Topic 5 – Unemployment-inflation tradeoffs and inflation control

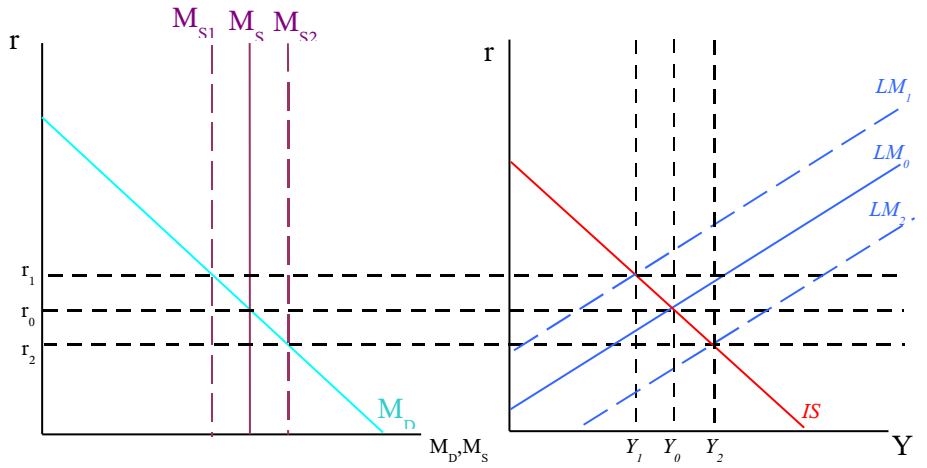
1. How may the Central Bank control the money supply? Why may it be difficult to hit a specific money supply target? What determines the supply of money, if the Central Bank conducts monetary policy by fixing the interest rate instead?

In modern market economies, the Central Bank can only indirectly control the supply of wider monetary aggregates. This is due to the intermediary operation of the commercial banking sector. Commercial banks only have to hold a fraction x_{re} (known as the ***reserve ratio***) of their total deposits as currency, because people on average only withdraw a small part of their overall accounts in a given period. The reserve ratio x_{re} will depend both on the optimizing decisions of banks based on their anticipations of economic conditions, but is also legally regulated by the government (generally by a legal minimum reserve ratio). The public, through their optimizing behaviour, choose a balance between holding their wealth as currency and holding it in bank accounts. This determines a ***currency-deposit ratio*** which we represent by x_{cu}. The amount of high powered money is given by: *H=currency+reserves*. The amount of money *M=currency+deposits*. Now, if we let the amount of deposits be *D*, then we have $H=(x_{cu}+x_{re})D$ and $M=(x_{cu}+1)D$. Combining these two equations, we can express M as a function of H: $M=(x_{cu}+1)\,(x_{cu}+x_{re})^{-1}H$. The part $(x_{cu}+1)\,(x_{cu}+x_{re})^{-1}$ is known as the ***money multiplier***. It is greater than 1, and decreasing in the reserve ratio and the currency ratio.

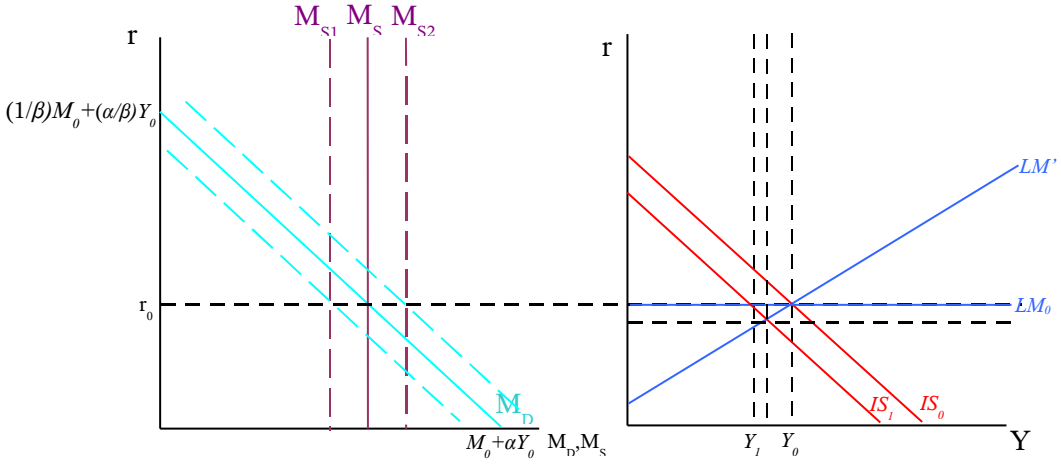
We have now seen a simple model of how the supply of high powered money by the central bank determines the ***nominal money supply***. However, the effective money supply depends on two other factors. The first is the price level. The ***real money supply*** is equal to the nominal money supply divided by the current price level (=M/P). Even if the Central Bank could fully control the real money supply, the amount of income supported by this quantity depends on the *velocity of money circulation*. This is a measure of how many transactions in a given period can be funded by a particular unit of money. The higher the velocity, the higher income must be to soak up a given supply of real money.

