18. Banks and Global Liquidity

Today and next time, we pursue an adaptation of our dealer model to the foreign exchange market under a gold standard. In lecture 10 "The World that Bagehot Knew" we talked about a world of bills of exchange, discounting banks, and the central bank as liquidity backstop. We start our discussion of international money there, by specifying that the firms issuing and accepting bills are both outside England, while the discounting banks and the central bank are inside.

Surplus Firm/Country		City of London Banks		Deficit Firm/Country	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
-goods +bill -bill +notes		 +bill -notes		+goods 	+bill
		 -bill +notes		-goods +notes -notes	 -bills

I'm showing here the surplus firm discounting bills for sterling pound notes (closer to reality would be deposits, but intuition is sharper with notes), and by assumption that is not his own domestic currency. Similarly, I am showing the deficit firm paying off the bill with sterling pound notes, and by assumption that is not his domestic currency either. So we've got the surplus firm with sterling it has to exchange for domestic currency, and the deficit firm with domestic currency it has to exchange for sterling. These are two different currencies, and the exchanges happen at two different times.

This is a job for a foreign exchange dealer who makes two-way markets in the various currencies, by quoting prices and absorbing the resulting order flow on his own balance sheet. Here are the two dealers, and I am also showing the Bank of England:

Surplus Dealer/Bank		Bank of England		Deficit Dealer/Bank	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
+notes/gold -domestic currency		 +/-gold			
			+/-notes	-notes/gold +domestic currency	

At the inception of the trade, the surplus dealer is creating domestic currency and building up inventories of international reserves. At maturity, the deficit dealer is destroying domestic currency and drawing down inventories of international reserves. And at any point in between, either dealer may decide he'd rather hold reserves in gold, or the other way around, and go to the Bank of England for that purpose. So we have three markets here.

Dealer Model

So long as we are on a gold standard, the analysis is fairly straightforward.
There is a mint par, defined as a quantity of gold that private agents can take to the mint and get pounds. But, because there is some cost of transporting gold abroad, the exchange rate for pounds can move a bit away from the mint par, on either side, without creating incentive to convert pounds into gold. These "gold points" are the outside spread, established by the central bank, within which the private dealers make markets, establishing the inside spread.

I remind you of the notation introduced in Lecture 16:
Dollar = x oz. of gold, mint par
Pound = y oz. of gold, mint par
Exchange rate $S = £/\$ = x/y$, ratio of mint pars, so actual exchange rate fluctuates between gold points:

$$x/y - \delta < S < x/y + \delta$$

In a world like this, dealers are willing to add to their inventories of foreign exchange if they can get them at a good (cheap) price, but once that price falls to the gold point they are unwilling to add any more. At that point, anyone who wants to sell foreign exchange must sell it not to the private dealers but rather to the central bank who pays gold (mint par) for them.
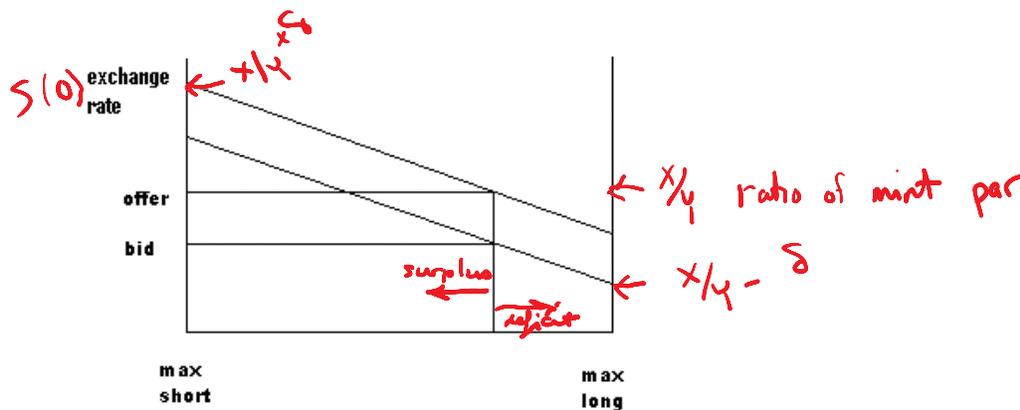
In the diagram I am showing the economics of a dealer who is taking on liquidity risk by shedding international reserves (pounds) and holding instead dollars. This is a position like our deficit dealer. He is willing to bear a certain amount of liquidity risk, but when it gets too much, so exchange rate falls to the gold points, he stops and the central bank steps in.

