PRINCIPLES OF MACROECONOMICS

FINAL EXAM REVIEW

KEY CONCEPT REVIEW

SHORT-RUN DYNAMICS

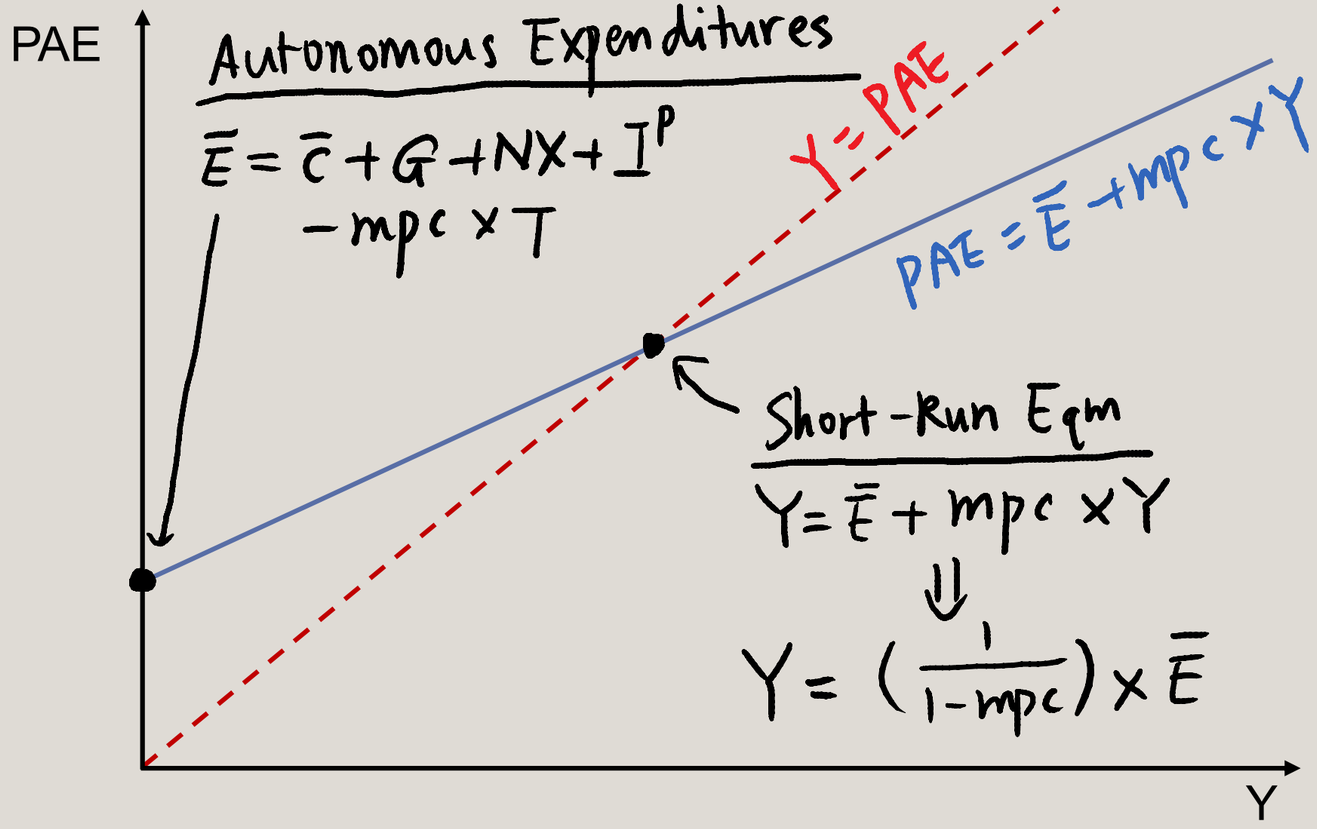
- Planned Aggregate Expenditures (PAE): $\underline{PAE = C + I^P + G + NX}$
- Planned investment can be different from actual investment
- Consumption determined by income Y-T: $\underline{C = \bar{C} + mpc \cdot (Y - T)}$
  - $\bar{C}$ = autonomous consumption
  - mpc = marginal propensity to consume (0 < mpc < 1)
  - mpc < 1 because we don't spend all our disposable income; some of the income is saved
- Hence:

$$PAE = \bar{C} + mpc \cdot (Y - T) + I^P + G + NX$$

or

$$PAE = \underbrace{(\bar{C} + G + I^P + NX - mpc \cdot T)}_{\bar{E} = \text{autonomous expenditure}} + \underbrace{mpc \cdot Y}_{\text{induced expenditure}}$$

