ECO 209Y
Macroeconomic Theory and Policy

Lecture 6: Fiscal and Monetary Policy

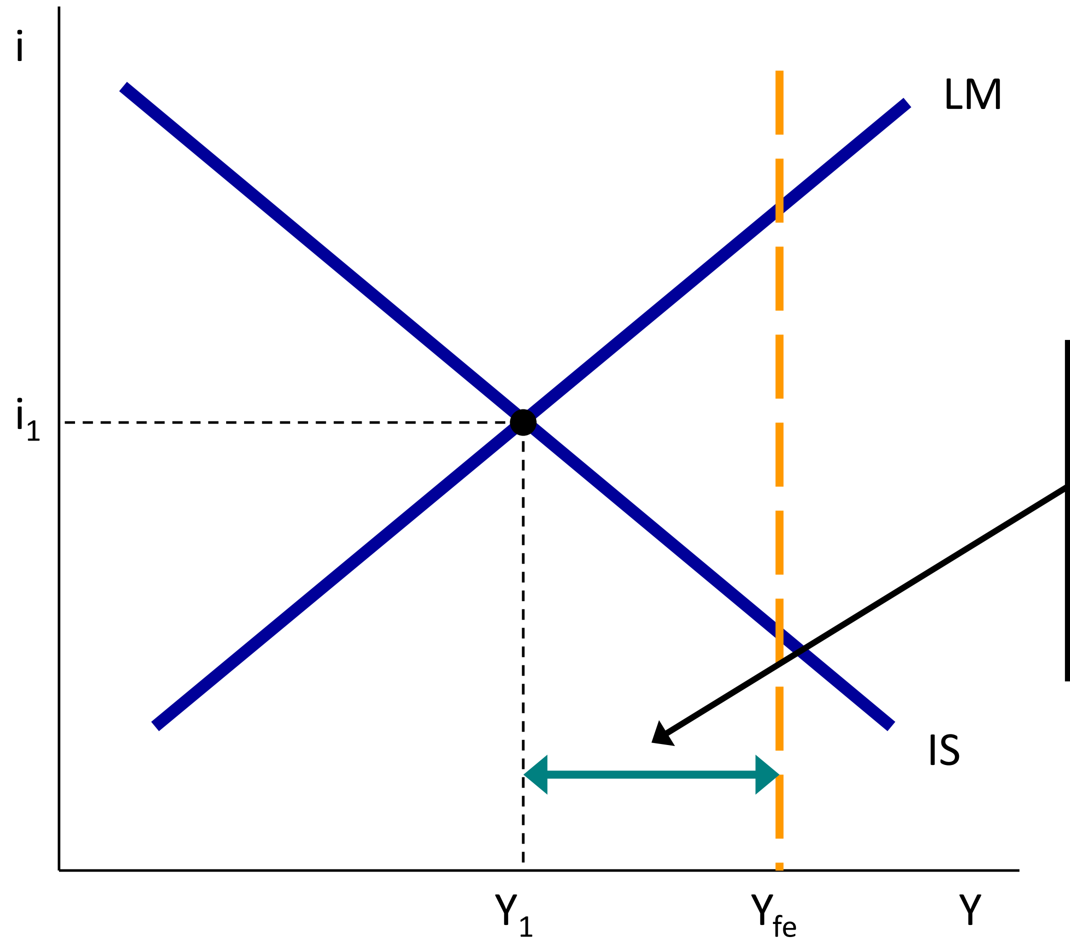
EQUILIBRIUM INCOME AND FULL EMPLOYMENT

- In the **IS-LM** model, equilibrium ***income*** and equilibrium ***rate of interest*** are determined simultaneously

- At the level of equilibrium ***income*** and equilibrium ***rate of interest*** both the goods market and the money market are in equilibrium
  - Graphically, equilibrium is determined where the **IS** and the **LM** curves intersect

- ***Equilibrium***, however, does not imply that the economy is operating at ***full employment***

Equilibrium Income and Full Employment (cont'd)



If $Y_1 < Y_{fe}$, then the economy is in a recession.

The recessionary gap is equal to the difference between Y_{fe} and Y_1.

FISCAL AND MONETARY POLICY

- The government can use ***fiscal policy*** or ***monetary policy***, or a combination of both, to get **Y** closer to the full employment level

- The government can increase its expenditure on goods and services or decrease taxes, thus increasing **AE**
  - When the government engages in this type of policies, it is implementing ***fiscal policy***

- The Bank of Canada can increase the supply of money, thus decreasing **i** and increasing **AE**
  - When the Bank of Canada engages in this type of policies, it is implementing ***monetary policy***