Central Bank defense

In a world like this, consider how a central bank that is committed to maintaining a fixed exchange rate would actually do it. Upward pressure on the currency can be met by issuing the currency to buy foreign reserves. No problem. But downward pressure (same as upward pressure on the price of gold) must be met by buying currency. Big problem.

There are three basic channels toward this end.

First, the central bank can buy in domestic currency with its holding of international reserves. Note, this is exactly what the deficit dealer was doing.

Assets	Liabilities
-$100 gold reserves +100 currency	
-100 currency	-100 currency

The net effect is a contraction of the balance sheet, since the currency purchased is the central bank's own liabilities. But this works only so long as the bank has reserves.

Second, he could sell some assets, presumably the most liquid ones, i.e. the public debt. In this case defending the currency looks like this.

Assets	Liabilities
-$100 domestic credit (Tbills) +100 dollars	
-100 dollars	-100 dollars

Now we have contraction of the balance sheet, but also possible downward pressure on Tbill price, hence upward pressure on interest rates, perhaps very large upward pressure if speculators fear devaluation. We often hear loose talk about central banks defending their currency by raising interest rates, and now we understand better what really happens; central banks offer interest bearing securities in exchange for currency, in the hope that the interest will prove sufficient incentive to prevent asset holders from demanding payment in international reserves.

Third, if the central bank has no more reserves and is unwilling to push interest rates higher, one further possibility is to rely on lines of credit with other central banks, (or with the IMF which, in

this respect, operates somewhat like an international central bank). These borrowed reserves then are sold for dollars.

Assets	Liabilities
+100 reserves	+100 borrowed reserves
-100 reserves +100 dollars	
-100 dollars	-100 monetary base

In the end, this third channel amounts to a portfolio adjustment on the liability side; the balance sheet stays the same but some of the money base in private hands shifts to other central banks. More generally, the point of these examples is to make clear in what sense contraction of the money supply supports the international value of the dollar. The most straightforward way of understanding what happens is that the central bank enters the market as a buyer of dollars, but since dollars are its own liability, its purchase of dollars is in effect a contraction of its balance sheet.

As always it is the deficit entity that is forced to adjust, but the deficit entity is not necessarily below the Bank of England in the hierarchy. In some cases, the deficit entity could be the Bank of England itself, if the pound drops to the gold points (or equivalently, in our dealer diagram, the dollar rises to the point where gold flows from the Bank of England in defense of its mint par). Let's explore that possibility for a while.

