

7. AD-AS and Inflation

EE212

Read: Case & Fair, ch. 12, 13; Froyen, ch. 8, ch. 10;
LRS, ch. 23, 24, 25, 30; Mankiw ch. 20, 21, 22

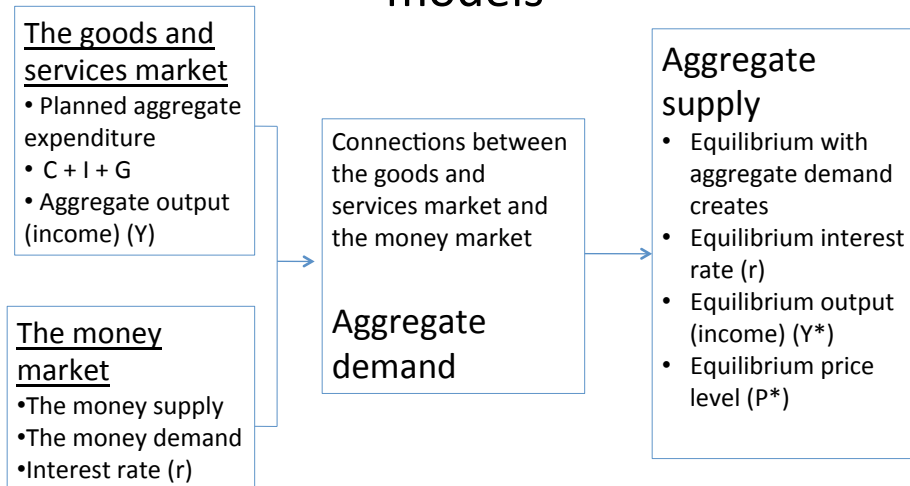
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1 Introduction

The overview of basic macroeconomic models



2 Aggregate Demand

- Aggregate Demand: The total demand for goods and services in the economy. It shows the relationship between demand for gross output (Y) at every price level (P)
- Gross output (Y) is the equilibrium output of the economy (It is the equilibrium in both good market and money market)
- Linking the money market with the goods market
 - The linkage occurs through how investment depends on r (real interest rate)
 - Linking the goods market with the money market
 - The linkage occurs through how money demand depends on Y (real output/income)
 - The linkages can be depicted through the IS-LM model.

Equilibrium in goods market

$$Y = DAE \\ = C + I + G + (X - M)$$

$$\text{Withdrawal} = \text{Injection} \\ S + T + M = I + G + X$$

- All are real variables.
- In good markets we talk about real variable, such as real national income or real gross output
- Therefore, changes in price does not affect equilibrium in good market directly.

Equilibrium in money market

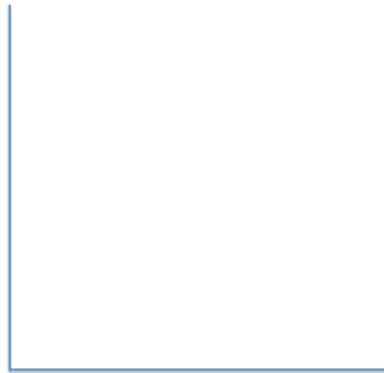
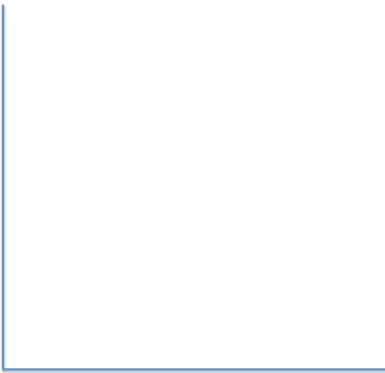
$$M^d = M^s$$

Real money Demand = Real Money Supply

$$L(Y, r) = \frac{\text{Nominal money supply}}{\text{Price level}}$$

• AD

• Shift



3 Aggregate Supply (AS)

- We have already derived the aggregate demand curve.
- Now we want to know what the aggregate supply curve looks like, so that we can find the equilibrium price and output of an economy.
- Unlike the aggregate demand curve, there are variations between short-run and long-run aggregate supply curve.
- Aggregate Supply: shows
 - total supply of goods and services in an economy. A curve that traces out the price decisions and output decisions of all firms in the economy.
 - the relationship between supply of gross output (Y) at every price level (P)
- Short run AS and Long-run AS