KEYNESIAN CROSS



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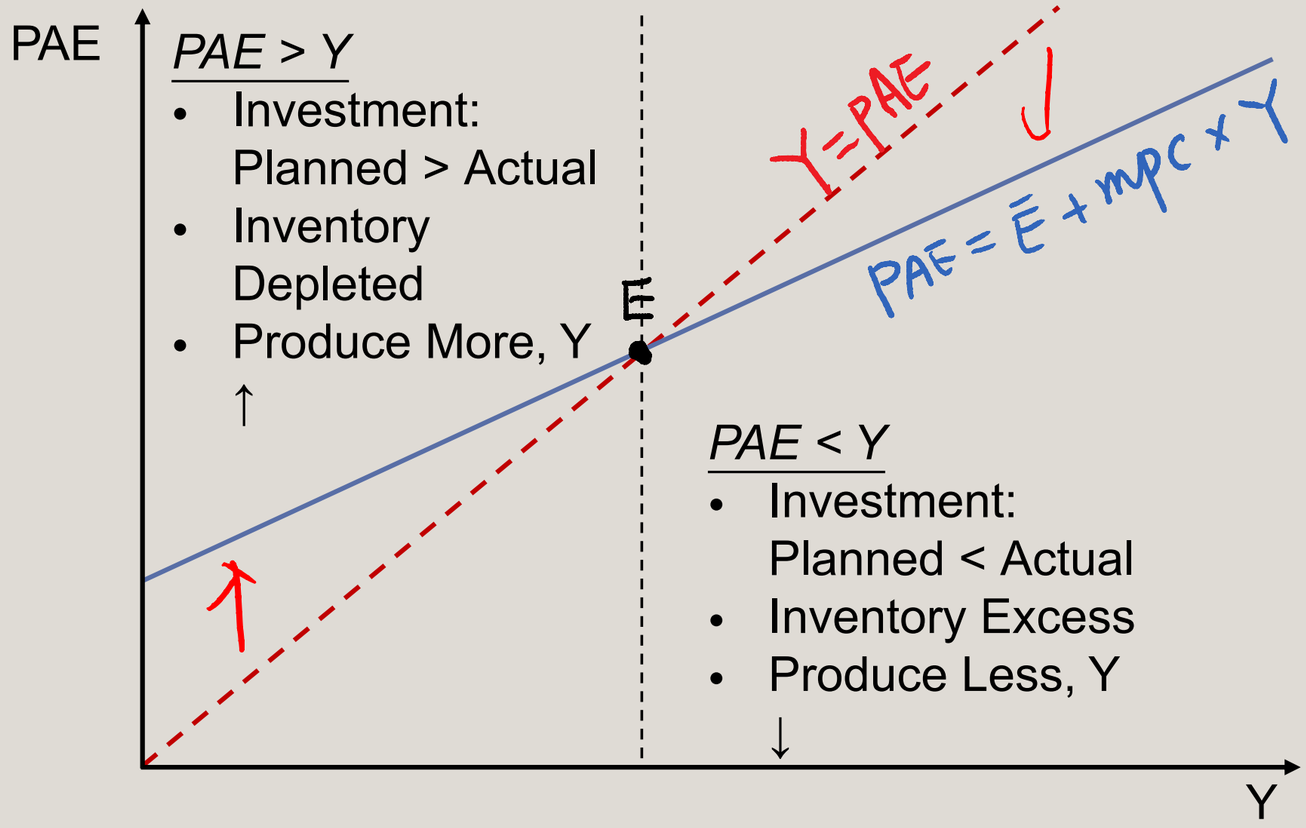


