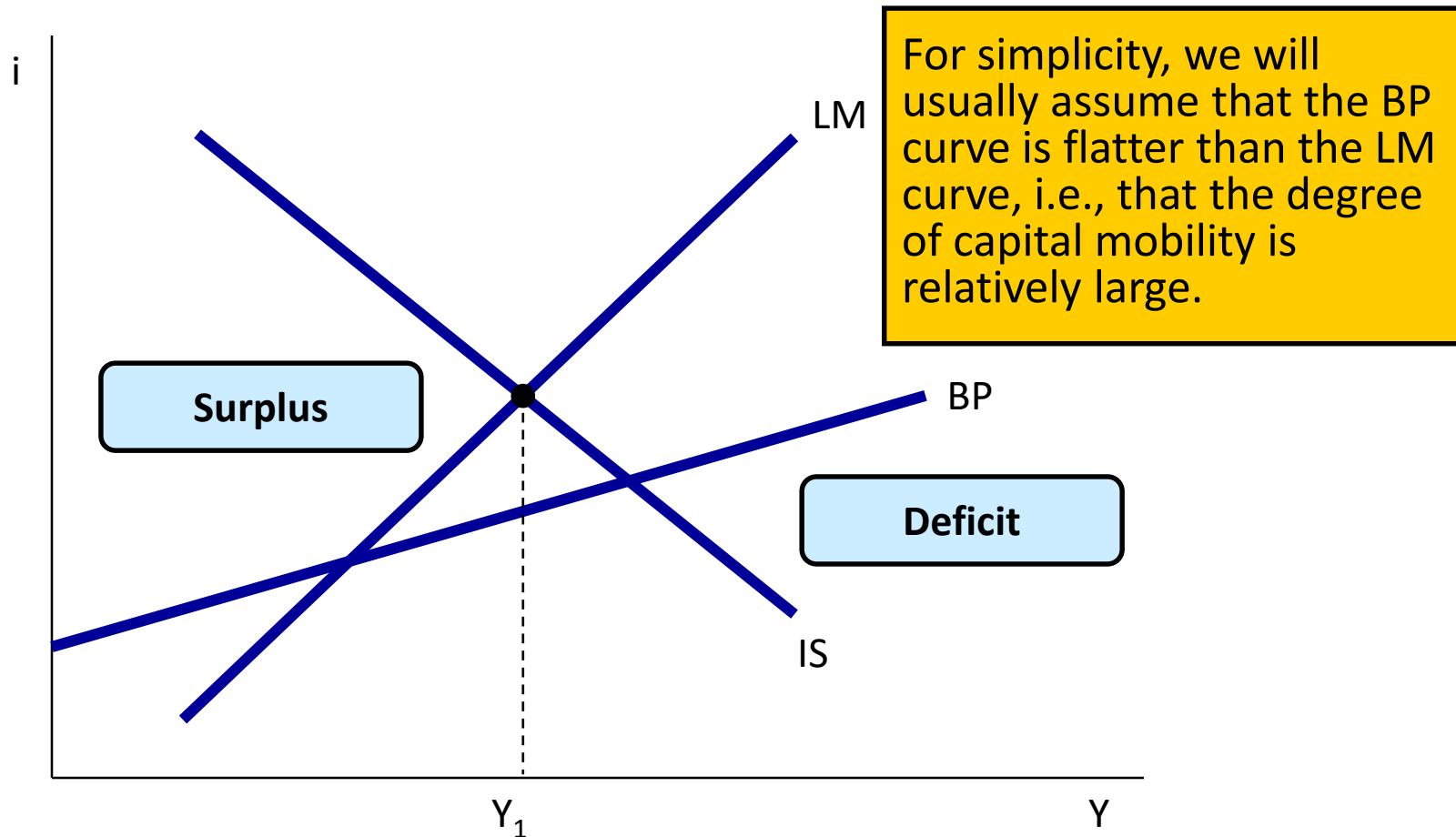
PERFECT CAPITAL MOBILITY ($a = \infty$) AND THE BP CURVE