3.1 Short Run Aggregate Supply (SRAS)

Assumption :

- In short run, economy **is not** at full employment level (use all factors of production)
- Constant Technology

Derivation of AS:

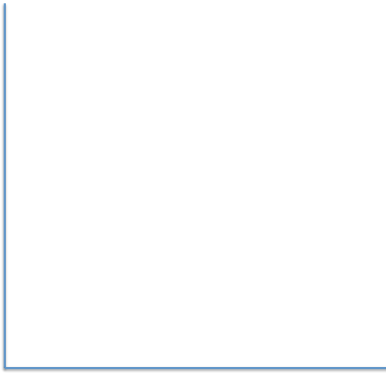
- In short run, prices of factors of production do not change much.
- Suppose producers need to use more factors of production, such as labor, but some people are still unemployed.
- Labor cannot request for higher wage that much because some people are still unemployed, so employers can employ other people
- wage may not change that much
- In short-run, we assume that wage is the main component of input cost, and that wage is “**sticky**”. With wage constant (in SR), as firms face higher demand, they can increase price and raise output in order to earn more profits.

Price Level (P) $\uparrow \Rightarrow \frac{\text{Sticky nominal wage}}{\text{price level}} = \text{real wage} \dots \Rightarrow \text{Demand for labor} \dots$

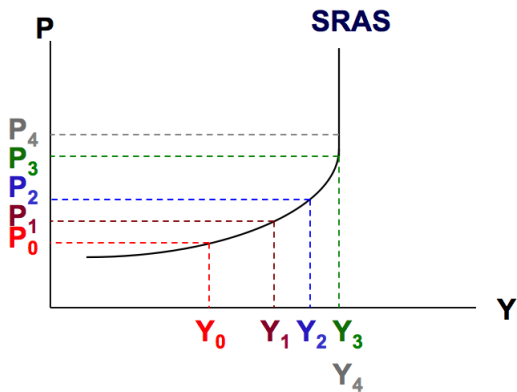
\Downarrow
 Production
 \Downarrow
 Output (Y)

- Production function

- SRAS



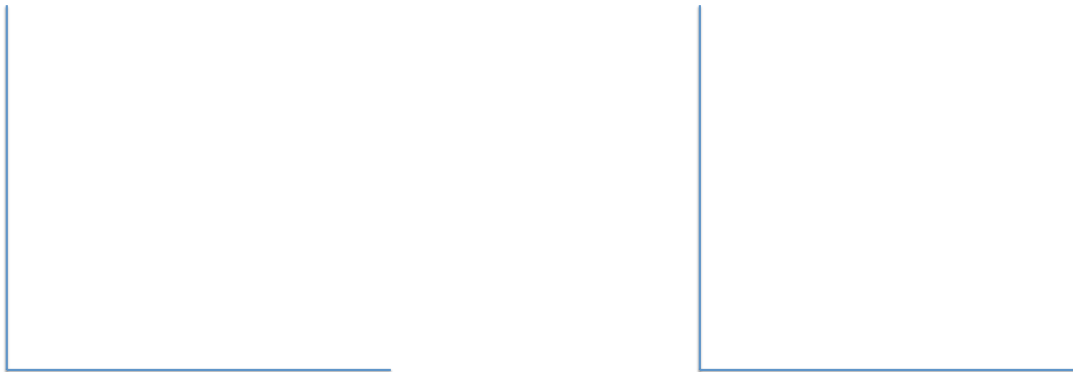
SRAS and its increasing slope



- The rationale for curving nature of SRAS.
 1. large amount of spare resources available
 2. some amount of spare resources available
 3. All available resources are fully used
- We can also think of the curve as reflecting the diminishing marginal return in production

Shift in SRAS

- With the rise in input cost
 - Such as the rise in wages or energy price SRAS
- With the rise in capacity to produce output ; such as the rise in labour force or in technology of production SRAS
- Rise in input cost
- rise in capacity to produce output