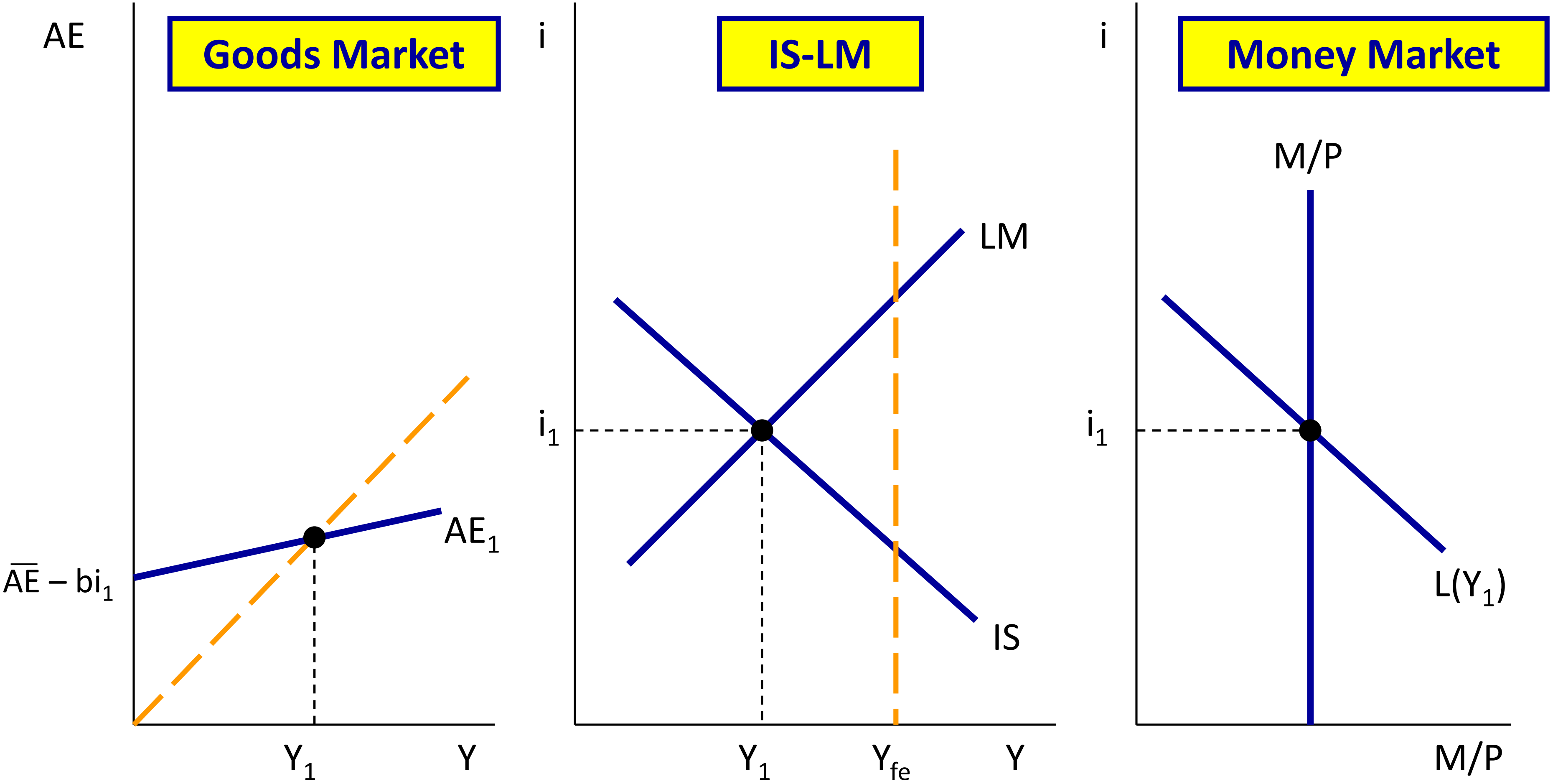
The Use of Fiscal Policy

- Initial assumptions:
  - The equilibrium level of income is below the ***full employment*** level
  - The government is running a ***balanced budget***
  - There is no foreign sector (**X = Q = 0**)
- Therefore, since **BD = 0** and **NX = 0**, then **S = I**
- Let's consider the effect on **Y** and **i** of:

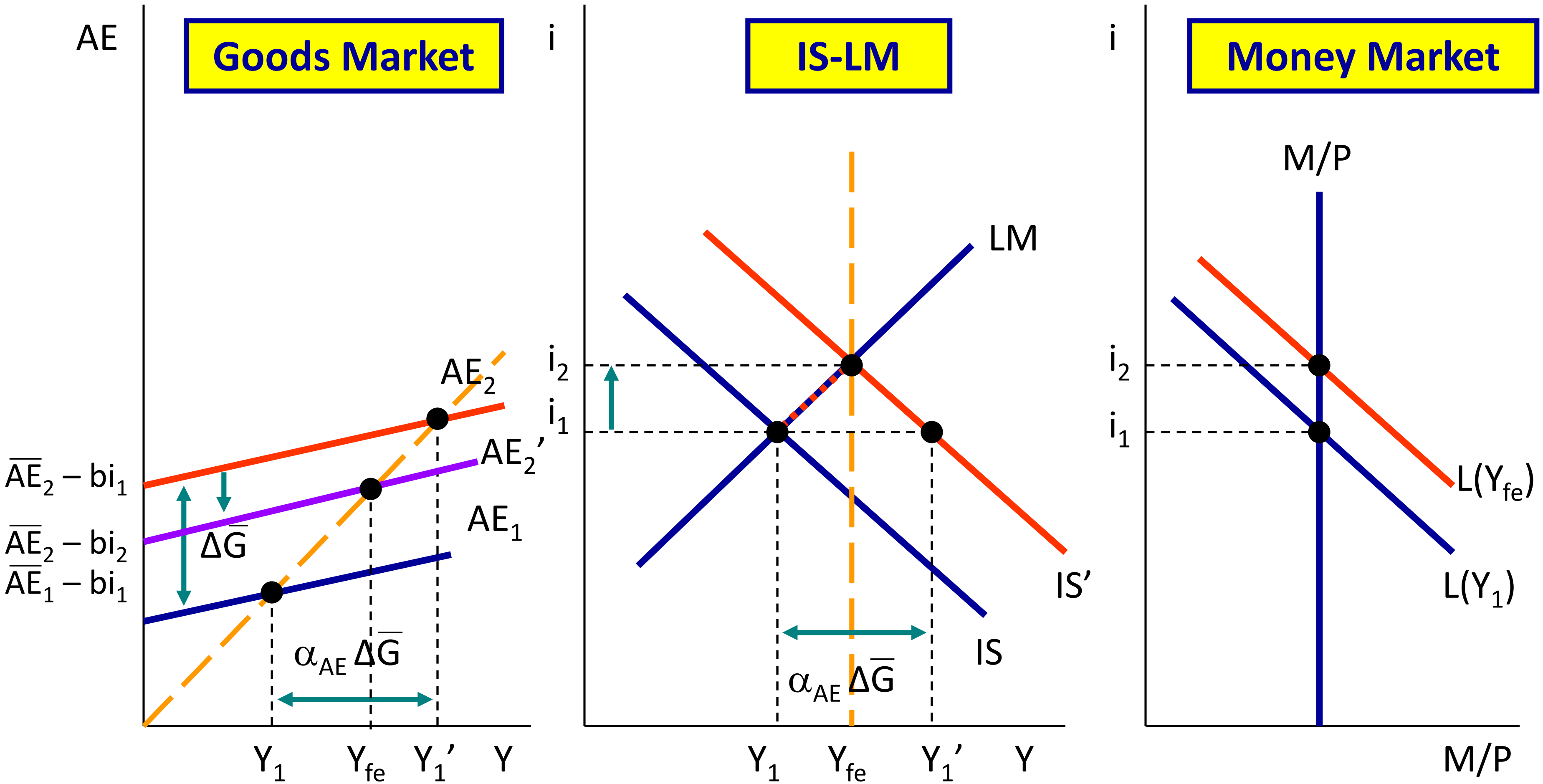
  1) An increase in **G** (government expenditure)

  2) A decrease in **TA** (taxes)

The Initial Equilibrium



The Impact of an Increase in $\overline{G}$



The Impact of an Increase in $\overline{G}$

$$\text{IS: } i = \frac{\overline{AE}}{b} - \frac{1 - c(1 - t)}{b} Y$$

$$\text{LM: } i = \frac{-\overline{M}/\overline{P}}{h} + \frac{k}{h} Y$$

$$Y^* = \frac{1}{1 - c(1 - t) + bk/h} \overline{AE} + \frac{1}{(h/b)[1 - c(1 - t)] + k} \overline{M}/\overline{P}$$

- An increase in $\overline{G}$ causes a similar increase in $\overline{AE}$ → **$\Delta\overline{AE} = \Delta\overline{G}$**
- An increase in $\overline{AE}$ causes the IS curve to shift vertically up by **$\Delta\overline{G} / b$** or horizontally to the right by **$\alpha_{AE}\,\Delta\overline{G}$**
- In turn, the increase in $\overline{AE}$ causes equilibrium income to increase by