It should be clear from the above discussion that the Central Bank has only indirect control of the variables which lead its supply of H to create the effective amount of liquidity (i.e. money supply) in the economy. Although the Central Bank can in principle completely control the supply of high powered money, as it is the monopolistic supplier of it (this is obviously ignoring the possibility of forgery), it cannot directly control the currency-deposit and reserve ratios, or the price level, or the velocity of money circulation. It may have policy tools to influence these variables, and it can attempt to predict them, but this will necessarily be an inexact procedure. It is thus unlikely that the Central Bank will be able to hit a precise target for any of the wider monetary aggregate supply variables.

We can represent the effect of this inaccuracy or uncertainty in the money supply by looking at the effect on the IS-LM equilibrium in the money supply curve is able to shift around. As can be seen from the graph below, the instability in the money supply line causes instability in interest rates and therefore investment and output in the IS-LM equilibrium. (Note that instability in the velocity of money would be represented as a shift in the M_D curve). This suggests that if the Central Bank could instead fix the interest rate it may be able to reduce this instability.



If the Central Bank fixes the interest rate instead of the money supply then the supply of money automatically adjusts to the demand. This is because the interest rate is essentially the price the central bank charges for borrowing high powered money, and fixing the price of a good means that the quantity must be sold that is demanded at that price. This means that the M_S curve will always shift to meet the M_D curve at r_0, and hence the LM curve will shift about so that it always meets the IS curve at r_0. Effectively, the LM curve is horizontal. There is a price, however, to be paid for this reduction of instability in the LM curve. Suppose that the instability is instead in the IS curve (e.g. fluctuations in autonomous investment). If the IS curve shifts to IS_1 then the reduction in output is greater for the horizontal LM curve than for the diagonal LM' curve (which is where money supply rather than interest rates are targeted). This is because when money supply is targeted, part of the reduction in output is crowded out because the reduction in output reduces money demand and hence reduces interest rates. This cannot occur if interest rates are being directly targeted.

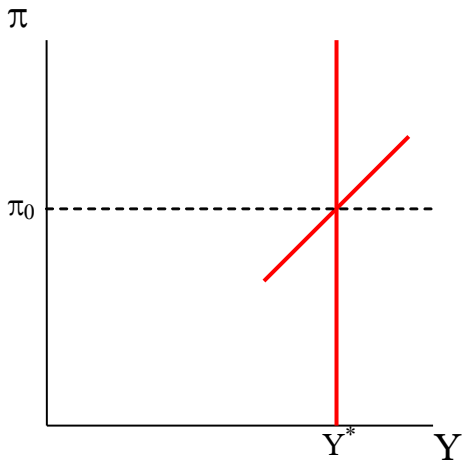


To conclude, neither a rigid money supply nor a rigid interest rate target are likely to be optimal policies for a central bank to use to regulate output (and therefore inflation). Most modern Central Banks use sophisticated economic models to predict the variables in the macroeconomy, and vary their interest rates over time in order to anticipate future inflationary and deflationary pressures.

2. "There is no unemployment-inflation trade-off. Therefore: (a) Central Bank policy should focus on controlling inflation only. (b) Lower unemployment can only be achieved by improving work incentives."