POINTS OFF THE BP CURVE



EQUILIBRIUM INCOME AND THE BALANCE OF PAYMENTS

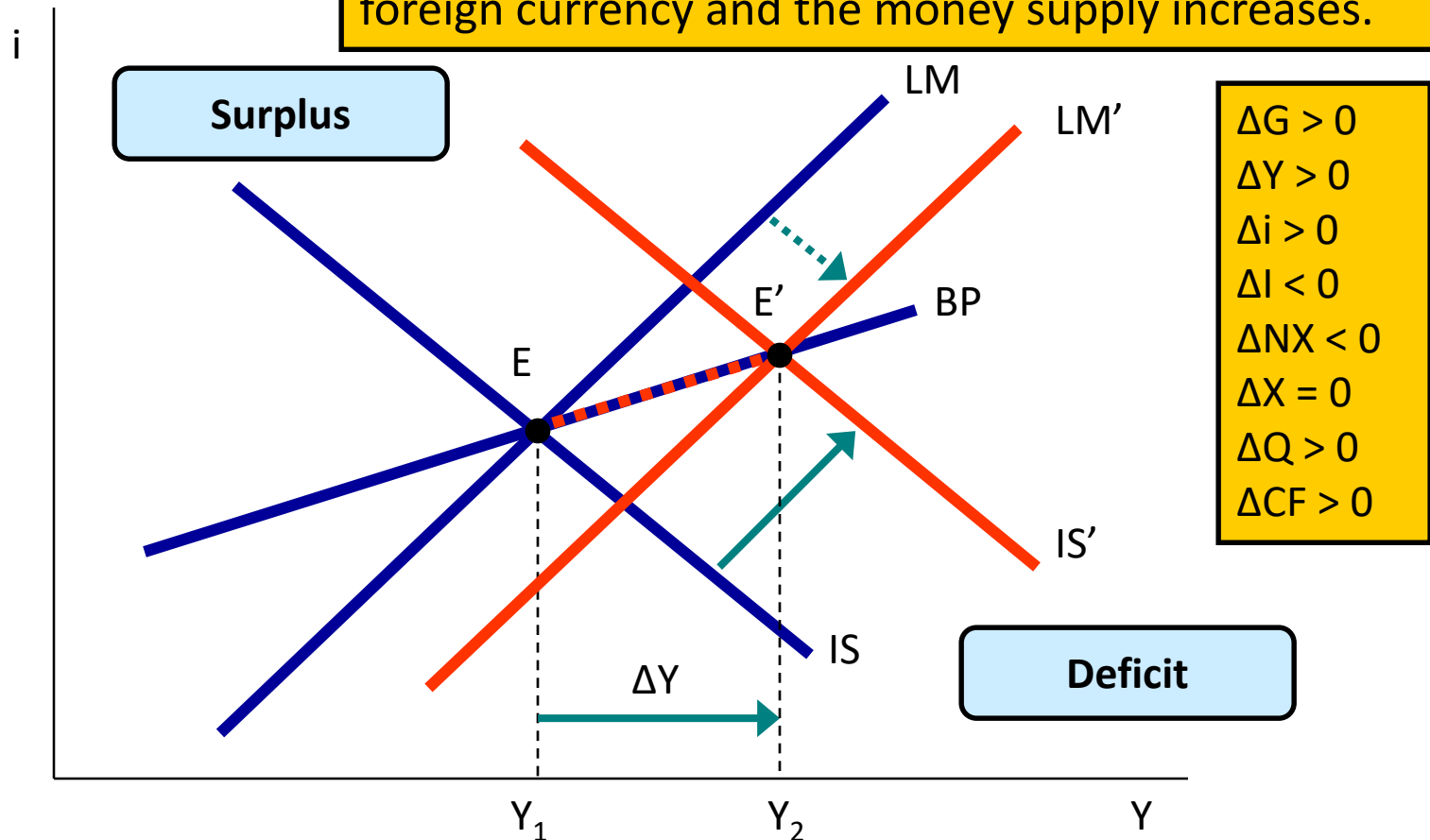


THE LINK BETWEEN THE BALANCE OF PAYMENTS AND THE MONEY SUPPLY

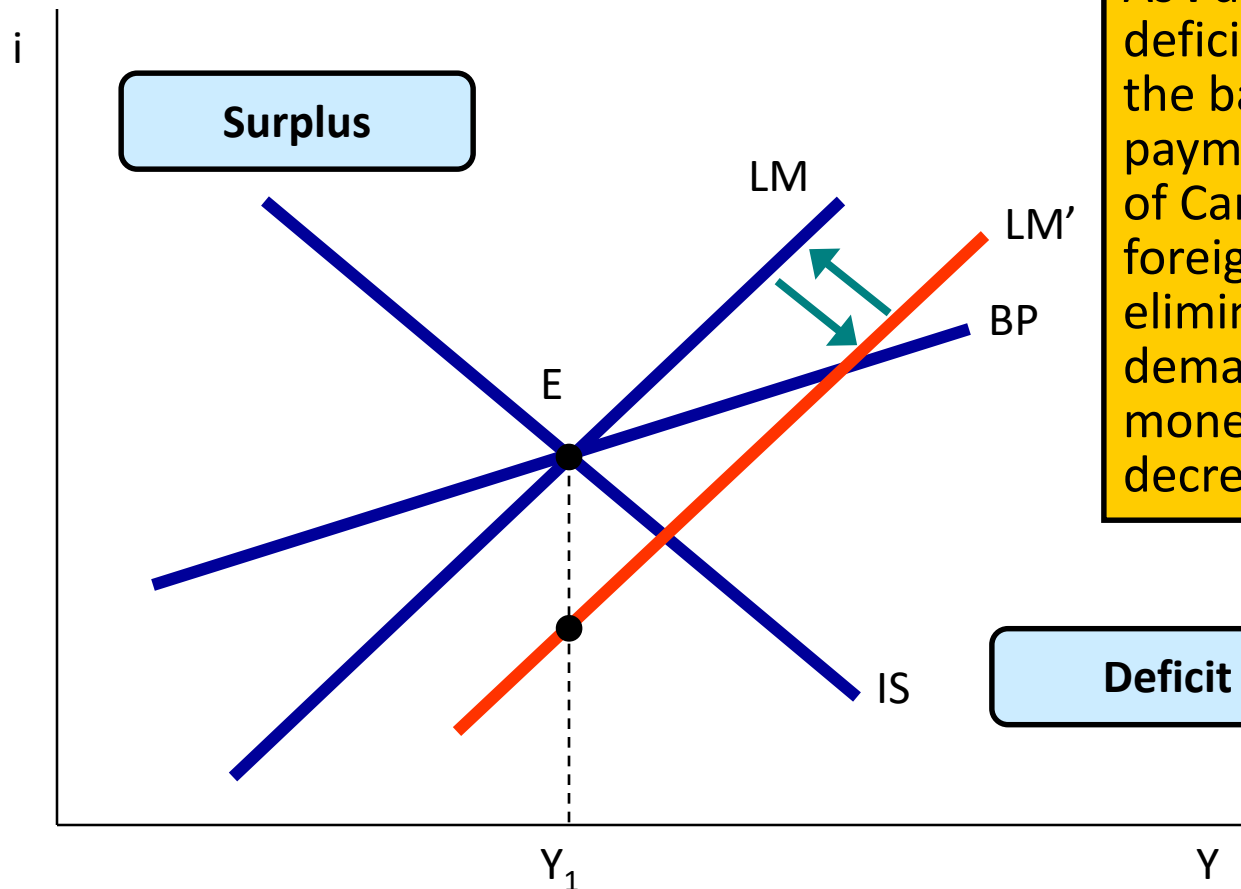
- Under a *fixed exchange rate system*, the central bank intervenes in the foreign exchange market to eliminate any excess demand or supply of foreign currency
- *There is a link between the central bank's purchase and sale of foreign currency and the supply of money*
- When there is a *surplus* (i.e., $BP > 0$), the central bank buys foreign currency and pays with domestic currency
 - The central bank pays with domestic currency and in this way injects money into the economy ($\Delta M > 0$)
- When there is a *deficit* (i.e., $BP < 0$), the central bank sells foreign currency and it's paid with domestic currency
 - The central bank is paid in domestic currency and in this way withdraws money from the economy ($\Delta M < 0$)

THE IMPACT OF EXPANSIONARY FISCAL POLICY

As Y and i start to increase along the LM curve, a surplus emerges in the balance of payments. The Bank of Canada purchases the excess supply of foreign currency and the money supply increases.