  $\{1 / [1 - c(1 - t) + bk/h]\}\,\Delta\overline{G}$

The Fiscal Policy Multiplier

$$Y^* = \frac{1}{1 - c(1-t) + bk/h}\overline{AE} + \frac{1}{(h/b)[1 - c(1-t)] + k}\overline{M}/\overline{P}$$

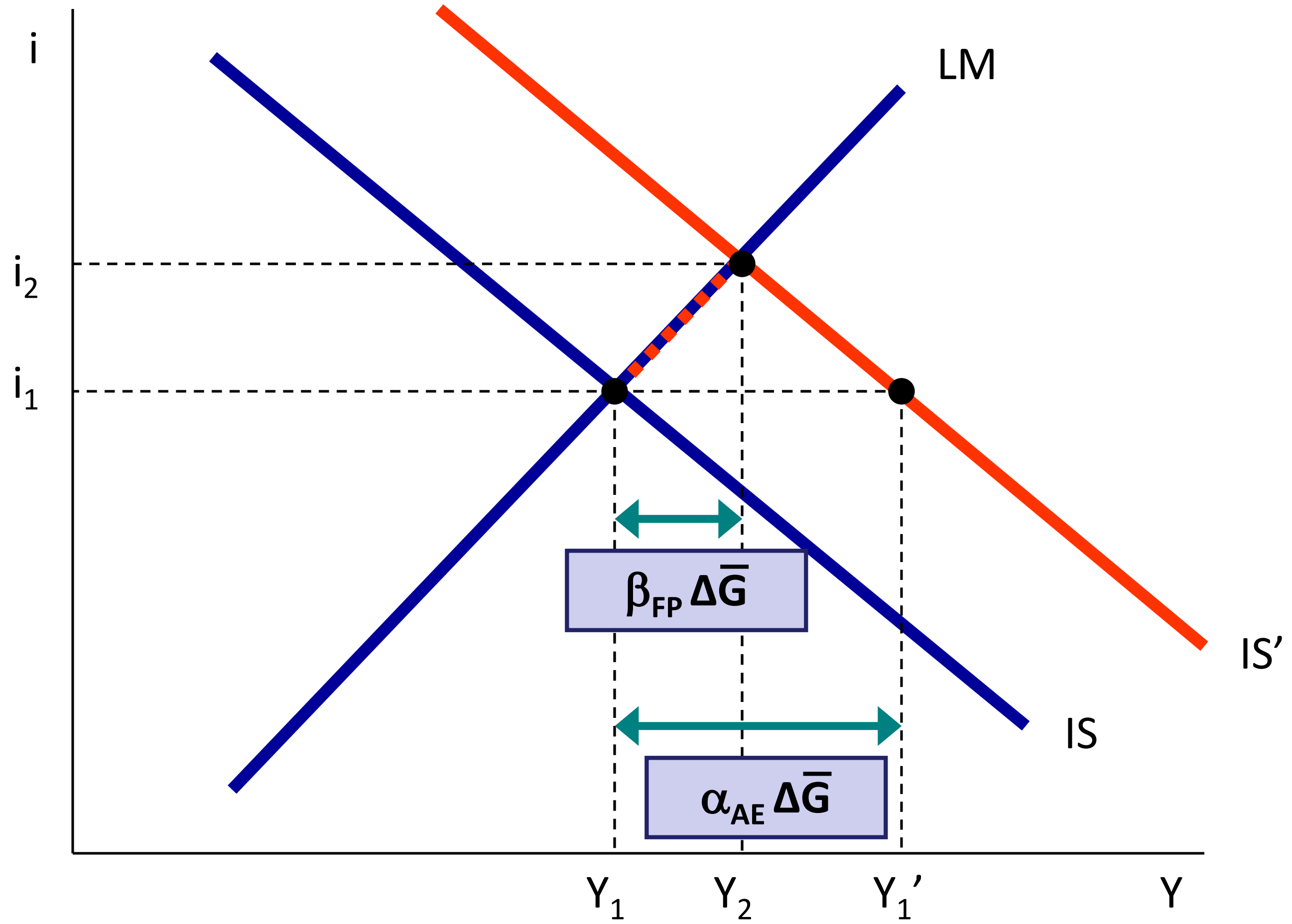
$$\Delta Y^* = \frac{1}{1 - c(1-t) + bk/h}\Delta\overline{AE}$$

$$\beta_{FP} = \frac{\Delta Y^*}{\Delta\overline{AE}} = \frac{1}{1 - c(1-t) + bk/h}$$

$$\Delta Y^* = \beta_{FP}\,\Delta\overline{AE}$$

Note that $\beta_{FP} < \alpha_{AE}$

THE IMPACT OF AN INCREASE IN $\bar{G}$



Crowding Out Effect

- What's the economics behind this change in **Y**?
  - The increase in **G** affects **AE** directly and thus increases **Y**
  - But the increase in **Y** increases the demand for money and thus **i** also increases
  - As **i** increases, desired investment (**I**) decreases
- Therefore, we have an increase in **G** and a decrease in **I**
  - That is, we have what is called a ***crowding out*** effect: the increase in **G** indirectly causes a decrease in **I**
  - But the ***crowding out*** effect is not complete since the increase in **G** is (in absolute value) greater than the decrease in **I** and thus both **AE** and **Y** increase

The Adjustment Path

- On the one hand, the ***goods market*** adjusts slowly, and thus it takes time for output to increase sufficiently to eliminate the excess demand

