



## Implications of No Labor Market Clearing

- How much will firms produce and sell?

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- How much will firms produce and sell?
  - Since firms are happy to employ more workers and sell their output at price  $P$ , at this price they will want to produce as much as aggregate spending allows them for (i.e. as much as they can sell)!

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## Illustrative Example

- What is aggregate spending at  $P$ ? Since there is no money market, it is simply:
  - $AE = C + I = (1-s)Y + I$  (no government)
- Since spending determines output  $Y$ , we have
  - $AE = Y$ ,
  - and thus:  $Y = I/s$
- The above result implies:
  - Investment  $I$  goes up  $\rightarrow Y$  goes up
  - Investment  $I$  falls  $\rightarrow Y$  falls

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## Keynes' Original Idea

- The example illustrates the Keynes' original idea
  - When firms are optimistic about the future, they are eager to invest, they create additional spending, and the economy is in an expansion phase
  - When firms suddenly lose their optimism, economy can slip into recession
- He referred to such waves of optimism and pessimism as *animal spirits*

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## Quote from Keynes

- *"Even apart from the instability due to speculation, there is the instability due to the characteristic of human nature that a large proportion of our positive activities depend on spontaneous optimism rather than mathematical expectations, whether moral or hedonistic or economic. Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as the result of animal spirits - a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities." J.M. Keynes, *The General Theory*, p. 161-162.*

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## Numerical Example

- Suppose  $s=0.1$ , and investment  $I$  falls from initial value of 40 to 30 due to pessimistic expectations of firms for future returns...

Output when  $I=40$

$$Y = AE = .9Y + 40$$

$$Y = 40 / 0.1 = 400$$

Output when  $I=30$

$$Y = AE = .9Y + 30$$

$$Y = 30 / 0.1 = 300$$

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## Numerical Example

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Output when  $I=40$       Output when  $I=30$

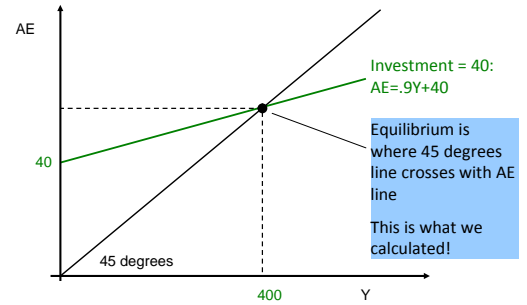
$$Y = AE = .9Y + 40 \quad \longrightarrow \quad Y = AE = .9Y + 30$$

$$Y = 40/0.1 = 400 \quad \quad \quad Y = 30/0.1 = 300$$

- The economy slips into recession!

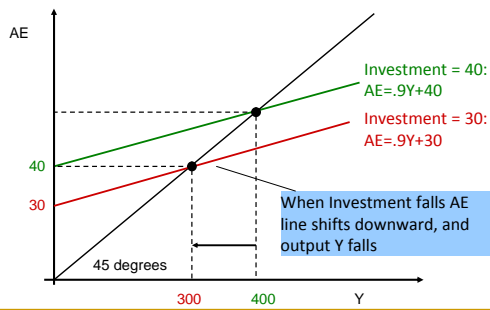
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## Graphical Illustration



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## Graphical Illustration



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## Complete Keynesian Model AD-AS Framework

Chapter 13

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## Deriving Aggregate Supply

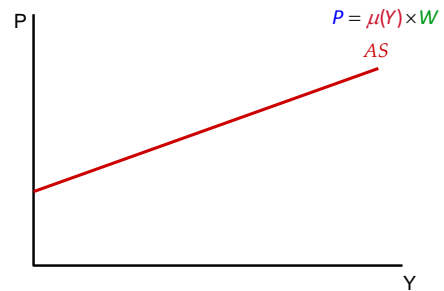
- Firms can freely hire workers at wage  $W$ , and set prices according to

$$P = \mu(Y) \times W$$

where  $\mu(Y)$  is an increasing function of aggregate output due to *diminishing returns from labor*

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## Aggregate Supply



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## Aggregate Supply

- Aggregate supply curve (or AS curve) tells us the price level consistent with firm's unit costs and their percentage markups at any level of output over the short run

