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# Lecture #15: Overview of 'Normal' Operation of Fixed Exchange Rate Regime

I begin with a summary of the discussion last time, and add some new discussion, to the analysis of the operating characteristics of fixed exchange rate regimes. The discussion this time focuses on the 'normal' operation of a fixed exchange rate regime. Next time, we'll discuss currency crises a time when a fixed exchange regime comes under extreme stress.

Fixed Exchange Rate Regimes have implications for the operation of monetary and fiscal policy. The first section below discusses these. The discussion can be used to shed light on several recent episodes in the world economy. Those are briefly discussed in the second section.

1. Fixed exchange rates have implications for fiscal and monetary policy.

   (a) Monetary policy. First, I summarize the lecture 14 discussion of the way the economy responds to various shocks when the central bank is committed to a fixed exchange rate (that's in parts (i)-(iii) below). Second, in part (iv) I discuss a new policy tool available to a central bank when it is under a fixed exchange rate. It can change the value of the 'fixed' exchange rate.

      i. Money demand shocks. Under a fixed exchange rate regime, the central bank keeps the domestic rate of interest equal to the foreign rate. To the extent that domestic money demand shocks are uncorrelated with the foreign interest rate, it follows that in a fixed exchange rate regime, the central bank insulates output and employment perfectly from money demand shocks.[1] So, from the perspective of money demand shocks, a fixed exchange regime is very good.

[1] By 'uncorrelated', I mean that the money demand shocks do not occur at the same time as a foreign interest rate shock. When a positive (negative) money demand shock in the domestic economy typically occured at the same time as a positive (negative) foreign interest rate shock, then the money demand shock is positively correlated with the foreign interest rate shock. In this case, the monetary authority in a fixed exchange rate regime would not typically be accommodating money demand shocks. Instead, when a money demand shock occured, they would usually not increase the money supply by the same amount, in order to let the interest rate go up and meet the rise in the foreign rate. The case of positive correlation seems unlikely and so is not discussed further in detail.

ii. Aggregate demand shocks. In a fixed exchange rate regime the central bank amplifies the output effects of an aggregate demand shock. So, this is not a good policy regime for insulating the economy from demand shocks. The central bank *can* soften the economic effect of these kinds of shocks, to the extent that it can coordinate interest rate policy with the central banks that it has a fixed exchange rate relationship with. This is more likely, the more correlated the aggregate demand shocks are across the countries in the fixed exchange rate relationship.

iii. Shock to foreign interest rate. This is a real headache for a central banker. When the interest rate of the country you're fixing your exchange rate to goes up, you have to raise your own interest rate too. This is an especially big problem if - as is almost certainly true - domestic aggregate demand is negatively related to the interest rate.

iv. We have not previously talked about how the central bank implements a change in the exchange rate in a 'fixed' exchange rate regime. If the notion of changing the exchange rate in a fixed rate regime sounds contradictory, well, it sort of is. This type of policy can only work well if it is used extremely rarely. If used too often, it makes an economy that wants to stick to a fixed exchange rate vulnerable to currency crises.
Suppose the central banker unexpectedly announces a devaluation in the exchange rate, from $E_0$ to $E_1$. Suppose that the jump is $x$ percent. That is, $E_1 = (1 + x)E_0$. See Figure 1a, which shows the jump. Note how all the figures there have a similar format. The point in time, $t0$, indicates the time of the exchange rate announcement. The line, which may or may not have a jump in it, indicates the time pattern of the variable indicated on the horizontal axis. In each case, time is divided into the long run and the short run (this is indicated explicitly only in Figure 1a).
To analyze how the economy will respond to this, we have to determine what the central bank must actually do, to achieve the devaluation of the currency. The exchange rate is not something that is actually set by the central bank. It is determined in the foreign exchange market. The central bank has an influence on that market through its ability to conduct open market operations. To understand this, imagine the market for apples which has one extremely large supplier. That supplier, by varying how many apples it brings to market, can obtain any desired price.
We begin by analyzing what happens in the long run, and then work backwards to the short run. We have not worked

with the long run for a while. This is because the shocks we have considered recently are temporary and so have not impact on the long run.
Our equations in the long run are:

$$\begin{aligned} \text{Money Market Equilibrium} \quad &: \quad \frac{M}{P} = L(R, Y) \\ \text{UIP} \quad &: \quad R = R^* + \frac{E^e - E}{E} \\ \text{Goods Market Equilibrium} \quad &: \quad Y = D(Y - T, q). \end{aligned}$$

