Money and nominal prices
Long and short runs

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Long and short runs

- Conceptually, the long run is a time segment sufficiently long that all dynamic adjustments of the economy to an exogenous change are completed.
- In practice: years, maybe decades, not months or quarters.
- Physical analogy: spring

Money and nominal prices
Demand for money

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Demand for money

- Basic rationale: bridge the gap between payments and receipts (on board, the seven-day week)
- Implications:

$$\frac{L^d}{P} = l\left(\frac{P_C}{P}, \frac{P_T}{P}; \overline{Y}\right),$$

- where

$$P \equiv \alpha P_C + (1-\alpha)P_T,\ \overline{Y} \equiv \frac{P_C\overline{C} + P_T\overline{T}}{P}$$

- Why micro before macro?

$$P_C = \theta P_T,$$

$$\frac{P_C}{P} = \alpha + \frac{1-\alpha}{\theta};$$

$$\frac{P_T}{P} = \alpha\theta + 1 - \alpha.$$

Money and nominal prices
Demand for money

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- Implications:

$$L^d = kP\overline{Y};$$

- where k is the number given by the function $l(\frac{P_C}{P}, \frac{P_T}{P}; \overline{Y})$ evaluated at equilibrium values of relative prices
- Determinants of k:
  - "pedestrian" features such as how often people get paid.
  - θ, α: These come from "real" part of economy, i.e., interplay of tastes and resources.
  - esempio: $k = .5$
- Nota bene: for the *individual*, P, $\overline{Y}$, and θ, α, $(and\ k)$ exogenous.
- Similar logic implies for the foreign country:

$$L_F^d = k_F P_F \overline{Y}_F$$

Money and nominal prices
Supply of money: flexible rates

Money and nominal prices
Supply of money: **flexible rates**

- Important distinction: fixed versus flexible exchange rates
- Flexible rates: assume exogenous money supplies (L for "liquidity"):

$$L_H^S = \overline{L}_H.$$
$$L_F^S = \overline{L}_F.$$

- Esempio:

$$\overline{L} = \overline{L}^* = 1.$$

Money and nominal prices
Equilibrium and solution under flexible rates

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- Demand equals supply

$$\overbrace{\overline{L}_H}^{L_H^S} = \overbrace{k_H P_H \overline{Y}_H}^{L_H^d};$$
$$\overbrace{\overline{L}_F}^{L_F^S} = \overbrace{k_F P_F \overline{Y}_F}^{L_F^d}.$$

- Solution for the price levels:

$$\widehat{P}_H = \frac{\overline{L}_H}{k_H \overline{Y}_H};$$
$$\widehat{P}_F = \frac{\overline{L}_F}{k_F \overline{Y}_F}$$

- Key feature: ceterus paribus, price level proportional to money supply

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Equilibrium and solution under flexible rates

- Determination of individual commodity nominal prices:

$$P_T = \frac{1}{(\alpha\theta + 1 - \alpha)} \times \frac{\overline{L}_H}{k_H \overline{Y}_H};$$
$$P_C = \frac{1}{(\alpha + \frac{1-\alpha}{\theta})} \times \frac{\overline{L}_H}{k_H \overline{Y}_H}$$
$$P_{F,T} = \frac{1}{(\alpha_F\theta_F + 1 - \alpha_F)} \times \frac{\overline{L}_F}{k_F \overline{Y}_F};$$
$$P_{F,C} = \frac{1}{(\alpha_F + \frac{1-\alpha_F}{\theta_F})} \times \frac{\overline{L}_F}{k_F \overline{Y}_F}.$$

- Again, ceterus paribus, proportional to money supply.

Money and nominal prices
Miller time! A theory of the nominal exchange rate

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Miller time! A theory of the nominal exchange rate

- Assume zero transport costs: Things must cost the same in the same currency:

$$P_T = EP_{F,T};$$
$$P_C = EP_{F,C}.$$

- So,

$$E = \frac{P_T}{P_{F,T}}.$$

- Hence,

$$E = \frac{(\alpha_F\theta_F + 1 - \alpha_F) \times k_F \times \overline{Y}_F \times \overline{L}_H}{(\alpha\theta + 1 - \alpha) \times k_H \times \overline{Y}_H \times \overline{L}_F}$$

- Ceterus paribus, nominal exchange rate proportional to relative money supplies.
- Known as PPP theory of exchange rate determination.

