# 7. AD-AS and Inflation

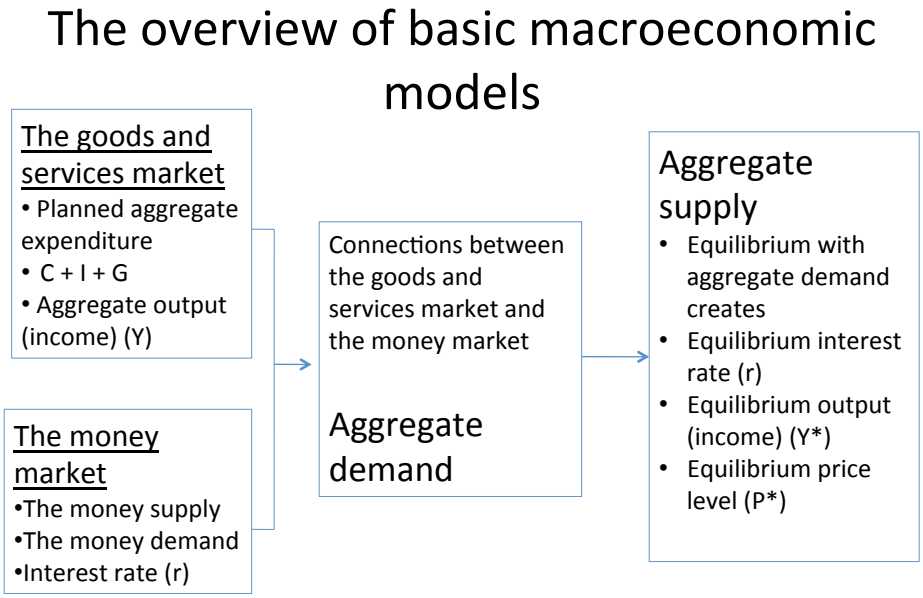
EE212

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

March 2016

# Contents

# 1 Introduction




# 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**

$$\begin{aligned} Y &= DAE \\ &= C + I + G + (X - M) \end{aligned} \qquad \begin{aligned} \text{Withdrawal} &= \text{Injection} \\ S + T + M &= I + G + X \end{aligned}$$

- 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.

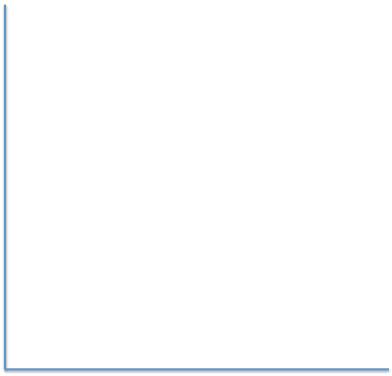
**Equilibrium in money market**

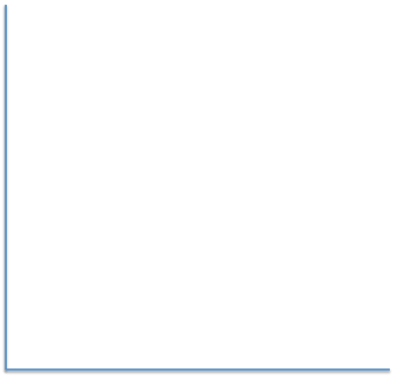
$$M^d = M^S$$

$$\text{Real money Demand} = \text{Real Money Supply}$$

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

- AD
- Shift





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# 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)
- Contant 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.