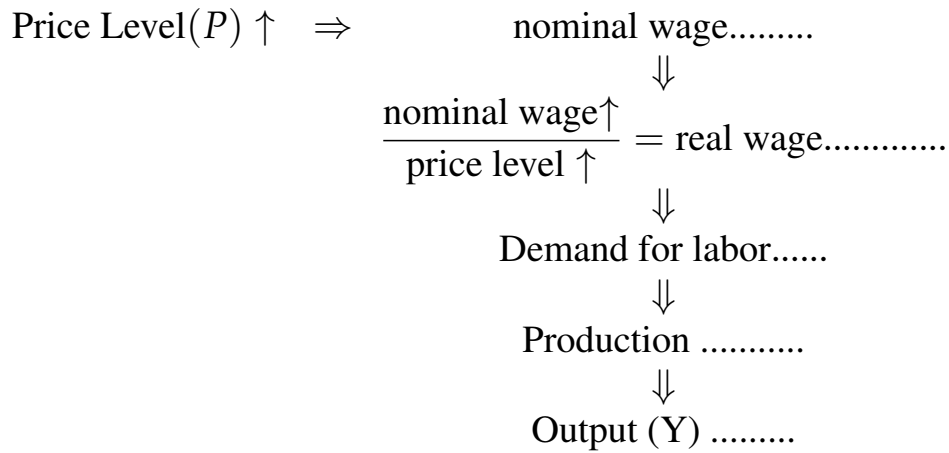


3.2 Long Run Aggregate Supply (LRAS)

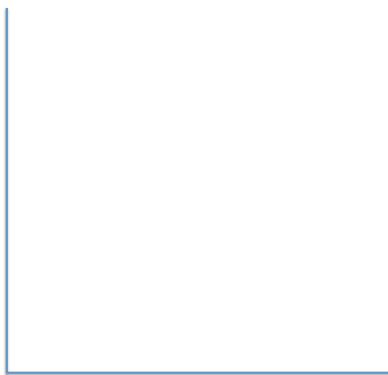
- **Assumption** : In long run, economy is at full employment level.
- In long run, **prices of factors of production can change a lot**

Derivation of LRAS curve

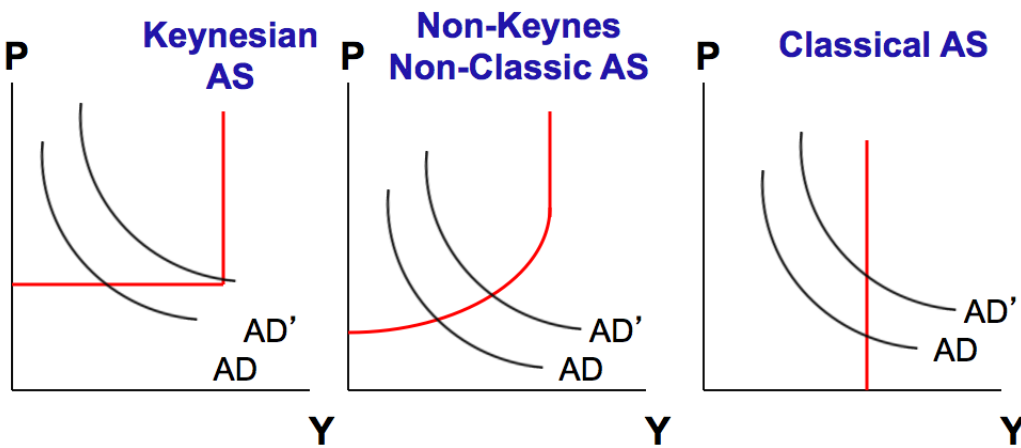
- Suppose producers need more factors of production, such as labor, but all labor are already employed.
- Labor can request for higher wage (D. for labor > S. of labor)
- Wage may change a lot.
- In the long-run, as wages can fully adjust, the profit margin from rise in prices will disappear.



- Putting SRAS and LRAS together with AD



- **Potential GDP** : The point where the LRAS lies signifies the level of output in which, if the actual output rises above there will be inflation.



