Lecture 10
Aggregate Demand and Supply

Principles of Macroeconomics
KOF, ETH Zurich, Prof. Dr. Jan-Egbert Sturm
Fall Term 2008
General Information

23.9. Introduction Ch. 1,2
30.9. National Accounting Ch. 10, 11
7.10. Production and Growth Ch. 12
14.10. Saving and Investment Ch. 13
21.10. Unemployment Ch. 15
28.10. The Monetary System Ch. 16, 17
4.11. International Trade (incl. Basic Concepts of Supply/Demand/Welfare) Ch. 3, 7, 9
11.11. Open Economy Macro Ch. 18
18.11. Open Economy Macro Ch. 19
25.11. **Aggregate Demand and Aggregate Supply** Ch. 20
2.12. Monetary and Fiscal Policy Ch. 21
9.12. Phillips Curve Ch. 22
Overview / Q&A
# Teaching evaluation by students

### R1: Rector's question

The instructor was engaged with his/her teaching.

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$MWV = 4.3$  $SA = 0.8$  ungültig 0  gültig 89

### R2: Rector's question

The instructor explained the material clearly and understandably.

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### R3: Rector's question

The instructor had a good grasp of the teaching language (pronunciation, grammar, vocabulary)

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Three types of international transactions are recorded in the balance of payments:

- Exports or imports of goods or services (NX)
- Purchases or sales of financial assets (-NCO)
- Transfers of wealth between countries
  - They are recorded in the capital account.
The Current Account divides exports and imports into four categories:

- **Merchandise trade**
  - Exports or imports of goods

- **Services**
  - Payments for legal assistance, tourists’ expenditures, and shipping fees

- **Income**
  - International interest and dividend payments and the earnings of domestically owned firms operating abroad

- **Current transfers**
  - International transfers
The Balance of Payments Accounts

- The Capital Account
  - It records asset transfers and tends to be relatively small for industrialized countries.
    - Result from non-market activities or represent acquisition or disposal of non-produced, non-financial, and intangible assets

- The Financial Account
  - It measures the difference between sales of assets to foreigners and purchases of assets located abroad.
    - **Financial inflow (capital inflow)**
      - A loan from the foreigners with a promise that they will be repaid
    - **Financial outflow (capital outflow)**
      - A transaction involving the purchase of an asset from foreigners
Examples of Paired Transactions

- A Swiss citizen buys a CHF 1000 typewriter from a German company, and the German company deposits the CHF 1000 in its account at a bank in Zurich.
  - That is, the Swiss trades assets for goods.
  - This transaction creates the following two offsetting entries in the Swiss balance of payments:
    - It enters the Swiss CA with a negative sign ($\Delta NX = -\text{CHF 1000}$).
    - It shows up as a CHF 1000 credit in the Swiss financial account ($-\Delta NCO = 1000$).
Aggregate Demand and Aggregate Supply

• Short-Run Economic Fluctuations

• Economic activity fluctuates from year to year.
  • In most years production of goods and services rises.
  • On average over the past 50 years, production in the U.S. economy has grown by about 3 percent per year.
  • In some years normal growth does not occur, indicating a recession.
Aggregate Demand and Aggregate Supply

• Short-Run Economic Fluctuations
  • A recession is a period of declining real incomes, and rising unemployment.
  • A depression is a severe recession.
THREE KEY FACTS ABOUT ECONOMIC FLUCTUATIONS

1. Economic fluctuations are irregular and unpredictable.
   - Fluctuations in the economy are often called the business cycle.
   - These fluctuations do not follow regular or easily predictable patterns.
Swiss GDP per capita (in 2002 US$, PPP)

Quelle: GGDC, eigene Berechnungen
Dow Jones Industrial Average since 1900

Source: Dow Jones
Swiss GDP and the KOF-Barometer

Y-o-y in %

Sources: BFS, seco, KOF
THREE KEY FACTS ABOUT ECONOMIC FLUCTUATIONS

2. Most macroeconomic variables fluctuate together.
   - Most macroeconomic variables that measure some type of income or production fluctuate closely together.
   - Although many macroeconomic variables fluctuate together, they fluctuate by different amounts.
Growth contributions: Demand components

Sources: BFS, KOF
THREE KEY FACTS ABOUT ECONOMIC FLUCTUATIONS

3. As output falls, unemployment rises.
   • Changes in real GDP are inversely related to changes in the unemployment rate.
   • During times of recession, unemployment rises substantially.
Employment vs. GDP (in Switzerland)

Real GDP growth (2-years average)

Quelle: BFS und KOF
EXPLAINING SHORT-RUN ECONOMIC FLUCTUATIONS

- The Assumptions of Classical Economics
  - Most economists believe that classical theory describes the world in the long run but not in the short run.
  - Changes in the money supply affect nominal variables but not real variables in the long run.
  - The assumption of monetary neutrality is not appropriate when studying year-to-year changes in the economy.
EXPLAINING SHORT-RUN ECONOMIC FLUCTUATIONS

• Neutrality of money
  • If the quantity of money in the economy were to double, prices would double and so would incomes. Real variables would remain constant.

