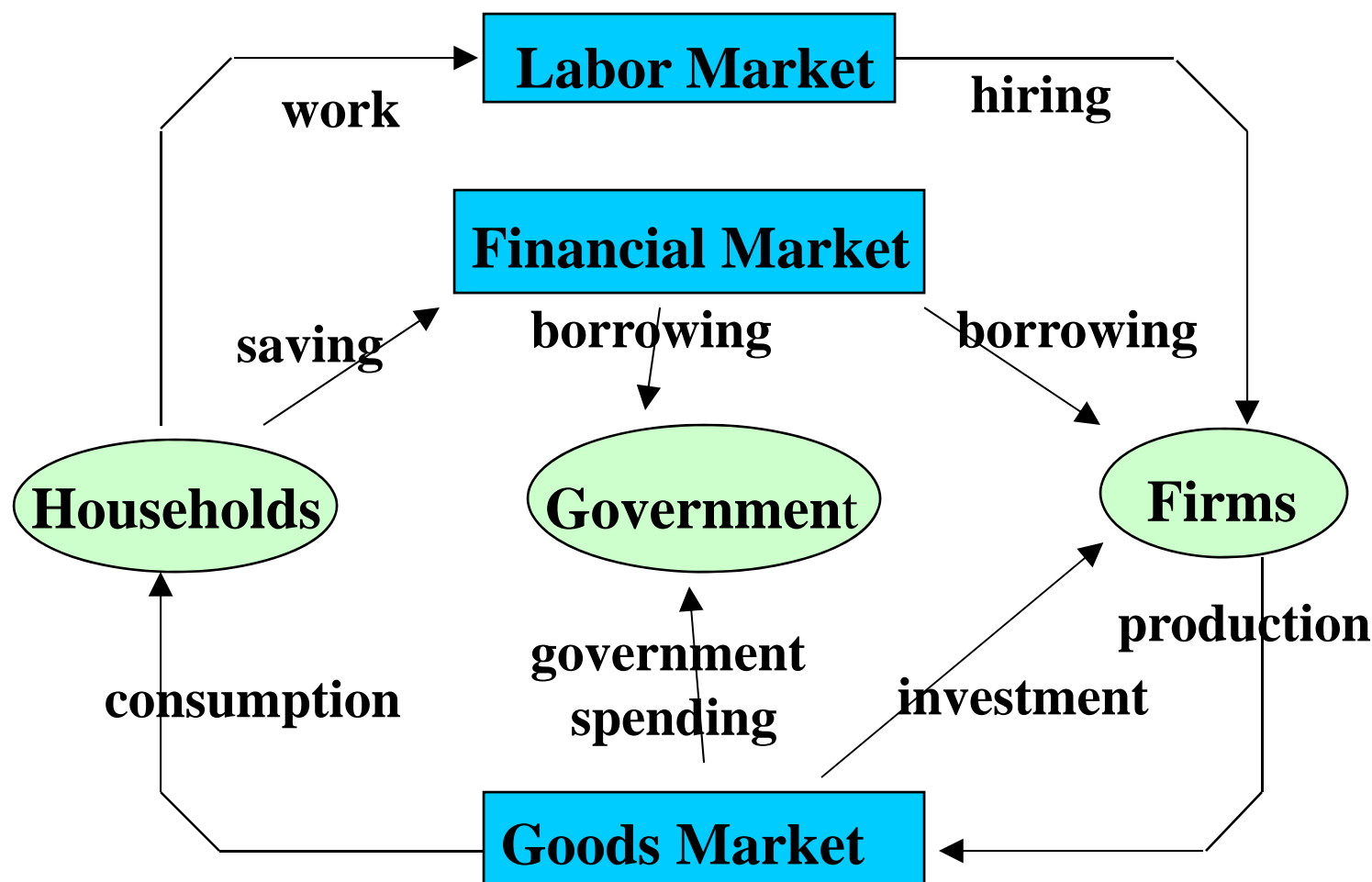


# Review: objectives

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- Remind you of the main theories.
- Overview of how parts of the course all fit together.
- Draw the most important and general lessons to remember from the course.