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

$$\Downarrow$$

$$\text{Production .....}$$

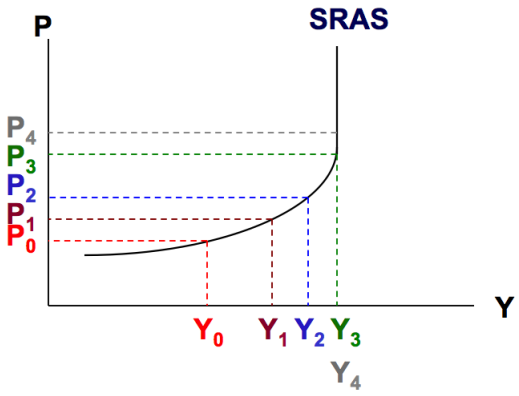
$$\Downarrow$$

$$\text{Output (Y) .....}$$

- Production function

- SRAS

**SRAS and its increasing slope**

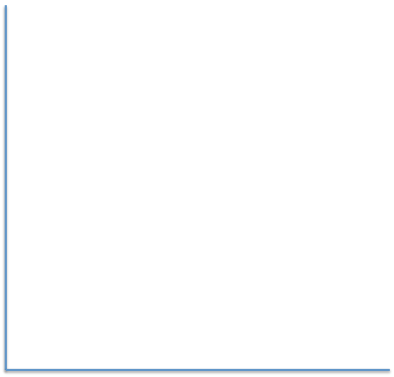



- The rationale for curving nature of SRAS.
  1. large amount of spare resources available
  2. some smount of spare resources available
  3. All available resources are fully used
- We can also think of the curve as reflecting the diminishing marginal return in production

**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

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## 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.

$$\text{Price Level}(P) \uparrow \quad \Rightarrow \quad \text{nominal wage.....}$$

$$\Downarrow$$

$$\frac{\text{nominal wage}\uparrow}{\text{price level}\uparrow} = \text{real wage.....}$$

$$\Downarrow$$

$$\text{Demand for labor.....}$$

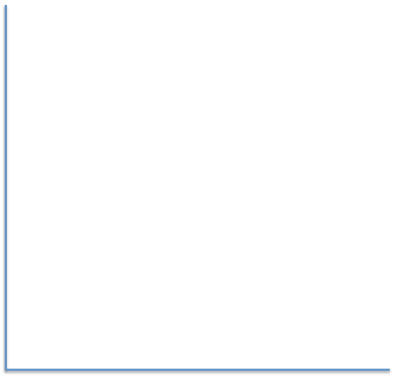
$$\Downarrow$$

$$\text{Production .....}$$

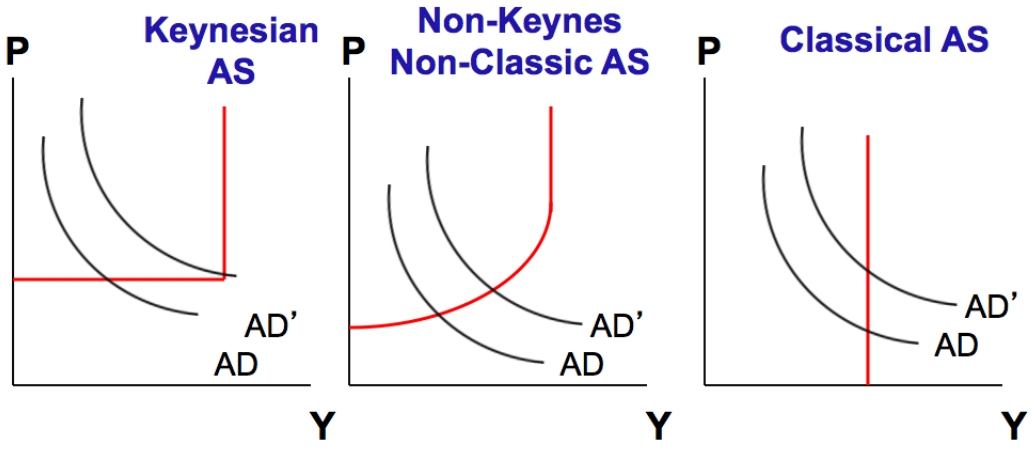
$$\Downarrow$$

$$\text{Output (Y) .....}$$

- 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.



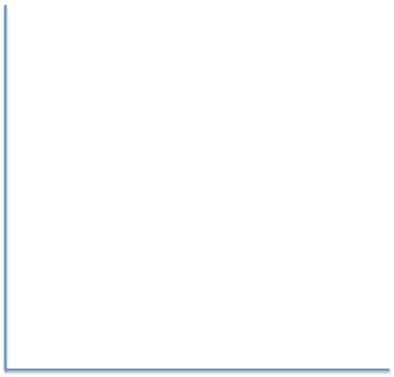

- Note: LRAS sometimes known as Classical AS

**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



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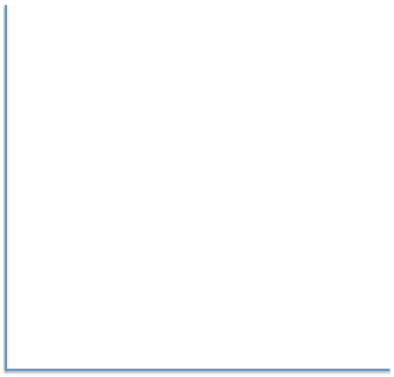
# 4 Changes in equilibrium

