The IS-LM/AD-AS Model:
A General Framework for Macroeconomic Analysis,
Part 3

Agenda
• Price Adjustment and the Attainment of General Equilibrium

General equilibrium in the AD-AS model

Disequilibrium in the AD-AS model
• Equilibrium in the AD-AS model:
  ➢ If the economy is NOT in general equilibrium, economic forces will work to restore general equilibrium in both the IS-LM and AD-AS models.
Price Adjustment and General Equilibrium

- Price adjustment in the IS-LM and AD-AS models:
  - An increase in government purchases,
  - An increase in the real money supply,
  - A short-run adverse supply shock, and
  - A long-run adverse supply shock.

Price Adjustment and General Equilibrium

- An increase in government purchases:
  - In Year 0, the economy is in general equilibrium.
    - Denote the general equilibrium level of output by $Y^*$. 

Price Adjustment and General Equilibrium

- An increase in government purchases:
  - In Year 1, government purchases increase.
    - Assume Ricardian equivalence does NOT hold.
    - An increase in government purchases shifts both the IS and AD curves to the right.
Price Adjustment and General Equilibrium
• An increase in government purchases:
  ➢ In Year 1, the increase in government purchases increases output but leaves the price level unchanged.
    • Short-run equilibrium is at:
      – The intersection of the IS and LM curves, and
      – The intersection of the AD and SRAS curves.
    • The labor market is temporarily out of equilibrium.
      – Employment has increased.
      – The unemployment rate has declined.

Price Adjustment and General Equilibrium
• An increase in government purchases:
  ➢ In Year 2, the price level begins to rise.
    • In Year 2, the SRAS curve shifts up because of excess aggregate demand in Year 1, i.e., Y_1 > Y^*.
      – How far the SRAS curve shifts up depends on the explicit price adjustment process for the economy.
      – Generally it is a multiyear process dependent on the amount of excess aggregate demand.

Price Adjustment and General Equilibrium
• An increase in government purchases:
  ➢ In Year 2, the price level begins to rise.
    • A higher price level reduces the real money supply, M/P.
      – Alternatively, the purchasing power of the nominal money supply, M^*, has been reduced.
    • A lower real money supply shifts the LM curve to the left, raising the real interest rate.

Price Adjustment and General Equilibrium
• An increase in government purchases:
  ➢ In Year 2, the price level begins to rise.
    • A higher real interest rate will:
      – Reduce interest-sensitive spending,
      – Reduce output and employment, and
      – Raise the unemployment rate.
Price Adjustment and General Equilibrium

• An increase in government purchases:
  ➢ In Year 3, the price level continues to adjust up.
    • In Year 3, the SRAS curve shifts up because of any excess aggregate demand in Year 2, i.e., \( Y_2 > Y^* \).
      – Because excess aggregate demand in Year 2 is less than in Year 1, the upward shift of the SRAS in Year 3 will be smaller than in Year 2.
  ➢ In Year 4 and beyond, this process continues until general equilibrium is re-established in both the IS-LM and AD-AS models.
    • Output will be at its full-employment level.
      – Employment will be at its full-employment level.
      – The unemployment rate will be at its natural level.
    • The price level will be permanently higher.

Price Adjustment and General Equilibrium

• An increase in government purchases:
  ➢ In Year 0, the economy is in general equilibrium.

Price Adjustment and General Equilibrium

• An increase in government purchases:
  ➢ Once general equilibrium has been re-established:
    • Output is back at its full-employment level.
    • The real money supply is lower.
      – Because of the increase in the price level.
    • The real interest rate is higher.
    • The composition of output has changed.

Price Adjustment and General Equilibrium

• An increase in the real money supply:
  ➢ In Year 0, the economy is in general equilibrium.
An increase in the money supply

Price Adjustment and General Equilibrium

- An increase in the real money supply:
  - In Year 1, the nominal money supply increases.
    - An increase in the nominal money supply shifts both the $LM$ and $AD$ curves to the right.
    - The increase in the real money supply increases output but leaves the price level unchanged.