• HOWEVER: These changes will not occur instantaneously. It takes time for prices and incomes to change, and in the meantime, there can be real effects.
The Model of Aggregate Demand and Aggregate Supply

- Two variables are used to develop a model to analyze the short-run fluctuations.
- The economy’s output of goods and services measured by real GDP.
- The average level of prices measured by the CPI or the GDP deflator.
The Model of Aggregate Demand and Aggregate Supply

- Economist use the *model of aggregate demand and aggregate supply* to explain short-run fluctuations in economic activity around its long-run trend.
The Model of Aggregate Demand and Aggregate Supply

- The *aggregate-demand curve* shows the quantity of goods and services that households, firms, and the government want to buy at each price level.
- The *aggregate-supply curve* shows the quantity of goods and services that firms choose to produce and sell at each price level.
Figure 5 Aggregate Demand and Aggregate Supply...

- Aggregate supply
- Aggregate demand

Equilibrium price level
Equilibrium output

Price Level

Quantity of Output
THE AGGREGATE-DEMAND CURVE

- The four components of GDP ($Y$) contribute to the aggregate demand for goods and services.

$$Y = C + I + G + NX$$
1. A decrease in the price level...

2. ...increases the quantity of goods and services demanded.
Why the Aggregate-Demand Curve Is Downward Sloping

- The Price Level and Consumption:
  - The Wealth Effect
- The Price Level and Investment:
  - The Interest Rate Effect
- The Price Level and Net Exports:
  - The Exchange-Rate Effect
Why the Aggregate-Demand Curve Is Downward Sloping

• The Price Level and Consumption:
  • The Wealth Effect
    • A lower price level raises the real value of money and makes consumers wealthier, which encourages them to spend more.
  • This increase in consumer spending means larger quantities of goods and services demanded.
Why the Aggregate-Demand Curve Is Downward Sloping

• The Price Level and Investment:
  • The Interest Rate Effect
    • A lower price level reduces the real interest rate and makes borrowing less expensive, which encourages greater spending on investment goods.
    • This increase in investment spending means a larger quantity of goods and services demanded.
Why the Aggregate-Demand Curve Is Downward Sloping

• The Price Level and Net Exports:
  • The Exchange-Rate Effect
    • A lower price level in Switzerland causes (Swiss interest rates to fall and) the real exchange rate to depreciate, which stimulates Swiss net exports.
    • The increase in net export spending means a larger quantity of goods and services demanded.
Why the Aggregate-Demand Curve Might Shift

• The downward slope of the aggregate-demand curve shows that a fall in the price level raises the overall quantity of goods and services demanded.

• Many other factors, however, affect the quantity of goods and services demanded at any given price level.

• When one of these other factors changes, the aggregate demand curve shifts.
Why the Aggregate-Demand Curve Might Shift

• Shifts might arise from changes in:
  • Consumption
  • Investment
  • Government Purchases
  • Net Exports
  • Money Supply
Figure 7 Shifts in the Aggregate Demand Curve

- **Price Level**
  - $P_1$

- **Quantity of Output**
  - $Y_1$
  - $Y_2$

- **Aggregate demand, $D_1$**
- **Aggregate demand, $D_2$**
THE AGGREGATE-SUPPLY CURVE

- In the long run, the aggregate-supply curve is vertical because the price level does not affect long run determinants of real GDP.
- In the short run, the aggregate-supply curve is upward sloping.
THE AGGREGATE-SUPPLY CURVE

• In the long run, an economy’s production of goods and services depends on its supplies of labor, capital, and natural resources and on the available technology used to turn these factors of production into goods and services.

• The price level does not affect these variables in the long run.

• The long-run aggregate supply represents the classical dichotomy and money
Figure 8 The Long-Run Aggregate-Supply Curve

1. A change in the price level . . .

2. . . . does not affect the quantity of goods and services supplied in the long run.
THE AGGREGATE-SUPPLY CURVE

• The long-run aggregate-supply curve is vertical at the natural rate of output, which is the production of goods and services that an economy achieves in the long run when unemployment is at its normal rate.
  • This level of production is also referred to as potential output or full-employment output.
  • The natural rate of output is the level of output towards which the economy gravitates in the long run.
Why the Long-Run Aggregate-Supply Curve Might Shift

- Any change in the economy that alters the natural rate of output shifts the long-run aggregate-supply curve.
- The shifts may be categorized according to the various factors in the classical model that affect output.
Why the Long-Run Aggregate-Supply Curve Might Shift

• Shifts might arise from changes in:
  • Labor
  • Capital
  • Natural Resources
  • Technological Knowledge
In the long run, technological progress shifts long-run aggregate supply, leading to growth in output... and lower price levels.
Using Aggregate Demand and Aggregate Supply to Depict Long-Run Growth and Inflation

- The most important forces that govern the economy in the long run are technology (output) and monetary policy (price level).
- Short-run fluctuations in output and the price level should be viewed as deviations from the continuing long-run trends of output growth and inflation.
Why the Aggregate-Supply Curve Slopes Upward in the Short Run

• In the short run, an increase in the overall level of prices in the economy tends to raise the quantity of goods and services supplied.
• A decrease in the level of prices tends to reduce the quantity of goods and services supplied.
• As a result, the short-run aggregate-supply curve is upward sloping.
1. A decrease in the price level...