- Note: LRAS sometimes known as Classical AS

Shift in LRAS curve

- LRAS may shift when potential output changes; productivity
 1. change in the availability of factors of production
 2. change in the technology
- LRAS shifts to the right ; potential output increases
- LRAS shifts to the left : potential output decrease

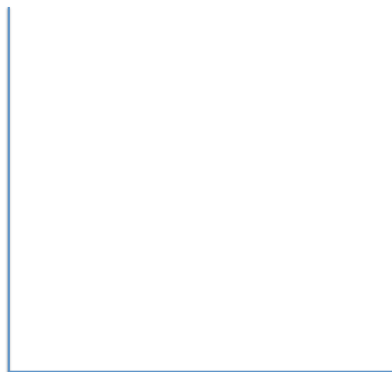


4 Changes in equilibrium

4.1 AD shift :

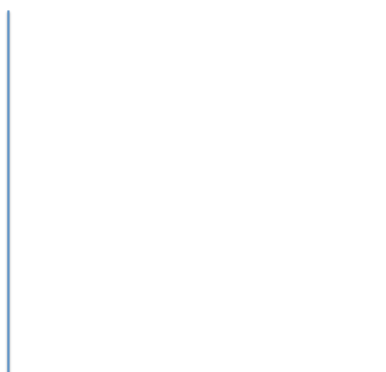
- suppose consumer credit increases

- Short run



- Price (P)
- Output (Y)

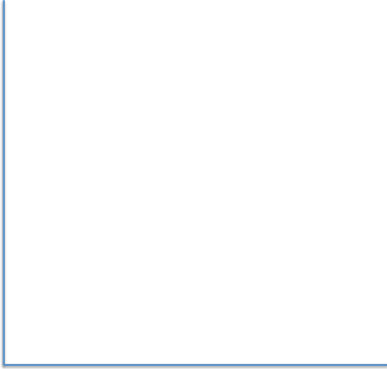
- Long run



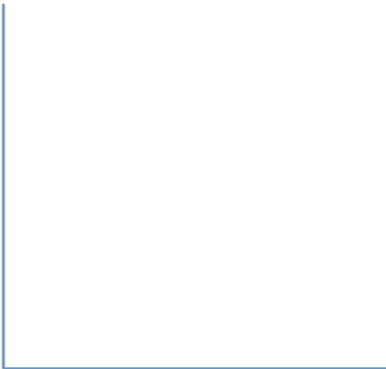
- Price (P)
- Output (Y)

4.2 AS shift :

- for example, epidemic occurs in the country
- Short run
- Long run



- Price (P)
- Output (Y)



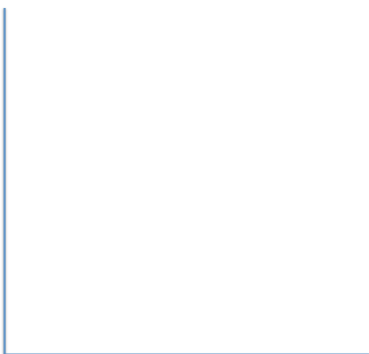
- Price (P)
- Output (Y)

• **Situation where $P \uparrow$ and $Y \downarrow$:** $P \uparrow \Rightarrow$ inflation , $Y \downarrow \rightarrow$ stagnation, $P \uparrow$ and $Y \downarrow \Rightarrow$ stagflation

• **Results of Solving problem of gross output (Y) :** The case when AS shift; AD

- Short run

- Long run



- Price (P)

- Price (P)

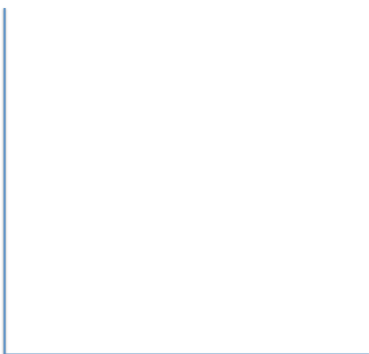
- Output (Y)

- Output (Y)

• **Results of Solving problem of gross price (P) :** The case when AS shift; AD

- Short run

- Long run



- Price (P)

- Price (P)

- Output (Y)

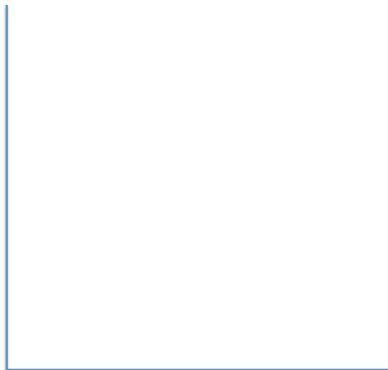
- Output (Y)

5 Using AD-AS to analyze inflation

- AD-AS can be used to depict the occurrence of inflation (in SR).
- Inflation: An increase in the overall price level
- Sustained inflation Occurs when the overall price level continues to rise over some fairly long period of time.
- Hyperinflation A period of very rapid increases in the price level.
- Causes of inflation
 1. Demand-pull Inflation: Inflation that is initiated by an increase in aggregate demand.
 2. Cost-push inflation: Inflation caused by an increase in costs.

