Macroeconomics: Lecture 5

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08 October, 2019

Agenda

- Derive the aggregate supply curve, and the aggregate demand curve.
- Determine the equilibrium in the short, and the medium run.
- Dynamic Effects of Monetary/Fiscal Policy.
- Material: Blanchard, Chapter 7.

- *AS* curve captures the effects of output on price level.
- Recall the wage equation we derived in the last lecture.

$$W = P^e F(u, z)$$

- Recap on the relationship between price level and wages.

$$P = (1 + m)W$$

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Aggregate Supply

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- $\downarrow$ Unemployment Rate $\Rightarrow \uparrow$ Nominal Wage

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- $\uparrow$ Output $\Rightarrow \uparrow$ Employment
- $\uparrow$ Employment $\Rightarrow \downarrow$ Unemployment Rate
- $\downarrow$ Unemployment Rate $\Rightarrow \uparrow$ Nominal Wage
- $\uparrow$ Nominal Wage $\Rightarrow \uparrow$ Price set by firms

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For any given unemployment level, $\uparrow P^e \Rightarrow \uparrow P$. What do you think is going on?

Aggregate Supply

For any given unemployment level, $\uparrow P^e \Rightarrow \uparrow P$. What do you think is going on?

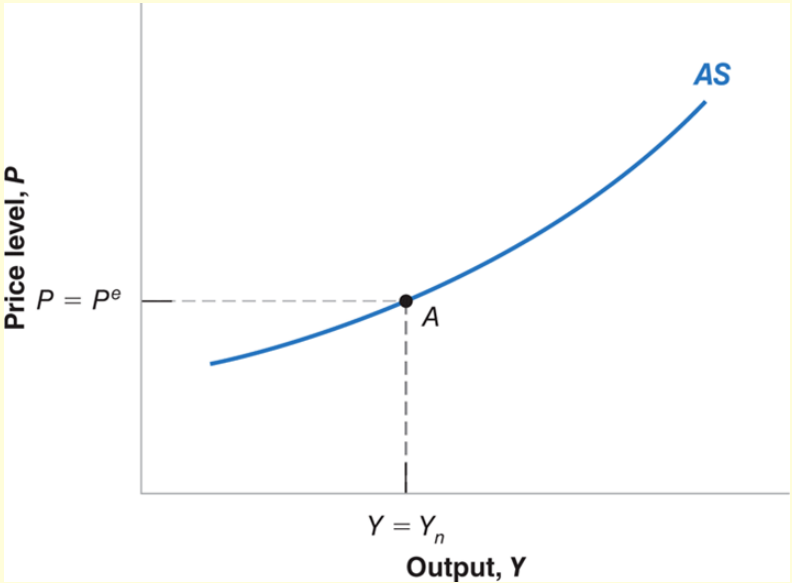
- If prices are expected to be higher, wage setters would demand higher nominal wage.

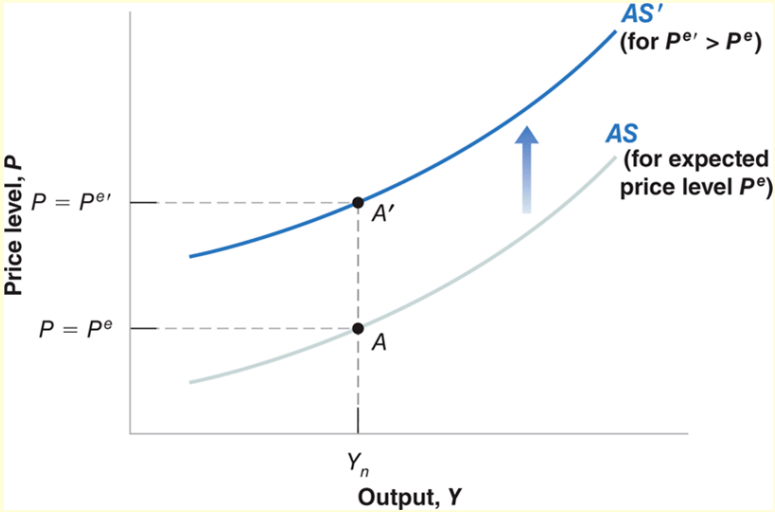
- $\uparrow W \Rightarrow \uparrow$ Costs $\Rightarrow \uparrow$ Prices set by firms $\Rightarrow \uparrow P$

Aggregate Supply: Properties

Three useful properties.