2. ...reduces the quantity of goods and services supplied in the short run.
Why the Aggregate-Supply Curve Slopes Upward in the Short Run

- Three Theories:
  - The Sticky-Wage Theory
  - The Sticky-Price Theory
  - The Misperceptions Theory
Why the Aggregate-Supply Curve Slopes Upward in the Short Run

• The Sticky-Wage Theory
  • Nominal wages are slow to adjust to changing economic conditions, or are “sticky” in the short run
  • Nominal wages do not adjust immediately to a fall in the price level. A lower price level makes employment and production less profitable.
  • This induces firms to reduce the quantity of goods and services supplied.
Why the Aggregate-Supply Curve Slopes Upward in the Short Run

• The Sticky-Price Theory
  • Prices of some goods and services adjust sluggishly in response to changing economic conditions.
  • An unexpected fall in the price level leaves some firms with higher-than-desired prices. For a variety of reasons, they may not want to or be able to change prices immediately.
  • This depresses sales, which induces firms to reduce the quantity of goods and services they produce.
Why the Aggregate-Supply Curve Slopes Upward in the Short Run

- **The Misperceptions Theory**
  - Changes in the overall price level temporarily mislead suppliers about what is happening in the markets in which they sell their output.
  - A lower price level causes misperceptions about relative prices.
  - These misperceptions induce suppliers to decrease the quantity of goods and services supplied.
Why the Aggregate-Supply Curve Slopes Upward in the Short Run

- All three theories suggest that output deviates in the short run from the natural rate when the actual price level deviates from the price level that people had expected to prevail.

$$\text{Quantity of output supplied} = \text{Natural rate of output} + a \left( \text{Actual price level} - \text{Expected price level} \right)$$
Why the Short-Run Aggregate-Supply Curve Might Shift

• Shifts might arise from changes in:
  • Expected Price Level.
  • Labor.
  • Capital.
  • Natural Resources.
  • Technology.
Why the Aggregate Supply Curve Might Shift

- An increase in the expected price level reduces the quantity of goods and services supplied and shifts the short-run aggregate supply curve to the left.
- A decrease in the expected price level raises the quantity of goods and services supplied and shifts the short-run aggregate supply curve to the right.
Figure 11 The Long-Run Equilibrium

- Long-run aggregate supply
- Short-run aggregate supply
- Aggregate demand
- Equilibrium price
- Natural rate of output
- Price Level
- Quantity of Output
TWO CAUSES OF ECONOMIC FLUCTUATIONS

• Four steps in the process of analyzing economic fluctuations:
  • Determine whether the event affects aggregate supply or aggregate demand.
  • Decide which direction the curve shifts.
  • Use a diagram to compare the initial and the new equilibrium.
  • Keep track of the short and long run equilibrium, and the transition between them.
TWO CAUSES OF ECONOMIC FLUCTUATIONS

• Shifts in Aggregate Demand
  • In the short run, shifts in aggregate demand cause fluctuations in the economy’s output of goods and services.
  • In the long run, shifts in aggregate demand affect the overall price level but do not affect output.
  • Policymakers who influence aggregate demand can potentially mitigate the severity of economic fluctuations.
1. A decrease in aggregate demand . . .

2. . . . causes output to fall in the short run . . .

3. . . . but over time, the short-run aggregate-supply curve shifts . . .

4. . . . and output returns to its natural rate.
• All societies experience short-run economic fluctuations around long-run trends.
• These fluctuations are irregular and largely unpredictable.
• When recessions occur, real GDP and other measures of income, spending, and production fall, and unemployment rises.
• Classical economic theory is based on the assumption that nominal variables do not influence real variables. Most economists believe that this is an accurate assumption in the long run, but not in the short run.
Economists analyze short-run economic fluctuations using the aggregate demand and aggregate supply model. According to this model, the output of goods and services and the overall level of prices adjust to balance aggregate demand and aggregate supply.
The aggregate-demand curve slopes downward for three reasons: a wealth effect, an interest rate effect, and an exchange rate effect.

Any event or policy that changes consumption, investment, government purchases, or net exports at a given price level will shift the aggregate-demand curve.
• In the long run, the aggregate supply curve is vertical.
• In the short-run, the aggregate supply curve is upward sloping.
• The are three theories explaining the upward slope of short-run aggregate supply: the sticky-wage theory, the sticky-price theory and the misperceptions theory.
Summary

• Events that alter the economy’s ability to produce output will shift the short-run aggregate-supply curve.

• Also, the position of the short-run aggregate-supply curve depends on the expected price level.

• One possible cause of economic fluctuations is a shift in aggregate demand.
• A second possible cause of economic fluctuations is a shift in aggregate supply.
• Stagflation is a period of falling output and rising prices.