Here, $q$ is the real exchange rate, $q = EP^*/P$, and $D$ is aggregate demand - planned household consumption, business investment, government spending, and the current account. $Y$ is output, which in the long run is determined by the amount of people and their education, and the amount of physical capital. In the UIP relation $(E^e - E)/E$ is actually redundant for present purposes, because $E^e = E$ under the 'normal' operation of the fixed exchange rate regime. Our three unknowns in the long run are $R$, $P$ and $M$. Until now we have thought of $M$ as an exogenous variable, and of $E$ as an endogenous variable. Under a fixed exchange rate regime, this is reversed. The variable, $E$, is exogenously set by the central bank. The variable, $M$, then becomes endogenous. It is whatever it takes for the central bank to be able to achieve its $E$ target.
From this system of relationships, we see that $q$ cannot change in the long run when there is an exchange rate change. Since nothing happens to $Y$, nothing happens to its relative price, $q$, either. But, if $q$ is to remain unchanged when the exchange rate jumps $x$ percent, then $P$ must jump $x$ percent too (see Figure 1c). From the UIP relationship, we see that nothing happens to the interest rate (see Figure 1b). From the money market equilibrium condition, we see that the money stock must jump $x$ percent. This is what the monetary authority must actually do in the long run, to make sure that the long run devaluation is $x$ percent (see Figure 1d). We derived this result long ago, when we were thinking of the monetary authority as fixing the money stock.
Now, let's consider the short run. We use the same three relations in the short run, except the variables that they determine are different. In the short run, $P$ is fixed and $Y$ adjusts (the relation that operates in the long run to determine $Y$ is inoperative in the short run - output can be below what the existing quantity of people and capital can normally produce,

or above). Other endogenous variables - besides $Y$ - are $R$ and $M$.

Recall: the first two relations, the money market equilibrium condition and the UIP, are summarized in the $AA$ curve and the last, the goods market equilibrium condition, is summarized in the $DD$ curve.

Consider $E^e$, the long run exchange rate. With the devaluation, this is increased from $E_0$ to $E_1$. We assume that the financial markets clear instantaneously, so this implies that $E$ jumps immediately. But, as soon as the jump occurs, the real exchange rate rises (depreciates) because $P$ and $P^*$ are fixed. This rise in $q$ shifts up aggregate planned spending, as indicated in Figure 2b. This leads to unintended inventory declumulation, which starts output increasing (see the arrows).

A feedback loop back to financial markets opens up at this point. The rise in output raises money demand (shifts the money demand curve in Figure 2a to the right), threatening to raise the domestic rate of interest. Now, the monetary authority is committed to the new, higher exchange rate, and so they do not want to see an interest rate rise. So, to offset the rising money demand pressures in the money market they have to increase the money supply (see Figure 2a). The short run equilibrium can be seen in Figure 2a and 2b: the money supply increases and output increases.

It is important to think through the passage from the short run to the long run using Figure 2. This passage is market by an increase in the price level since output is now higher than the 'normal' (full employment) level, $Y_0$. The rise in the price level, by reducing $q$ (remember, $E$ is fixed at $E_1$), shifts the aggregate demand curve back down. This creates a 'race' in Figure 2a: the rise in the price level is reducing $M/P$ and it is shifting the money demand curve to the left. Which falls faster determines whether the monetary authority has to increase or decrease the price level along the transition to the long run. We know that in the long run the price level and money stock have to jump by the same percent as the jump in $E$. But, we don't know whether in the short run, the money supply had to jump by more or less than $x$ percent, to ensure that the exchange rate is $E_1$.

