Lecture 9

Money and Banking, Econ 345

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Foreign currency controls

- Young can only hold home currency
  - Old can still exchange for foreign currency and trade
- Exchange rate regimes:
  - flexible
  - fixed

Flexible exchange rate

- Each country has its own money market
- Money market clearing conditions for each country:

$$\begin{aligned} [CA] &: \quad M_t^{CA} = p_t^{CA} N_t^{CA} (y^{CA} - c_1^{CA}) \\ [US] &: \quad M_t^{US} = p_t^{US} N_t^{US} (y^{US} - c_1^{US}) \end{aligned}$$

- Exchange rate is then

$$e_t = \frac{p_t^{US}}{p_t^{CA}} = \frac{N_t^{CA}}{N_t^{US}} \frac{(y^{CA} - c_1^{CA})}{(y^{US} - c_1^{US})} \frac{M_t^{US}}{M_t^{CA}}$$

- Value of CA$ (exchange rate) is higher if demand for CA$ is higher than for US$, or if supply of CA$ is lower than supply of US$

Behaviour of exchange rate under flexible exchange rate regime

- Let n^{CA} denote populatoin growth in CA, and μ^{CA} - money growth in CA
- Use the previous expression to obtain the growth rate of e_t:

$$\frac{e_{t+1}}{e_t} = \frac{n^{CA}}{n^{US}} \frac{\mu^{US}}{\mu^{CA}}$$

- CA$ *appreciates* ($\frac{e_{t+1}}{e_t} > 1$) if
  - population growth in CA is higher than in US, $n^{CA} > n^{US}$
  - if money growth is lower than in US, $\mu^{CA} < \mu^{US}$

Fixed exchange rate

- Fixed exchange rate: $e_{t+1} = e_t$
- Money market clearing conditions for each country:

$$\frac{e_{t+1}}{e_t} = \frac{n^{CA}}{n^{US}} \frac{\mu^{US}}{\mu^{CA}} = 1 \quad \text{or} \quad \mu^{CA} = \mu^{US} \frac{n^{CA}}{n^{US}}$$

- Fixed exchange rate in CA imposes a restriction on the money growth in CA
  - CA government no longer can generate any desired seignorage
  - Monetary policies in CA and US are not independent
- Recall from single-country OLG:

$$\pi = \frac{\mu}{n}$$

- Fixed exchange rate implies that inflation rates are equal:

$$\frac{\mu^{CA}}{n^{CA}} = \frac{\mu^{US}}{n^{US}} \quad \text{or} \quad \pi^{CA} = \pi^{US}$$

- High-seignorage countries can adopt fixed exchange rate (e.g., with US) to tame inflation

Example 4.2 in Champ-Freeman

Suppose that the (gross) rate of return on fiat money in US is 2 and that of CA is 1. The (gross) rate of the CA population (n^{CA}) is 1.2. Foreign exchange controls are in effect.

- What is the time path of the exchange rate e_{t+1}/e_t?
  - recall that return on money is $p_t/p_{t+1} = n/\mu$, so $\frac{n^{CA}}{\mu^{CA}} = 1$, $\frac{n^{US}}{\mu^{US}} = 2$.
  - $\frac{e_{t+1}}{e_t} = \left(\frac{n^{CA}}{\mu^{CA}}\right) / \left(\frac{n^{US}}{\mu^{US}}\right) = 0.5$, i.e., CA\$ is depreciating relative to US\$
- Suppose that CA wishes to maintain a fixed exchange rate with US. To accomplish this goal CA must set its gross rate of fiat money creation (μ^{CA}) to what value?
- $\mu^{CA} = n^{CA}\frac{\mu^{US}}{n^{US}} = 1.2 \cdot \frac{1}{2} = 0.6$

Indeterminacy of the Exchange Rate

- No foreign currency controls
  - people are free to hold and use the money of any country
- Can only write money market clearing condition *for both countries* together:

$$\frac{M_t^{CA}}{p_t^{CA}} + \frac{M_t^{US}}{p_t^{US}} = N_t^{CA}(y^{CA} - c_1^{CA}) + N_t^{US}(y^{US} - c_1^{US})$$

- 1 equation for 2 price levels: p_t^{CA} and p_t^{US}
  - cannot pin down the exchange rate $p_t^{US} / p_t^{CA} = e_t$
  - indeterminacy of the exchange rate
- Money supply in CA no longer determines the exchange rate, because this money can be used in either CA or US:

$$\frac{1}{p_t^{US}}\left(e_t M_t^{CA} + M_t^{US}\right) = N_t^{CA}(y^{CA} - c_1^{CA}) + N_t^{US}(y^{US} - c_1^{US})$$

- Imagine if CA$ and US$ were freely exchanged - what would be the exchange rate?
  - anything - there is nothing to pin down the exchange rate