

Lecture 8

Money and Banking, Econ 345

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International Monetary Systems

- Until now considered single country with single fiat money
- Next: want to understand monetary links between countries

Questions:

- How exchange rates are determined?
- Why do they fluctuate?
- Should countries adopt fixed or flexible exchange rate regime?

A Model of International Exchange

- 2 countries: CA and US
- Each country is a 2-period OLG economy:
 - endowments: $(y^{CA}, 0)$ and $(y^{US}, 0)$
 - same good in both countries (e.g., oranges)
 - initial old own home money: M^{CA} and M^{US}
 - change in money supply finances government purchases
- Assume free international trade in goods (can buy in CA or US) :
 - exchange rate e_t is how many US\$ can be purchased for 1 CA\$

$$e_t = \frac{\# \text{ US\$}}{1 \text{ CA\$}}$$

Trades available to old in period t

Country	Trade 1	Trade 2
CA	Keep CA\$ Buy goods in CA at price p_t^{CA}	Trade for e_t units of US\$ for each CA\$ Buy goods in US at price p_t^{US}
US	Trade for $1/e_t$ units of CA\$ for each US\$ Buy goods in CA at price p_t^{CA}	Keep US\$ Buy goods in US at price p_t^{US}

Exchange rate in monetary equilibrium

- 1 CA\$ buys $\frac{1}{p_t^{CA}}$ oranges in Canada, or $\frac{e_t}{p_t^{US}}$ oranges in US
- 1 US\$ buys $\frac{1}{e_t p_t^{CA}}$ oranges in Canada, or $\frac{1}{p_t^{US}}$ oranges in US
- If $\frac{1}{p_t^{CA}} > \frac{e_t}{p_t^{US}}$ then no one wants to hold US\$
- If $\frac{1}{p_t^{CA}} < \frac{e_t}{p_t^{US}}$ then no one wants to hold CA\$
- In equilibrium with valued CA and US fiat money it must be:

$$\frac{1}{p_t^{CA}} = \frac{e_t}{p_t^{US}} \quad \text{or} \quad e_t = \frac{p_t^{US}}{p_t^{CA}}$$

- Can determine behaviour of exchange rate from prices in CA and US

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:

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

- Exchange rate is then

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

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

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

- 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:

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

- 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