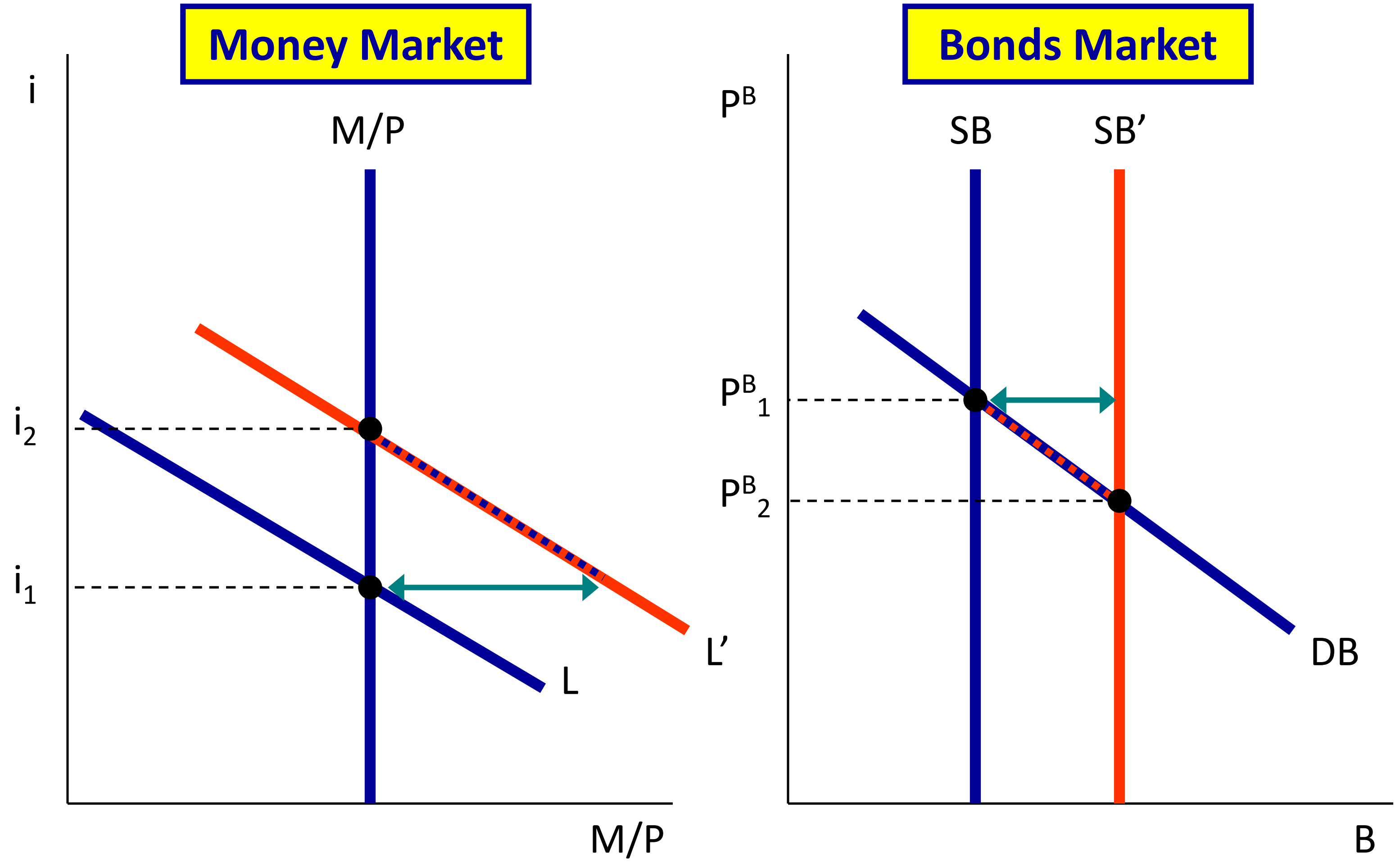
- On the other hand, the ***money market*** adjusts very rapidly since any disequilibrium in the money market is corrected by a simple change in the rate of interest
  - Therefore, for simplicity, we are assuming that the money market is ***always*** in equilibrium

- Therefore, as it was indicated before, the ***adjustment path*** is always along the **LM** curve

The Increase in the Rate of Interest

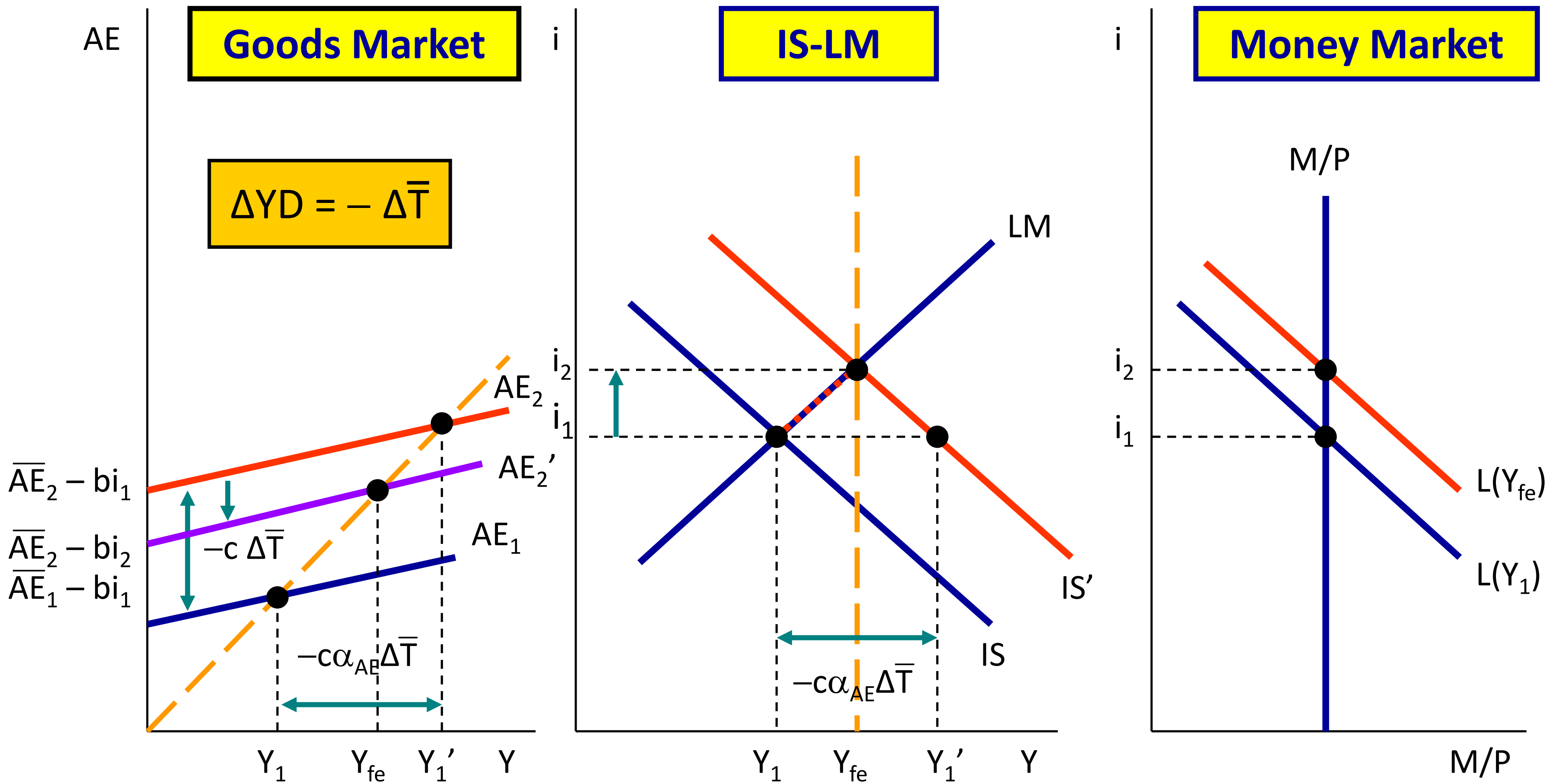
- An increase in **Y** causes **L** to increase, and thus **i** increases
- In addition, an increase in **G** causes the government to run a ***budget deficit***
  - ***If the money supply is kept constant***, the government has to compete with the private sector for funds
  - In this way, the ***demand for money*** increases (while the ***supply*** does not) and **i** increases
- Alternatively, the government issues new bonds to finance the deficit and thus the ***supply of bonds*** increases (while the ***demand*** does not)
  - Therefore, the ***price*** of bonds decreases and the bonds' ***yield*** (the rate of interest) increases

