Professor Mark Gertler
Intermediate Macroeconomic Theory
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Lecture 7

Money, Inflation and Nominal Interest Rates: Long Run Trend Behavior

We have developed a theory of trend behavior of "real economic variables": quantities

Nominal variables: Inflation and Nominal Rate of Interest:.

Inflation: $\frac{P_t - P_{t-1}}{P_{t-1}}$

Nominal Interest Rate on bond that pays 1$ next period: $\frac{1-S_t}{S_t}$ versus real rate $\frac{(1/P_{t+1})-(S/P_{tt})}{(S/P_{tt})} = \frac{1}{S_t}\frac{P_t}{P_{t+1}} - 1 = \frac{1+r_t^n}{1+\pi_{t+1}} - 1 = \frac{1+r_t^n-\pi_{t+1}+\pi_{t+1}}{1+\pi_{t+1}} - 1 = \frac{r_t^n-\pi_{t+1}}{1+\pi_{t+1}}$

$\frac{r_t^n-\pi_t}{1+\pi_t} = \frac{r_t^n-\pi_t}{1}(1-\frac{\pi_t}{1+\pi_t}) \approx r_t^n - \pi_t$

Irving Fisher

purchasing power of money $= \frac{1}{P}$

Develops quantity theory of money to explain purchasing power of money:

Definition of money: Anything generally acceptable in exchange

Solves double co-incidence of wants problem.

Other roles:

Unit of account,

Store of value. But not yielding. Begs question why it is held.

Inside Money: Liabilitty of the government.

types of inside money: fiat, commodity.

Outside Money: Liability of private financial instituions.

Fisher first develops theory to explain purchasing power of inside fiat money; value of inside money follows:

Ouantity Theory Follows from Quantity Identity

$$MV = PY$$

$$\frac{\Delta M}{M} + \frac{\Delta V}{V} = \frac{\Delta P}{P} + \frac{\Delta Y}{Y}$$

$$\frac{\Delta P}{P} = \frac{\Delta M}{M} + \frac{\Delta V}{V} - \frac{\Delta Y}{Y}$$

Moving from identity the identity to the theory. Two assumptions:

1. $\frac{\Delta Y}{Y}$ is independent of $\frac{\Delta M}{M}, \frac{\Delta V}{V}, \frac{\Delta P}{P} - monetaryneutrality$
2. $\frac{\Delta V}{V} = 0$,

$$\frac{\Delta P}{P} = \frac{\Delta M}{M} - \frac{\Delta Y}{Y}$$

an increase in $\frac{\Delta M}{M}$

increases $\frac{\Delta P}{P} bythesameamount.$

Why is V constant:

$$M = kPY$$

$$k = \frac{1}{V}$$

Problems:

1. V not constant - highly procyclical.

2. Y not independent of M

The first issue: accounting for variable velocity.

Money demand depends inversely on nominal rates: opportunity cost of holding money (c) depends on the state of financial institutions.

$$\frac{M}{P} = cYe^{-\nu r^n}$$
$$\frac{M}{P} = \frac{1}{V}Y; \qquad \frac{1}{V} = ce^{-\nu r^n}$$

$$\begin{aligned} \log M - \log P &= \log Y - \log V \\ &= \log Y + \log c - \nu r^n \\ &= \log Y + \log c - \nu(r + \pi_{+1}) \end{aligned}$$

let $Y = Y^*$, $r = r^*$

$$m_t - p_t = y^* + \log c_t - \nu r^* - \nu E_t \pi_{+1}$$

$$\begin{aligned} m_t - p_t &= k - \nu(E_t p_{t+1} - p_t) \\ p_t &= \frac{1}{1+\nu}(m_t - k) + \frac{\nu}{1+\nu} E_t p_{t+1} \end{aligned}$$

$$\begin{aligned} p_t &= (1-\alpha)(m_t - k) + \alpha E_t p_{t+1} \\ p_t &= E_t \sum_{i=0} (1-\alpha)\alpha^i (m_{t+1} - k) \\ &= E_t \sum_{i=0} (1-\alpha)\alpha^i m_{t+1} - k \end{aligned}$$

if future values of m are expected to rise quickly, p can go up faster than current M.