It is useful to see what happened in the $AA$ - $DD$ curve system, which is displayed in Figure 3. The initial equilibrium is at point 1. The short run equilibrium is at point 2. The economy moves back to point 3 in the long run, with the $DD$ curve shifting left to $DDpp$ with the rise in $P$. As the $DD$

curve shifts to the left, the $AA$ curve shifts left too. It does so in part because $P$ is rising. But, $M$ has to be adjusted continually, to make sure that the intersection of the $AA$ and $DD$ curve always occurs at the $E = E_1$ line. That is what the fixed exchange rate regime is all about.
To summarize, the devaluation leads to a temporary jump in output. This may be a welcome, 'refreshing', development from the perspective of a central banker. One reason may be that the government in office is facing political elections and the central banker's job tenure is a function of which government is in power. The central banker may perceive that a temporary boost to output will improve the government's election prospects. The analysis was done starting at a position of full employment. However, it could also have been done starting in a nasty recession. If so, the devaluation would accelerate the return to full employment.[2]

v. It is important to emphasize that the refreshing boost to output that comes with a devaluation may in the long run not be welcome or refreshing at all. The central bank that resorts to this may earn a bad reputation and create the expectation that the devaluation tool will be used again. This can make the economy vulnerable to the central banker's worst nightmare: a currency crisis. This is a nasty situation in which the public expects the central banker to devalue in the future and then financial markets do things which place the central banker in a situation of having to either devalue immediately or face a bad recession. In this case, if the central banker resorts to the devaluation, we say the economy has fallen into an expectations trap. Thus, use of the devaluation tool makes the economy vulnerable to expectations traps. But, the mechanism by which this happens will be discussed later, where currency crises will be discussed.

(b) Fiscal policy. Fiscal policy is now highly effective at moving output and employment (this is easy to work out for yourself). Still, it does not follow that fiscal policy is useful for stabilization purposes. The inside and outside lags are long and variable. In addition, fiscal policy is made by the legislature: a lot of people have to agree on what to do, and often such agreements end up being a hodge-podge of different things which may or not have much to

[2]You may wonder what incentive a central banker may have to boost output when the economy is at full employment. Actually, the economy may be inefficiently active, even at 'full employment'. Taxes and monopoly power have the consequence that the economy is somewhat slow and lethargic even in the long run. Monetary policy is capable of shaking off some of that lethargy, at least temporarily.

do with the overall stabilization objective. Finally, an increase in $G$ creates an important group of constituents, who will fight to prevent $G$ from being reduced later, when it is no longer needed for stabilization purposes.