An Increase in $\bar{G}$ and the Rate of Interest



The Impact of a Decrease in $\overline{T}$

$\overline{AE} = \overline{C} - c\overline{T} + c\overline{TR} + \overline{I} + \overline{G}$



The Impact of a Decrease in $\overline{T}$

$$\text{IS: } i = \frac{\overline{AE}}{b} - \frac{1 - c(1-t)}{b} Y$$

$$\text{LM: } i = \frac{-\overline{M}/\overline{P}}{h} + \frac{k}{h} Y$$

$$Y^* = \frac{1}{1 - c(1-t) + bk/h} \overline{AE} + \frac{1}{(h/b)[1 - c(1-t)] + k} \overline{M}/\overline{P}$$

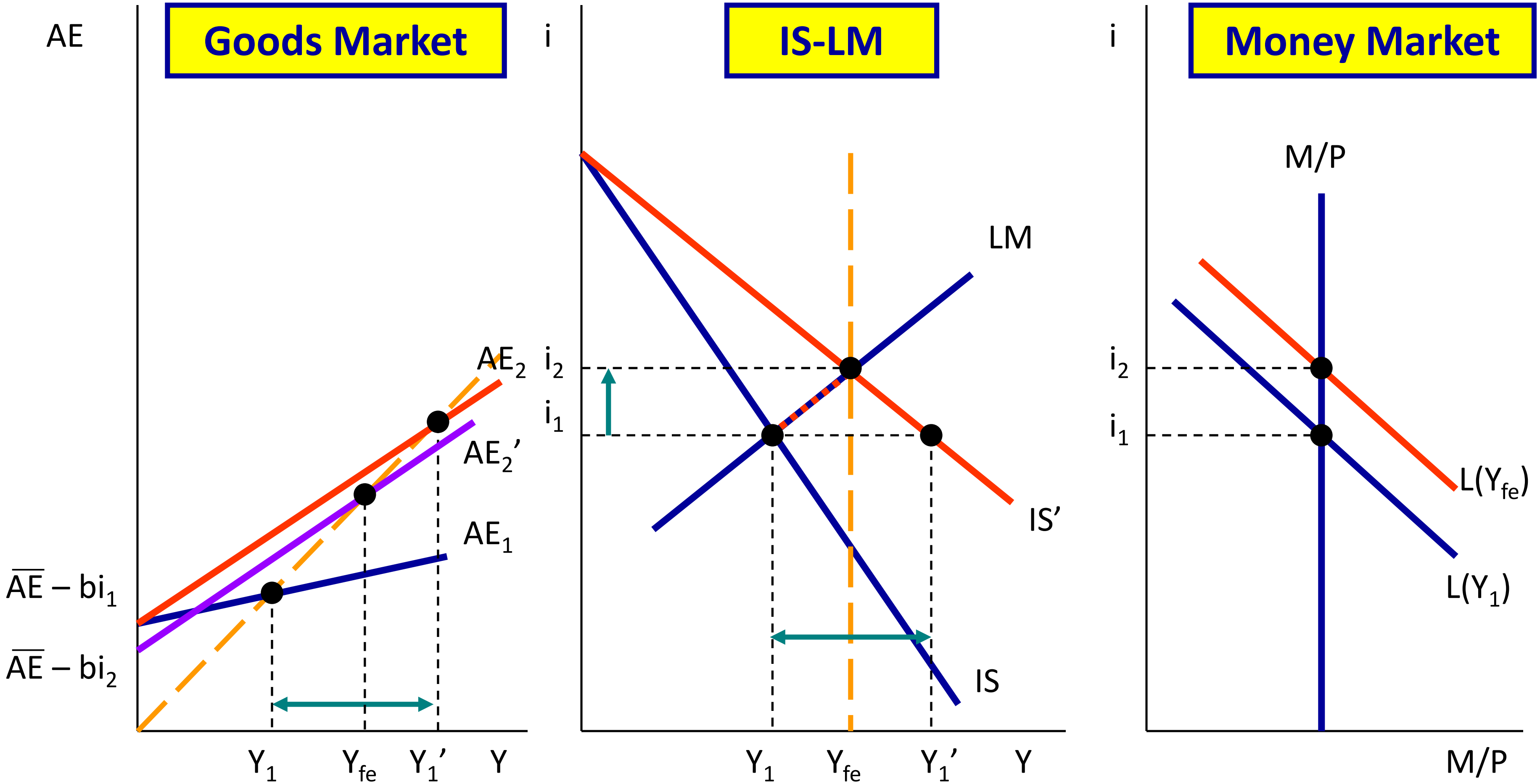
- A decrease in $\overline{T}$ causes an increase in AE → $\Delta\overline{AE} = -c\,\Delta\overline{T}$
- An increase in $\overline{AE}$ causes the IS curve to shift up by $-c\,\Delta\overline{T} / b$ or horizontally to the right by $\alpha_{AE}(-c\,\Delta\overline{T})$
- In turn, the increase in $\overline{AE}$ causes equilibrium income to increase by

