Problem Set 5

Question 2

a) In what sense is money neutral? Why is monetary policy useful if money is neutral?

In Problem Set 4, Question 2-Part (e), we already analysed the effect of an expansionary monetary policy. In this question we saw the effect of an increase in the nominal money supply (M) on output level, price level and interest rate in the short and medium run.

Summing up, the monetary expansion causes:

in the short run:
- decrease in the interest rate
- increase in the output level (is higher than its natural level)
- increase in the price level

in the medium run:
- no change in the interest rate (it rises back to its initial level)
- no change in the level of output (it falls back to its initial natural level)
- higher price level than at the outset

1) Answer to the first question:

Money is neutral because nominal money supply has no effect on output and the interest rate in the medium run. The increase in the nominal money supply is entirely reflected in the proportional increase in the price level. The interest rate is determined by the position of the IS curve and the natural level of output (which is determined by the position of the AS curve). Because the IS curve doesn't move, there is no effect on the interest rate (and level of investment) so that the level of output also does not change. Therefore in the medium run the monetary policy is not effective.

2) Answer to the second question:

Despite the neutrality of money in the medium run, monetary policy can be effective in the short run. With a monetary expansion, the LM curve shifts down and the AD curve shifts to the right. The interest rate decreases and therefore output increases due to increased investment. In summation, monetary policy can be useful in the short run as it decreases the interest rate and increases output.

In application, monetary policy can speed up the economy's return to the natural level of output when output has fallen below this level. As an example of monetary policy being able to pull the economy out of recession and towards the natural level of output, we can look at our analysis from Question 1, Part (c) in Problem Set 4.

There we used an expansionary monetary policy to prevent a decrease in output (and the resultant increase in unemployment), caused by a decline in business confidence (negative exogenous demand shock). We saw that without monetary policy, output
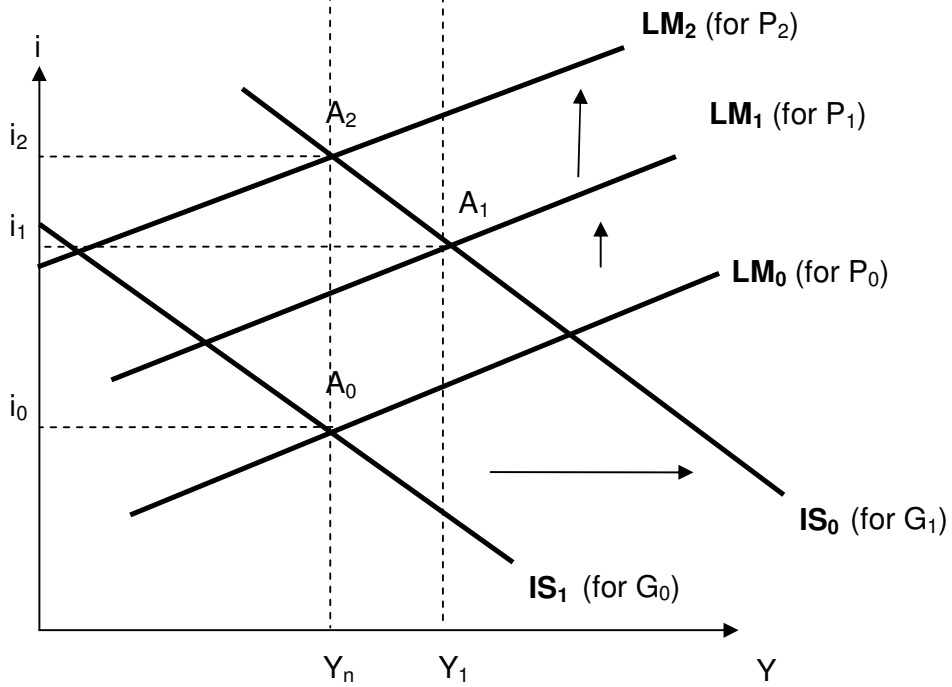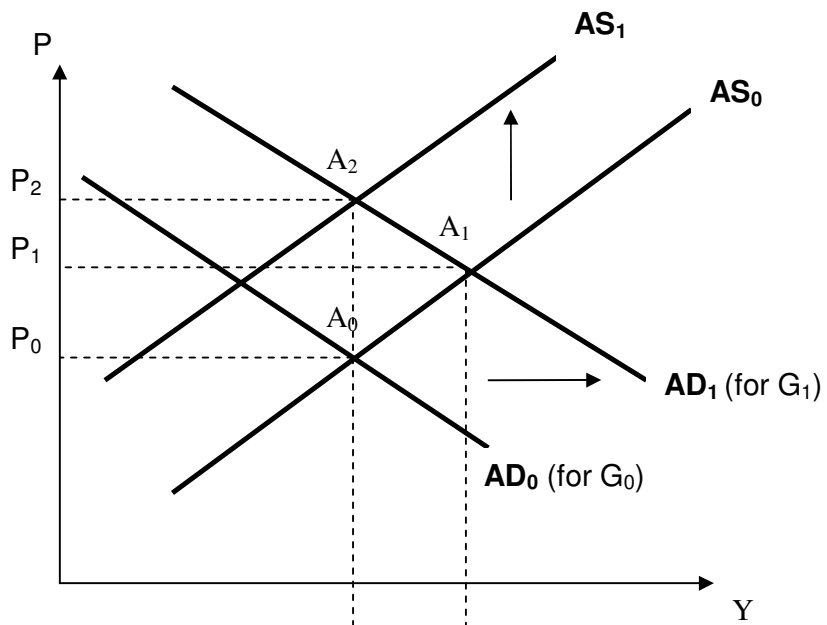
returned to its natural level in the medium run. When applying monetary policy, output already returned to its natural level in the short run and in fact the initial output level and price level did not change at all. The monetary policy was useful against the negative demand shock. (The monetary policy also prevented the increase in the rate of unemployment which remained at its natural level.)