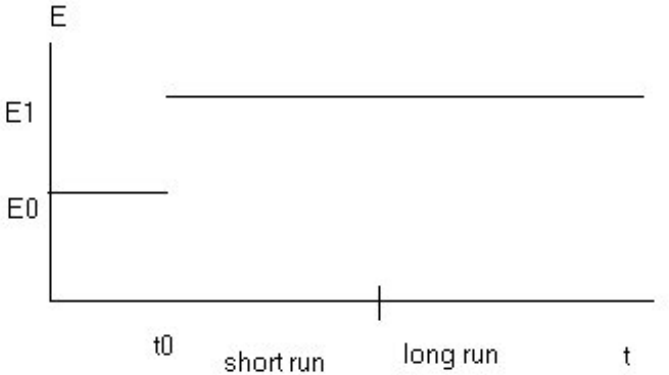

Fig 1a: Response of Exchange Rate

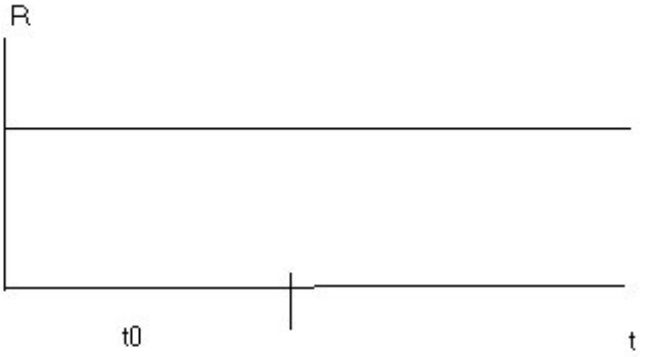

Fig 1b: Response of Interest Rate

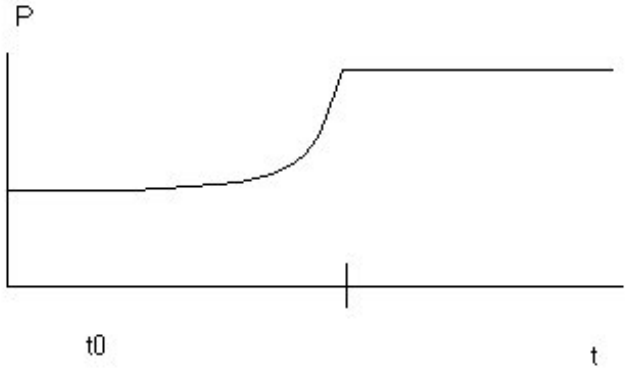

Fig 1c: Response pf Price Level

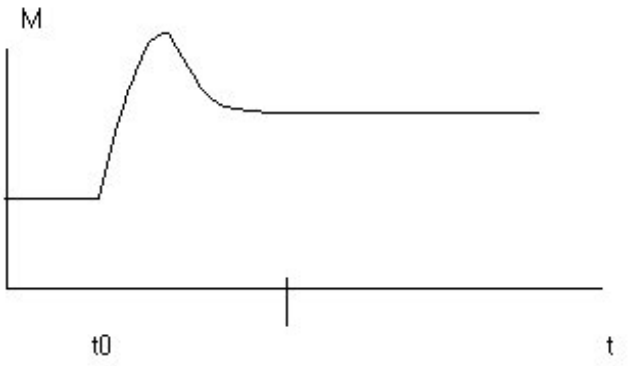

Fig 1d: Response of Money Stock

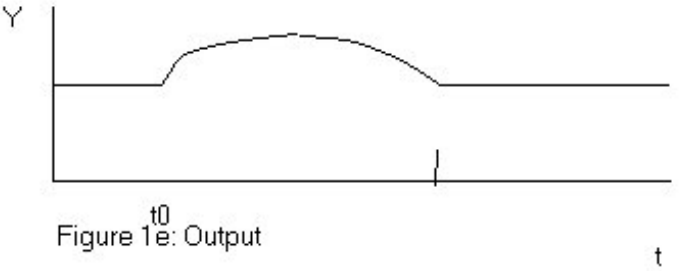

Figure 1e: Output

