

Topics for Today

1.) 2nd - Generation Currency Crisis Models
- Multiple Equilibria + "Sunsports"

2.) Policy Implications

2nd-Generation Currency Crisis Models

1st Generation crisis models have 2 shortcomings:

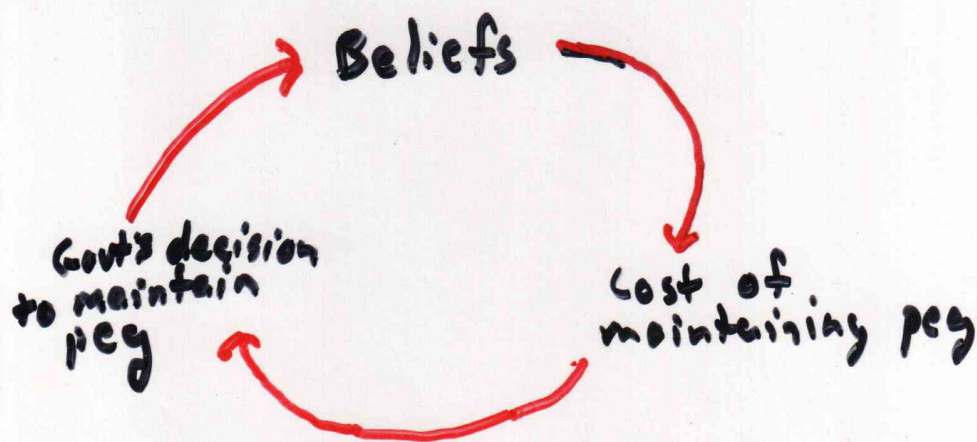
1.) Empirical: Sometimes crises are not preceded by (obvious) macroeconomic imbalances, e.g., budget deficits, current account deficits, excessive domestic credit growth, etc. (EMS crisis '92-'93, Kaminsky & Reinhart (AER '99), Eichengreen et al '95). According to 1st generation theories, currency crises should be predictable. In practice, they are very difficult to predict.

2.) Theoretical: 1st generation models make unrealistic assumptions about government policy. They assume government policy is fixed, and unresponsive to macroeconomic conditions.

2nd-Generation Models are designed to address these shortcomings. We will see that addressing the 2nd (theoretical) shortcoming can potentially fix the first (empirical) shortcoming!

Basic Idea

When govt. policy reacts to the state of the economy, there can be multiple equilibria, and currency crises can become self-fulfilling prophecies. This multiplicity arises because govt. policy changes in response to market sentiment, which in turn depends on beliefs about govt. policy (Circularity).



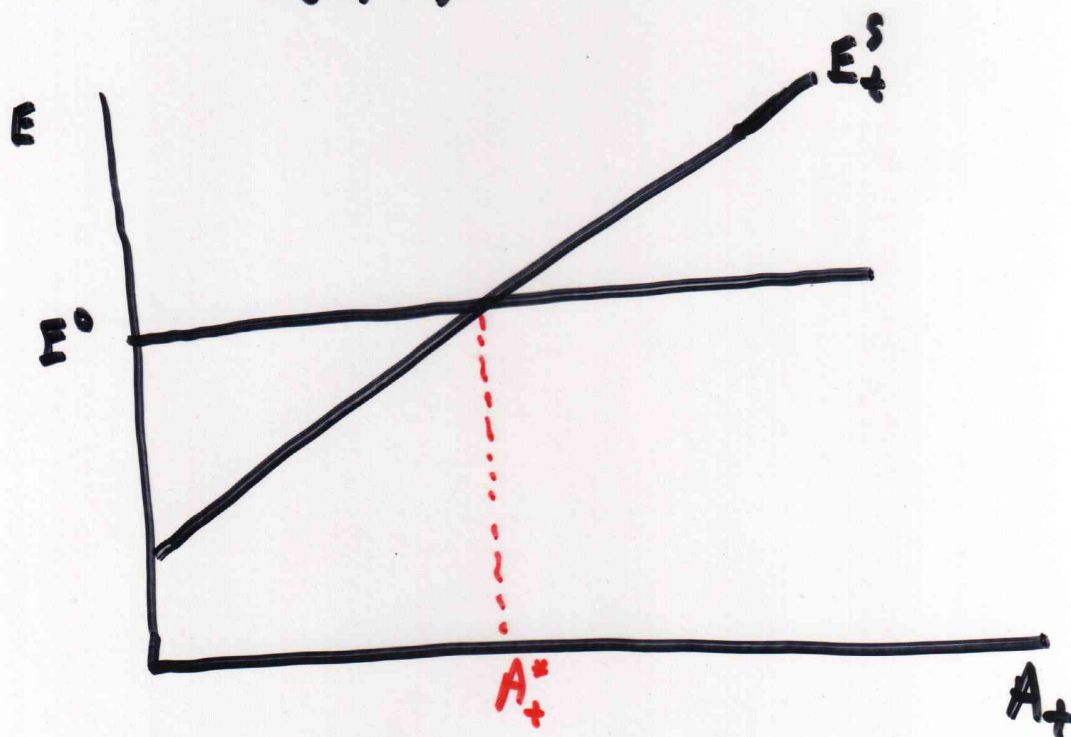
Example 1

In our earlier 1st generation model, we assumed that domestic credit, A_t , grew at the fixed rate, μ , no matter what. This caused the "shadow exchange rate" to drift up over time, eventually intersecting the pegged line