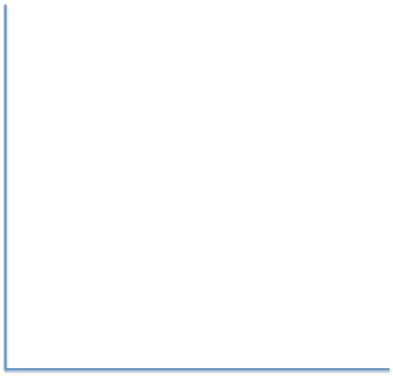
## 4.1 AD shift :

- suppose consumer credit increases
- Short run



- Price (P) .....
- Output (Y) .....

- Long run

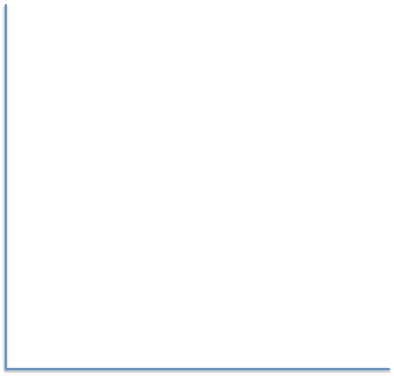


- Price (P) .....
- Output (Y) .....

## 4.2 AS shift :

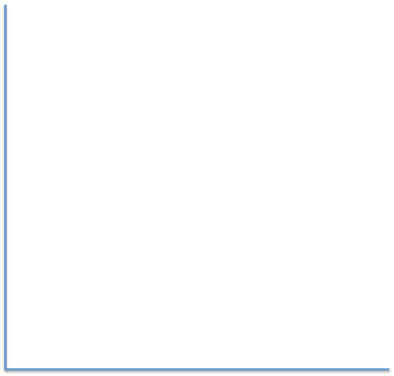
- for example, epidemic occurs in the country

- Short run



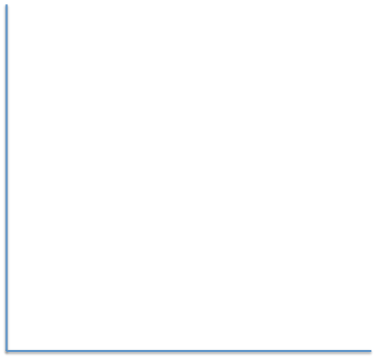
- Price (P) .....
- Output (Y) .....

- Long run



- 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) .....
  - Output (Y) .....
  - Price (P) .....
  - Output (Y) .....
- **Results of Solving problem of gross price** (P) : The case when AS shift; AD .....
  - Short run
  - Long run

  - Price (P) .....
  - Output (Y) .....
  - Price (P) .....
  - Output (Y) .....

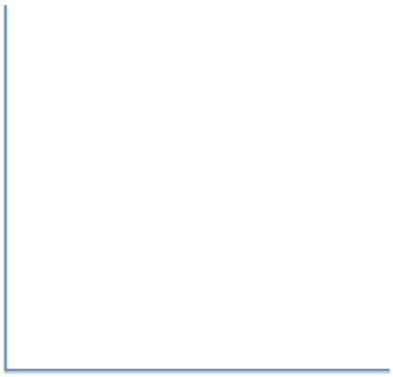
# 5 The analysis of fiscal policy and monetary policy using AD-AS model

- Note how the earlier depiction of "expansionary" or "contractionary" policies cause the shift in AD.
  - AD will shift to the left and right, in response to how a policy change output.
- Nonetheless, in order to see the effects on output and price, we will have to check the characteristics of AS curve.
  - Whether we are looking at SR or LR
  - And if in SR, where along the SRAS are we looking at.