We should remember that monetary policy is not useful when the LM curve is flat. This was the case in Question 1, Problem Set 3, where the LM curve was flat at interest rates close to zero. The expansionary monetary policy was ineffective because the economy had fallen into a "Liquidity Trap".

b) Fiscal policy, like monetary policy, cannot change the natural level of output. Why then is monetary policy considered neutral but fiscal policy not?

We have already answered this in Problem Set 4, Question 2-Part (f), when we analysed a deficit reduction in the form of a decrease in government spending.

We can now use the example of **expansionary fiscal policy** in form of an increase in government spending to sum up the analysis of fiscal policy and to compare it with **expansionary monetary policy** from part (a).

AS$_1$

P

AS$_0$

P_2 A$_2$

P_1 A$_1$

P_0 A$_0$

AD$_1$ (for G$_1$)

AD$_0$ (for G$_0$)

Y

LM$_2$ (for P$_2$)

i

A$_2$ **LM$_1$** (for P$_1$)

i_2

i_1 A$_1$

LM$_0$ (for P$_0$)

A$_0$

i_0

IS$_0$ (for G$_1$)

IS$_1$ (for G$_0$)

Y_n Y_1 Y

Looking at the IS-LM diagram first, we can see that the increase in government spending causes the IS curve to shift to the right, from IS_0 to IS_1. On the AS-AD diagram, the fiscal expansion causes the AD Curve to shift to the right, from AD_0 to AD_1. The new equilibrium has a higher output level, Y_1, and also a higher price level, P_1. This higher price level slightly offsets the increase in output level as it decreases the real money supply (M/P) and so shifts the LM Curve upwards, from LM_0 to LM_1. The new **(short run)** equilibrium is at A_1, with higher output level Y_1, higher price level P_1 and higher interest rate i_1.