1. The aggregate supply curve is **upward sloping**.
2. The *AS* curve passes through a point such that $P = P^e$, $Y = Y_n$.
3. $\uparrow P^e \Rightarrow$ Upward shift in *AS*.


AS
Price level, P
P = P^e
A
Y = Y_n
Output, Y


AS′
(for $P^{e\prime} > P^e$)
AS
(for expected price level P^e)
Price level, P
$P = P^{e\prime}$
$P = P^e$
A′
A
Y_n
Output, Y

Aggregate Demand

We will derive the aggregate demand relation using the $IS - LM$ framework.

- IS:

$$Y = C(Y - T) + I(Y, i) + G$$

- LM:

$$\frac{M}{P} = YL(i)$$

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- $\uparrow P \Rightarrow \downarrow \frac{M}{P}$

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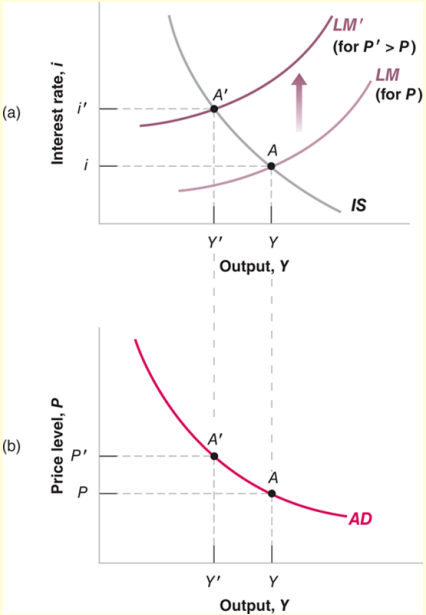
Cookbook:

- Draw *IS* and *LM* curves.
- Now, there is an increase in price level. Therefore, $\downarrow \frac{M}{P}$.
- This would shift

Aggregate Demand

Cookbook:

- Draw *IS* and *LM* curves.
- Now, there is an increase in price level. Therefore, $\downarrow \frac{M}{P}$.
- This would shift *LM* curve upwards.
- Equilibrium $\uparrow i$, and $\downarrow Y$.
- $\uparrow P \Rightarrow \downarrow Y$


(a)
Interest rate, i
LM′
(for P′ > P)
LM
(for P)
A′
A
i′
i
IS
Y′
Y
Output, Y
(b)
Price level, P
A′
A
P′
P
AD
Y′
Y
Output, Y

Aggregate Demand

- Any variable that shifts *IS* or *LM* curve will shift the *AD* function.
- $\uparrow G \Rightarrow AD$ shifts to the right.
- $\downarrow M \Rightarrow AD$ shifts to the left
- *AD* function can be written as

$$Y = Y\left(\frac{M}{P}, G, T\right)$$

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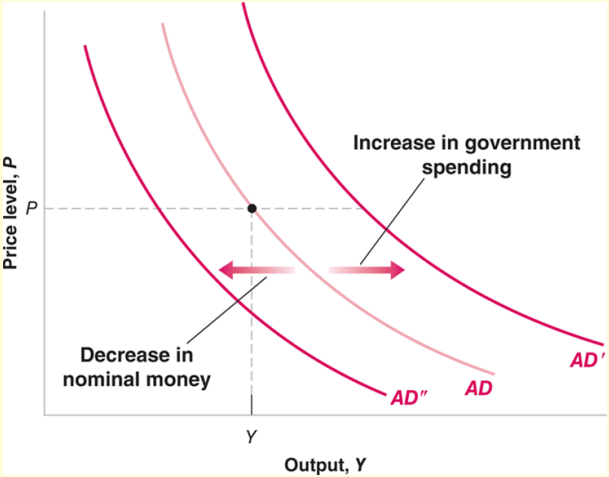

Basic Set-up

Recap:

- *AS* Relation

$$P = P^e(1+m)F\left(1-\frac{Y}{L}, z\right)$$

- *AD* Relation

$$Y = Y\left(\frac{M}{P}, G, T\right)$$

- The equilibrium depends upon P^e.
- In the short run, P^e would be fixed
- In the medium run, P^e will change.

Short-Run Equilibrium

- An upward-sloping *AS* curve.
- A downward-sloping *AD* curve.
- $Y > Y_n$, and $P > P^e$.

