International Monetary Systems

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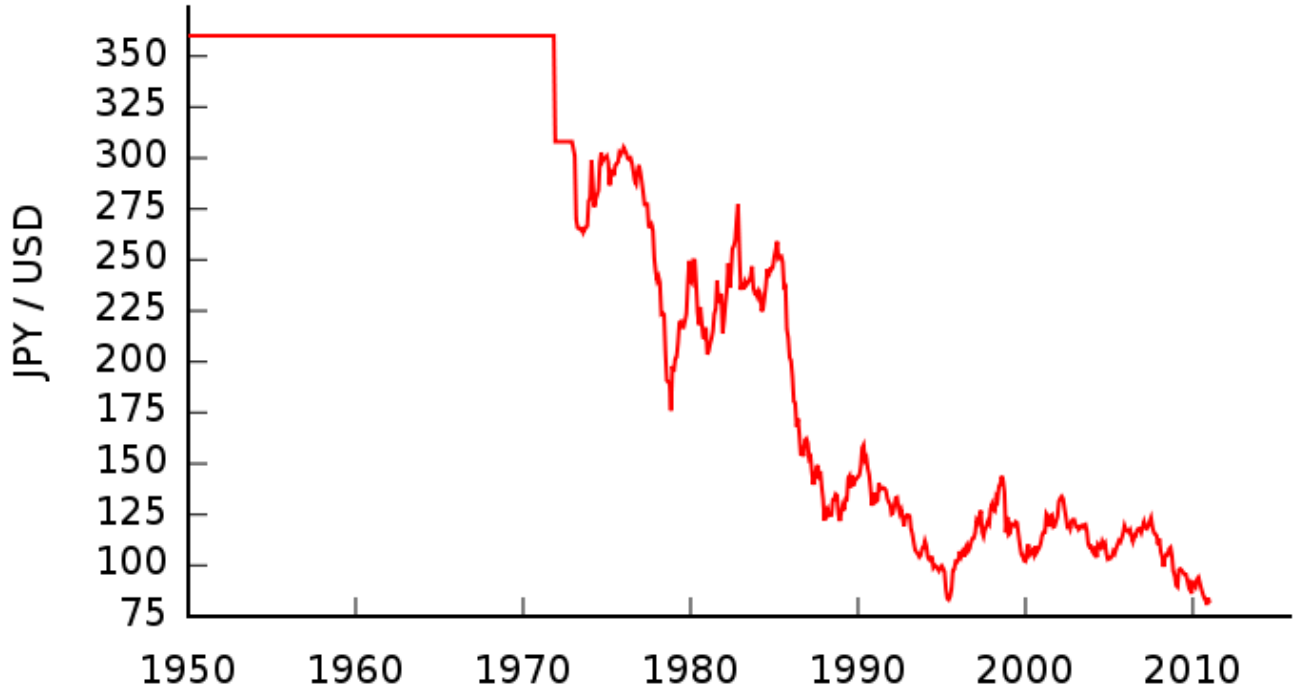
Issues

- What determines the nominal exchange rate between two fiat monies?
- What is the optimal monetary system?
  - separate currencies with floating exchange rates
  - separate currencies with fixed exchange rates
  - currency union
- Practical problems with fixed exchange rates and monetary unions

Excess volatility?



A simple OLG model

- Two-period-lived agents, young endowed with nonstorable y and care only for consumption when old $E_t u(c_{t+1})$
- People are distributed across two regions (countries), labeled a and b; people and goods are identical across countries
- Governments in each country manage their own monies, M_t^a and M_t^b; new money is use for government finance
- Let N_t^a, N_t^b denote populations of young at date t

Foreign currency controls

- There is free trade in goods (e.g., the old of country a may purchase goods from the young of country a, and vice-versa)
  - the real exchange rate is fixed at unity (goods are the same across countries)
- Citizens are not permitted to carry foreign money from one period to the next
  - the young who sell to foreigners must therefore dispose of accumulated foreign money on FX market (the young of different nationalities end up swapping currencies)

- The effect of this regime is to render national currencies as imperfect substitutes (in extreme form here)

- Let v_t^i denote the value of currency i measured in units of output

- In this model, the young end up carrying y units of real money balances

- The currency regime forces this quantity to be in the form of the national currency

- Therefore, market clearing conditions are $v_t^i M_t^i = N_t^i y$ for $i = a, b$

- The nominal exchange rate e_t must satisfy the no-arbitrage-condition $v_t^a = e_t v_t^b$ (law of one price)

