Structural Model

• Examines whether one variable affects another by using data to build a model that explains the channels through which the variable affects the other.

• Transmission mechanism
  - The change in the money supply affects interest rates.
  - Interest rates affect investment spending.
  - Investment spending is a component of aggregate spending (output).
Reduced-Form

• Examines whether one variable has an effect on another by looking directly at the relationship between the two

• Analyzes the effect of changes in money supply on aggregate output (spending) to see if there is a high correlation

• Does not describe the specific path
Structural Model
Advantages and Disadvantages

• Possible to gather more evidence ⇒ more confidence on the direction of causation
• More accurate predictions
• Understand how institutional changes affect the links
• Only as good as the model it is based on
Reduced-Form
Advantages and Disadvantages

• No restrictions imposed on the way monetary policy affects the economy
• Correlation does not necessarily imply causation
  ◆ Reverse causation
  ◆ Outside driving factor
Early Keynesian Evidence

- Monetary policy does not matter at all
- Three pieces of structural model evidence
  - Low interest rates during the Great Depression indicated expansionary monetary policy but had no effect on the economy
  - Empirical studies found no linkage between movement in nominal interest rates and investment spending
  - Surveys of business people confirmed that investment in physical capital was not based on market interest rates
Objections to Early Keynesian Evidence

- Friedman and Schwartz publish a monetary history of the U.S. showing that monetary policy was actually contractionary during the Great Depression
- Many different interest rates
- During deflation, low nominal interest rates do not necessarily indicate expansionary policy
- Weak link between nominal interest rates and investment spending does not rule out a strong link between real interest rates and investment spending
- Interest-rate effects are only one of many channels
**FIGURE 1** Real and Nominal Interest Rates on Three-Month Treasury Bills, 1931–2005

Timing Evidence of Early Monetarists

- Money growth causes business cycle fluctuations but its effect on the business cycle operates with “long and variable lags”
- Post hoc, ergo propter hoc
  - Exogenous event
  - Reduced form nature leads to possibility of reverse causation
  - Lag may be a lead
FIGURE 2  Hypothetical Example in Which Money Growth Leads Output
Statistical Evidence

• Autonomous expenditure variable equal to investment spending plus government spending
  - For Keynesian model AE should be highly correlated with aggregate spending but money supply should not
  - For Monetarist money supply should be highly correlated with aggregate spending but AE should not

• Neither model has turned out be more accurate than the other
Historical Evidence

• If the decline in the growth rate of the money supply is soon followed by a decline in output in these episodes, much stronger evidence is presented that money growth is the driving force behind the business cycle.

• A *Monetary History* documents several instances in which the change in the money supply is an exogenous event and the change in the business cycle soon followed.
Figure 3 The Link Between Monetary Policy and GDP: Monetary Transmission Mechanisms
Lessons for Monetary Policy

- It is dangerous always to associate the easing or the tightening of monetary policy with a fall or a rise in short-term nominal interest rates.

- Other asset prices besides those on short-term debt instruments contain important information about the stance of monetary policy because they are important elements in various monetary policy transmission mechanisms.
Lessons for Monetary Policy (cont’d)

• Monetary policy can be highly effective in reviving a weak economy even if short-term interest rates are already near zero

• Avoiding unanticipated fluctuations in the price level is an important objective of monetary policy, thus providing a rationale for price stability as the primary long-run goal for monetary policy