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### Lecture #17: Currency Crisis

1. Currency crises. To defend a fixed exchange rate against  $E^e$  going up, must raise interest rate now. How much? Might have to raise  $R$  a lot. Suppose the market assigns a 50% chance that you will devalue the exchange rate 10% within the month. Then, the expected depreciation of the exchange rate over the next month is the probability that there is no change in the exchange rate times zero (the percent change that occurs when there is no change) plus the probability of a 10 percent change:

$$\frac{E^e - E}{E} = 0.5 \times 0 + 0.5 \times 0.10 = 0.05.$$

This means that the interest rate today has to be raised 0.05, or 5 percent, in monthly terms. In annual terms, it must be raised by  $12 \times 5 = 60$  percent! That's a lot.

If aggregate demand is a negative function of the interest rate, then raising the interest rate is a problem:

- (a) It slows aggregate demand in the economy and therefore leads to a reduction in output and employment.
- (b) It creates disruptions in the banking system. First, banks have to start calling in loans and this can be economically costly if it means shutting down investment projects before they have fully matured. Second, the banking system might already be in a weak position. It may be that the assets of the banking system are questionable because of years of bad loans (fueled, perhaps by government guarantees). As a result, a lot of loans are barely 'performing', i.e., paying their interest payments. The slow economy produced by an interest rate hike could tip marginal firms into bankruptcy, and this can turn a lot of loans that may be marginal into being completely non-performing. If a lot of the assets of the banking system go bad, then a lot of banks go bankrupt: their assets are way below their deposit liabilities.

Governments don't like it if banks go bad. They assign a special status to banks. That's because banks lie in between virtually every economic transactions.. They are like the air of the economy. If they go bad, goes the worry, then everything else goes bad too.

Because defending a fixed exchange rate when  $E^e$  rises can be very costly, especially for a central bank in a weak economy with a shaky banking system, they will do everything possible to get  $E^e$  back down in a painless way:

- (a) Have high government officials go on TV and repeat that the government's commitment to the exchange rate is absolute and complete.
- (b) Raise interest rates, but by only a little (say, less than 60% in the above example). Then, argue that everything is being done to defend the exchange rate.
- (c) Take an action which will make a devaluation, if it occurs, very costly for the government. The idea is that this will give the markets a concrete reason to believe that no devaluation will be allowed to occur. An example is Mexico, in the period leading up to the 1994 Mexican currency crisis. To finance a large part of the Mexican government debt, the government borrowed short-term and in US dollars. Borrowing in US dollars meant that if there was a peso devaluation, then the peso value of the Mexican government debt would be very high. This would be a big problem for the Mexican government. The Mexican government hoped that, private traders seeing this, would be convinced that therefore the Mexican government would do everything possible to prevent a devaluation. A consequence of making the debt short-term meant that the bad consequences of a devaluation would be immediate and swift.

In the end, if markets come to be completely certain that a devaluation is coming, the central bank may do a cost-benefit calculation, and decide that the costs of defending the exchange rate outweigh the benefits. This cost-benefit analysis is more likely to result in an actual devaluation if the markets perceive that the government assigns a relatively low cost to the devaluation and a huge benefit to terminating the defense. You can see this from the above numerical example. If the probability of devaluation jumps from 50 to 75 percent, then interest rate must go up by 90 percent ( $12 \times 0.75 \times 0.1 = 0.9$ )!

2. Why does  $E^e$  go up? The answer divides into two. The two are closely related.
  - (a) One ('First generation models') lays responsibility with bad government policy. This says that  $E^e$  goes up because the market perceives that the government is pursuing inconsistent goals. Domestic output and employment goals dictate a monetary policy

which is incompatible with the fixed exchange rate. This can happen for various reasons:

- i. Unemployment is low, and the government just raises  $M$  and hopes (see below for more on this) that the exchange rate does not devalue.
  - ii. The market may come to expect that  $M$  must rise in the future. This is thought to have played a role in the Asian currency crisis. The argument is that unwise government banking guarantees over a period of years led to very bad loans. People began to realize the extent of the bad loan problem and expected that to pay for this, the government would eventually have to resort to the printing press. Raising taxes to do it would just be too much. This produced a rise in  $E^e$ .<sup>1</sup> Notice that this story does not require that  $E^e$  jump in response to *actual* high money growth. In fact, high money growth was not observed prior to the crises in the Asian crisis countries.
- (b) The second reason ('Second generation models') lays responsibility with private expectations. Under this view, government policy may be perfectly responsible. Yet, the market for no reason, or flimsy reasons, just thinks  $E^e$  will rise.
- i. An example is the 1995 French presidential election, when people came to believe that the government would devalue to help with the election. To defend the exchange rate required raising the interest rate above those in Germany by 3 percent.
  - ii. A bad shock to aggregate demand produces the realization that the government will be in a situation where the conflict between domestic goals and the fixed exchange rate goal may be particularly sharp. The markets may raise  $E^e$  at this time because they believe that monetary policy will be dictated by domestic considerations and will not be committed to defending the exchange rate. This may really belong in the 'bad government policy' category above, if the reason the markets believe this is that in the past the government has shown itself unwilling to pay much of a price to defend the exchange rate. On the other hand, the markets may believe this, even if the government is perfectly committed to the exchange rate, and would have done what is necessary to defend it, despite the weak aggregate demand.

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<sup>1</sup>This argument is laid out very carefully in Burnside, Eichenbaum and Rebelo, Prospective Deficits and the Asian Currency Crisis, manuscript, Northwestern University, 1999. It can be found on Eichenbaum's web page, which can be accessed through the economics department's web site.