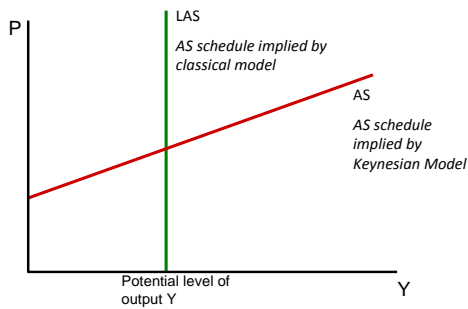
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## Keynesian versus Classical Model

- In contrast, in the classical model, the AS schedule would be vertical
  - We refer to classical AS curve (LAS) as the *potential level of output Y*, and include it in the diagram
    - The corresponding unemployment rate to potential level of output is called the *natural level of unemployment*

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## Keynesian versus Classical Model



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## Aggregate Demand

- Since in Keynesian model AS curve is not vertical, to pin down output, we need to derive aggregate spending
  - In the classical model, we don't have to do it – output is already pinned down because LAS is vertical

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## Deriving Aggregate Spending

- Aggregate spending is determined by equilibrium in the money market and the goods market (or alternatively loanable funds market)
- Goods market clearing requires
  - $Y = C + I(i)$
- Money market clearing requires
  - $M^s = M^d(P, Y, i)$

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## Deriving Aggregate Spending

- Aggregate spending is determined by equilibrium in the money market and the goods market (or alternatively loanable funds market)
- Goods market clearing requires
  - $Y = C + I(i)$ 
    - Investment is decreasing in interest rate (opportunity cost of investment)
- Money market clearing requires
  - $M^s = M^d(P, Y, i)$ 
    - Money demand increasing in P and Y and decreasing in interest rate i (opportunity cost of holding money)

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### Deriving Aggregate Spending

- Goods market clearing ( $\rightarrow Y$  such that  $Y=AE$ )
  - $Y=(1-s)Y+I(i)$
  - $Y=I(i)/s$
- Money market clearing ( $\rightarrow i$  such that  $M^s=M^d$ )
  - $M^s=M^d(P, Y, i)$

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### Deriving Aggregate Spending

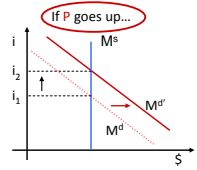
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- Thus,

□ If  $P$  goes up,  $i$  goes up to clear money market, and  $Y$  falls because  $I(i)$  does!

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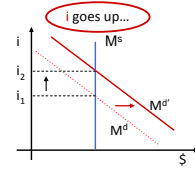


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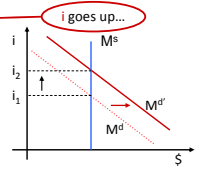


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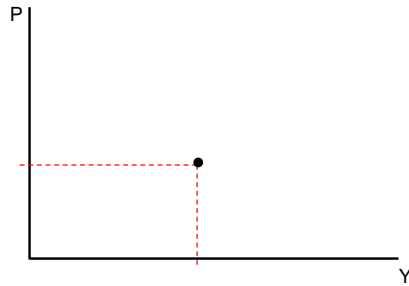
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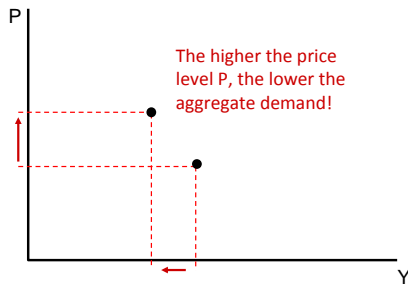
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### Conclusion: AD Curve is Downward Sloping



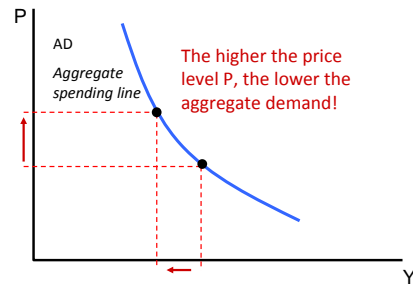
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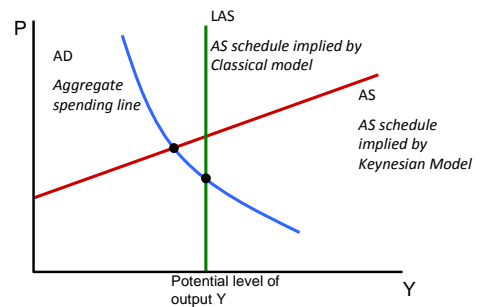
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### Aggregate Demand Curve