There is a consensus among the economics profession that the above statement will hold in the long run. Once all nominal prices (including, most importantly, wages) have had time to adjust to one another, the optimizing behaviour of economic agents will lead to the same real equilibrium in the economy. This means that just as the amount of potatoes produced in the long run depends on the real supply and demand functions for potatoes, the amount of labour employed will depend on the real supply and demand functions for labour. To put it another way, in the long run, the economy is ***money neutral***; money plays the role solely of frictionlessly "oiling" the transactions in the economy. In the short run, however, many economists believe that changes in the money supply (and therefore, changes in the rate of inflation) do have an effect on the real variables in the economy. This can be due to misperception by economic agents (either workers or firms) of the real price level when prices change unexpectedly or imperfections in the labour market which prevent it from clearing immediately (often due to the presence of trade unions and collective wage bargaining). The controversy is over how long the short run is relative to the long run. The neoclassical school of macroeconomics has operated on the assumption that the short run is a matter of days or weeks, and sought for explanations of economic fluctuations which rely on the real structure of the economy. Keynesianism, on the other hand, has seen the short run as lasting for years, so that monetary policy is very important in stabilizing the economy in order to increase economic welfare through preventing unnecessary unemployment. However, before the rise of monetarism, Keynesianism did not properly recognize the long run neutrality of money. Modern neo-Keynesianism, on the other hand, sees the interest rate purely as a short run stabilization tool, and recognizes that inflation should be kept at a low and stable rate in the long run.

Most models of the macroeconomy start from the assumption that there is a vertical long run supply curve (we will consider a criticism of this view later on). This output level Y^*, represents the total amount that can be produced when the labour market "clears". The structure of the labour market within this model, however, can be quite different from a true classical model where workers compete on an individual basis for jobs. The labour supply curve can incorporate the role of trade unions, or the need for efficiency wages (a model based an asymmetric information where firms pay workers higher than the market clearing rate so that the threat of being sacked induces workers to exert greater effort). It is best to think of Y^*, simply as the level of output compatible with no change in the inflation rate. A common formulation of the connection between the output level and the inflation rate is $\Delta\pi=\alpha(Y-Y^*)$. When output is above the equilibrium rate, there will be inflationary pressure as nominal wages catch up with the changes in other nominal variables (particularly the money supply). It is the rate of inflation which changes, because previous increases or decreases in inflation are built into the expectations of agents. This model is therefore based on ***adaptive expectations***. The model provides a more satisfying definition of the short run aggregate supply curves than one where the position of the SAS curve depends on the current price level. The position as the SAS curve depends instead on the current inflation rate. We therefore need to put inflation π on the y-axis rather than the price level P:



If the expected inflation rate π_0 is also the target rate, then there is no incompatibility between stabilizing the employment rate at the equilibrium level of employment and keeping the inflation rate on target. The active use of monetary policy in order to keep inflation on target in response to aggregate demand shocks is thus, in a neo-Keynesian world, part and parcel of fulfilling part (a) of the title statement. Essentially, modern central bank policy aims to shift the AD curve, via changes in the interest rate, to ensure that it always passes through the intersection of the SAS and LAS curves in the diagram above. This begs the question what the optimal target inflation rate will be, from the point of view of overall economic welfare. There are a number of good reasons why the optimal inflation rate should be small but positive. Firstly, and obviously, high rates of inflation are damaging due to their impairment of the efficiency of the price mechanism and the likelihood that an economy which allows a high rate of inflation will also allow that rate to vary more, thus making agents' expectations more likely to be wrong, and therefore causing greater fluctuations. Secondly, deflation is even more damaging than inflation, because when the price level is expected to fall, investment collapses because people prefer to hold money rather than real assets, causing a large and persistent recession which can be difficult to recover from. Having a positive rate of inflation gives a margin for error in avoiding deflation. Thirdly, if taxes must be raised by the government, then it is better for the tax burden to be spread over many commodities rather than just on a few. Since inflation is essentially a tax on money, it may well make microeconomic sense for money to bear a small part of the overall tax burden by having a positive rate of inflation.