Price Adjustment and General Equilibrium

- An increase in the real money supply:
  - In Year 2, the price level will begin to rise.
    - In Year 2, the $SRAS$ curve shifts up because of excess aggregate demand in Year 1, i.e., $Y_1 > Y^*$.
      - How far the $SRAS$ curve shifts up depends on the explicit price adjustment process for the economy.
      - Generally it is a multiyear process dependent on the amount of excess aggregate demand.

Price Adjustment and General Equilibrium

- An increase in the real money supply:
  - In Year 2, the price level will begin to rise.
    - A higher price level reduces the real money supply, $M/P$.
      - Alternatively, the purchasing power of the nominal money supply, $M^*$, is reduced.
    - A lower real money supply shifts the $LM$ curve to the left, raising the real interest rate.
Price Adjustment and General Equilibrium

• An increase in the real money supply:
  ➢ In Year 2, the price level will begin to rise.
    • A higher real interest rate will:
      – Reduce interest-sensitive spending,
      – Reducing output and employment, and
      – Raise the unemployment rate.

Price Adjustment and General Equilibrium

• An increase in the real money supply:
  ➢ In Year 3, the price level continues to adjust.
    • In Year 3, the SRAS curve shifts up because of any excess aggregate demand in Year 2, i.e., \( Y_2 > Y^* \).
      – Because excess aggregate demand in Year 2 is less than in Year 1, the upward shift of the SRAS curve in Year 3 will be smaller than it was in Year 2.

Price Adjustment and General Equilibrium

• An increase in the real money supply:
  ➢ In Year 4 and beyond, this process continues until general equilibrium is re-established in both the IS-LM and AD-AS models.
    • Output will be back at its full-employment level.
      – Employment will be back at its full-employment level.
      – The unemployment rate will be back at its natural rate.
    • The price level will be permanently higher.

Price Adjustment and General Equilibrium

• An increase in the real money supply:
  ➢ Once general equilibrium has been re-established:
    • Output is back at its full-employment level.
    • The real money supply is back at its original level.
      – The price level has increased proportionately with the increase in the nominal money supply.
    • The real interest rate is back at its original level.
    • The composition of output has NOT changed.
Price Adjustment and General Equilibrium

• An increase in the real money supply:
  ➢ Once general equilibrium has been re-established:
    • All real variables are unchanged.
    • All nominal variables have increased proportionately with the increase in the money supply.
  ➢ This result is known as the Classical Dichotomy.
    • Or the Long-run Neutrality of Money.

Price Adjustment and General Equilibrium

• An increase in the real money supply:
  ➢ Trend money growth and inflation:
    • This analysis can also handle the case in which the money supply is growing continuously.
      – If both the money supply and price level grow at the same rate, then there is no change in the real money supply, and the \( LM \) curve does not shift.
      – If the money supply grows faster than the price level, then the \( LM \) curve would shift to the right.

Price Adjustment and General Equilibrium

• An increase in the real money supply:
  ➢ Trend money growth and inflation:
    • Thus, “an increase in the real money supply” can be thought of as:
      – An increase in the growth rate of money relative to its trend, or
      – An increase in the growth rate of money relative to the growth rate of inflation.

Price Adjustment and General Equilibrium

• An increase in the real money supply:
  ➢ Trend money growth and inflation:
    • Similarly, “a decrease in the price level” can be thought of as:
      – An decrease in the price level or inflation relative to its trend, or
      – An decrease in inflation relative to the growth rate of money.
The self-correcting economy:

- The economy is brought back into general equilibrium by adjustment of the price level.
- How rapidly does the economy reach general equilibrium?
  - Classical and Keynesian economists differ significantly in their answer to this question.

Classicals believe that price adjustment is rapid.
- Firms change prices instead of output in response to changes in demand.
- The adjustment process is almost immediate.
  - The economy quickly returns to full employment after a shock.
- There is NO appropriate role for monetary and/or fiscal policy in stabilizing the economy.