- Aggregate demand curve (or AD curve) tells us the level of aggregate demand (aggregate spending) consistent with goods market and money market clearing at any price level  $P$

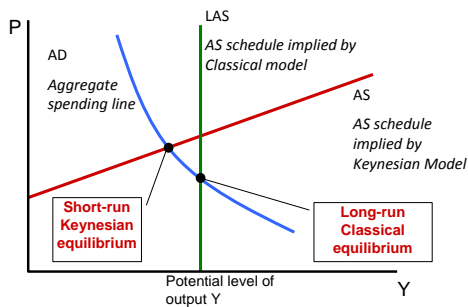
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### Complete AD-AS Diagram



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### Complete AD-AS Diagram



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### Complete AD-AS Diagram

- The **short-run Keynesian equilibrium** is where AS curve and AD curves cross
- The **long-run classical equilibrium** is where AD line and LAS lines cross

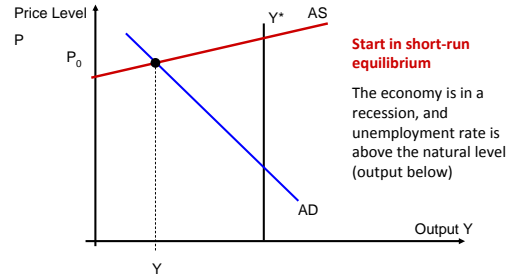
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## Complete AD-AS Diagram

- **Medium-run self-correcting mechanism** links the two outcomes in the following way
  - Unemployment above the natural classical level → in the medium-run nominal wages  $W$  gradually fall, AS line shifts down...
  - Unemployment below the natural classical level → in the medium-run nominal wages  $W$  gradually go up, AS line shifts up...

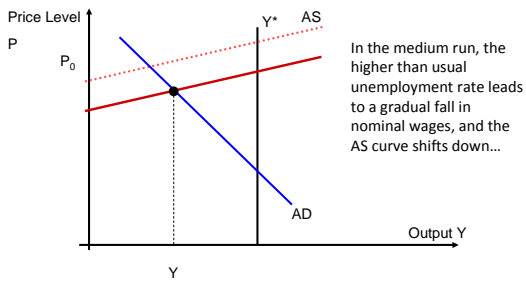
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## Illustrating Self-Correcting Mechanism



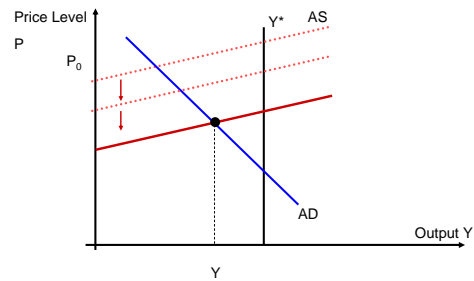
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## Illustrating Self-Correcting Mechanism



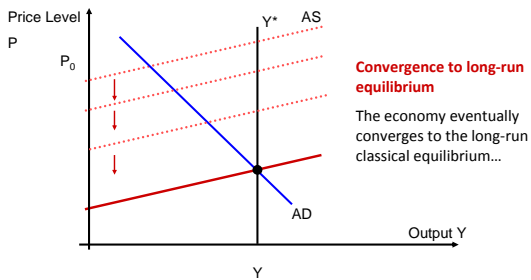
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## Illustrating Self-Correcting Mechanism



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## Illustrating Self-Correcting Mechanism



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## Shocks that Lead to a Recession

- What can cause recession according to AD-AS diagram?
  - Supply shocks (aggregate cost shocks)
    - Shocks that make labor or non-labor production costs go up
  - Demand shocks (aggregate spending shocks)
    - Shocks that shift AD curve to the left (fall in spending)

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### Supply Shocks Leading to a Recession

- Increase in non-labor production cost or pure markups (e.g. oil prices)
  - Shifts  $\mu(Y)$  upwards
- Autonomous increase in labor costs (e.g. higher wages negotiated by unions)
  - Increases  $W$

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### Demand Shocks Leading to Recession

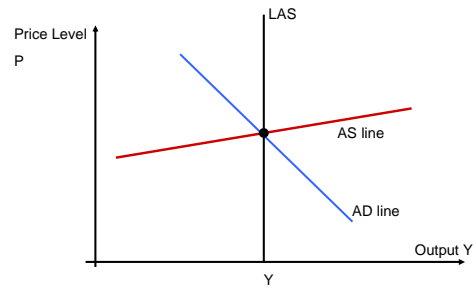
- Fall in money supply
- Autonomous increase in money demand (other than due to  $P$  or  $Y$  that are on the axis)
- Fall in government expenditures  $G$  or increase in net taxes  $T$
- Increase in propensity to save  $s$
- Fall in autonomous investment or propensity to invest
- Fall in net exports (the textbook includes it)