$$E_t^s = \frac{A_t}{L(\bar{Y}, R)}$$

$$\ln E_t^s = \ln A_t + \alpha \mu$$

if $L = e^{-\alpha R}$



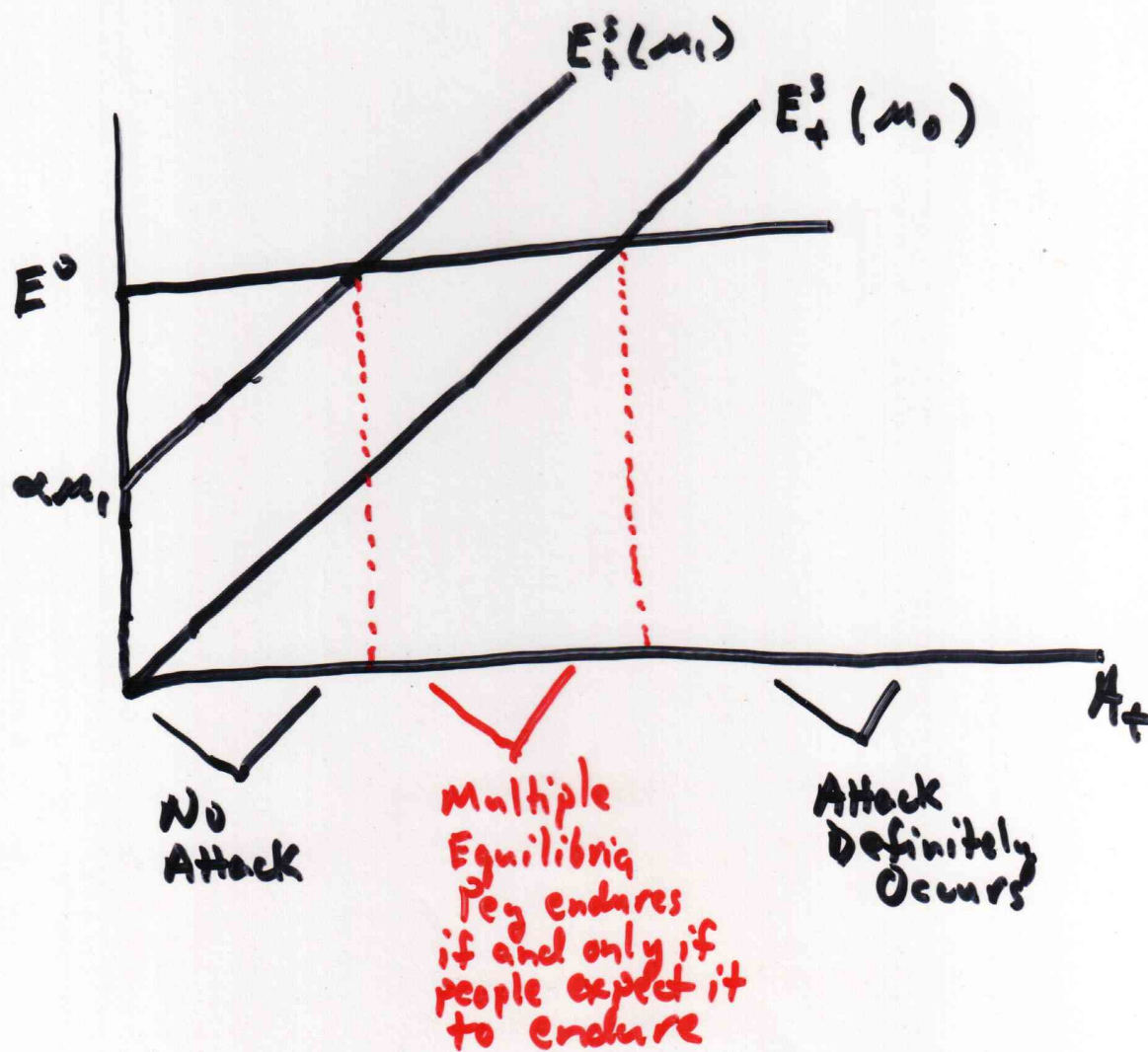
The collapse will occur as soon as A_t reaches A_t^*

Now suppose the growth rate of A_t depends on whether there is an attack or not! Often speculative attacks produce financial market volatility & other disruptions (e.g., very high interest rates), which lead the govt. to increase the money supply.