There are several examples of this. One is the Asian crisis countries. In the years before the crisis in 1997, several things had happened to make aggregate demand in these countries low. China devalued its currency, which reduced world demand for Asian crisis country goods, which had fixed the exchange rates to the dollar. The NAFTA agreement made Mexico a stronger competitor with the Asian countries for US markets. The US dollar appreciated vis a vis the Yen, putting the Asian crisis countries at a disadvantage relative to Japan.

- iii. A rise in foreign interest rates. If the central bank is to defend the exchange rate under these circumstances, then they must raise the interest rate. Markets may figure that the government does not have the stomach for this, and they raise  $E^e$ . This may have effects which force the government to devalue in the end, even though, if markets had not raised  $E^e$ , the government would have had the resolve to raise the interest rate.

One example of this is Mexico in 1994. The US raised interest rates in that year and this put Mexico, which had a fixed exchange rate relative to the dollar, in a tough situation. The situation was tough because that was a presidential election year. So, markets expected the government to devalue. Partly to counter this, they undertook the action described above, of borrowing in US dollars.

A second example is Europe in 1992. As a result of reunification in Germany, German interest rates rose. The rest of the countries in the EMS ('European Monetary System') had to raise their interest rates too, to preserve the exchange rate system in the EMS. Private markets decided in 1992 that a number of countries in the EMS just wouldn't have the stomach to do this, and raised  $E^e$  for these countries. Throughout 1992 these countries had to keep interest rates even higher than Germany's interest rates to defend the exchange rate. This was painful because unemployment was already high at this time. Markets understood how painful this was, and this is one reason they raised  $E^e$  in the first place. They figured that the pain would ultimately result in a devaluation. They were right in the case of Britain and Italy.

The attack went like this. On September 5-6, government officials solemnly proclaimed that the countries in the EMS were committed to the fixed exchange rates. September 8 - first attack, against Scandinavian countries. Finland gives up quickly and abandons the fixed exchange rate. Sweden defends, and raises rates first to 24 percent, then to 75 percent (at an annual rate). September 10-11 another attack. The

Bank of Italy gives up, after sustaining huge foreign exchange losses. The lira is devalued 7% on September 13. September 16-17: the British pound comes under attack. The Bank of England gives up. Sweden increases interest rates to 500 percent! Ireland goes to 300 percent. France successfully defends. By the end of September, the crisis was over.<sup>2</sup>

The Swedish crisis was particularly severe, and it is interesting to look at Sweden more closely. Its unemployment rate in the summer of 1992 was high, it had jumped from a 1982-91 average of 2.4 percent to 5.3 percent in 1992. The government deficit was in bad shape. Further recession would have made it a lot worse. The banking system was also thought to be in a troubled state. The market perceived that to defend the exchange rate would be quite costly, and this was one reason they raised  $E^e$ . One of the reasons that Sweden wanted to defend the exchange rate was that it wanted to prove to the other Europeans that it was ready for membership in the European Community (EC). When things happened that the market thought would make Swedish devaluation ‘excusable’ in the eyes of EC members, then the market’s probability of a devaluation went up. So, when a vote occurred in Denmark that seemed to make European unification seem less likely in the near term, the idea was that the cost of abandoning the fixed exchange rate went down. The attack on Sweden became stronger. Sweden survived the September crisis. But, later, on November 19, they surrendered. (These observations are taken from Obstfeld’s paper, cited in the footnote.)

Obstfeld (see the footnote for the reference) summarizes the situation nicely:

“Governments will balance the costs of defenses against the benefit of resisting realignment pressures; and often they will conclude that the pain is not worth the gain. Any economic event that raises the market’s estimation of the government’s susceptibility to pain, or that lowers the perceived gains from a successful parity defense, can trigger a speculative attack....If governments determine the extent of their resistance through cost-benefit analysis, however, self-fulfilling crises become likely in situations where economic distress already places the government under pressure. ... If markets expect a devaluation, for example, interest rates will rise, thus creating an

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<sup>2</sup>For a discussion of the European currency crisis of 1992, see Obstfeld, *The Logic of Currency Crises* (on his web site at Berkeley Econ department) or Blanchard, *Macroeconomics*, chapter 14. Obstfeld argued that the 1992 European crisis could not be explained by ‘first generation models’.

incentive to devalue. Similarly, expectations of devaluation may be incorporated in wage demands, raising authorities' incentive to accommodate. These processes are circular: thus their timing is basically arbitrary and they can be brought into play by seemingly minor events."

The fact that expectations are so important is one reason central bankers are advised to be humorless and to not give any impression that they have human concerns. To see this, imagine a market participant deciding if the exchange rate will drop in the future. They will imagine the central banker weighing the pain of raising the interest rate (high unemployment, disruptions) against the gain (staying in the fixed exchange rate regime) and they will believe that the 'pain' side will receive little weight. (Look back at the Barro quote and the discussion of the Blinder incident at Jackson Hole in a previous lecture and in the 'expectation trap' handout on the web site.)

3. Can exchange rates and interest rates be controlled independently? The theory outlined so far says, 'no'. A lot of central bankers believe the answer is 'yes'. Who is right? The central bankers are probably right in the very short run (days, weeks, hours?) and the theory is probably right in the longer run. The difference between short and long run is probably why central bankers sometimes get caught in 'first generation' currency attacks. They believe that monetary policy can independently fix the exchange rate *and* target domestic output and employment.

There are two reasons why these two goals may not be incompatible in the short run. First, it may take time for markets to sell domestic assets and buy foreign assets when the domestic interest rate is low. Second, there may be imperfect substitutability between domestic and foreign assets. This second possibility is explored more in the next lecture.