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### Example of a Negative Demand Shock

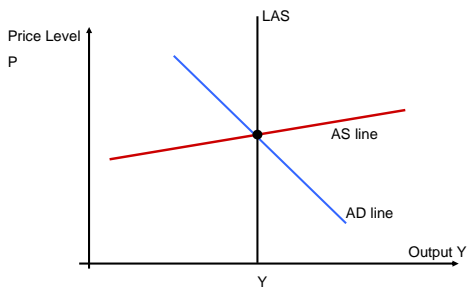
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### Start in a Long-Run Equilibrium



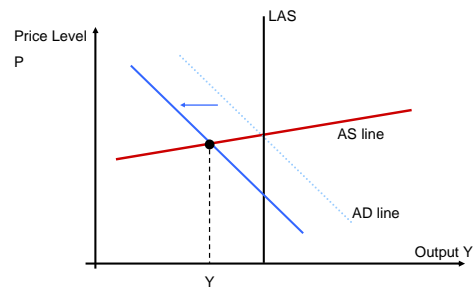
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### Shift the AD Line



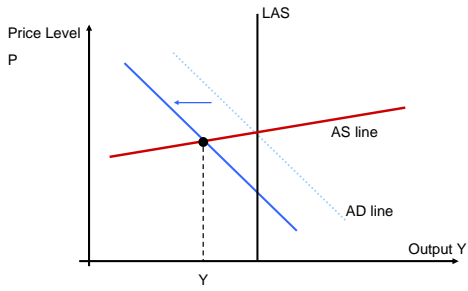
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### Find New S-R Equilibrium



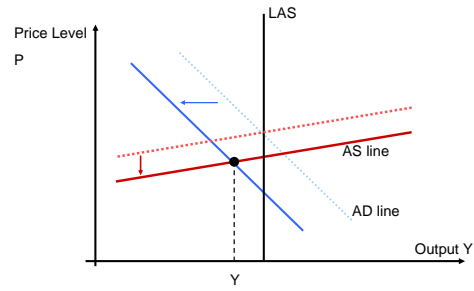
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### Apply Self-Correcting Mechanism



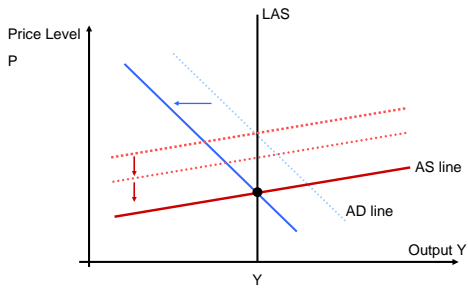
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### Apply Self-Correcting Mechanism



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### Identify the New Long-Run Equilibrium



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### Results

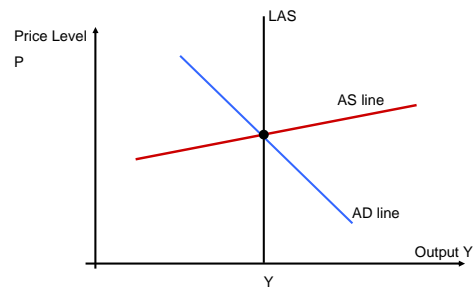
- Fall in aggregate demand (spending) results in
  - Fall in output and employment in the short-run (thus increase in cyclical unemployment)
  - Deflation in the short-run (fall in price level)
  - No change in output in the long-run, and permanently lower price level P
- Stabilization policy possible:
  - The FED or government policy can use expansionary fiscal or monetary policy to avert the recession

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### Example of a Negative Supply Shock that Shifts LAS as Well (e.g. Oil Shock)

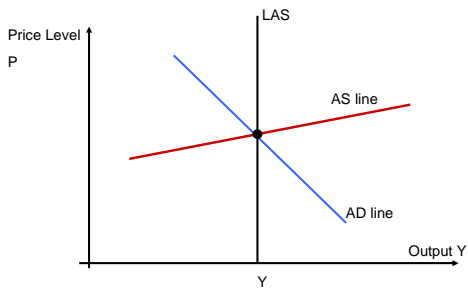
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### Start from the Long-Run Equilibrium