In particular, suppose

$$\frac{\dot{A}}{A} = \mu_0 \quad \text{if no attack takes place} \\ \text{(for simplicity, suppose } \mu_0 > 0 \text{)}$$

$$= \mu_1 \quad \text{if there is an attack}$$



Example 2

Assumptions

- 1.) There are 2 traders, each with Resources = 6
- 2.) It costs 1 to take a position (e.g. transaction cost)
- 3.) The govt. devalues by 50% if an attack is "successful".
- 4.) If both traders attack, and the govt. runs out of reserves + devalues, traders get equal shares.

There are 3 cases to consider, depending on CB reserves

A.) High Reserve Game ($R = 20$)

		Trader 2	
		Hold	Sell
Trader 1	Hold	0, 0	0, -1
	Sell	-1, 0	-1, -1

Unique Nash Equil.

B.) Low Reserve Game ($R = 6$)

		Trader 2	
		Hold	Sell
Trader 1	Hold	0	0
	Sell	2	2

$\frac{6}{2} - 1 = 2$ (bottom-left cell)
 $\frac{6}{2} - 1 = 2$ (bottom-right cell)

Unique Nash Equil. (pointing to the bottom-right cell)

C.) Intermediate Reserve Game ($R = 10$)

		Trader 2	
		Hold	Sell
Trader 1	Hold	0	-1
	Sell	0	$\frac{3}{2}$

$\frac{10}{2} - 1 = 4.5$ (bottom-right cell)
 $\frac{10}{2} - 1 = 4.5$ (bottom-right cell)

Multiple Nash Equil. (pointing to the bottom-right cell)

Which will occur?

Risk-Dominance vs. Pay-off Dominance in Coordination Games

Consider the following simple coordination game

Mr. B

	1	2
Mr. A		
1	2, 2	3, 0
2	0, 3	4, 4

- 1.) There are 2 Nash Equilibria $(1,1)$ and $(2,2)$
- 2.) $(2,2)$ is "pay-off dominant"
- 3.) $(1,1)$ is "risk-dominant"

Suppose you have no idea which action your opponent will take. Assume 50-50 on each.

$$E(1) = \frac{1}{2}(2) + \frac{1}{2}(3) = \frac{5}{2}$$

$$E(2) = \frac{1}{2}(0) + \frac{1}{2}(4) = 2$$

$$E(1) > E(2) \Rightarrow 1 \text{ "risk-dominates"}$$

How strongly must player believe that opponent will choose 2?

$$(1-p)(2) + p \cdot 3 = (1-p)(0) + p \cdot 4$$

$$\Rightarrow p = 2/3$$

$\Rightarrow [0, 2/3]$ is "basin of attraction" for action 1

Let π = Prior prob. that opponent chooses 2

$$\pi > 2/3 \Rightarrow \text{play 2}$$

$$\pi < 2/3 \Rightarrow \text{play 1}$$

Since $\pi > 1/2$, 1 is risk-dominant

A lot of experimental work shows that risk dominance is more important than payoff dominance

Implications for currency crises?

Imperfect Common Knowledge - Morris + Shin (AER '98)

- 1.) Assume there is some value of reserves, R , below which the CB devalues for sure, $\underline{R}$.
- 2.) Assume speculators do not observe R
- 3.) Each speculator receives a noisy signal of R (uniformly distributed around R).
 $S_i \in [R - \epsilon, R + \epsilon]$ where ϵ is "small"

Note, signals are correlated across speculators.
Your signal tells you about R and it gives you information about other people's signals

Key Point: It is never Common Knowledge that the peg is sustainable.

Note: Signals can differ across individuals by at most 2ϵ

1.) First-Order Knowledge of Sustainability
(you know the peg is sustainable)

$$S_i \geq \underline{R} + \epsilon$$

2.) 2nd-Order Knowledge of Sustainability
(you know that everyone else knows the
peg is sustainable)

$$S_i \geq \underline{R} + 3\epsilon$$

} smallest signal someone
could have conditional
on $S_i = \underline{R} + 3\epsilon$ is
 $S_i = \underline{R} + \epsilon$

3.) 3rd-Order Knowledge of Sustainability
(you know that everyone else knows that
everyone else knows the peg is sustainable)

$$S_i \geq \underline{R} + 5\epsilon$$

Common Knowledge of sustainability
 $\Rightarrow$ Infinite-Order Knowledge!

Policy Implications

- ① If 1st-generation models are right, then there is a sense in which countries hit by crises "get what they deserve." International agencies like the IMF should not bail them out. The correct response is to either float the ex. rate or reduce fiscal deficits.
- ② If 2nd-generation models are right, there is a sense in which countries hit by crises are "victims" of destabilizing speculation. The IMF should provide generous emergency credit lines in order to convince the markets that speculation will be "unsuccessful".