## 5.1 Slope of AS and effects from AD shocks

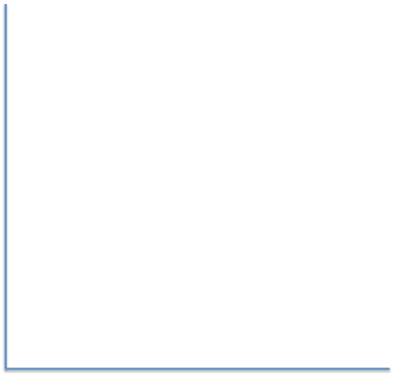
- In case of SRAS. We need to check which portion of SRAS are we at.
  - Whether we are in the flat part, where plenty of production capacity is available.
    - In this case, expansionary policies can yield large change in output.
  - Or whether we are in the steep part, where we are starting to face with limited capacity of production.
    - In this case, expansionary policies will result in a strong inflation

- Flat SRAS



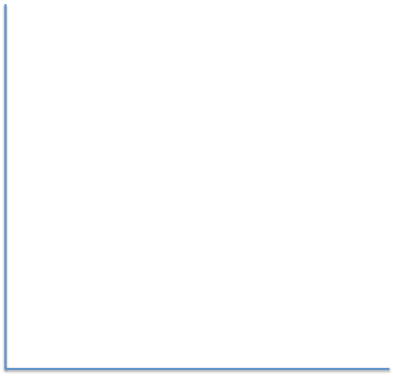
  - In this case, expansionary policies can yield large change in output.

- Steep SRAS



  - In this case, expansionary policies will result in a strong inflation

- 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**

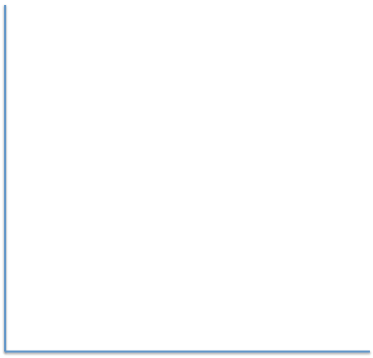
| | **Price** | **Output** |
|---|---|---|
| **AS flat** | | |
| **AS steep** | | |
| **AS vertical** | | |

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

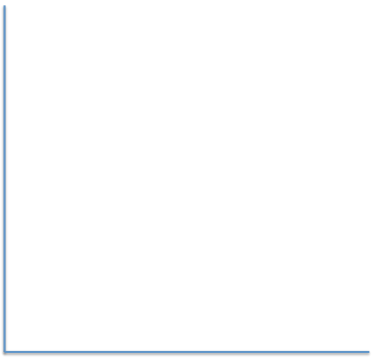
## 5.2 Expansionary Fiscal Policy

### Short-Run Analysis

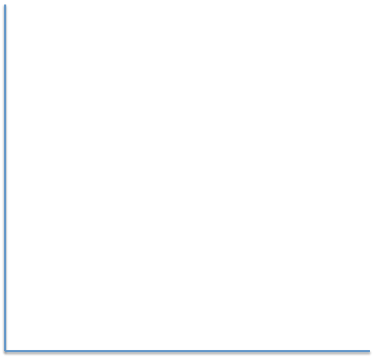
- DAE



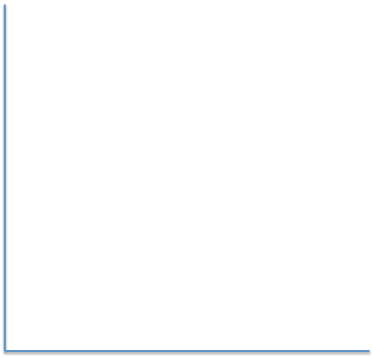
- ISLM



- Short run



- Money Market



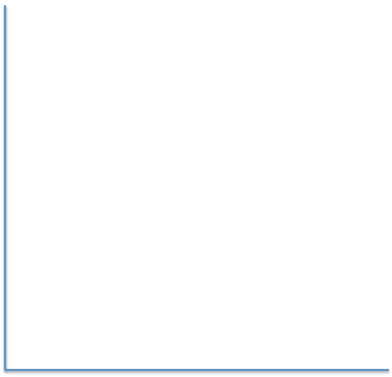
- Expansionary Fiscal policy ; DAE shifts to the .....
- ..... curve shifts to the .....
  output ..... for all levels of *r*
- AD curve shifts to the .....
- IS curve shifts to the .....
- AD curve shifts .....
- Price level (P) ..... and Output (Y) .....
- As price level increases, LM curve shifts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