$$\{1 / [1 - c(1-t) + bk/h]\}\,(-c)\,\Delta\overline{T}$$

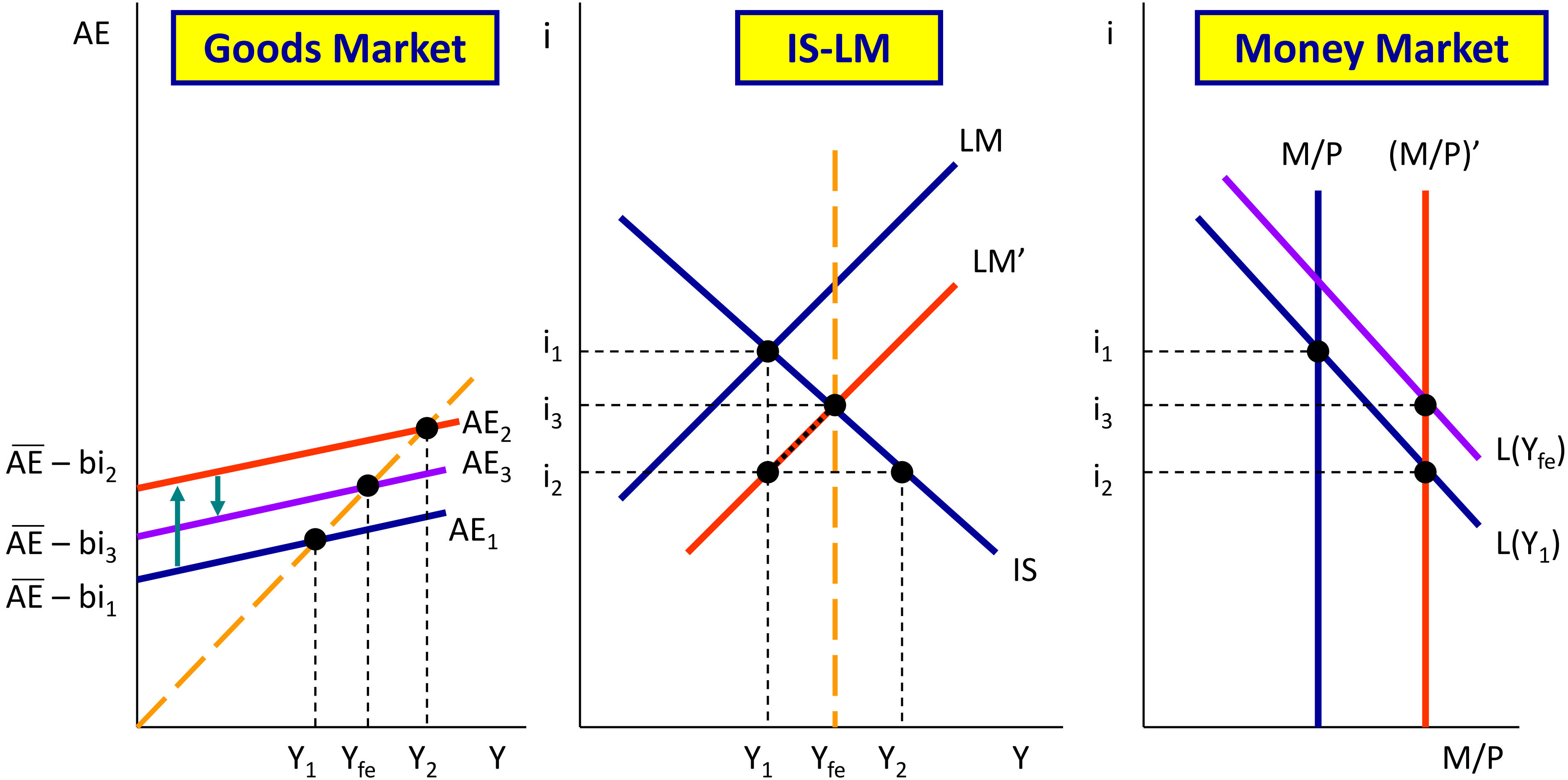
The Impact of a Decrease in "t"

$AE_1 = \overline{AE} - bi_1 + c\,(1-t)\,Y$

$$i = \frac{\overline{AE}}{b} - \frac{1 - c\,(1-t)}{b}\,Y$$



The Impact of an Increase in $\overline{M}/\overline{P}$



The Impact of an Increase in $\overline{M}/\overline{P}$

$$\text{IS: } i = \frac{\overline{AE}}{b} - \frac{1 - c(1 - t)}{b} Y$$

$$\text{LM: } i = \frac{-\overline{M}/\overline{P}}{h} + \frac{k}{h} Y$$

$$Y^* = \frac{1}{1 - c(1 - t) + bk/h} \overline{AE} + \frac{1}{(h/b)[1 - c(1 - t)] + k} \overline{M}/\overline{P}$$

An increase in $\overline{M}/\overline{P}$ shifts the LM curve down by

$$-(1/h)\, \Delta(\overline{M}/\overline{P})$$

In turn, the increase in $\overline{M}/\overline{P}$ causes equilibrium income to increase by

$$[1/\{(h/b)\, [1 - c(1 - t)] + k\}\, \Delta(\overline{M}/\overline{P})$$

The Monetary Policy Multiplier

$$Y^* = \frac{1}{1 - c\,(1 - t) + bk/h}\,\overline{AE} + \frac{1}{(h/b)[1 - c\,(1 - t)] + k}\,\overline{M}/\overline{P}$$

$$\Delta Y^* = \frac{1}{(h/b)\,[1 - c\,(1 - t)] + k}\,\Delta(\overline{M}/\overline{P})$$

$$\beta_{MP} = \frac{\Delta Y^*}{\Delta(\overline{M}/\overline{P})} = \frac{1}{(h/b)\,[1 - c\,(1 - t)] + k}$$

$$\Delta Y^* = \beta_{MP}\,\Delta(\overline{M}/\overline{P})$$

Changes in Money Supply

- The Bank of Canada changes the real supply of money through ***open market operations***
- An open market operation is the sale of government bonds to the public (or commercial banks) or the purchase of government bonds from the public (or commercial banks) by the Bank of Canada
- When the Bank of Canada ***buys*** government bonds in the market, the real ***money supply*** increases
  - This includes the so-called ***quantitative easing***
- When the Bank of Canada ***sells*** government bonds in the market, the real ***money supply*** decreases

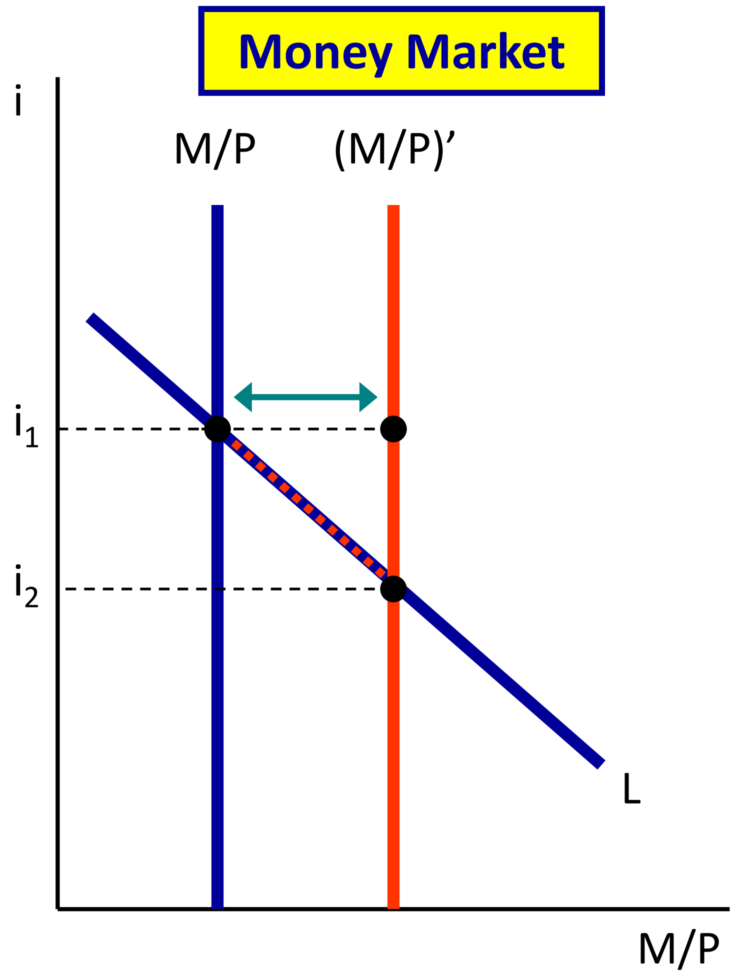
The Impact of an Open Market Purchase by the Bank of Canada