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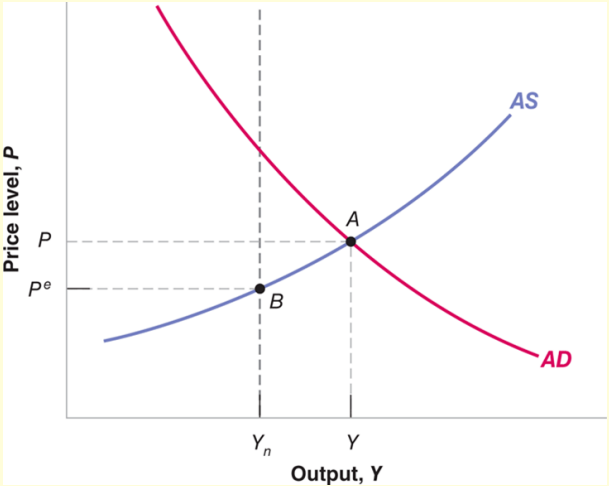

What happens when time passes?

From the Short Run to the Medium Run

- Since $P > P^e$, wage-setters would notice this and demand higher nominal wages.
- This would increase firms' wage bill (which would be transfered in form of higher prices).
- *AS* curve will move upwards.
- Output will keep declining until it reaches the 'natural' level.
- In the medium run, $Y = Y_n$ & $P > P^e$.

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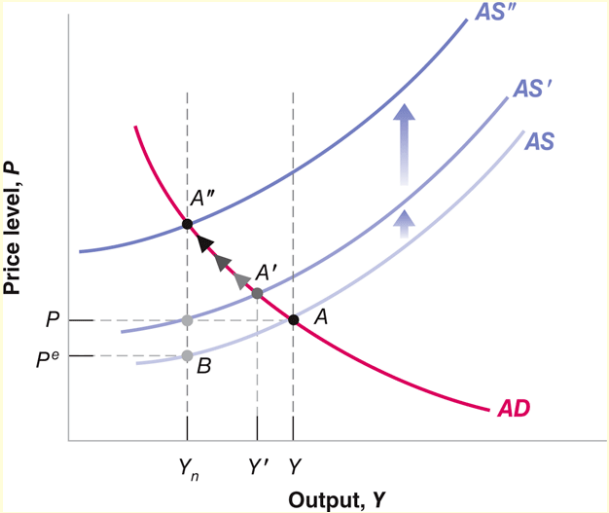

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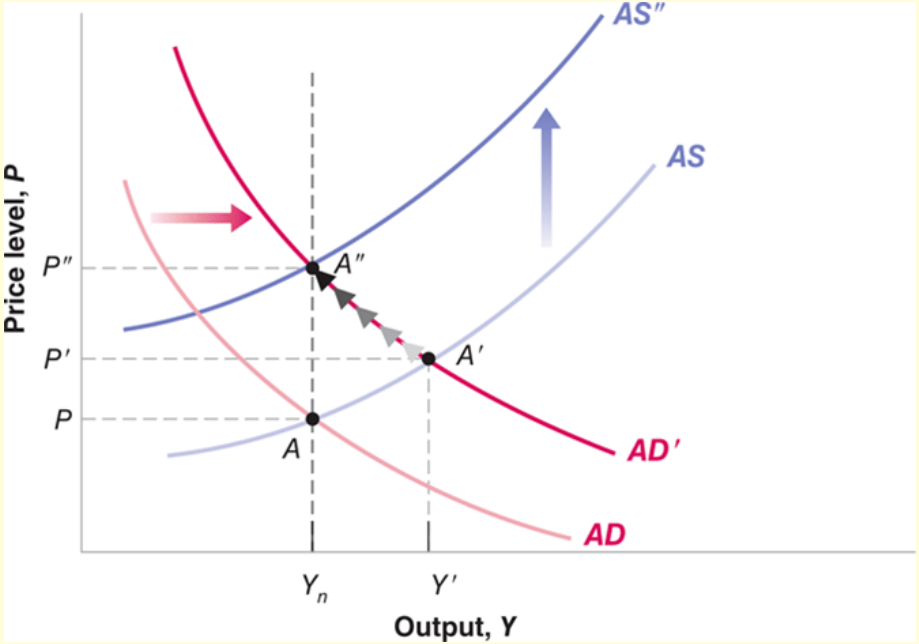
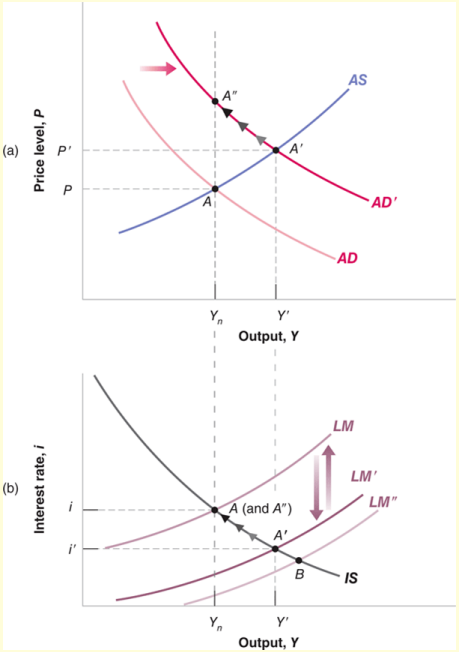
- As time passes, price level will keep rising until...
- Output reaches the natural level.
- $\uparrow P \Rightarrow \downarrow \frac{M}{P} \Rightarrow LM$ curve shifts upwards.