- r .....
- Effect of fiscal policy :

  $G \uparrow \Rightarrow$ $DAE$..... :
  $\Rightarrow IS$ [.....] :
  $\Rightarrow r$..... $\Rightarrow I$..... $\Rightarrow Y$..... ..... effect :

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

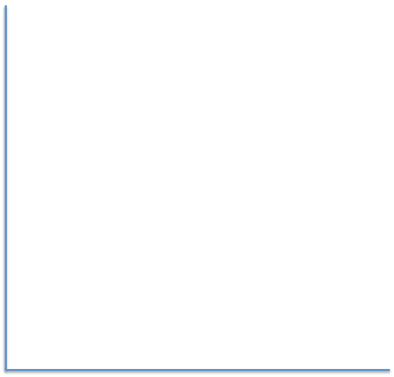
  $P \uparrow \Rightarrow$ real money..... $\Rightarrow LM$ [.....]
  $\rightarrow r$..... $\Rightarrow I$..... $\Rightarrow Y$..... crowding out effect
- the steeper AS curve, the larger the crowding out effect.
  - Long run



  - 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.

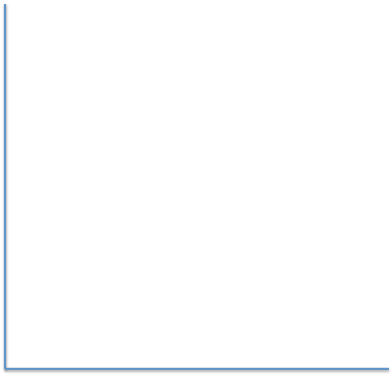
## 5.3 Expansionary Monetary Policy

- Money Market

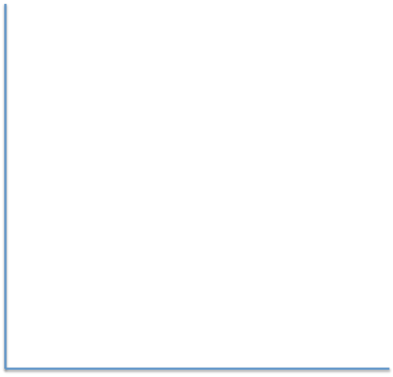


- ISLM

- Short run



- DAE



- Expansionary monetary policy⇒ .....
- 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 .....

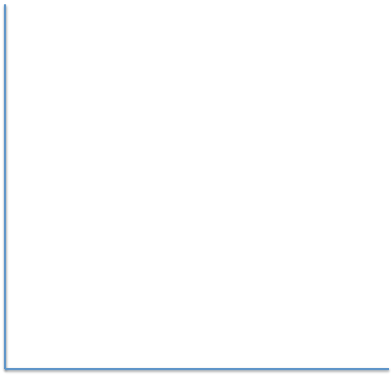
- Effect of Expansionary Monetary policy : Short Run

  $M^S \uparrow \Rightarrow r \downarrow$ for all y $\Rightarrow LM$[.....] $\Rightarrow r$..... $\Rightarrow I$..... $\Rightarrow DAE$..... $\Rightarrow Y$.....[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 Monetarty 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

# 6 Using AD-AS to analyze inflation

- AD-AS can be used to depict the occurrance 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.

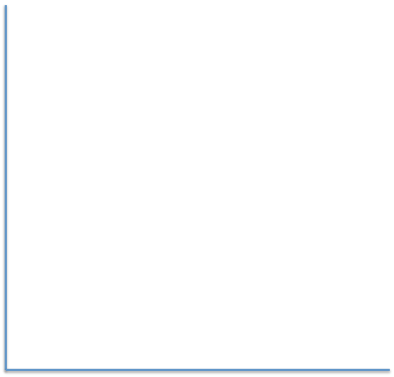
## 6.1 Demand pull inflation

- 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) .....

## 6.2 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.