Lecture 5

Topic: Currency Crises
This is not the same as a financial crisis.

What are currency crises?

Flexible vs. fixed exchange rates
Flexible: The value of exchange rate is determined by market forces; exchange rate fluctuates (Ex.: Euro vs. US)
Fixed: Central bank defines target rate and band around it. Foreign exchange interventions if market rate moves outside of the band. (Ex.: Danish Krona vs. Euro) The fluctuations are very small. This implies less uncertainty for investors.

Currency crisis = strong exchange rate pressure that would result in a substantial appreciation or depreciation of a currency over a short period of time.

- Usually in the context of currency depreciation. (because a depreciation is more harmful for a country than depreciation)
- Most damaging in fixed exchange rate regimes (agents do not expect an appreciation/depreciation)
- Must not lead to actual depreciation/appreciation, exchange rate pressure alone sufficient if it forces central bank to substantially intervene.

"**Archetypical**" currency crisis:

- Loss of confidence in economy/currency.
- (Large-scale) sales of domestic financial assets. Much less demand for the currency so there comes a pressure to depreciate.
  (=speculative attack)→exchange rate pressure.
- Central bank tries to fight the attack by:
  - Raising interest rates
  - Selling foreign reserve assets against local currency

If measures are not successful: Sharp depreciation of the local currency

Currency crisis indicator = captures the extent of exchange rate pressure based on:

1. Change in the exchange rate (forced to adjust fixed exchange rate because of the speculative attack.)
2. Change in the short-term interest rate (forced to adjust interest rates to fight the speculative attack.)
3. Change in foreign reserve assets (forced to sell/buy foreign reserve assets to fight the speculative attack.)

[**Eichengreen, Rose, and Wyplosz**, 1995]

What matters for an event to qualify as a currency crisis is the amount of exchange rate pressure. Not only an actual change in the exchange rate qualifies as a currency crisis (successful attack).
A currency crisis also occurs if a country can defend the fixed exchange rate by adjusting its interest rates or trading foreign reserve assets (unsuccessful attack).

Bordo et al. (2001): Frequency of currency crises has increased from 1% before WWI to 7% in the 1990s. (Reason: emerging markets, increased capital mobility.)
Characteristics of currency crises:

- Reversal of capital flows (loss of confidence in economy/currency leads to sell of domestic assets / withdrawal of capital. So: FA ↓)
- Adjustment of current account: CA ↑ (since CA+FA=0).
- Increased real value of foreign debt (due to devaluation of domestic currency.)
- Reduction in GDP growth (due to higher interest rates , fewer funds available for domestic investment due to capital outflow, higher real debt). This makes a currency crisis so damaging for a country.

How do currency crises arise? How can we prevent them?

Different theories have been developed to explain and understand currency crises:
1st generation models: Crisis due to bad macroeconomic conditions ('bad fundamentals').
2nd generation models: Role of investors in triggering a crisis.

How do currency crises arise?
1st and 2nd generation model differ along two dimensions:

1. Rationale for the crisis: Flawed domestic economy vs. purely speculative actions.
2. Role of international investors: React to crisis (passive) vs. influence the outcome of the crisis (active).

First generation models:
Based on **Krugman** (1979) and **Flood and Garber** (1984).

- Key source for the crisis is unsustainable fiscal policy ('bad fundamentals').
- Investors play a passive role.
- Devaluation is the only possible outcome.

Key elements:

1. Increasing money supply is the result of loaning to government and buying foreign reserve assets:

$dM = dF + dR$
$dM > 0$: Increase in money supply
$dF > 0$: Expansionary fiscal policy
$dR > 0$: Purchase of foreign reserve assets

2. The money supply influences the price level:

$P=m(M)$,with $dP/dM > 0$
An increase in the money supply ($dM > 0$) leads to inflation ($dP > 0$)

3. PPP condition:

$P=E \cdot P^*$ (P^*=foreign price level)
E has to adjust when P changes: Inflation (P↑) leads to a devaluation of the domestic currency (E↑).

