

**Class handout. Analysis of currency crisis in the IS-LM framework: The credibility  
currency-mismatch trap**

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May 2004.

This class handout intends to explain currency crisis in emerging economies in the framework of the IS-LM model. It is based on [Bradford DeLong's "The International Financial Crisis of the 1990s: Analytics"](#). It tries to simplify DeLong's analysis to students with no algebra knowledge and only a basic knowledge of the IS-LM model. It introduces the concept "**the credibility currency-mismatch trap**" to describe the "IS curve that turns back" in DeLong analysis.

1. The investment function and the credibility gap.

First, consider a minor terminology change that may make the analysis clearer. To explain international currency crisis – for example to explain the birth and fall of Argentina's currency board- DeLong's term "degree of financial crisis" is renamed "**credibility gap**". The term credibility gap may describe better the problem of fixed exchange rates in emerging economies. When we talk about this problem we find assertions like: there is no credibility for monetary policy; an anchor for the exchange rate is needed to gain credibility; a clear rule for monetary policy is needed for the central bank to be credible and solve Barro's inconsistency problem; the original sin hypothesis

causes problems of credibility, etc. Countries with high inflation have a problem of credibility that can degenerate into a problem of currency crisis and financial crisis.

The investment function is identical to DeLong's function:

$$I = I_0 - I_r \times r - I_c \times C \quad (1)$$

But now, **C** is the credibility gap, and, **r** is the interest rate.

We measure the credibility gap by means of the **expected variation of the exchange rate**. The investor has to finance the investment in dollars at today's exchange rate but he is going to receive the future benefits in local currency at a future unknown exchange rate as a consequence of the existence of a currency mismatch problem in emerging economies.

Therefore, **C** would be the expected variation of the exchange rate:

If  $C = 0$ , there is no expected depreciation of the exchange rate. There is no credibility problem.

If  $C > 0$ , there is an expected depreciation of the exchange rate. The bigger the expected depreciation of the exchange rate the bigger the credibility problem.

This minor question of terminology makes it easier to understand that **C** can be measure

by individuals. How do individuals measure the expected depreciation of the exchange rate and therefore the credibility gap? It seems appropriate to use the expected inflation. Also, as we are going to deal with shifts in policy regimes rational expectations would seem to be the correct approach.

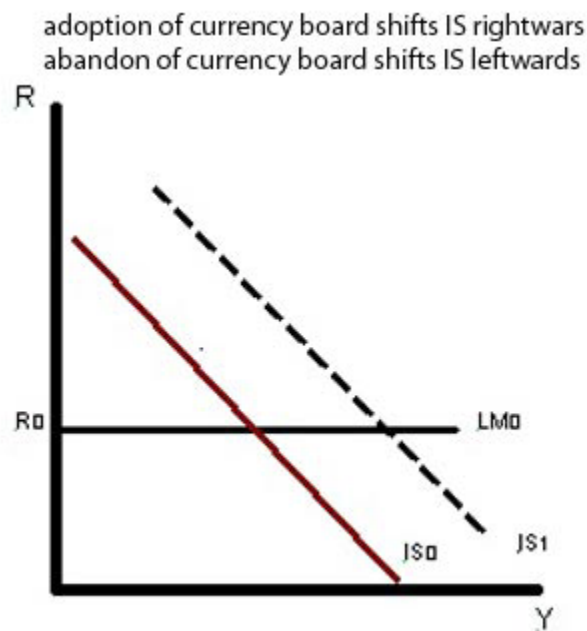
## 2. Shifts in the IS function.

The IS function shifts when the credibility gap changes. For example, when after a period of high inflation monetary authorities and monetary policy gain credibility the expected inflation rate decreases and the expected depreciation rate will also diminish. This means that the credibility gap diminishes and so the IS curve shifts to the right. This shift represents the economic boom induced by an inflow of foreign investment. This would explain for example the big inflow of foreign investment to Argentina especially from Spanish companies when it pegged its exchange rate to the dollar.

## 2. Shifts in the IS function: The case of Argentina

When Argentina adopted its currency board its credibility gap changed from a very high level  $C = C_{A1}$  to a very low level  $C = C_{A2}$ . Inflation figures for the 1980s were very high and so was expected inflation. After credibly fixing the exchange rate the inflation rate decreased dramatically. Individuals did predict inflation in a rational form as they realized that there had been a shift in policy regime. In this case the IS curve shifted rightwards from  $IS_0$  to  $IS_1$  (see Figure 1).