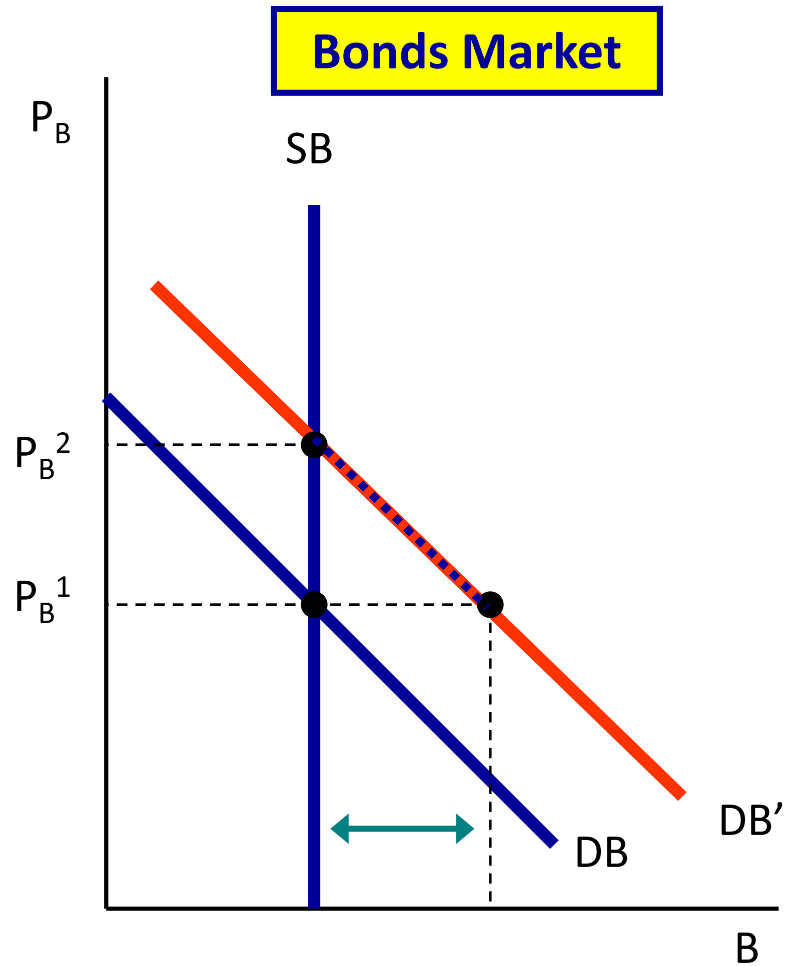
- When the Bank of Canada buys government bonds from the public, it creates an ***excess demand*** for bonds
  - Since the public receives money for their bonds, this also creates an ***excess supply*** of money

- Therefore, the P_B increases to eliminate the excess demand in the bonds market
  - As P_B increases, its ***yield*** (the ***rate of interest***) falls
  - As **i** decreases, the excess money supply is eliminated

- It is the reduction in **i** that causes investment to increase (increase in **AE**), and thus the equilibrium **Y** to rise

Open Market Purchase

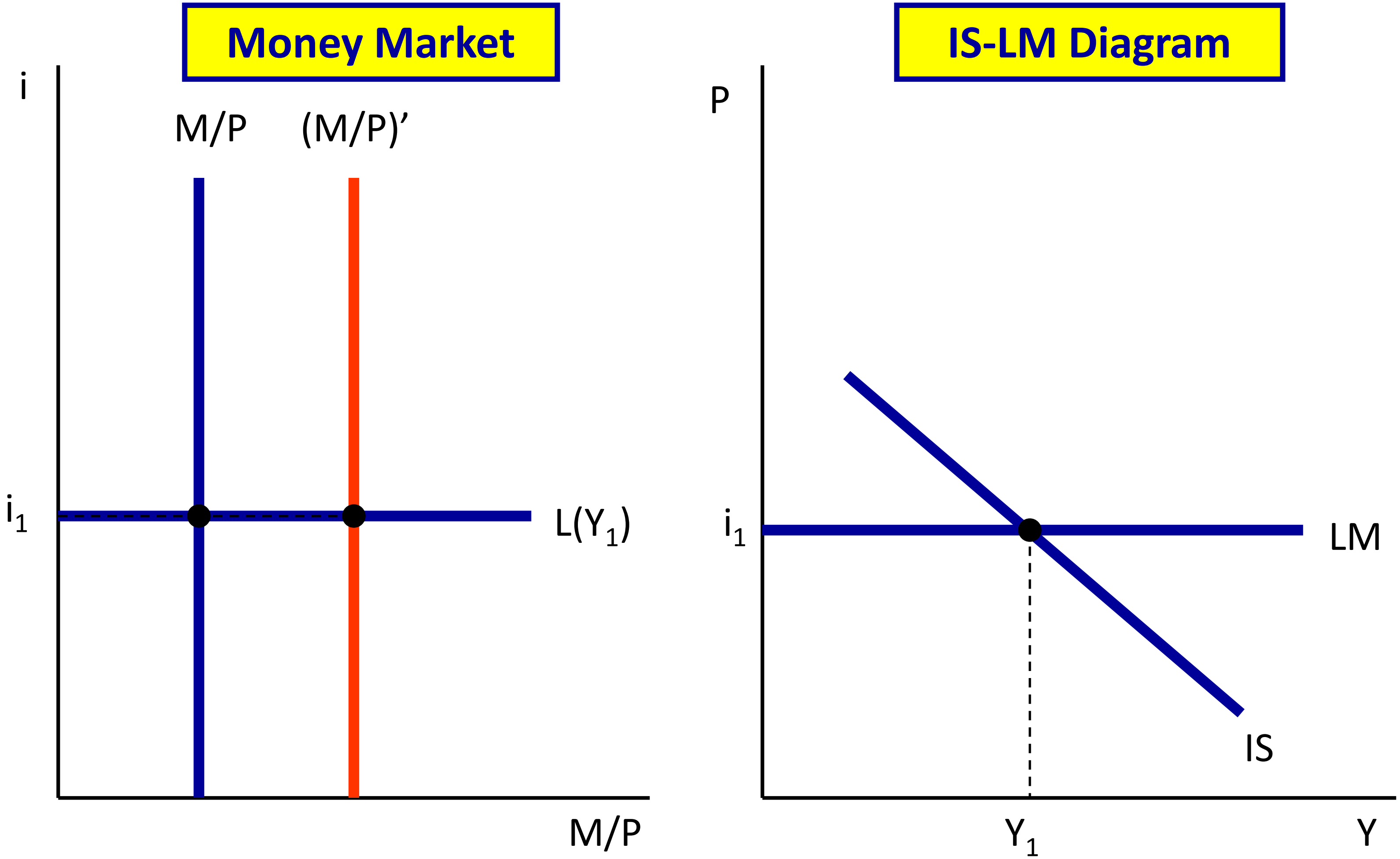




THE LIQUIDITY TRAP

- The ***liquidity trap*** occurs when the **L** curve is very flat at low levels of **i**, and thus the **LM** curve is also very flat
- At the extreme, the **L** curve is horizontal at the given **i**
  - This means that at the given **i** the public is willing to hold any amount of money supplied (i.e., **h = ∞**)
  - Therefore, the **LM** is also horizontal and thus changes in **M** do not affect its position
- In this case, ***monetary policy*** is ineffective, i.e., it has little or no effect on **i** and thus on the level of **Y**
  - But ***fiscal policy*** is very effective in this case