How does a currency crisis unfold:

- Government runs a constant budget deficit financed by loans from the central bank (dF > 0).
- To keep M constant the central bank must sell foreign reserve assets:

$dF = -dR \Rightarrow dM = 0$

- Foreign reserve assets are limited: Eventually the central bank will run out of foreign reserves (R= 0).
- Once R = 0, the continued government borrowing will increase the money supply (dM = dF > 0).
- Growing money supply will lead to inflation (dP > 0).
- According to the PPP condition, with a higher P, the fixed exchange rate regime cannot be maintained and the domestic currency has to be devaluated:

$P = E \cdot P^*$: $dP > 0$ bedause $E \uparrow$

- Investors are forward looking: Know when R = 0 will be reached and currency will be devaluated.
- Investors will attack (sell) currency before the foreign reserves are depleted.
- Currency crisis starts before foreign the reserves are depleted.
- Devaluation is the only possible outcome given the unsustainable fiscal policy ('bad fundamentals').

Investors don't cause the currency crisis but influence the timing of the currency crisis.

Criticism:

- Devaluation is the only possible outcome given the unsustainable fiscal policy ('bad fundamentals'):
    - Government has no other instruments to prevent the devaluation (e.g. increasing in the interest rate).
    - Government has no access to international capital markets to finance the budget deficit (unrealistic for most countries).
- Investor's expectations play very limited role (determine when the currency crisis starts but not whether).

Second-generation models

Based on **Obstfeld** (1994) and **Krugman** (1996)

- Government faces benefits and costs of maintaining the fixed exchange rate regime (trade-off).
- The costs increase if investors expect a devaluation.
- Depending on the parameter values, a devaluation will happen, will not happen, or may happen (multiple equilibria)

Investors play an active role: Their expectations influence the outcome (self-fulfilling expectations).

Notation:

E = current exchange rate

E* = optimal exchange rate of the government

$\overline{E}$ = fixed exchange rate (peg)

E_{exp} = exchange rate expected by investors

C = welfare loss from giving up the fixed exchange rate (reputation/credibility cost)

Social loss function:

$$H = [a(E^* - E) + b(E^{exp} - E)]^2 + R(dE)$$

With $R(dE) = \begin{cases} 0 & if\ dE = 0 \\ C > 0 & if dE \neq 0 \end{cases}$

Elements in the social loss function:
α(E* – E): Loss (for government) arising from deviation of current exchange rate from optimal exchange rate.
b(E^{exp} – E): Loss (for investors) arising from deviation of current exchange rate from expected exchange rate.
C: (Reputation) loss arising from giving up the fixed exchange rate.

There are three cases to consider:

1. The government abandons the peg: It will set the optimal exchange rate E*. Investors know the optimal rate and hence will expect it: E^{exp} = E*.
2. The government maintains the peg and investors expect this: E^{exp} = E.
3. The government maintains the peg, but investors expect it will be abandoned: E^{exp} = E*.

Social losses in the three cases:

1. Abandon the peg

E = E* and E^{exp} = E*
dE > 0→R(dE) = C

$$H = [a(E^* - E^*) + b(E^* - E^*)]^2 + C \rightarrow H = C$$

C= reputation cost for the government changing the exchange rate = all social loss

2. Maintain peg when investors expect this

E = $\overline{E}$ and E^{exp} = E
dE = 0→R(dE) = 0

$$H = [a(E^* - \bar{E}) + b(\bar{E} - \bar{E})]^2 + 0 \rightarrow H = [a(E^* - \bar{E})]^2$$

There are only losses for the government.

3. Maintain the peg when investors expect abandonment

E = $\overline{E}$ and E^{exp} =E*
dE = 0→R(dE) = 0

$$H = [a(E^* - \bar{E}) + b(E^* - \bar{E})]^2 + 0 \rightarrow H = [(a + b)(E^* - \bar{E})]^2$$

No reputation costs. There are also social losses for investors.

Case #3 clearly has higher social loss than case #2. The social losses when maintaining the peg are higher when investors expect abandonment than when investors when investors expect the government won't abandonment.

Results:

- The government will chose the action that minimizes social losses.
- If the government maintains the fixed exchange rate, R(E)=0, but the actual exchange rate differs from E*.

