Aggregate Demand Theories of the Business Cycle

AS-AD General Theory

All three of these types of business cycle explanations can be thought of as special cases of a general AS-AD theory of the business cycle, in which fluctuations in aggregate demand (and sometimes aggregate supply) cause the business cycle.
Chapter 15

The Business Cycle

- periodic autonomous displacements of the

- AD curve: "aggregate demand curves"
- AS curve: "aggregate supply curves"

- an initial displacement

- does not give rise to subsequent displacements of the AD or AS curve

Simple → Keynesian view: Choi, Chill

Complex → does give rise to subsequent displacements of the AD or AS curve

- Monetaryist: Qat. Exp. RBC
Rational Expectations View (Lucas)

- \[ y = y^* + \frac{1}{1+\lambda} \epsilon_m + \frac{1}{1+\lambda} \epsilon_y \]
- \[ p = m^e + \sigma - y^* + \frac{1}{1+\lambda} (\epsilon_m - \epsilon_y) \]

Advice: Take macro 302
The Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel 1995

"for having developed and applied the hypothesis of rational expectations, and thereby having transformed macroeconomic analysis and deepened our understanding of economic policy"

Robert E. Lucas Jr.
USA
University of Chicago
Chicago, IL, USA
b. 1937

\[ y = y^* + \frac{1}{\alpha} \epsilon_m + \frac{\lambda}{\alpha} \epsilon_y^* \]
\[ \rho = m^e + \sigma - y^* \epsilon^e + \frac{\lambda}{\alpha} (\epsilon_m - \epsilon_y^*) \]

- expected money growth ($m^e$) does not influence $\Delta GDP (y)$

- unexpected errors
  - $\epsilon_m$ is money growth
  - $\epsilon_y^*$ is f.e. price

Last modified June 16, 2000
- the rate of inflation \( p \) is influenced by
  - expected money growth \( E_m \)
  - unexpected money growth \( E_m \)
  - expected changes in f.i.e. RGDP \( y^* \)
  - unexpected changes in f.i.e. RGDP \( y^* \)
  - the income velocity \( v \)

- test these hypotheses!

  specifically test the following hypotheses

  \[
  \frac{\Delta y}{\Delta m} = 0
  \]

  - expected money growth

  \((m^*)\) does not influence RGDP \( y^* \)
Does a change in the expected money growth influence RGDP(\$)?

Answer: Yes

FIGURE 20-2  EXPECTED MONEY GROWTH AND GROWTH OF OUTPUT.

(Source: DRI/McGraw-Hill Macroeconomic Database and authors' calcu
A rational expectation is a forecast based on all the available relevant information.

A typical model of markets based on systematic forecast errors do not make rational expectations work well in practice.

\[ P_{t+1} = f(C_t, P_t, P_{t-1}, \ldots) \]

Expectations

Future = \( P \) (part)}

Rational expectations
Adaptive expectations

Future = f (past)

Specifically

\[ p_e = \frac{1}{\sum_{i=0}^{n} \lambda_i} \sum_{i=0}^{n} \lambda_i p_{t-i} \]

\[ \text{expected price at } t+1 = \text{wtd. average of observed prices} \]

It can be shown that the model based on \( p_{e2} \) is inconsistent (different from) \( p_e \)

What to do?

Use the AD-AS model to make the forecast of the expected price; output etc.

i.e. \( p_e = p_{e2} \)
\textbf{Ch 12: } 
\hspace{1cm} \text{Money Supply (M) = Price Level (P) x GNP} \hspace{1cm} \Rightarrow \text{\textit{m}} = \text{\textit{e}} \times \text{\textit{M}}; \text{\textit{v}} = \text{\textit{e}} \times \text{\textit{V}}

\hspace{1cm} \text{p} = \text{\textit{e}} \times \text{\textit{P}}; \text{\textit{y}} = \text{\textit{e}} \times \text{\textit{GNP}}

\textbf{AO: } 
\hspace{1cm} \overline{m} + \overline{y} = \overline{p} + \overline{\gamma}

\textbf{SAS: } 
\hspace{1cm} \overline{p} = \overline{p^e} + \lambda (\overline{y} - \overline{y}^*)

\text{\textit{p}}: \text{actual price}

\text{\textit{p}^e}: \text{expected price}

2 \text{eqs}

2 \text{unknowns: } \overline{p}, \overline{\gamma}

\text{Solve}

\hspace{1cm} \overline{y}^* = \frac{1}{1 + \lambda} \overline{m} + \frac{1}{1 + \lambda} (\overline{v} - \overline{p}^e) + \frac{1}{1 + \lambda} \overline{\gamma}^*

\hspace{1cm} \overline{p}^e = \frac{1}{1 + \lambda} \overline{m} + \overline{y} - \overline{y}^*) + \frac{1}{1 + \lambda} \overline{p}^e

\text{Typically } \overline{p}^e^2 \text{ (the forecast) is different from } \overline{p}^e

\text{\overline{p}^e^2} \text{ in inconsistent with } \overline{p}^e

\overline{p}^e \text{ is not rational}
Use endogenously (model based)

firmed expectations

c.e. $p_e = p^2$

- Substitute
  
  $p_e = \frac{\lambda}{1+\lambda} (m+\delta-y^*) + \frac{\lambda}{1+\lambda} p^2$

  rewrite
  
  $p_e = \lambda \cdot m + \bar{\delta} - y^*$

  therefore a one percent increase in $m$ increases $p$ by one percent
  
  not by $\frac{1}{1+\lambda}$ percent

  using endogenously based price expectations

  also recall
  
  $p = p_e + \lambda (y - y^*)$

  but $p = p_e$

  therefore $y = y^*$
therefore

if \( M \) is known at the time of making the forecast of \( p \)

- then monetary policy
  - increases \( p \) proportionately
  - but has a zero output effect
    - in short run
    - in long run

\[ \rightarrow \text{money in neutral} \]
For policy purposes

i.e. forecasting purposes,

we need to work with

\[ N_{t+1} \times V_{t+1} = P_{t+1} - \Delta X_{t+1} \]

or

\[ \frac{\Delta N_{t+1}}{N_{t+1}} + \frac{\Delta V_{t+1}}{V_{t+1}} = \frac{\Delta P_{t+1}}{P_{t+1}} + \frac{\Delta X_{t+1}}{X_{t+1}} \]

if \( N_{t+1} \) and \( V_{t+1} \) are

not controllable then

we must use

expected magnitudes

\[ \left( \frac{\Delta N_{t+1}}{N_{t+1}} \right) ; \left( \frac{\Delta V_{t+1}}{V_{t+1}} \right) \]
Typically
\[
\left( \frac{\Delta N_{t+1}}{N_{t+1}} \right)_{\text{act.}} \neq \left( \frac{\Delta \hat{N}_{t+1}}{\hat{N}_{t+1}} \right)
\]

\[
\text{error} \quad E_m = \frac{\Delta N_{t+1}}{N_{t+1}} - \left( \frac{\Delta \hat{N}_{t+1}}{\hat{N}_{t+1}} \right)
\]

**Strong assumption** → On average $E_m = 0$

→ No systematic mistakes
\[ y = y^* + \frac{1}{1 + 2} e^m + \frac{1}{1 + 2} e^y \]
\[ p = m^2 + u - y^* \cdot \frac{1}{1 + 2} (e^m - e^y) \]

\textit{Note}

1. \( y \) is not influenced by \( m^2 \)
2. If \( e^m; e^y \) equal zero then \( p = m^2 \)