Keynesians believe that price adjustment is slow.
- It takes years before prices and wages fully adjust to changes in demand.
- When not in general equilibrium, output is determined by aggregate demand and the labor market is not in equilibrium.
- There is an appropriate role for monetary or fiscal policy in stabilizing the economy.
Aggregate Demand and Aggregate Supply

- A short-run adverse supply shock:
  - In Year 0, the economy is in general equilibrium.

A short-run adverse supply shock

- In Year 1, the increase in imported goods prices raises the price level and decreases output.
  - A higher real interest rate will:
    - Reduce interest-sensitive spending,
    - Reduce output and employment, and
    - Raise the unemployment rate.
Aggregate Demand and Aggregate Supply

• A short-run adverse supply shock:
  ➢ In Year 2, the price level will begin to fall.
    • In Year 2, the SRAS curve shifts down because of the insufficient aggregate demand in Year 1, i.e., \( Y_1 < Y^* \).
      − As the SRAS curve shifts down, the price level falls.
      − A lower price level increases the real money supply.
      − A higher real money supply shifts the LM curve to the right, reducing the real interest rate.

• A short-run adverse supply shock:
  ➢ In Year 2, the price level will begin to fall.
    • A lower real interest rate stimulates:
      − Increases interest-sensitive spending,
      − Increases output and employment, and
      − Decreases the unemployment rate.

• A short-run adverse supply shock:
  ➢ In Year 3 and beyond, the price level continues to fall until general equilibrium is re-established in both the IS-LM and AD-AS models.
    • Output will be back at its full-employment level.
      − Employment will be back at its full-employment level.
      − The unemployment rate will be back at its natural rate.
    • The price level will be back at its original level.

• A long-run adverse supply shock:
  ➢ In Year 0, the economy is in general equilibrium.
A long-run adverse supply shock

- In Year 1, there is a permanent decrease in productivity.
- A permanent decrease in productivity shifts BOTH the SRAS curve up and the LRAS curve (and the FE line) to the left.
  - The short-run effects could be:
    - Greater than,
    - Equal to, or
    - Less than
  - the long-run effects.

Aggregate Demand and Aggregate Supply

- In Year 1, there is a permanent decrease in productivity.
- A permanent decrease in productivity shifts both the SRAS curve up and the LRAS curve (and the FE line) to the left.
- The short-run effects could be:
  - Greater than,
  - Equal to, or
  - Less than
  - the long-run effects.

Aggregate Demand and Aggregate Supply

- In Year 1, the upward shift of the SRAS curve:
  - Increases the price level,
  - Reduces the real money supply,
  - Shifts the LM curve to the left,
  - Raises the real interest rate,
  - Reduces interest-sensitive spending, and
  - Reduces output and employment.

Aggregate Demand and Aggregate Supply

- In Year 1, the leftward shift of the LRAS curve reduces the economy’s full-employment level of output.
  - Which reduces general equilibrium output.
Aggregate Demand and Aggregate Supply

- A long-run adverse supply shock:
  - In Year 2, if the short-run effects are less than the long-run effects, then:
    - Output in Year 1 is greater than the new, lower full-employment level of output, i.e., \( Y_1 > Y^{*1} \).
    - So there is excess aggregate demand and the SRAS curve will shift up and the price level will rise.
  - This process continues until general equilibrium is re-established.

- A long-run adverse supply shock:
  - In Year 2, if the short-run effects are greater than the long-run effects, then:
    - Output in Year 1 is less than the new, lower full-employment level of output, i.e., \( Y_1 < Y^{*1} \).
    - So there is insufficient aggregate demand and the SRAS curve will shift down and the price level will fall.
  - This process continues until general equilibrium is re-established.

A long-run adverse supply shock

Once general equilibrium has been re-established:
- Output is at its new, lower full-employment level.
- The price level will be permanently higher.
- The real money supply will be lower.
- The real interest rate will be higher.
- The composition of output has changed.