WHAT AFFECTS SHORT-RUN EQUILIBRIUM

- Short-Run Equilibrium = Multiplier × Autonomous Expenditures

$$\boldsymbol{Y} = \left(\frac{\mathbf{1}}{\mathbf{1}-\boldsymbol{mpc}}\right) \times \bar{\boldsymbol{E}}$$

- Marginal Propensity to Consume closer to 1 means higher Multiplier

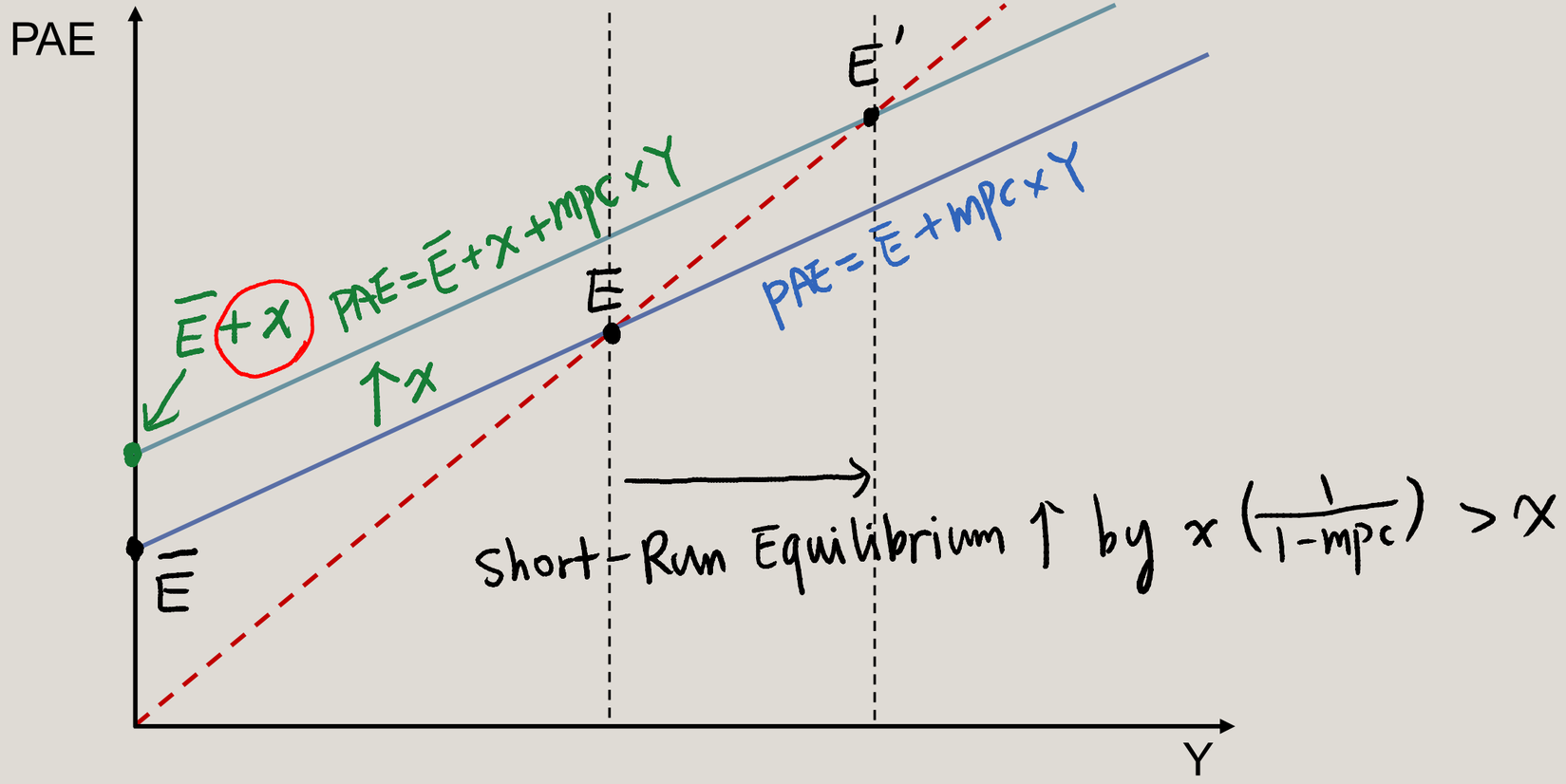
$$\boldsymbol{mpc} \uparrow \Leftrightarrow \left(\frac{\mathbf{1}}{\mathbf{1}-\boldsymbol{mpc}}\right) \uparrow$$