When Argentina abandoned his currency board it incurred in a very high cost. There was a movement from a very low  $C_{A2}$  to a very high  $C_{A1}$ . Rational individuals had into account the shift in regime. Inflation expectations were now formed according with a less disciplined monetary policy. So there was a big shift of the IS curve to the left (see Figure 1).



### 3. Shifts in the IS function: The case of Mexico.

Now let us apply the investment function to the case of Mexico. Mexico's exchange rate regime was less strict than the one of Argentina (super-fixed regime). Also Mexico had a better curriculum in past inflation. Therefore, in the case of Mexico there was a smaller leftwards and rightward shift in the IS curve. If we compare the values of  $C$  for Mexico and Argentina this corrected investment function would predict that to abandon a super-

fixed exchange rate (Argentina) would have a bigger cost than to abandon a fixed exchange rate (Mexico 1994). With a super-fixed regime you win more credibility, so when you loose, you loose more. In fact you loose what you won". This investment function provides an indicator of the predictable cost of a currency crisis in an emerging economy. The cost will be bigger the **bigger** the inflation before the fixing of the exchange rate and the **smaller** the inflation after the fixing of the exchange rate.

#### 5. The shape of the IS function

To simplify the analysis in the IS-LM framework when the interest parity condition is introduced and avoid the analysis of the rotation of the IS-LM curves, following De Long, the LM curve is assumed to be horizontal: "*Deemphasizing the LM curve **and stressing that real-world central banks peg interest rates** and not the money supply, thus removing the yawning gulf between what students learn in class and what they read in the newspaper about monetary policy*". (DeLong)

#### 6. Shifts in the IS curve and "the credibility-currency mismatch trap"

To simplify the analysis **shifts** in the IS curve are contemplated instead of the shape of the curve. Figure 1 depicts the standard IS-LM-BB model with perfect capital mobility and fixed exchange rate. On the vertical axis we measure (R) and on the horizontal axis we measure output (Y).

The initial and “happy” situation is in A. At this point interest parity hold and the expected appreciation or depreciation (credibility gap) of the peso-dollar exchange rate is zero. So, interest rates are equal in both countries (for a clearer exposition consider Argentina’s peso and U.S. dollar)

- Interest parity condition:

$$R_{\text{peso}} - R_{\text{dollar}} = \text{expected variation exchange rate peso/dollar}$$

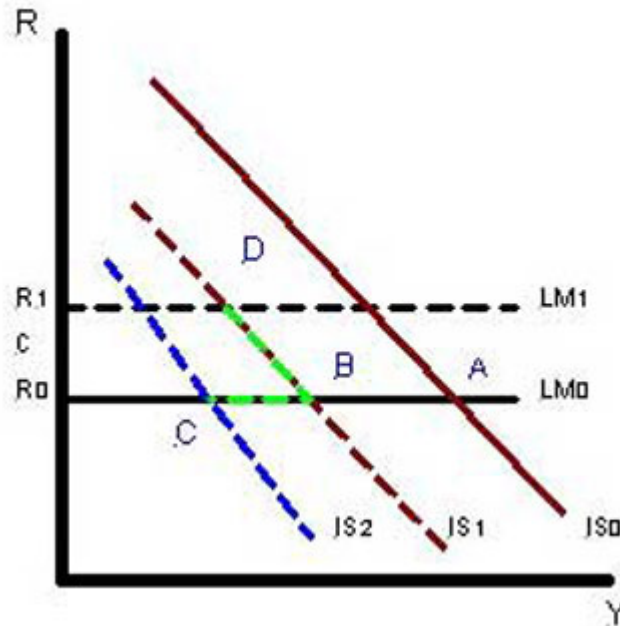
- When there is no credibility problem:

$$\text{Expected variation exchange rate peso/dollar} = 0$$

- So, in the initial happy point A:

$$R_{\text{peso}} = R_{\text{dollar}}$$

## The credibility currency-mismatch trap



Description of Figure 2: The credibility currency-mismatch trap

### Initial happy situation: point A

**Currency crisis:** Credibility gap from  $C=0 \rightarrow C>0$ ;  $IS_0 \rightarrow IS_1$ ;  $A \rightarrow B$

B is an unstable point: there is loss in international reserves. Monetary authorities have two options.