- If the government abandons the peg, it can set its ideal exchange rate E*, but this will create a reputation loss R(E)>0.
- It is not clear in general which choice is "best". Depends on the parameter value, so Multiple equilibria:

1. The government will maintain the peg for sure (even if investors expect it will be abandoned) if:

$$[(a+b)(E^* - \bar{E})]^2 < C$$

[Social losses when maintaining the peg, even if investors expect abandonment, are smaller than social losses when abandoning the peg.]
Requires that reputation costs from abandoning the peg (C) are high and that the desired exchange rate is close to the peg.

2. The government will abandon the peg for sure if:

$$C < [a(E^* - \bar{E})]^2$$

[Social losses when abandoning the peg are smaller than losses when peg is maintained and investors expected this.]
This happens if the credibility cost of abandoning the peg (C) is low and the desired exchange rate (E*) is very different from the peg. E* being very different from E means that there are large benefits from devaluating the currency (e.g. high unemployment, high domestic debt.)

3. The government will maintain the peg if investors believe it will be maintained, but will abandon the peg if investors expect abandonment, if:

$$[a(E^* - \bar{E})]^2 < C < [(a+b)(E^* - \bar{E})]^2$$

This is the case of self-fulfilling expectations: Whatever investors expect, will happen.

Bad fundamentals or expectations?

- 1st and 2nd generation models predict that currency crises (can) occur because of bad fundamentals.
- In 1st generation models, the crisis is inevitable.
- In 2nd generation models, expectations alone can also trigger a currency crisis; crisis is no longer inevitable.

Reality is somewhere in between 1st and 2nd generation models

- **Empirical evidence**: The bulk of currency crises can be attributed to weak fundamentals (falling reserves, excessive money and credit growth, high current account deficit), but self-fulfilling crises can also occur.

Contagion = Spread of currency crisis to other countries.
Why:

1. Because of "spreading" of bad fundamentals (since countries are economically linked):

- If one country devaluates, other countries exporting similar products will lose competitiveness.
- If investors lose money in a crisis country, they may be unable to continue lending to other countries.

2. Because of self-fulfilling expectations:

- Investors (falsely) perceive other countries as "similar" to the crisis country (e.g. spreading of Latin American 1982 crisis to Philippines).
- Less politically costly to devaluate if other countries have also just done so.

Policy trilemma = three (partially) incompatible policy
Objectives:

1. Fixed exchange rate (facilitates trade and international investment)
2. Monetary policy independence (important instrument to steer the economy)
3. International capital mobility (more efficient allocation of savings and investment, better risk-diversification see next week's lecture)

Remember the uncovered interest parity condition (approximation):

$$\frac{E^e - E}{E} = i_h - i_f \;\rightarrow\; i_h = i_f + dE$$

Let's include transaction costs (reflect the degree of capital mobility, i.e. how easy it is to invest internationally):

$$i_h = i_f + dE + TC$$

If a country wants perfect capital mobility: TC ≈ 0:

$$i_h = i_f + dE$$

- If we adopt fixed exchange rates (dE = 0), this implies ih = if → no monetary policy independence!
- If we want monetary policy independence ($i_h \neq i_f$), this implies the exchange rate cannot be fixed (dE ≠ 0)

So only two objectives can be achieved at the same time!

If a country wants fixed exchange rates: dE = 0: $i_h = i_f + TC$

- If the country adopts full capital mobility (TC = 0), this implies ih = if, so no monetary policy independence!
- If the country wants monetary policy independence ($i_h \neq i_f$), this implies we need capital controls (TC ≠ 0)

So only two objectives can be achieved at the same time!

If a country wants independent monetary policy ($i_h \neq i_f$): $i_h = i_f + dE + TC$

- › If we adopt full capital mobility (TC = 0), the exchange rate cannot be fixed (need to set $dE = i_h - i_f$)
- › If we want fixed exchange rates (dE = 0), this implies that we need capital controls (need to set $TC = i_h - i_f$)

So only two objectives can be achieved at the same time!

From a policy trilemma to a policy dilemma

- In practice, there is no effective system of capital controls.
- Implies that we have to start from the premise of perfect capital mobility, so there are only two options left (dilemma):
    - Retain independent monetary policy, but let currency float (e.g. Canada, Britain).

- Stabilize currency, but give up ability to adjust interest rates at discretion (e.g. Argentina).