5.1 Demand pull inflation

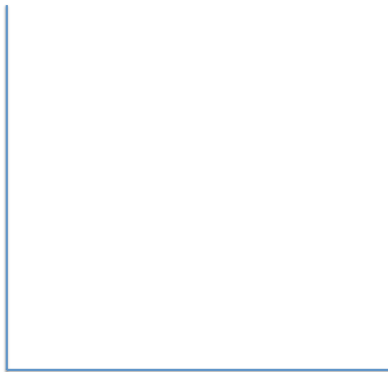
- Inflation caused by shift in AD
- This happens particularly when AD shift at the steep portion of SRAS
- Short run



- AD curve shifts to the
- Price (P)
- Output (Y)

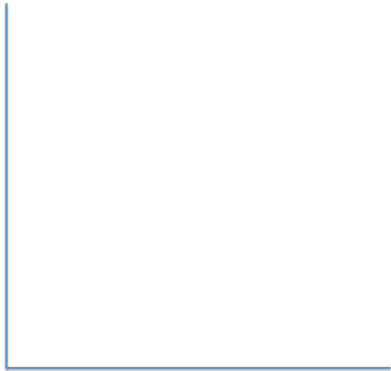
5.2 Cost-push inflation

- Inflation caused by the rise in input prices
- For example, the rises in energy price SRAS shift to the left
- This results in “stagflation”, both the rise in price and the fall in output.
- The government can react to stagflation, but only at the cost of raising price even further.
- Stagflation is thus a very bad news for the economy.
- Short run



- AS curve shifts to the
- Price (P)
- Output (Y)
- Money and inflation
 - The central bank may choose to control the interest rates (to be at a certain level), but only at the cost of creating inflation, particularly when the government uses expansionary fiscal policy.
 - On the other hand, most central bank today chooses to do “inflation targeting”, controlling the money supply with the goal of allowing inflation to happen only within a limited range.

- The case of LRAS
 - In the LR, wages adjust fully to any change in price.
 - This means firms only produce at their potential output.
 - Any policy changes will only result in changes in the price level.



- **Expansionary policy**

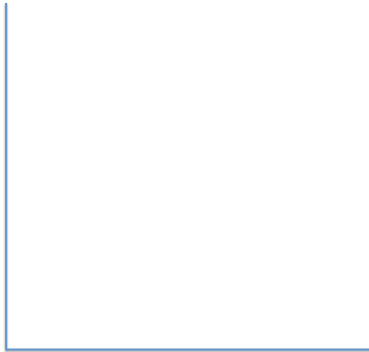
	Price	Output
AS flat		
AS steep		
AS vertical		

- Note that there is a short-run trade off between inflation and output.
- In the long run, output remains the same.

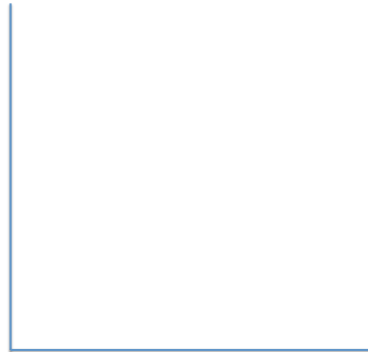
6.2 Expansionary Fiscal Policy

Short-Run Analysis

- DAE



- ISLM



- Short run



- Money Market



- Expansionary Fiscal policy ; DAE shifts to the
- curve shifts to the
output for all levels of r
- AD curve shifts to the
- IS curve shifts to the
- AD curve shifts
- Price level (P) and Output (Y)
- As price level increases, LM curve shifts to the

- r

- Effect of fiscal policy :