### Option 1: Abandon the fixed exchange rate. $B \rightarrow C$

This movement is the net result of a contractive effect due to a **currency mismatch** effect due to original sin bigger than the expansive effect due to depreciation.

The point C is reached because the exchange rate depreciates until the **credibility gap** (expected depreciation) is again zero  $C=0$

### Option 2: Defend the fixed exchange rate

Monetary authorities have to increase interest rate to stop the flight of capital  $R_0 \rightarrow R_1$

Conclusion:

From **B** you confront a **crisis path BC or BD**; you are caught in a **credibility currency-mismatch trap**:

**Whatever way you choose you end in a recession.**

Now, suppose there is a confidence crisis (credibility gap goes from zero to a positive value), like the one in Argentina after the Tequila crisis. Investment decreases and IS shifts to the left, and the economy goes from point A to point B (Figure2). In point B people are selling pesos and buying dollars. Argentina authorities have **two options**:

Option1: To defend the exchange rate. In this case the Central Bank increases the interest rate to incentive people to maintain pesos. This will imply that money supply decreases. Another possibility for the central bank is to buy pesos in exchange for dollars to retire the undesired pesos. In this case the money supply will also decrease. The economy goes along the IS curve from B to D. (In B there will be a horizontal LM curve parallel to the initial LM curve). In any case, in the new situation the interest rate has to go up to the level at which interest parity holds, and there is a **contraction of output**. It is important to point out that there is shift in the horizontal LM curve to show that a credibility problem has been generated as a consequence of past misbehavior of monetary authorities (**original sin**). So it is a monetary problem that must be solve with a monetary measure.

Option 2: The other alternative is to abandon the fixed exchange rate. In this case due to the currency mismatch the IS curve shifts to the left. We assume that the shift to the right induced by the depreciation of the Argentina's peso will be overcompensated by the shift to the left generated by the currency mismatch. Consumers and firms indebted in dollars will see how the value of their debts

increases, so consumption and investment will decrease. In this case the economy will go to a point like C. (The horizontal LM curve remains unchanged).

With both options you have a recession. It could be said that you are in a trap because you have to choose between **D** (you have lost credibility-people think that the currency is going to loose value) and **C** (you have currency mismatch due to the original sin). Therefore you have to move along what I would call the **crisis path**. (This path is the same as the “**IS curve that turns back**” in DeLong analysis). The problem could be described with a term that could be named the “**credibility-currency mismatch trap**”, i.e., you confront a crisis path that you will irremediably lead to a recession. It is important to note that if there is not currency mismatch there is no displace from A to B and the abandon of the fixed exchange rate will have a positive effect in output. This would have been the case of the United Kingdom in the EMS crisis 1992-93)

#### 6. The possibility of choosing an intermediate point (“sweet spot”) in the path crisis

Can we choose an intermediate point in the crisis path? DeLong points out that: “*The best the central bank can do is try to find the “sweet spot” where the recession is smallest....*” In the context of currency crisis in emerging economies the task can be sometimes impossible and it seems that it depends on “how fixed” is the initial exchange rate regime. The two cases are explained below:

**A sweet spot in the AC path?** With a super fixed exchange rate (currency board) it is very likely that you cannot find an intermediate point in the AC path. In this context when you lose your credibility you lose it all. Argentina's authorities had to abandon the currency board and the peso depreciated inevitably very rapidly. If Argentina's authorities had announced that they were to maintain the currency board but with a new exchange rate (let us say 1.3 pesos = 1 dollar) it is very likely that the result would have been the same because nobody would have believed the new commitment. Brazil abandoned its fixed exchange rate and established a crawling peg, but in a few months it had to let float the Brazilian real. Once lost the credibility on the fixed exchange rate there was no credibility left for the crawling peg. The exchange rate goes very quickly to its market value when people lose the confidence in the "magician" that was maintaining it suspended in the air (there is no in between for levitations). So, it seems that you have to choose A or C and that there is no middle point for emerging economies confronted with the problem of no credibility.

#### **A sweet spot in the AB path?**

Also in this case it seems that there is no possibility of finding a lasting sweet spot in the AB path. If monetary authorities do not want to increase the interest rate up to the level that makes interest parity condition hold, the central bank will be losing international reserves. The country can borrow, but at an increasing cost because they have a credibility problem. Here the role of the IMF can be introduced. What the IMF loans do is to maintain the country in a point between

A and B. But if credibility is not restored there will be an unavoidable shift to B or C, because loans cannot go forever.

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