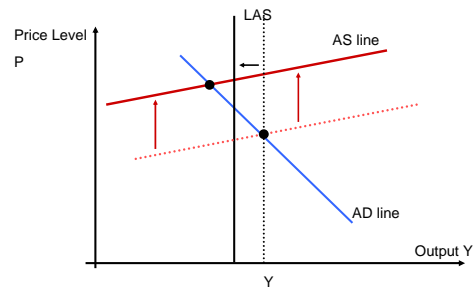
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### Shift the AS line and LAS



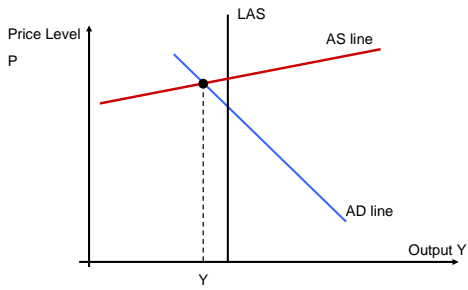
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### Shift the AS line and LAS



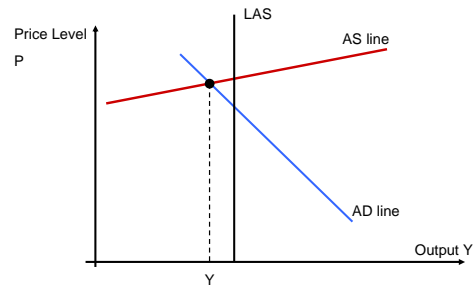
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### Identify S-R Level of Output



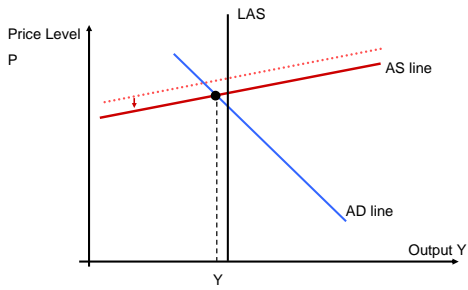
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### Apply Self-Correcting Mechanism



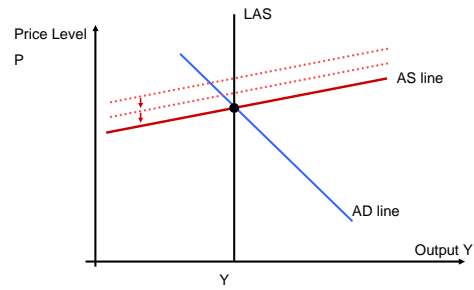
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### Apply Self-Correcting Mechanism



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### Identify the New Long-run Equilibrium



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## Result

- LAS shifts to the left: Imported oil more expensive, potential long-run output falls
- AS shifts up even more to reflect additional temporary cost shock that in the long-run will be largely averted due to technological adjustments (e.g. implementation of oil saving technology)
- Overall, the economy experiences a sharper fall in output in the short-run than in the long-run, and some inflation in the medium run

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## Result

- Stabilization policy possible:
  - FED and government can not avoid the long-run fall in output, but can alleviate the effects of the fall in output in excess of the long-run equilibrium by temporarily shifting the AD line to the right until the economy adjusts to the new situation

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## Short-run and Long-run Effects of Monetary and Fiscal Policy

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## SR and LR Effects of Fiscal Expansion

Type of Policy	SR Effect Keynesian model	LR Effect Classical model
Increase in G	Rightward shift of AD line Expenditures up, output up, interest rates up	Crowding out of investment, fall in future output – fall in potential output
Decrease in T	Same effect as above, but smaller	Same effect as above but smaller
Simultaneous increase in G and T	Same effect as above but smaller	Same effect as above but smaller

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## SR and LR Effects of Monetary Expansion

Type of Policy	SR Effect Keynesian model	LR Effect Classical model
Increase in $M^s$ (monetary expansion)	Rightward shift of the AD line Interest rates down, higher investment spending, output up	No effect on output, only price level higher (inflation)

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## Final Remarks

- Fiscal and monetary policy useful tools to stabilize business cycle when driven by Keynesian departures from the long-run equilibrium – if driven by productivity shocks and fluctuating potential output – it is better to do nothing!
- Because we do not have certainty about the extent to which each mechanism contributes to overall fluctuations, one should be cautious to use policy tools to stabilize output without much information about the source of the distortions causing it

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