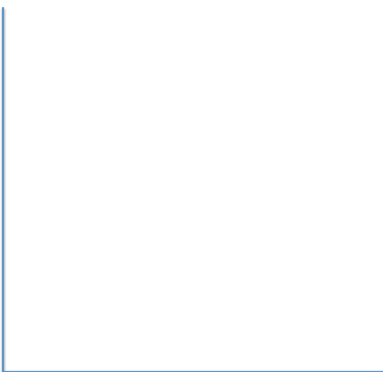
$$\begin{aligned}
 G \uparrow &\Rightarrow DAE \dots\dots\dots : \\
 &\Rightarrow IS [\dots\dots\dots] : \\
 &\Rightarrow r \dots\dots \Rightarrow I \dots\dots \Rightarrow Y \dots\dots \dots\dots\dots \text{effect} :
 \end{aligned}$$

AD shift to the right, Excess, Price level \uparrow

$$\begin{aligned}
 P \uparrow &\Rightarrow \text{real money} \dots\dots\dots \Rightarrow LM [\dots\dots\dots] \\
 &\rightarrow r \dots\dots \Rightarrow I \dots\dots \Rightarrow Y \dots\dots \quad \text{crowding out effect}
 \end{aligned}$$

- the steeper AS curve, the larger the crowding out effect.

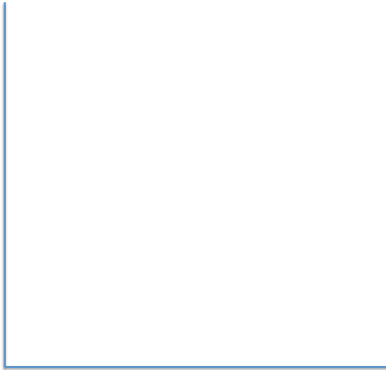
- Long run



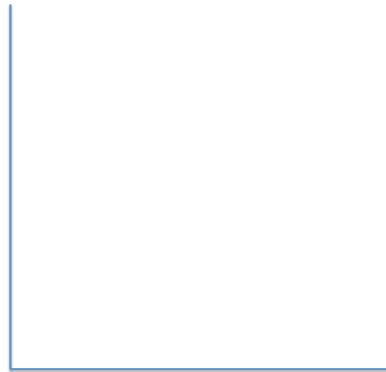
- AD curve shifts to the
- Price (P)
- Output (Y)
- An alternative explanation on what happens at the steep portion of SRAS.
 - Firms running into full capacity, meaning that a large rise in price is needed for them to produce a little more.
 - As price rises from initial shift in AD is large, the resulting shift in money demand will also be large.
 - This means the crowding out effects will be large, taking away all the initial change in AD.

6.3 Expansionary Monetary Policy

- Money Market



- ISLM



- Short run



- DAE



- Expansionary monetary policy \Rightarrow
- LM curve shifts to the
- curve shifts to the
- AD curve shifts
- Price level (P) and Output (Y)
- As price level increases, LM curve shifts to the
- r

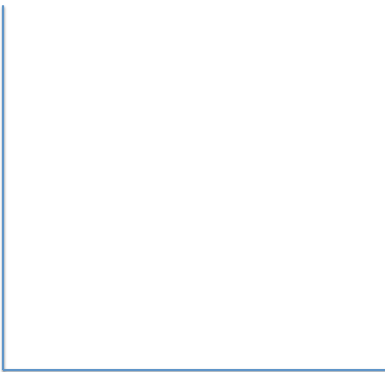
- Effect of Expansionary Monetary policy : Short Run

$M^s \uparrow \Rightarrow r \downarrow$ for all $y \Rightarrow LM[\dots\dots\dots] \Rightarrow r \dots\dots\dots \Rightarrow I \dots\dots\dots$
 $\Rightarrow DAE \dots\dots\dots \Rightarrow Y \dots\dots\dots$ [move-along IS curve]

AD shift to the right, Excess Demand, price level \uparrow

$P \uparrow \Rightarrow$ Real money supply $\downarrow \Rightarrow LM$ [left]
 $\rightarrow r \uparrow \Rightarrow I \downarrow \Rightarrow Y \downarrow$

- Long run



Effect of Monetary Policy : Long Run

- AD curve shifts to the
 - Price (P)
 - Output (Y)
- Through the use of the AD-AS model, please explain in details “the similarity and difference” between Keynesian (short-run) and Classical (long-run) perspective on macroeconomics in relation to:
 - a. The perception of how the government should react to economic recession
 - b. The effects of expansionary macroeconomic policies