Economics 115: The Trilemma

February 10, 2009

1 Definition and Examples

The Trilemma is the fact that countries cannot have more than two of the following three things:

- 1. A fixed exchange rate
- 2. An open capital market (no capital controls)
- 3. An independent monetary policy

Below are some of the choices that countries have made:

- Countries on the gold standard (like the U.S. from 1873-1914) chose to have a fixed exchange rate and open capital markets. They did not have independent monetary policy. (The U.S. did not even have a central bank, although the Treasury performed some of a central bank's functions.)
- The U.S. today chooses to have an open capital market and an independent monetary policy. Thus it does not have a fixed exchange rate: you cannot take your dollars to the San Francisco Fed and exchange them for gold or foreign currency at a set price.
- Countries in the Euro area, like countries on the Gold Standard, have chosen to have open capital markets and fixed exchange rates and thus they do not have independent monetary policies. The European Central Bank (the ECB) sets monetary policy for all 13 countries in the Euro-zone.
- China has (roughly) chosen to have a fixed exchange rate and an independent monetary policy. This means that they must have capital controls, which they indeed do. For example, Article 9 of "The People's Bank of China Decree [2006], No. 3" states[1]:

  > An individual's foreign exchange sales and domestic individual's foreign exchange purchases shall be imposed an annual limit. Within the annual limit, an individual can conduct a sale or purchase business with a bank by presenting valid identity documents; beyond the annual limit, an individual can conduct a current account business with a commercial bank by presenting valid

[1] see http://www.pbc.gov.cn/english/detail.asp?col=6800&id=71

identity documents and relevant materials proving the transaction amount while a capital account business shall be conducted according to relevant provisions in Chapter Three.

2 Intuition

In this section I will give some intuition for the Trilemma. I will proceed by assuming that country is on a fixed exchange rate and has no capital controls. I will then show that the country cannot have an independent monetary policy.

- If a country has a fixed exchange rate and an open capital market, it must be the case that the domestic interest rate, i, equals the foreign interest rate, i^*. If this were not true there would be arbitrage opportunities.

  - For example, suppose the Fed was fixing the Dollar to the Euro at 1 dollar per Euro. In other words, you could bring a \$20 dollar bill to the San Francisco Fed and they would give you 20 Euros (and vice-versa). Now suppose the interest rate on bonds here is 5%, and in Europe is 10%. Then if I am an investor with \$100 worth of U.S. bonds, I can have \$105 dollars in a year by leaving my money in the U.S ($100 * (1 + 0.05) = 105$). Alternatively, I can take my \$100 dollars to the Fed and exchange them for 100 Euros. I can then invest these Euros in European bonds and have 110 Euros at the end of the year. After converting these Euros back to dollars at the fixed exchange rate, I will have \$110 dollars - five dollars more than if I had invested in U.S. bonds.

    Thus investors will sell U.S. bonds in order to buy European bonds. As the supply of U.S. bonds that people want to sell rises, their price will fall. Recall that the price and yield (interest rate) on a bond are inversely related. Hence as investors sell U.S. bonds the yield on U.S. bonds will rise above 5%. When will the yield stop rising? It will stop rising when there is no longer an arbitrage opportunity, in other words when the yield on U.S. bonds (i) equals the yield on foreign bonds (i^*).

- Since $i = i^*$, no independent monetary policy is possible. Monetary policy works by changing i (for example, this fall, the Federal Reserve lowered the interest rate to 0). But we have just seen that i must equal i^*. Therefore independent monetary policy is not possible. The central bank must leave $i = i^*$.

- Note how the above story relies crucially on the lack of capital controls: in the story I told, U.S. investors can sell bonds and use the proceeds to buy Euros. With capital controls, they would not be able to do this. Recall how Chinese law limits how much foreign currency one can purchase.

- This story also relies on a fixed exchange rate: investors can make money with certainty by investing in European bonds because they know the rate at which they will be able to convert Euros back to dollars. But if the exchange rate might change, then an investors' calculation ceases to be so simple.