LECTURE 20
PLANNED AGGREGATE EXPENDITURE AND OUTPUT
April 6, 2017

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LECTURE 20
Planned Aggregate Expenditure and Output

April 6, 2017
Announcements

• We have handed out Problem Set 5.
  • It is due at the start of lecture on Thursday, April 13th.
  • Problem set work session next Tuesday, April 11th, 5:00–7:00 p.m. in 648 Evans.

• Research paper reading for next time.
  • Romer and Romer, “The Macroeconomic Effects of Tax Changes.”
I. **Overview of Short-Run Fluctuations**
Real GDP in the United States, 1950–2016

Source: FRED (Federal Reserve Economic Data); data from Bureau of Economic Analysis.
Short-Run Fluctuations

• Times when output moves above or below potential (booms and recessions).

• Recessions are costly and very painful to the people affected.
The U.S. Unemployment Rate, 1948–2017

II. **The Key Role of Demand**
Key Determinant of Output in the Short Run

• In the short run, aggregate output is determined by demand.

• Three terms that mean the same thing:
  • Planned aggregate expenditure
  • Planned spending
  • Planned aggregate demand

• All three terms refer to the total amount that people in the economy plan to buy (or spend).
Evidence on the Key Role of Demand

- Historical experience
- Academic research
Why is output determined by demand in the short run?

• Nominal rigidities (inflation doesn’t change substantially in the short run).

• Due to limited information, menu costs, long-term contracts, or other factors.
III. PLANNED AGGREGATE EXPENDITURE
Components of Planned Aggregate Expenditure (PAE)

- Consumption (C)
- Planned investment ($I^p$)
- Government purchases (G)
- Net exports (NX)

$$\text{PAE} = C + I^p + G + NX$$
Short Run versus Long Run

• In the short run:
  • PAE can be anything.
  • Output responds to match PAE.

• In the long run:
  • Output is at $Y^*$ (determined by normal technology, capital, and employment).
  • PAE adjusts to equal $Y^*$.
  • Movement in $r$ brings this about.
IV. DETERMINANTS OF EACH COMPONENT OF PAE
Determinants of Planned Investment ($I^p$)

• Real interest rate ($r$)

• Expectations (“animal spirits”)

• We talk about “planned investment” because we are leaving out the unplanned investment in inventories that happens when PAE is different from actual output.
Determinants of Government Purchases (G)

- Politics
- Wars, natural disasters

We take G as given.
Determinants of Net Exports (NX)

• For now we are assuming they are just given.

• Will discuss the economic determinants later in the course.
Determinants of Consumption (C)

- Real interest rate ($r$)
- Expectations ("consumer confidence")
- Wealth
- Disposable income
Consumption and Disposable Income

• Aggregate income: Same as aggregate output ($Y$)

• Aggregate tax payments: Same as government tax revenues ($T$)

• Aggregate disposable income: $Y - T$

• Consumption function: $C = f(Y - T)$

• Sometimes written in the particular form:

$$C = \bar{C} + c \cdot (Y - T)$$

(where $\bar{C}$ is positive and $c$ is between 0 and 1)
Consumption Function

\[ C = \bar{C} + c \cdot (Y-T) \]

slope = \( c \)
Consumption Function
\[ C = \bar{C} + c \cdot (Y - T) \]

- **Autonomous consumption**: The part of consumption that does not vary with income (\( \bar{C} \)).

- **Marginal propensity to consume (MPC)**: The change in planned consumption due to a change in disposable income (\( c \)).
Consumption and Disposable Income

Source: Frank, Bernanke, Antonovics, and Heffetz, “Principles of Economics.”
V. Determination of Short-Run Output
45-degree Line

- Captures the equilibrium condition that $Y = PAE$.
- Also reflects the empirical/behavioral reality that output responds to planned spending in the short run.
45-degree Line

Y = PAE

45°
Expenditure Line

- Captures the fact that planned aggregate spending is a function of total income (which is the same as total output).

- $\text{PAE} = C + I^p + G + NX$, where $C = f(Y-T)$. 
The slope of the expenditure line (PAE) is the MPC.

\[ \text{PAE} = C + I^p + G + NX \]
Determination of Short-Run Output

• Output in the short run is determined by the intersection of the 45-degree line and the expenditure line.
Determination of Short-Run Output

Sometimes called the “Keynesian Cross” diagram.
How does the economy get to short-run equilibrium?

At $Y_3$, unintended negative inventory investment leads firms to increase production.

At $Y_2$, unintended inventory investment leads firms to cut production.
In the long run, \( \text{PAE} = \text{Y} \) and \( \text{PAE} \) cross at \( \text{Y}^* \) (potential output).
VI. Shifts in the Expenditure Line
Crucial Determinant of Short-Run Fluctuations: Shifts in the Expenditure Line

• Expenditure line (PAE) shows how planned spending varies with output.

• Anything that changes planned spending other than output, will shift the curve.

• If the expenditure line shifts, short-run equilibrium output will change.
Example: A Fall in Autonomous Consumption

• A fall in consumption *not* caused by a fall in output.

• A decline in the intercept of the consumption function ($\bar{C}$).
Great Crash of the Stock Market in October 1929

Source: Federal Reserve Bank of St. Louis, FRED.
Why might a fall in stock prices reduce consumer spending (at a given level of output)?

- Reduction in wealth makes consumers feel poorer.
- Fall in stock prices makes consumers pessimistic (lowers consumer confidence).
- Stock price volatility causes uncertainty and leads to “wait and see” behavior.
The Collapse of Consumer Spending in Late 1929

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<thead>
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<th>TABLE I</th>
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<td><strong>CONSUMER BEHAVIOR FOLLOWING THE GREAT CRASH</strong></td>
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<th>Cumulative percentage change in real seasonally adjusted retail sales</th>
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<td>Ten-cent store sales</td>
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<td>Grocery store sales</td>
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Source: Christina Romer, “The Great Crash and the Onset of the Great Depression.”
A Fall in Autonomous Consumption

Diagram showing two consumption curves, $C_1$ and $C_2$, on a graph with the Y-axis labeled as $C$ and the X-axis labeled as $Y-T$. The curves represent different levels of autonomous consumption.
A Fall in Autonomous Consumption

\[ Y = \text{PAE} \]

\[ \text{PAE}_1 \]

\[ \text{PAE}_2 \]
Real GDP, 1909–1939

Source: Christina Romer, “The Prewar Business Cycle Reconsidered,” and BEA.
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Multiplier Effect

• A change in PAE changes output by more than the initial change in PAE.

• Why? Because changes in output affect consumer spending and reinforce (or multiply) the initial change in PAE.

• Existence of the multiplier effect explains why moderate changes in planned spending cause more substantial changes in output.