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Notes on the Currency Crisis Model

Consider a country which a) has a fixed exchange rate and b) runs substantial budget deficits (did anyone say Argentina?). We will discuss both aspects in turn to see why they give rise to a dilemma and ultimately a currency crisis.

Fixed exchange rate:

To discover the implication of a fixed exchange rate regime, we rely on the three ingredients of the monetary model (money market equilibrium, PPP, uncovered interest parity) and combine them in log-linear fashion.

Sidenote: log-linear formulations are popular in economics because coefficients in log-linear equations are elasticities. And elasticities in turn are popular because they avoid having to worry about units of measurement (as derivatives force us to do) and express both cause and effect in relative terms. End of digression.

money market equilibrium:

$$M/P = L(Y, i)$$

and in log-linear form (implying a specific money demand fct):

$$m - p = \eta y - \lambda i$$

where small letters denote natural logs — except for the interest rate (no need to take the log there because it's already a percentage). The coefficient η is the elasticity of money demand with respect to Y and λ the so-called semi-elasticity of money demand wrt the interest rate.

PPP:

$$P = eP^* \quad \text{or in logs} \quad p = \ln e + p^*$$

uncovered interest parity:

$$i - i^* = \Delta \ln e$$

Plugging the two parities into the money market equation for p and i gives:

$$m = \ln e - \lambda \Delta \ln e + (p^* + \eta y - \lambda i^*) \tag{1}$$

Disregarding the terms in parentheses, we see from this equation that a fixed exchange rate requires a particular money supply. Note that the change in the exchange rate should be zero as long as the exchange rate is credibly fixed.

Budget deficits:

Suppose the government leans on the central bank to finance its spending spree. That is, the central bank provides money and receives gov't bonds in return. Consider the central bank's balance sheet:

assets	liabilities
domestic credit B^H	deposits held by private banks
foreign reserves B^F	currency in circulation
base money = M	base money = M

Suppose that domestic credit expands at a constant rate μ, i.e.

$$\frac{B^H_{t+1} - B^H_t}{B^H_t} = \mu \quad \text{or in logs} \quad b^H_{t+1} - b^H_t = \mu$$

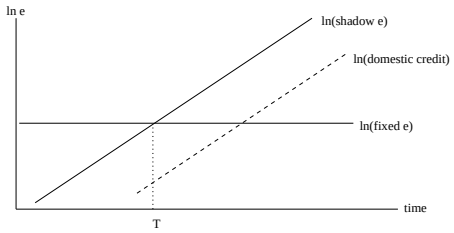
So domestic credit goes up. But money supply has to stay constant in order to maintain the fixed exchange rate. Hence, foreign reserves are being sold to maintain the exchange rate. How long can this continue?

Currency crisis:

Krugman's model explains why there will be a crisis — a sudden loss of the remaining reserves and forced flotation of the exchange rate — before the country slowly and peacefully runs out of reserves. The crucial concept of his explanation is the *shadow eschange rate*, defined as the market rate that would obtain if the country did not possess any foreign reserves. Using equation (1), the shadow exchange rate $\tilde{e}$ takes the form:

$$\ln \tilde{e} = b^H + \lambda\mu - (p^* + \eta y - \lambda i^*)$$

The μ in the middle term is the expected depreciation of the exchange rate which corresponds to the increasing money supply — without foreign reserves the money supply increases at rate μ because it consists only of domestic credit. Graphically:



The exchange rate collapses at time T when the shadow exchange rate intersects the peg. Why does it not collapse earlier? Because an attack would lead to an appreciation and imply losses for the attacker as the shadow rate lies below the peg. On the other hand, waiting beyond T would increase the profitability of the attack but other speculators will be faster so the attack occurs at T.