- Change short-run equilibrium in 2 ways:
  - Change Autonomous Expenditures by changing any of:
    - Autonomous Consumption ($\bar{C}$)
    - Planned Investment (I^P)
    - Government Purchases (G)
    - Net Exports (NX)
    - Taxes
    - Transfers

    (Recall T = Net Taxes = Taxes – Transfers)

    Moves PAE curve up/down, but does not change slope.
  - Change Marginal Propensity to Consume (mpc). Changes slope and intercept $\bar{E}$. This is more complicated and we did not consider it in class.

KEYNESIAN CROSS – SHIFT PAE UP ($\bar{E}$ INCREASES BY X)



SHIFTING PAE CURVE UP/DOWN

- 1 unit increase in $\bar{E}$ ➔ $(\frac{1}{1-mpc})$ unit increase in Short-Run Equilibrium

  Multiplier Effect!

- Recall equation for Autonomous Expenditures: $\boldsymbol{\bar{E} = \bar{C} + G + I^P + NX - mpc \cdot (Taxes - Transfers)}$
- A 1 unit increase in $\bar{C}, G, I^P, NX$ implies 1 unit increase in $\bar{E}$, hence implies a $(\frac{1}{1-mpc})$ unit increase in Short-Run Equilibrium.
- A 1 unit increase in Transfers implies a mpc unit *increase* in $\bar{E}$, hence a $mpc \cdot (\frac{1}{1-mpc}) = \frac{mpc}{1-mpc}$ unit increase in Short-Run Equilibrium.
- A 1 unit increase in Taxes implies a mpc unit *decrease* in $\bar{E}$, hence a $\frac{mpc}{1-mpc}$ unit decrease in Short-Run Equilibrium.

SHIFTING PAE CURVE UP/DOWN - SUMMARY

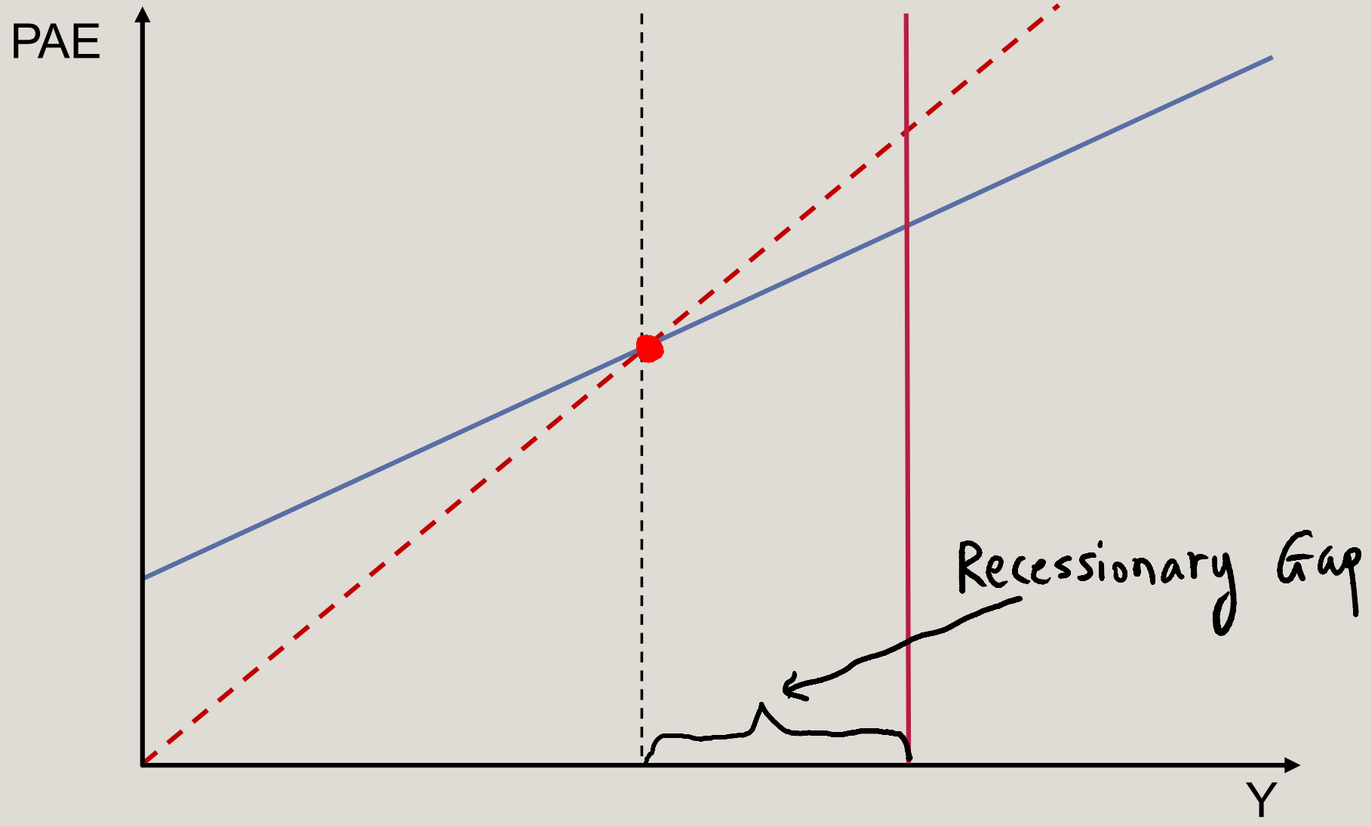
- To **increase** Short-Run Equilibrium Output (Y) can:
  - Increase: $\bar{C}$,G, I^P,NX, or Transfers
  - Decrease: Taxes
- To **decrease** Short-Run Equilibrium Output (Y) can:
  - Decrease: $\bar{C}$,G, I^P,NX, or Transfers
  - Increase: Taxes