THE IMPACT OF EXPANSIONARY MONETARY POLICY



As i decreases, a deficit emerges in the balance of payments. The Bank of Canada sells foreign currency to eliminate the excess demand and the money supply decreases.

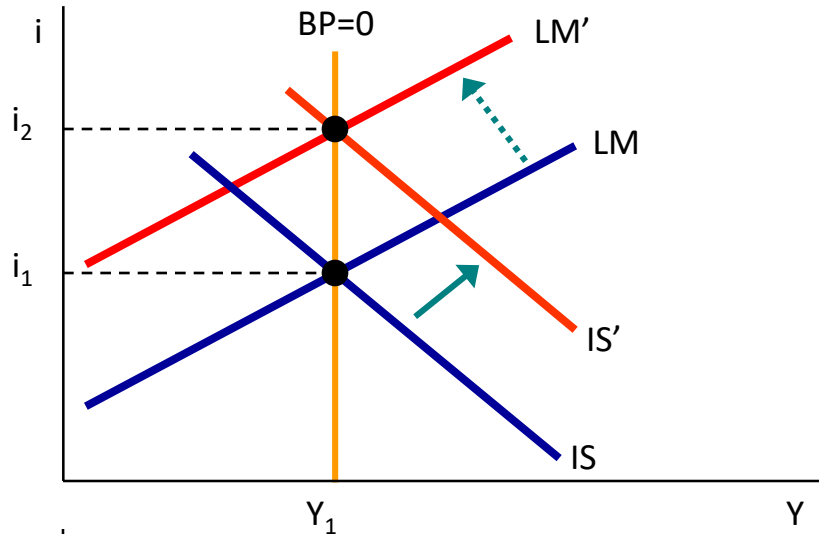
STERILIZATION POLICIES

- The Bank of Canada can use *sterilization* policies to offset the effect of foreign exchange transactions on the money supply
 - For instance, when the Bank of Canada buys foreign currency it can simultaneously decrease the money supply through an open market operation
 - Sterilization policies are not possible if there is a relatively high degree of capital mobility
- ***Sterilization policies will work only if there is some degree of control on capital movements***

ARGUMENTS FOR CAPITAL ACCOUNT REGULATIONS: THE “*TRILEMMA*”

- It is not possible for a country to maintain the following three goals simultaneously:
 - Free capital mobility
 - Fixed exchange rates
 - An autonomous monetary policy
- The “*Trilemma*”: Countries can achieve at most only two of these three goals simultaneously
- Therefore, if a country wants to have an *independent monetary policy* while keeping a *stable* and *competitive exchange rate*, then it must *control capital mobility*

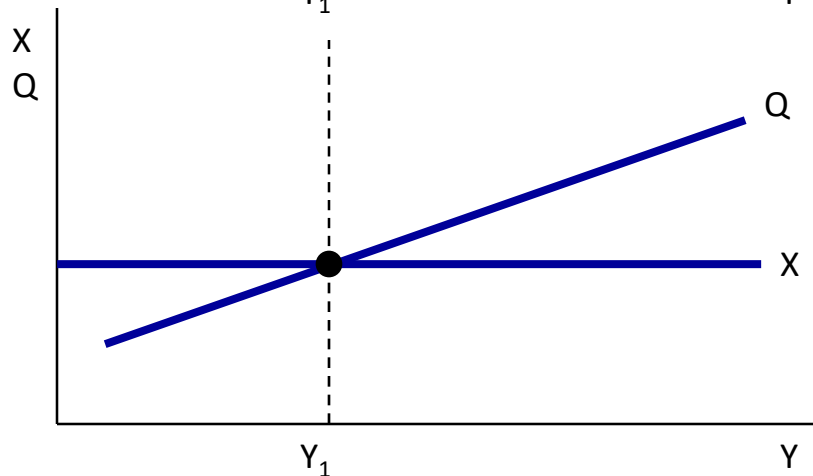
APPENDIX I: EXPANSIONARY FISCAL POLICY WITH NO CAPITAL MOBILITY



At the initial equilibrium income the economy is in external balance.