# Macroeconomic model with Three Markets & Three agents



# Building blocks of theories

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- Production: depends on factors capital and labor

$$Y^s = F(K, L)$$

- Demand for goods comes from  $C + I + G$
- Consumption behavior: responds to current income by a MPC:

$$C = \bar{C} + bY$$

- Fisher model suggests should include future income and the interest rate also.

# Building blocks continued

- Investment behavior: responds to the interest rate

$$I = \bar{I} - dY$$

- Money demand behavior: responds to both the interest rate and income, as well as proportional to price level.

$$\left( \frac{M}{P} \right) = eY - fr$$

- These building blocks summarize our assumptions about how people behave, and can be combined in different ways.

# Equilibrium in the Long Run

- Key assumption: Prices are flexible to clear markets (Supply=demand)
- This is assumed by the Neoclassical model.

- Equilibrium condition:  $Y^s = C + I + G$

or equivalently:  $S = I$

- So  $Y = \bar{Y} = F(\bar{K}, \bar{L})$

- And  $\bar{Y} = C(\bar{Y}) + I(r) + \bar{G}$

the interest rate adjusts to make investment equal available saving in the economy.

# Equilibrium in the Long Run

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## Big Lesson #1:

In the long run, the level of GDP is determined by the supply side of economy (available factors and technology).

# Equilibrium in the Long Run

- Nominal side of the economy:

Money supply set by central bank:  $M^s = \bar{M}$

- Equilibrium in money market:

$$\frac{\bar{M}}{P} = eY - fr$$

- Since  $Y$  and  $r$  are already determined, the money market determines the price level.
- So a rise in  $M^s$  will raise  $P$  (inflation) proportionately.  $P = M^s / (e\bar{Y} - f\bar{r})$

# Equilibrium in the Long Run

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## Big Lesson #2: Classical Dichotomy

In the long run, a change in money supply only affects nominal variables (like price level and inflation), without affecting real variables (like GDP or unemployment).



# Equilibrium in the **Short** Run

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- Key assumption: Prices are fixed, so markets do not clear (Supply  $\neq$  demand)

use  $P = \bar{P}$     **not**     $Y = \bar{Y} = F(\bar{K}, \bar{L})$

- This is assumed by the Keynesian model
- Goods market equilibrium: production adjusts to planned expenditure:

$$\begin{aligned} Y &= C + I + G \\ &= \bar{C} + bY + \bar{I} - dr + \bar{G} \end{aligned}$$

# Equilibrium in the **Short** Run

---

$$\begin{aligned} Y &= C + I + G \\ &= \bar{C} + bY + \bar{I} - dr + \bar{G} \end{aligned}$$

- This is an IS curve:

$$Y = \frac{1}{1-b} [\bar{C} + \bar{I} + \bar{G} - dr]$$

- Which says output and interest rate can be affected by changes in fiscal policy like **G**.

# Equilibrium in the **Short** Run

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- Money market: With  $r$  and  $Y$  now free, the money equilibrium becomes an LM curve:

$$\frac{M^s}{\bar{P}} = eY - fr$$

$$\Rightarrow r = \frac{e}{f}Y - \frac{1}{f} \frac{M^s}{\bar{P}}$$

- Which says output and interest rate can be affected by changes in money supply.

# Equilibrium in the **Short** Run

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- Big Lesson #3:

In the short run, changes in demand side of economy affects amount of goods produced

- Big lesson #4: Break Classical Dichotomy:

In short run, a rise in money supply does affect the level of GDP and other real variables.