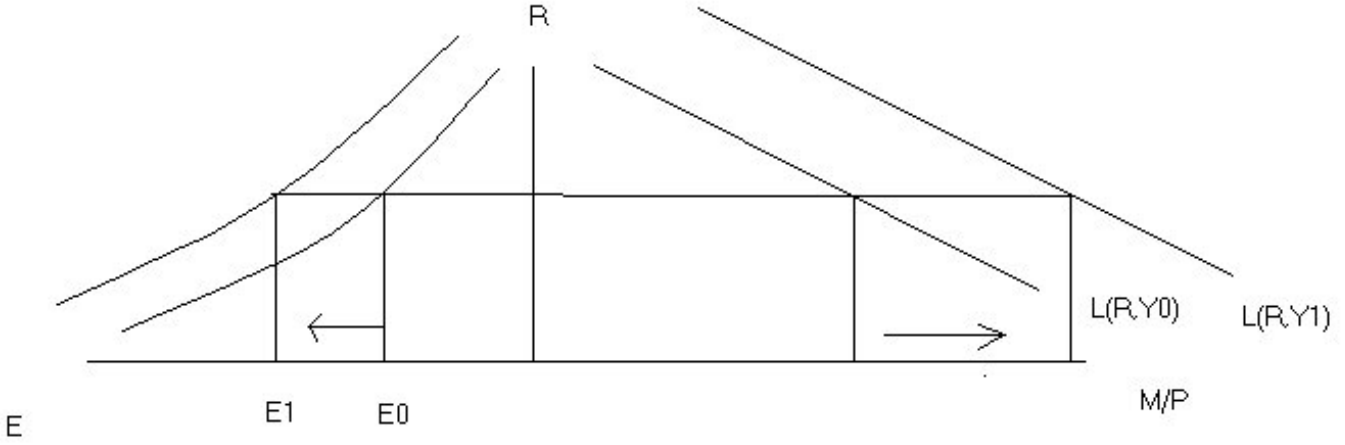


Figure 2a: Effect on Financial Market Conditions of Rise in Ee

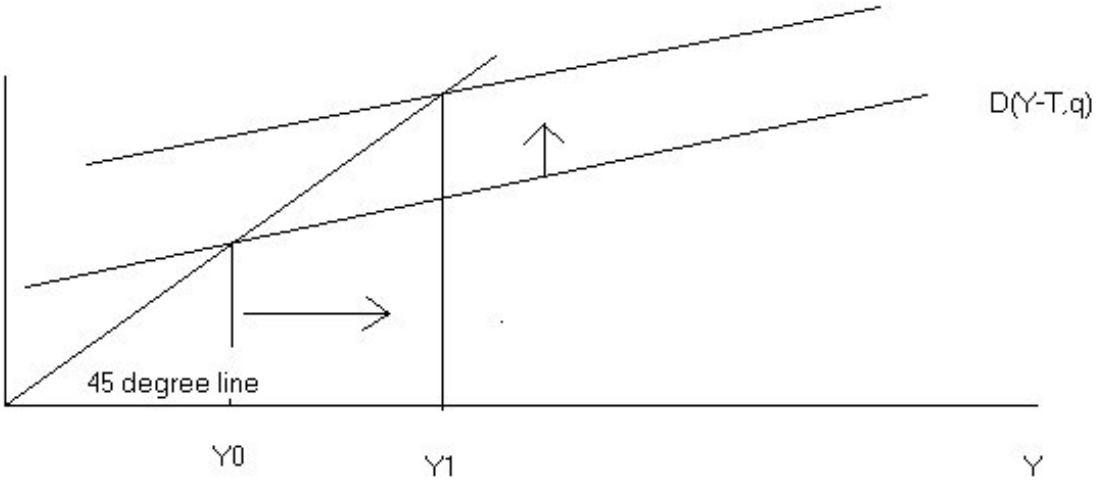


Figure 2b: The Rise in E Shifts the Aggregate Demand Curve Up
(q=EP*/P)

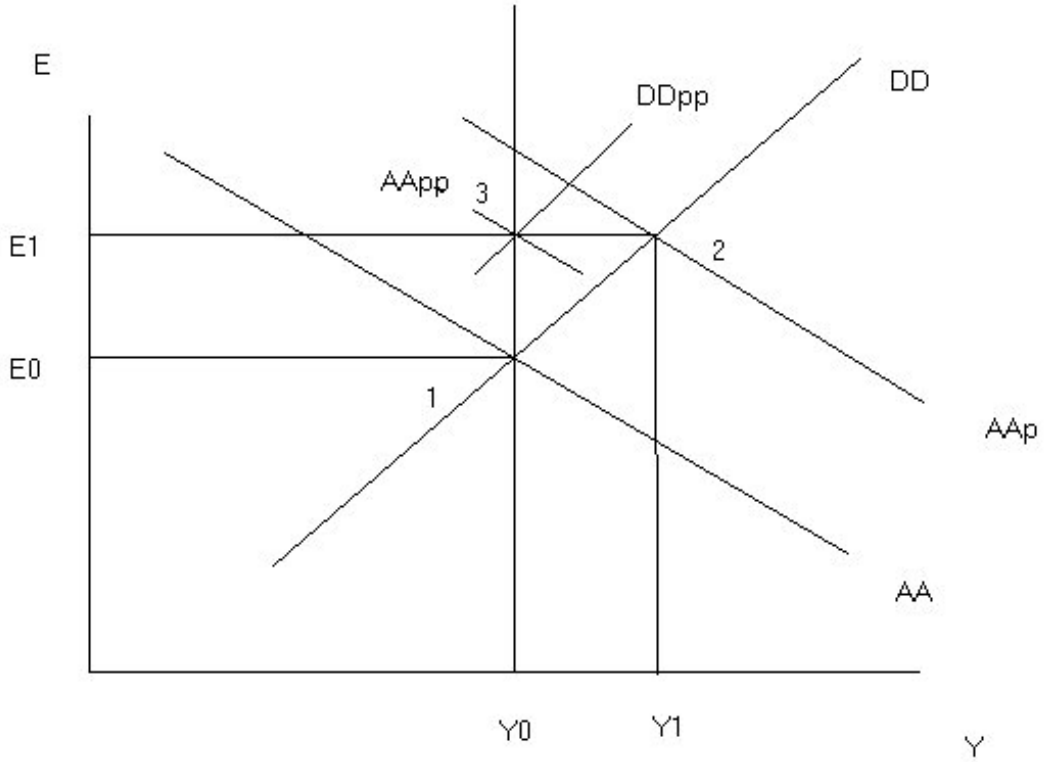


Figure 3: Effect of A Devaluation - Short Run, Go to Point 2, Long Run, Go to Point 3