Bottomline: *The increase in nominal money is exactly offset by a proportional increase in the price level. The real money stock is therefore unchanged.*


AS″
AS
Price level, P
P″
P′
P
A″
A′
A
AD′
AD
Yn
Y′
Output, Y


(a)
Price level, P
P′
P
A″
A′
A
AS
AD′
AD
Y_n
Y′
Output, Y
(b)
Interest rate, i
i
i′
A (and A″)
A′
B
LM
LM′
LM″
IS
Y_n
Y′
Output, Y

Budget Deficit Reduction

Government decides to cut some of its spendings.

- There are two strategies: reduce G or increase T.
- Suppose $\downarrow G$ and $\leftrightarrow T$.
- Also suppose that $Y = Y_n$ at this point.

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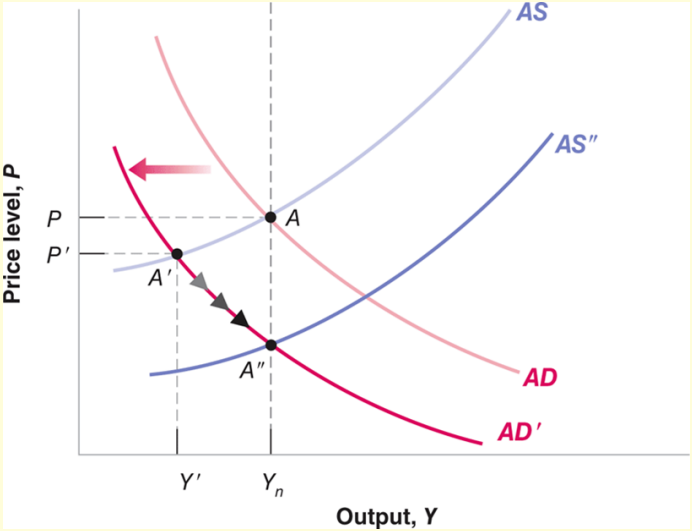
Government decides to cut some of its spendings.

- There are two strategies: reduce G or increase T.
- Suppose $\downarrow G$ and $\leftrightarrow T$.
- Also suppose that $Y = Y_n$ at this point.
- The *AD* curve shifts leftwards. (**Reduction in output**).
- Since output is below Y_n, the *AS* will keep moving downwards until the economy is stabilized.


AS
AS″
Price level, P
P
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A′
A″
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AD′
Y′
Y_n
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Deficit Reduction: Background Story

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- Fall in interest rate stops when $Y = Y_n$.