- Next:
  - Why do we want to affect the short-run equilibrium output?

    Expansionary/Recessionary Gaps!
  - How do we increase/decrease $\bar{C}$,G, I^P,NX, T?

    Fiscal Policy (G and T), Monetary Policy (I^P and $\bar{C}$)

RECESSIONARY GAP:
SHORT-RUN EQUILIBRIUM < POTENTIAL OUTPUT Y*



ELIMINATE RECESSIONARY GAP (FISCAL POLICY WITH G)

- Need to increase Short-Run Equilibrium by Y* - E units
- Use Fiscal Policy (G):
  - 1 unit increase of G implies a $(\frac{1}{1-mpc})$ unit increase in Short-Run Equilibrium, E.
  - To get a (Y* - E) increase in Short-Run Equilibrium (and hence eliminate gap), need to

$$\text{Increase G by: } \frac{Y^* - E}{\frac{1}{1-mpc}} = (1 - mpc) \cdot (Y^* - E) \text{ units}$$

  - Summary: Increase Government Purchases by Gap divided by Multiplier

ELIMINATE RECESSIONARY GAP (FISCAL POLICY WITH G)

Example: Potential Output Y* = 1100, $\bar{E}$ = 200, and mpc = 0.8.

a) What is the multiplier?

Multiplier = $\frac{1}{1-mpc} = \frac{1}{1-0.8} = 5$

b) What is the short-run equilibrium output?

PAE = 200 + 0.8Y, solve for PAE = Y:

Y = 200 + 0.8Y ➔ Y = 200/(1 - 0.8) = 1000

(Could just do $\bar{E}$ × Multiplier = 200 × 5 = 1000)

c) Recessionary Gap = 1100 – 1000 = 100. How much to increase Government Purchases to eliminate gap?