The description of neo-Keynesian monetary policy above is essentially consistent with monetarism, the idea that the nominal money supply should be allowed to grow only in line with target inflation. Leaving aside the issues of velocity and the money multiplier (i.e. assuming these are constant over time) monetary policy which aims to maintain the target rate of inflation in the short run will, in the long run, automatically allow the nominal money supply to grow at a rate equal to the growth rate of the economy plus the inflation rate. The neoclassical school, on the other hand, does not see the need for short run stabilization via monetary policy because the private economy is seen as having automatic mechanisms to ensure this adjustment. One way to achieve this result is to substitute adaptive expectations for ***rational expectations*****.** If agents can fully anticipate the future results of any alterations in the money supply, there will be no period while private sector wages and prices catch up with these changes. This will mean that monetary policy will have no effect on output,

only on inflation. In this kind of world, the best the government can do is to keep the fluctuations to the money supply down to a minimum. Active monetary policy could, in this situation, actually *increase* the instability of the economy.

Neo-Keynesian theory has essentially become the modern paradigm for macroeconomics. It combines the best features of monetarism, Keynesianism, and recent developments in microeconomics such as imperfect information and game theory. There is, however, controversy within this framework about the validity of part (b) of the title statement. In the long run, if the vertical LAS model is correct, the level of employment will return to the equilibrium level whatever the government does in the short run in terms of monetary policy. This implies that if the government tries to use monetary policy in the short run to consistently raise the level of output above the equilibrium rate (i.e. by systematically setting the interest rate too low) all it will do is to cause a rising rate of inflation. This is where mainstream neo-Keynesianism differs from traditional Keynesian theory, which ignored the supply side of the economy and saw aggregate demand management as the complete solution to the problem of achieving low unemployment.

The ineffectiveness of aggregate demand management policy to lower the rate of unemployment in the long run does not, of course, imply that government policy has no effect on the unemployment rate. On the contrary, modern macroeconomics sees supply side policy as the key is improving the efficiency of the operation of the economy in terms of employment, inflation and output. Essentially, what is required are changes in government policy which will shift either the labour supply or the labour demand curves advantageously so that the equilibrium rate of unemployment is lower. There are many policy instruments available to the government that will clearly affect this: Rates and incidence of taxation, the size and duration of unemployment benefits, the levels of education and vocational training, infrastructure, healthcare; in fact virtually every area of government policy can have an effect on the equilibrium employment and output level.

The consideration of the many factors which affect the position of the LAS curve brings into focus, however, the possible serious criticism of the simple model we have so far examined. This concerns the concept of ***hysteresis***, the idea that the long run equilibrium of the economy is path-dependent. If the long run output capacity of the economy depends on investment in all kinds of real variables, and short run fluctuations affect employment and output, it would seem unavoidable that the conclusion must be that negative short run fluctuations do have a negative impact on the long run performance of the economy. This threatens to make a nonsense of the distinction between the short run and the long run. In the specific context of the unemployment performance of the macroeconomy, one of the most important forms of hysteresis is the particularly damaging effect of long run unemployment. There is plenty of empirical evidence to show that it becomes much harder for workers to find new jobs once they have been unemployed for a lengthy period of time. This will imply that failure to achieve the target inflation rate (assuming that the target rate is also the expected rate) will result in the LAS curve and the equilibrium unemployment rate changing over time (i.e. temporary unemployment today can increase the equilibrium level of unemployment). This means that using monetary policy in an inflationary manner (i.e. raising Y above Y^*) could actually reduce the equilibrium unemployment rate and bring long run benefits.

If defence of the neo-Keynesian approach to the short run management of the economy, however, a number of things should be pointed out. Firstly, the effect of hysteresis is likely to be small and take a long time to build up. This means that the

distinction between the long run and the short run is still valid. Secondly, there are likely to be better ways to solve the problem of hysteresis (e.g. retraining of the unemployed and other active labour market programmes) than simply causing excess inflation.

To conclude, modern macroeconomic theory, primarily in the form of neo-Keynesianism, shows us that in the short run, controlling inflation and preventing unemployment are, in terms of short run aggregate demand management, two sides of the same coin of keeping the inflation rate on target. Despite the issue of hysteresis, however, in the long run monetary policy is not the answer to the policy problem of reducing the equilibrium rate of unemployment. In this sense, neo-Keynesianism has taken on board the best ideas of neoclassical macroeconomics concerning the importance of supply side policy in ensuring good long run economic performance.