Money and Inflation

• What is Money?
  ➢ Money serves 3 functions:
    • A unit of account.
      ➢ How things are priced.
    • A store of value.
      ➢ Holds value over time.
    • A medium of exchange.
      ➢ Universally accepted in transactions.
        » Exchange finalizes the transaction.

• Where does money come from?
  ➢ Currency and coins are issued by the government.
  ➢ “Other” money is issued by the financial system.
    • Heavily influenced by the central bank.

Monetary Policy in the Long Run

Agenda

• Money and Inflation
  ➢ What is money?
• The Quantity Theory of Money
  ➢ The equation of exchange
• The Long-run Dichotomy

Money and Inflation

• What is money?

Money and Inflation

• Countries with high inflation are also experiencing rapid growth in their money supply.

Money and Inflation

• Why do some countries have rapid growth in their money supply and other countries don’t?

Money and Inflation

• Observations
  • Countries with high inflation are also experiencing rapid growth in their money supply.

Money and Inflation

• What causes inflation?

Money and Inflation

• Countries with high inflation are also experiencing rapid growth in their money supply.

Money and Inflation

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Money and Inflation

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Money and Inflation

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Money and Inflation

• Why do some countries have rapid growth in their money supply and other countries don’t?
Money and Inflation

- Solow growth model determines Y.
  - As a function of L, K, and A.
  - No mention of P or inflation.
- Separate model for focusing on money.
  - Money supply is exogenous.
    - Determined by central bank.
  - Quantity theory of money determines P and p-dot.
    - And nominal Y.

Quantity Theory of Money

- The Quantity Theory of Money
  - A long run theory of money supply and demand.
  - Suggests that the price level varies directly and proportionately with the quantity of money.
  - Derived from the Equation of Exchange.

Quantity Theory of Money

- Equation of Exchange:
  \[ M \times V = P \times Y \]
  - Where
    - M = the money supply,
    - V = the velocity of money,
    - P = average price level,
    - Y = real GDP or income, and
    - \( P \times Y \) = nominal GDP
  - The equation of exchange is an identity.

Equation of Exchange

- Three basic assumptions:
  - V is constant.
  - Y is determined by L, K, and A.
    - From Solow growth model.
    - Y is independent of M.
  - Causation runs from M to P.
    - Because the money supply is exogenous.
      - Determined by the central bank.

Equation of Exchange

- Three basic assumptions:
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Equation of Exchange

- Three basic assumptions:
  - V is constant.
  - People hold M in relationship to:
    - Their income, Y
    - The opportunity cost of holding money, R
    - The ease and cost of converting financial assets to money 
    - Liquidity
  - If liquidity is low, then people primarily hold M in proportion to Y.
    - Deregulation and recent technological advancements have greatly increased liquidity of most financial assets.
    - Empirical evidence suggests that V is generally not constant.

Equation of Exchange

- The Equation of Exchange:
  \[ M \times \nabla V = P \times \nabla Y \]
  - Where
    - \( \nabla V \) = fixed velocity, and
    - \( \nabla Y \) determined by A, L, and K.
Quantity Theory of Money

• Then
  \[ M*V \rightarrow P*Y \]
  ➢ Or
  \[ \Delta M \rightarrow \Delta P \]
  ➢ Changes in the money supply lead to changes in the general price level.
  • This is the Quantity Theory of Money.

Quantity Theory of Money

• Alternatively, if
  \[ M*V = P*Y \]
  ➢ then
  \[ m-dot + v-dot = p-dot + y-dot \]
  ➢ But if v-dot = 0 and y-dot = 0 (assumed)
  ➢ then
  \[ m-dot = p-dot \]

Quantity Theory of Money

• Now, if
  \[ y-dot > 0 \]
  ➢ then
  \[ m-dot = p-dot + y-dot \]
  ➢ and
  \[ m-dot > p-dot \]

Quantity Theory of Money

• Conclusion:
  ➢ Inflation is a monetary phenomenon.
    • A change in M causes a proportionate change in P*Y.
    • Since Y is determined by real factors, changes in the M cause a proportionate change in P.
    • Thus, “inflation is always and everywhere a monetary phenomenon.”

Quantity Theory of Money

• How Well Does the Quantity Theory Work?
  ➢ There should be a strong positive relationship between money growth and inflation.
    • Observation
      ➢ Strong positive, but not exact, relationship exists.
      ➢ Changes in velocity.

Quantity Theory of Money

• Graph showing the relationship between annual percent change in the money supply and inflation rate.
Quantity Theory of Money

• How Well Does the Quantity Theory Work?
  ➢ The quantity theory must be used with care.
    • In countries with high rates of inflation, there is a strong positive relationship between inflation and money supply growth.
    • In countries with low rates of inflation, the positive relationship between inflation and money supply growth is less strong.
  ➢ In determining how well the theory works,
    • Must consider the stability of V.
    • How fast Y is growing.

• Policy Implications
  ➢ To control inflation, control M growth.
    • Central banks are responsible for inflation.
      ➢ Central bank independence.
      ➢ Inflation targeting mandates.

Quantity Theory of Money

• Why do some countries have high inflation?
  ➢ Low inflation is not always a government priority.
    • Government spending must be financed by:
      ➢ Tax revenues,
      ➢ Borrowing from the private sector, or
      ➢ Seignorage.
    • Seignorage is the difference between the cost of printing money (almost zero) and the value of the goods that the money can buy.
      ➢ This is a source of revenue for the government.
      ➢ It can pay for government expenditures.

• Why do some countries have high inflation?
  ➢ Low inflation is not always a government priority.
    • If the tax system is inefficient and/or financial markets are un- or underdeveloped, then governments might resort to seignorage.
    • Financing government with seignorage increases M.
      ➢ Rapid increases in the M lead to rapid increases in inflation.
      ➢ This creates an “Inflation Tax.”
        » Holders of cash become poorer as its purchasing power is reduced.
        » It reallocates resources from holders of currency to the government.

Quantity Theory of Money

• Policy Implications:
  ➢ Central Bank Independence
    • Central banks that are insulated from political influence can refuse to inflate the money supply.
    • Quantity theory is the major rationale for justifying:
      ➢ Central bank independence.
      ➢ Inflation targeting mandates.

The Long-Run Dichotomy

• In the long-run:
  ➢ Y is determined by L, K, and A.
    • The real sector.
  ➢ P and P*Y are then determined by M.
    • The nominal sector.
The Long-Run Dichotomy

• In the long-run:
  
  ➢ The Real and Nominal sectors are independent.
    • The real sector depends on relative, not absolute, P.
      ➢ Changes in absolute prices do not alter supply decisions.
      ➢ Changes in M only affects absolute prices.
    • The nominal sector depends on absolute, not relative, P.
  
  ➢ The aggregate supply curve is vertical.
    • At potential Y.