Every unit increase of G increase short-run equilibrium by 5. To eliminate 100 unit gap,

Increase G by $\frac{Gap}{Multiplier}$ = 100/5 = 20

ELIMINATE RECESSIONARY GAP (FISCAL POLICY WITH TAXES)

- As before, need to increase Short-Run Equilibrium by Y* - E units
- Use Fiscal Policy (Taxes):
  - 1 unit *decrease* of Taxes implies a $\frac{mpc}{1-mpc}$ unit increase in Short-Run Equilibrium, E.
  - To get a (Y* - E) increase in Short-Run Equilibrium (and hence eliminate gap), need to

decrease *Taxes* by: $\frac{Y^*-E}{\frac{\text{mpc}}{1-mpc}} = \left(\frac{1-mpc}{mpc}\right) \cdot (Y^* - E)$ units

ELIMINATE RECESSIONARY GAP (FISCAL POLICY WITH TAXES)

Example: Potential Output Y* = 1100, $\bar{E}$ = 200, and mpc = 0.8.

d) Recessionary Gap = 1100 – 1000 = 100. How to change Taxes to eliminate gap?

Method 1: Every unit decrease in Taxes increase short-run equilibrium by $\frac{mpc}{1-mpc}$ = 0.8/0.2 = 4. To eliminate 100 unit gap,

$$\text{decrease Taxes by } \frac{\frac{Gap}{\text{mpc}}}{1-mpc} = 100/4 = 25$$

Method 2: To raise short-run equilibrium by 100, need to increase autonomous expenditures by 20 (since 20 × 5 = 100). Recall, $\bar{E} = \bar{C} + G + I^P + NX - mpc \cdot T$

so how much do we need to decrease T so that $\bar{E}$ increases by 20?

Every unit decrease in T gives us a mpc unit increase in $\bar{E}$, so T needs to decrease by 20/mpc = 20/0.8 = 25 units.

ELIMINATE RECESSIONARY GAP (FISCAL POLICY WITH TAXES)

e) Why did we need to decrease taxes more than increase government purchases?

When Taxes decrease, disposable income increases, but not all of the additional income is spent on consumption; some will be saved. So we need larger tax reduction to get same spending increase as just increasing government purchases, G.

ISSUES WITH FISCAL POLICY

- Relative Inflexibility
  - Changes to taxes/government spending are legislative, and slow.
  - Also have other goals such as income redistribution, national defense, social safety net.
- Deficits: increasing government spending
  - reduces national savings,
  - decreases investment in capital goods, and
  - reduces long-run growth.
- Affects potential output in addition to planned spending.