# The SR and LR effects of an *IS* shock

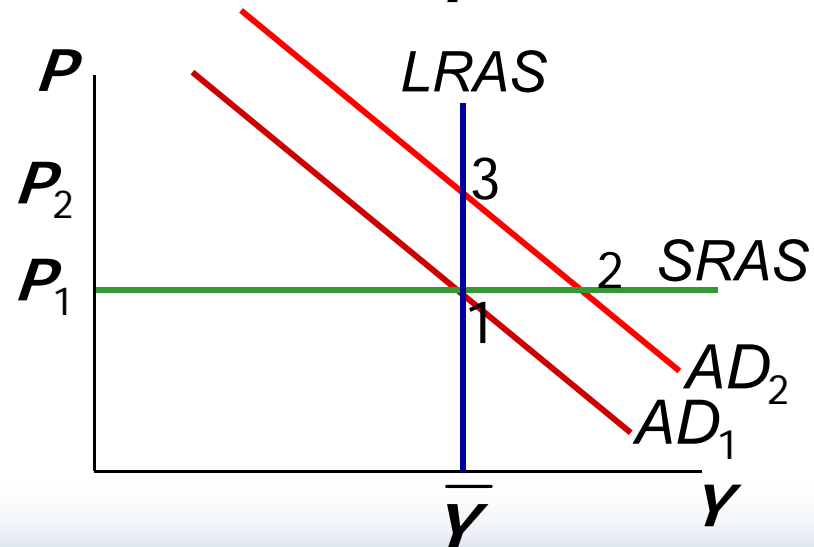
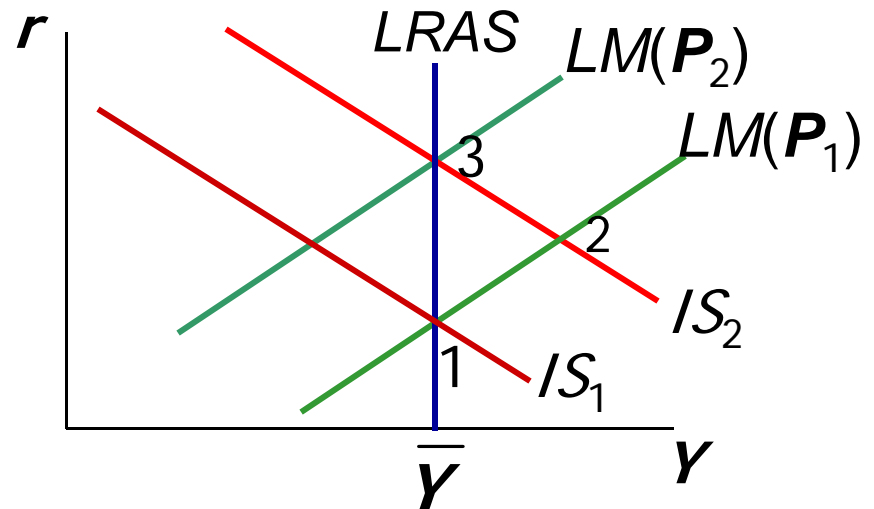
A rise in  $G$  shifts the  $IS$  curve right...

raising output and the interest rate in the short run.

In the long run, the price level rises...

which shifts the  $LM$  curve left...

Until output returns to its normal level.