Money and nominal prices
Equilibrium and solution under fixed rates

Money and nominal prices
Equilibrium and solution under fixed exchange rates

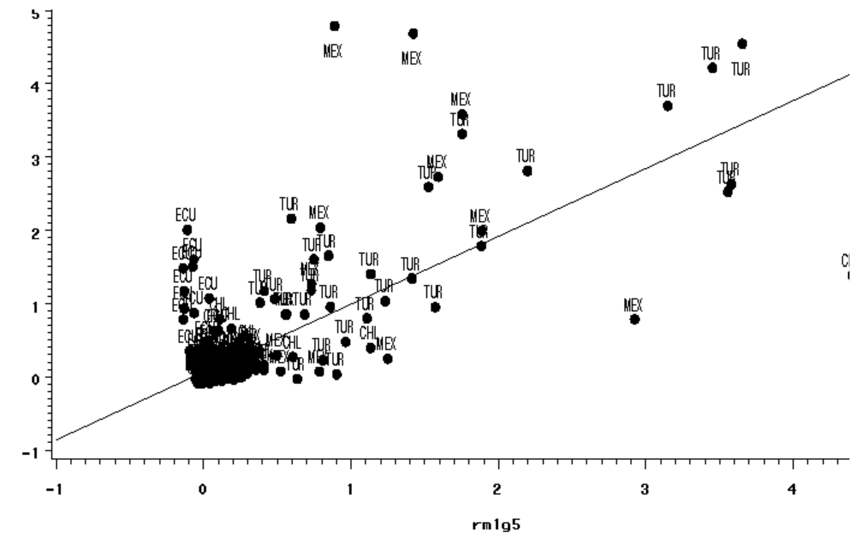
- Fixed rates: authority stands ready to buy and sell at fixed rate $\bar{E}$.
  - Exchange rate now exogenous.
  - What becomes endogenous?
- Stare at PPP solution equation, but with L^S and L_F^S instead of $\bar{L}^S$ and $\bar{L}_F^S$:

$$\bar{E} = \frac{(\alpha_F\theta_F + 1 - \alpha_F) \times k_F \times \bar{Y}_F \times L^S}{(\alpha\theta + 1 - \alpha) \times k_H \times \bar{Y}_H \times L_F^S}.$$

- Can solve for relative money supplies,and thus relative price levels, as endogenous variables.
- Using LOOP, can back out individual money supplies and price levels.
- Upshot: give up control of your own money supply and price level.

Money and nominal prices
Evidence?

Money and nominal prices
Evidence? **rel. money growth versus inflation**



Regression Equation:
nxrg5 = 0.063412 + 0.926649*rmlg5

Example

$$L^d = \frac{1}{2}P_I;\; L^{*d} = \frac{1}{2}P^*_{I^*}, \bar{Y}_H = \bar{Y}_F = 1$$

$$P_I = \frac{1}{3}P_C + \frac{2}{3}P_T;$$

$$P^*_{I^*} = \frac{2}{3}P^*_C + \frac{1}{3}P^*_T;$$

$$\bar{L} = \bar{L}^* = 1.$$

$$\frac{P_C}{P_T} = \frac{P_{C,F}}{P_{T,F}} = \frac{1}{2}.$$

Esempio

$$\overbrace{1}^{\bar{L}} = \frac{1}{2}\left(\frac{1}{3}P_C + \frac{2}{3}P_T\right);$$

$$\frac{P_C}{P_T} = \frac{1}{2} \rightarrow P_C = \frac{1}{2}P_T;$$

$$1 = \frac{1}{2}\left(\frac{1}{3}\frac{1}{2}P_T + \frac{2}{3}P_T\right);$$

$$2 = P_T\left(\frac{1}{6} + \frac{4}{6}\right);$$

$$P_T = \frac{6}{5} \cdot 2 = \frac{12}{5} = 2.4;$$

$$P_C = 1.2$$

Esempio

Can you do the foreign country, and solve for exchange rate?