USING MONETARY POLICY TO AFFECT $\bar{C}$ AND I^P

- Real Interest Rate = Nominal Interest Rate – Inflation

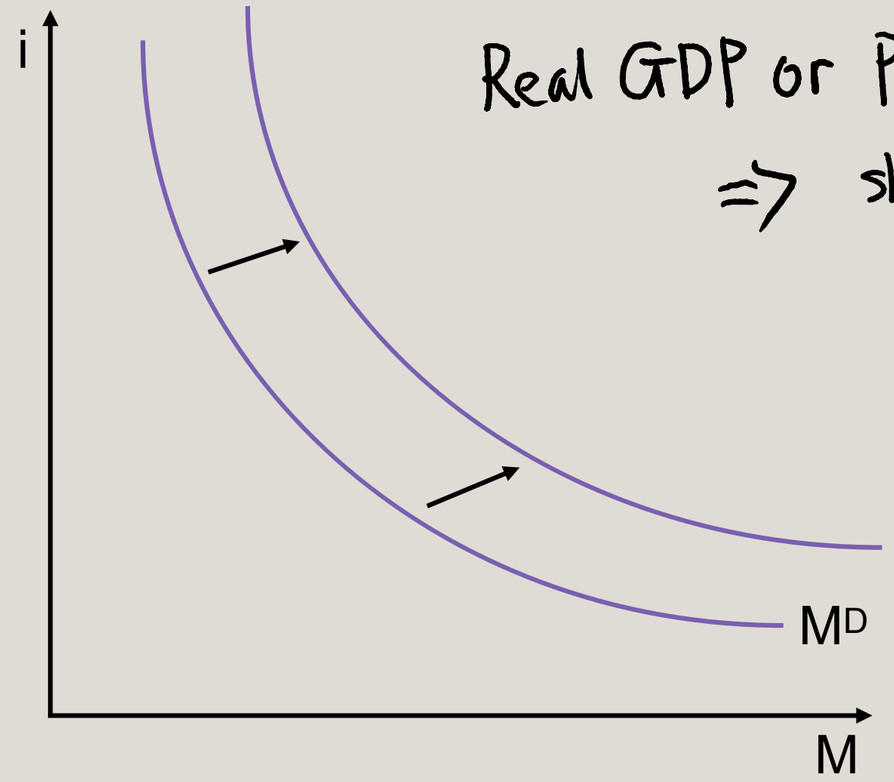
$$r = i - \pi$$

- A higher real interest rate leads to:
  - Increased savings, and hence less consumption
  - Decreased investment (since borrowing money is more expensive)
- Hence r ↑ ➔ $\bar{C}$ ↓, I^P ↓ ➔ $\bar{E}$ ↓ ➔ Y ↓
- If we know how r affects $\bar{C}$ and I^P, we can change r to increase/decrease $\bar{E}$, and hence increase/decrease short-run equilibrium output.

DEMAND FOR MONEY

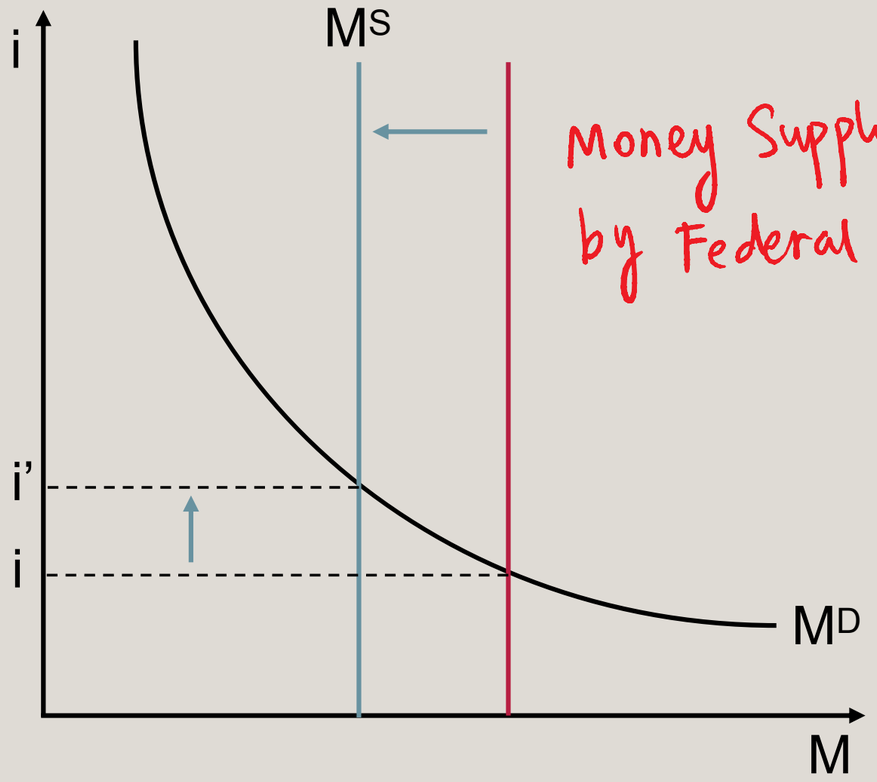
- To understand how to set interest rate, examine demand for money.
- Demand for Money:
  - Benefit of holding money
    - Need money for transactions.
    - More transactions, more benefit, and higher demand when real GDP Y ↑ or price level P ↑.
  - Cost of holding money
    - Forgo interest payments.
    - Higher interest rates, higher cost, less demand.

MONEY DEMAND CURVE



Real GDP or Price Level increases
⇒ shift right

EQUILIBRIUM FOR MONEY



How the Federal Reserve Sets r

- To **increase** interest rate, **decrease** money supply:
  - Open market **sale** of bonds
  - More bonds being sold → prices of bonds drop → interest rates on bonds increase → people buy new lower priced bonds with money → money supply increases
- To **decrease** interest rate, **increase** money supply:
  - Open market **purchase** of bonds
  - More bonds being purchased → prices of bonds rise → interest rates on bonds decrease → people sell new high priced bonds and get more money → money supply increases
- We assume that, in the short-run, *inflation is constant*. A change in the nominal interest rate gives the same change in the real interest rate.