# The SR and LR effects of an *LM* shock

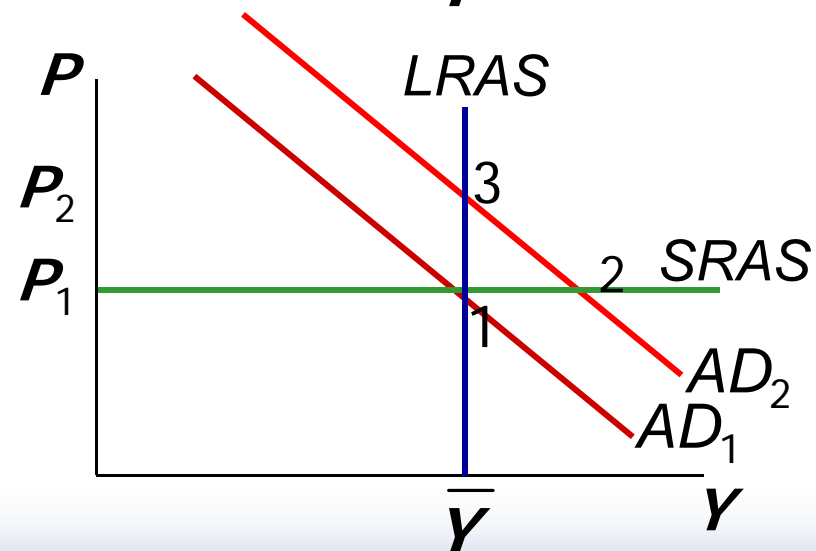
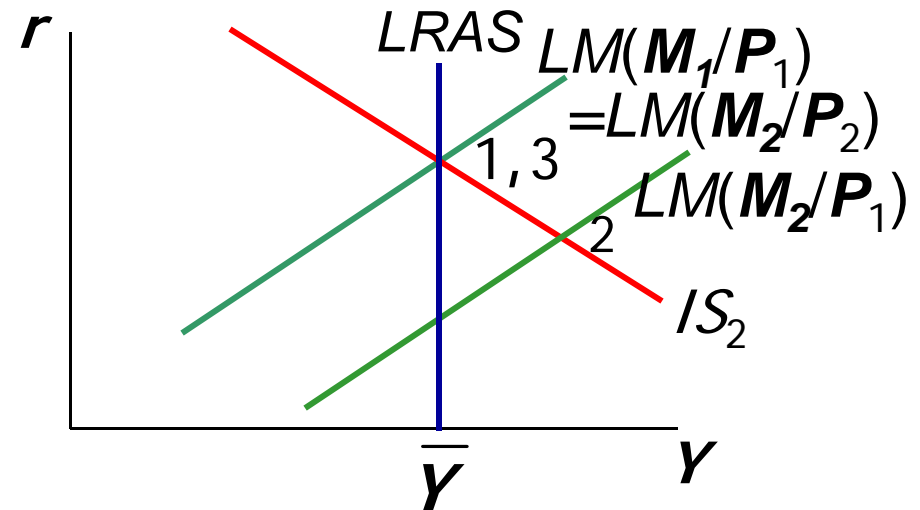
A rise in  $M$  shifts the LM curve right...

Lowering the interest rate and raising output in the short run.

In the long run, the price level rises...

shifting the LM back to its original position

Until output returns to its normal level.



## Other things to know:

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A Phillips curve describes the tradeoff policy makers can choose, between reductions in unemployment and inflation.

$$\pi = \pi^e - \beta(u - u^n)$$

So if monetary or fiscal policy is used to raise output and reduce unemployment, this typically comes at the cost of extra inflation.

# Main ideas from Solow Growth Model

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- The steady state condition (where a country ends up in the long run) depends on its saving rate, population growth rate, and technological progress:

$$s f(k) = (\delta + n + g)k$$

- The golden rule condition (where consumption per person is highest) is also determined by these same things:

$$MPK = \delta + n + g$$

- Getting to the golden rule requires the right saving rate and good policies.



# Factors market

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- In a well-functioning factors market, the rate of payment is determined by the marginal productivity:

labor: *real wage* = *MPL*

capital: *real rental rate* = *MPK*

- Natural rate of unemployment comes from:
  - Structural causes: wage rigidity, unions
  - Frictional causes: sectoral shocks, unemployment insurance

# More on Consumption Theory

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## Fisher's theory of intertemporal choice

- Consumer chooses current & future consumption to maximize lifetime satisfaction subject to an intertemporal budget constraint.
- Shows that current consumption depends on lifetime income (including both current and future income), as well as the interest rate.

This theory helps explain the 'Consumption Puzzle': why a temporary rise in income leads to a drop in average propensity to consume (APC), but a permanent rise in income leaves APC constant.