- Consequently, we have

$$e_t = \frac{v_t^a}{v_t^b} = \frac{M_t^b}{M_t^a}\frac{N_t^a}{N_t^b}$$

- Or, in terms of growth rates

$$\frac{e_{t+1}}{e_t} = \frac{\mu^b}{\mu^a}\frac{n^a}{n^b}$$

- Nominal exchange rate (and dynamics) depend on relative fundamentals

Fixing the exchange rate under FCC

- Suppose that country b wants to unilaterally fix its exchange rate against country a to $e_t = e$

- Our theory implies that there exists a monetary policy that achieves this goal

$$M_t^b = eM_t^a \left(\frac{N_t^b}{N_t^a} \right)$$

- Among other things, this policy implies that domestic monetary policy must follow foreign monetary policy

Nominal exchange rate indeterminancy

- You are playing poker with poker chips that are colored blue, white, and red
  - what determine the exchange rate between chips of different colors?
- How can market forces be guaranteed to price the exchange rate between two intrinisically useless objects correctly?
- What determines the exchange rate between Canadian greens and purples? ($20 and $10 bills)

No portfolio restrictions

- Absent currency controls, there is no reason for currencies not to be treated as perfect substitutes here (assume this is so)

- Individual demands for real money balances are still equal to y, but now money balances can consist of either currency

- The relevant market-clearing condition is now given by

$$v_t^a M_t^a + v_t^b M_t^b = \left[N_t^a + N_t^b \right] y$$

- LHS is world supply of money, RHS is world demand for money

- Use $e_t = v_t^a / v_t^b$ to rewrite condition above as

$$v_t^b \left[e_t M_t^a + M_t^b \right] = \left[N_t^a + N_t^b \right] y$$

- We lose one restriction $\Rightarrow$ two equations, one unknown (an infinite number of v_t^b, e_t combinations consistent with maximizing behavior and market-clearing)

- Manuelli and Peck (IER, 1990) show that only restriction on equilibrium exchange rate is that it follows a Martingale; i.e., $E_t e_{t+1} = e_t$

  – fixed exchange rate is an example

International currency traders

- Seems like a stretch to imagine that everyone views competing currencies as perfect substitutes

- But the result continues to hold even if only a subset of agents treats two currencies as perfect substitutes

  - e.g., international currency traders dealing in major currencies

- Modify the model above *à la* King, Wallace and Weber (JIE, 1992)

- Assume that citizens of country a and b deal in their national currencies only (perhaps because of FCC)

- Introduce a third set of agents, type c, who belong to neither country and who view the two currencies as perfect substitutes

- Let $0 \leq \lambda_t \leq 1$ denote fraction of money held as country a money by type c agents

- Market-clearing conditions are now given by

$$\begin{aligned} v_t^a M_t^a &= N_t^a y + N_t^c \lambda_t y \\ v_t^b M_t^b &= N_t^a y + N_t^c (1 - \lambda_t) y \end{aligned}$$

- Or...

$$e_t = \frac{M_t^b}{M_t^a} \left[\frac{N_t^a + N_t^c \lambda_t}{N_t^a + N_t^c (1 - \lambda_t)} \right]$$

- Again, there are no fundamentals pinning down portfolio holdings of type c agents

- Now, imagine that type c are risk-neutral and that type a and b are risk-averse

- There are stochastic rational expectations equilibria where the nominal exchange rate follows a bounded martingale, even with constant fundamentals

- Nominal exchange rate is driven *entirely by speculation*

- Welfare losses accrue to agents of country a and b

Fixing the exchange rate

- **Cooperative stabilization:** both countries commit to exchanging currencies at stipulated rate
  - e.g., no one questions the exchange rate between Queens and Lauriers
- **Unilateral peg:** single country commits to exchanging currencies at stipulated rate
  - if commitment is shaky, may open door to a speculative attack
- **Currency union:** adopt a single currency (another version: **dollarization**- adopt a major foreign currency)

Inflationary incentives under fixed exchange rates

- Suppose countries a and b agree to fix the exchange rate at e
- Imagine the country a holds its money supply fixed, while country b grows its money supply at rate μ^b

$$v_t^b \left[eM^a + M_t^b \right] = \left[N_t^a + N_t^b \right] y$$

- Value of country b money falls over time...but so does value of country a money! (Country b "exports" its inflationary policy to country a)

Coordinated fiscal policies and monetary policy independence

- Countries have an incentive to overinflate under fixed exchange rate regimes
- Similar "free riding" issues can arise in monetary unions
- E.g., member country issues high levels of debt that is then held widely in portfolios of other member countries (Greece?)
- Imagine than default suddenly becomes necessary
- The only question is how to default (may be pressure on monetary authority to monetize debt)