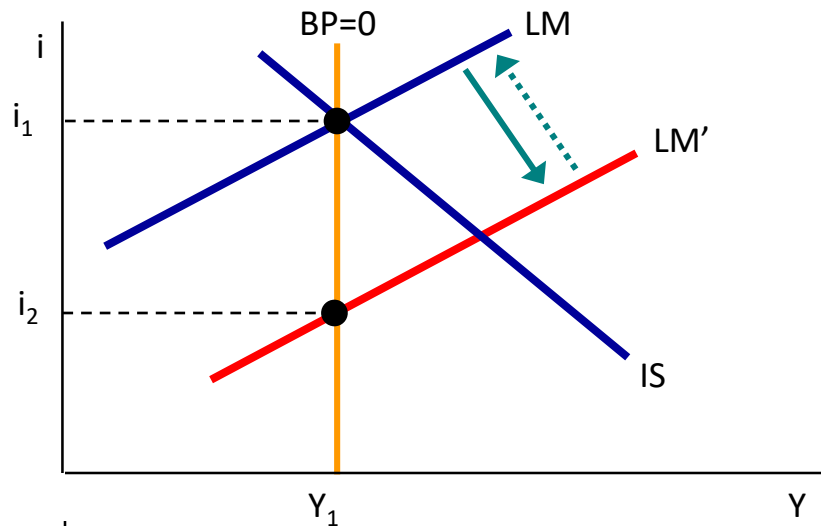
An increase in G causes the IS curve to shift up to the right and a situation of excess demand arises in the goods market.

$$\begin{aligned}\Delta Y &= 0 \\ \Delta i &> 0 \\ \Delta I &< 0 \\ \Delta NX &= 0 \\ \Delta X &= 0 \\ \Delta Q &= 0\end{aligned}$$



As Y increases, Q rises and a deficit arises in the external sector. The central bank sells foreign currency to eliminate the excess demand and the money supply decreases, causing the LM curve to shift up to the left.

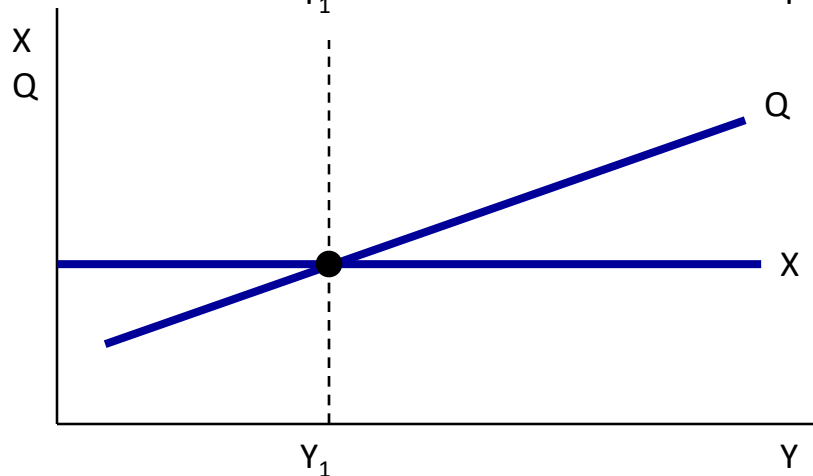
APPENDIX II: EXPANSIONARY MONETARY POLICY WITH NO CAPITAL MOBILITY



At the initial equilibrium income the economy is in external balance.

An increase in the M^S causes the LM curve to shift down to the right. The rate of interest falls and an excess demand arises in the goods market.

$$\begin{aligned}\Delta Y &= 0 \\ \Delta i &= 0 \\ \Delta I &= 0 \\ \Delta NX &= 0 \\ \Delta X &= 0 \\ \Delta Q &= 0\end{aligned}$$



As Y increases, Q rises and a deficit arises in the external sector. The central bank sells foreign currency to eliminate the excess demand and the money supply decreases, causing the LM curve to shift up to the left.

APPENDIX III: INCREASE IN AUTONOMOUS EXPORTS AND IMPERFECT CAPITAL MOBILITY