THE LIQUIDITY TRAP (CONT'D)



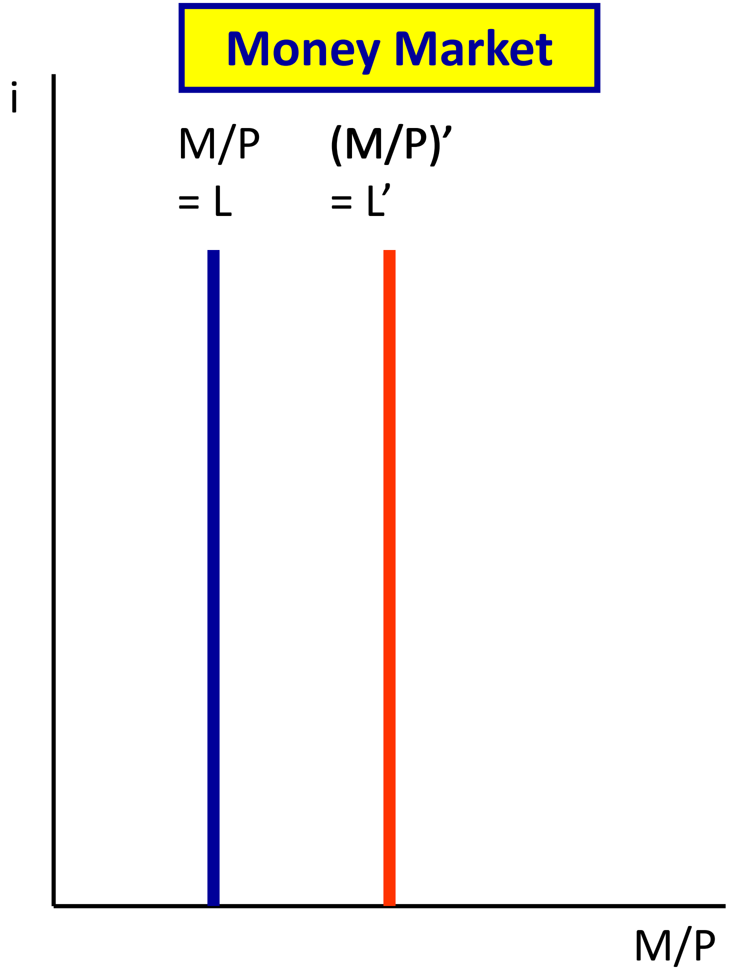
The Classical Case

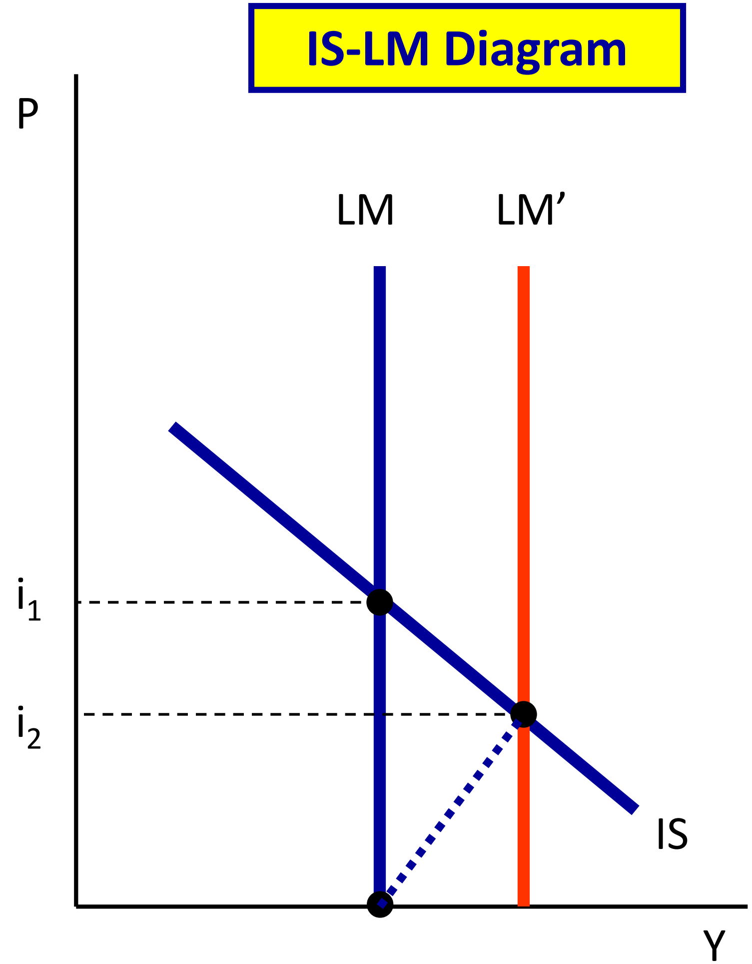
- The opposite case would be when the **L** curve is very steep at relatively high levels of **i**, and thus the **LM** curve is also very steep

- In the extreme case, the ***classical case***, the **L** curve is vertical (i.e., **h = 0**)
  - This means that the demand for money is completely unresponsive to changes in **i** (it depends only on **Y**)
  - Therefore, the **LM** curve is also vertical

- In this case, ***monetary policy*** is very effective, i.e., it has the maximum effect on the level of output
  - But ***fiscal policy*** is completely ineffective in this case

THE CLASSICAL CASE (CONT'D)





ACCOMMODATING POLICIES

- On the one hand, expansionary ***fiscal policy*** increases both **Y** and **i**
- On the other hand, expansionary ***monetary policy*** increases **Y** while decreasing **i**
- The government, however, can use a combination of both fiscal and monetary policies to increase **Y** without affecting **i**
- For instance, an increase in **G** can be accompanied by an increase in **M** thus leaving **i** unchanged
  - In this case, the Bank of Canada is implementing ***accommodating*** monetary policy

Monetary Accommodation