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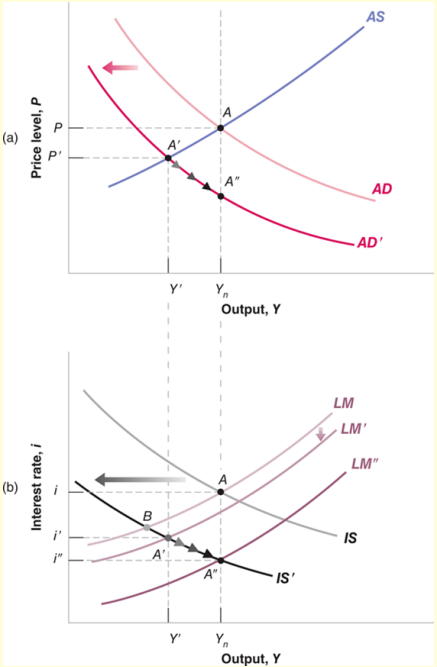
- Now, recall that price level falls ($\downarrow P$).
- What happens to the *LM* curve?
- $\downarrow P \Rightarrow \uparrow \frac{M}{P}$
- Fall in interest rate stops when $Y = Y_n$.
- How is investment impacted in this process?

Deficit Reduction: Background Story-II

- Let's go back to the start.

$$Y_n = C(Y_n - T) + I(Y_n, i) + G$$

- $\leftrightarrow Y \& T \Rightarrow \leftrightarrow C$
- $\downarrow G$ has been compensated for by $\uparrow I$.


(a)
Price level, P
P
P′
A
A′
A″
AS
AD
AD′
Y′
Y_n
Output, Y
(b)
Interest rate, i
i
i′
i″
A
B
A′
A″
LM
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LM″
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Y′
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Deficit Reduction: Bottomline

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2. In the medium run, output returns to the natural level, and investments rise.

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- Rise of China and other emerging economies put upward pressure on oil prices in the 2000s.
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- Let's do that.
- Link oil prices with the production of goods.
- $\uparrow$ Oil Price $\Rightarrow\uparrow$ Cost of production.

Effects on the Natural Rate of Unemployment

Suppose that oil price has gone up.

- Start think about labour market equilibrium.
- Increasing oil price will lead to a rise in cost of production.
- The price setting curve will move downwards because of rise in markup.
- The natural unemployment rate is now higher.
- Output will take a hit.

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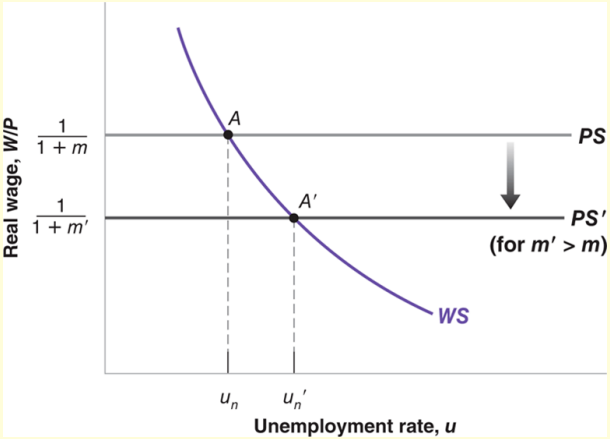

The Dynamics of Adjustment

- Output is now lower. Prices are higher. So, which way would the *AS* curve move?

- *AS* curve will move up.

- What happens over time?

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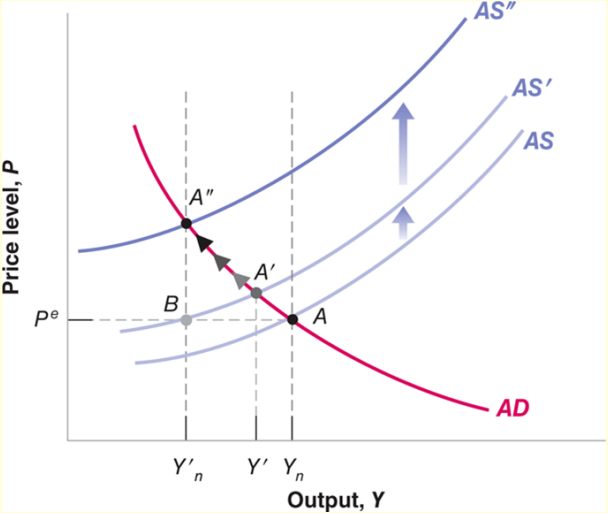

Cheatsheet

	Short Run			Medium Run		
	Output Level	Interest Rate	Price Level	Output Level	Interest Rate	Price Level
Monetary expansion	increase	decrease	increase (small)	no change	no change	increase
Deficit reduction	decrease	decrease	decrease (small)	no change	decrease	decrease