City of London and Bank of England Defense

Put yourself in the shoes of the City of London banks. Their global discount business involves daily note outflow, and also note inflow as discounts reach maturity. Each individual bank is watching the balance between outflow and inflow, and adjusting its discount rate in order to bring them into line. Higher rate discourages new discount, so stemming outflow for a while until inflow restores liquidity. All banks are doing this, and competition between them establishes the market rate of interest, which fluctuates over time depending on the aggregate note outflow and inflow between the banking system and the rest of the world.
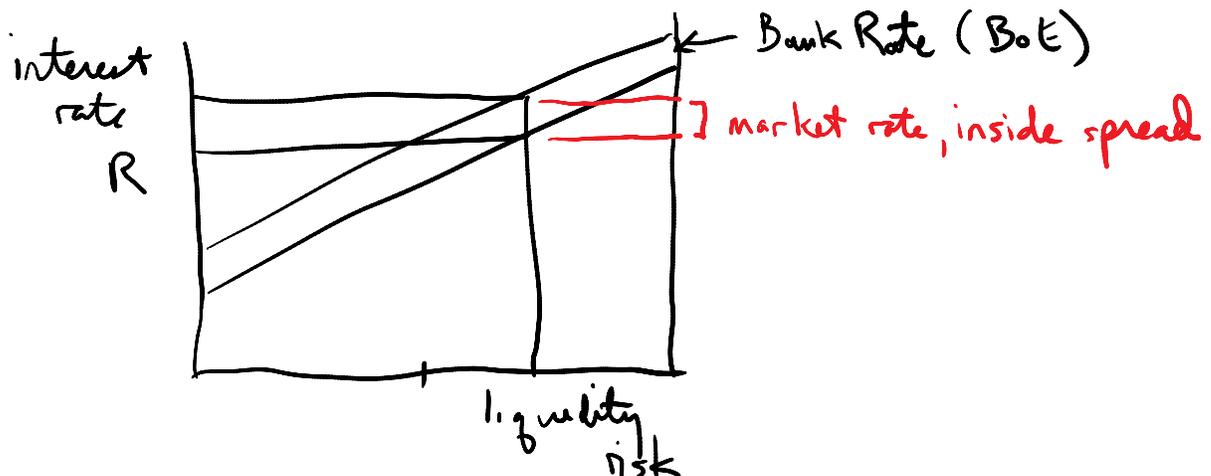
We have seen in previous lectures how to understand this discount system using the dealer model.   Banks are willing to take on additional liquidity risk, by continuing to discount even when note reserves are falling, if they get compensated by a higher interest rate. But at some point, they have enough, market rates rise to bank rate (the discount rate quoted by the Bank of England) and the Bank of England takes over. It may discount (or rediscount) bills and pay out notes, just like the private banks. But it may also discount bills by creating deposits, which are promises to pay notes, insofar as banks are willing to accept deposits as substitutes for notes.

Bank of England: Banking Department

Assets	Liabilities
+bills -notes	
+bills	+deposits

We have seen in previous lectures how this kind of lender of last resort activity—lending freely but at a high rate against good security—can stem an "internal drain", meaning a net outflow of notes from the banking system into circulation.   The important point to emphasize now is the limits on such activity when the problem is an "external drain", meaning a net outflow of notes to the rest of the world. The rest of the world doesn't want notes, it wants gold, so if it finds itself with excess notes it just takes them to the issue department of the Bank and exchanges them:

Bank of England: Issue Department

Assets	Liabilities
-gold	-notes

You can see from the balance sheets that the Bank of England now faces exactly the same problem that our deficit country central bank faces. It can pay out gold for a while, but reserves inevitably fall short. The next steps are

--raising Bank Rate, so discouraging the world from bringing bills to London for discount, and allowing repayment of maturing bills to restore gold reserves. The problem with this policy is that it inevitably raises domestic interest rates as well, even though domestic credit was not the source of the problem.
--borrowing from other central banks, who may have larger gold reserves
--suspending specie payments.

This latter is the "nuclear option" but the Bank of England historically was forced to resort to it on numerous occasions. Obviously once the Bank of England suspends gold payments, the gold point story about determination of exchange rates no longer operates. So what is the story then? That will be our question for next time.   You will see then why I have been putting so much emphasis on Covered Interest Parity

CIP: $[1+R^*(0,T)]S(0) = [1+R(0,T)]F(T)$

Meanwhile, in summary, observe how important central banks are for the operation of the gold standard. They establish two critical outside spreads that provide bounds on the system within which profit maximizing dealers can operate to make markets. One bound is on the exchange rate, i.e. the gold points. The other is on the interest rate, i.e. Bank Rate, which is a term interest rate.   In modern exchange rate systems, neither of these bounds is effective. Nonetheless, as we will see next time, the analysis we have just been through can be adapted to explain how things work.

In closing, I refer you to a passage from Keynes (1924) Tract on Monetary Reform, where he refers to the gold standard as a "barbarous relic", and emphasizes the role of Ministers of Finance in discovering how to operate national currencies without the discipline of gold. He urges them to focus their efforts on stabilizing domestic pricing, hoping that such stability will also (through purchasing power parity) stabilize exchange rates. We know now, from our own experience, that price stability is not enough, as Mundell emphasizes. That means that we need a theory of exchange that does not come from purchasing power parity, but rather from somewhere else, i.e. CIP.