In the medium run, the price level has risen above the expected price level, P^e, and so the expected price level rises as well. This pushes the price level up further, which in turn pushes down the real money supply (M/P) and so shifts the LM Curve further up, to LM_2. The level of output decreases back to the natural level of output, Y_n, and the interest rate increases further to i_2. The increase in the price level shifts the AS Curve up, giving the medium run equilibrium at A_2, with output at the initial natural level (Y_n) and the price level increasing to P_2.

Summing up, we can say that fiscal expansion causes:

in the short run:
- increase in the interest rate (it rises to i_1),
- increase in the output level (is higher than its natural level),
- increase in the price level.

in the medium run:
- increase in the interest rate (it rises to i_2),
- no change in the level of output (it falls back to its initial natural level) ,
- higher price level than at the outset.

In the short run both the expansionary monetary and expansionary fiscal policy have the same effects on i,Y and P. In both cases i decreases, Y increases and P increases.

In the medium run both fiscal and monetary policy have no effect on the natural level of output but the price level increases in both cases. In contrast to the expansionary monetary policy, the expansionary fiscal policy causes an increase in the interest rate in the medium run. Here the level of output is the same as before (Y_n), as are consumption (C) and taxes (T). The increase in government spending (G) is therefore offset by the decrease in investment (I) caused by the increase in the interest rate.

$$Y_n = C(Y_n - T) + I\downarrow(i) + G\uparrow$$

The fiscal policy is therefore not neutral because it changes the composition of aggregate demand on the goods market in the medium run. An increase in G causes a decrease in investment. Conversely a decrease in G caused an increase in investment.

We can apply an analogous argument by analysing a decrease in taxes (expansionary fiscal policy) or an increase in taxes (deficit reduction).

c) Discuss the following statement: "Since neither fiscal nor monetary policy can affect the natural level of output, it follows that, in the medium run, the natural level of output is independent of all government policies."

The statement is false.

Government can affect the natural level of output on the supply side of the economy, which is represented by AS curve with the following relation:
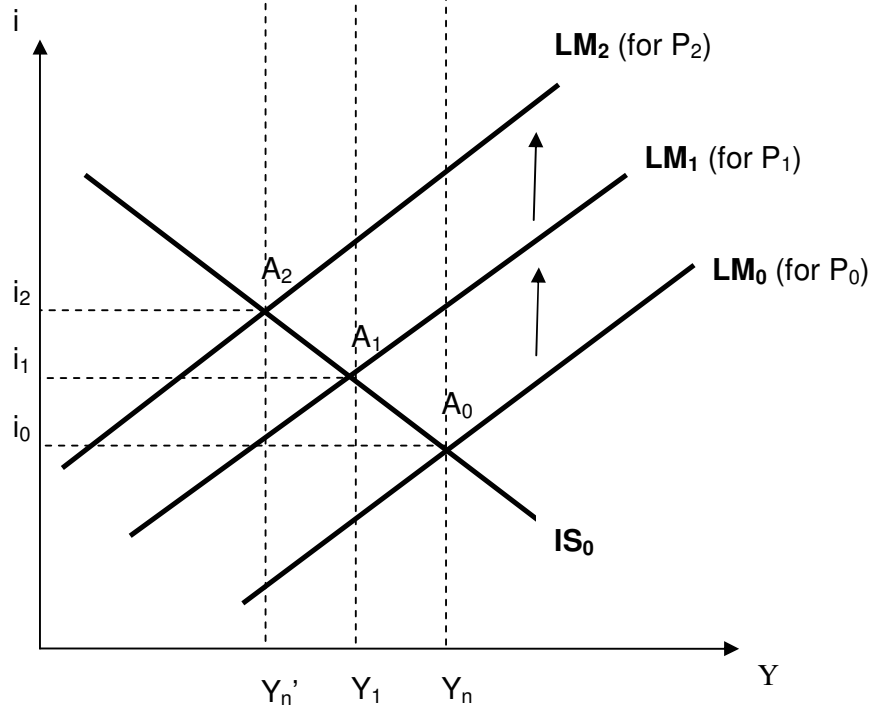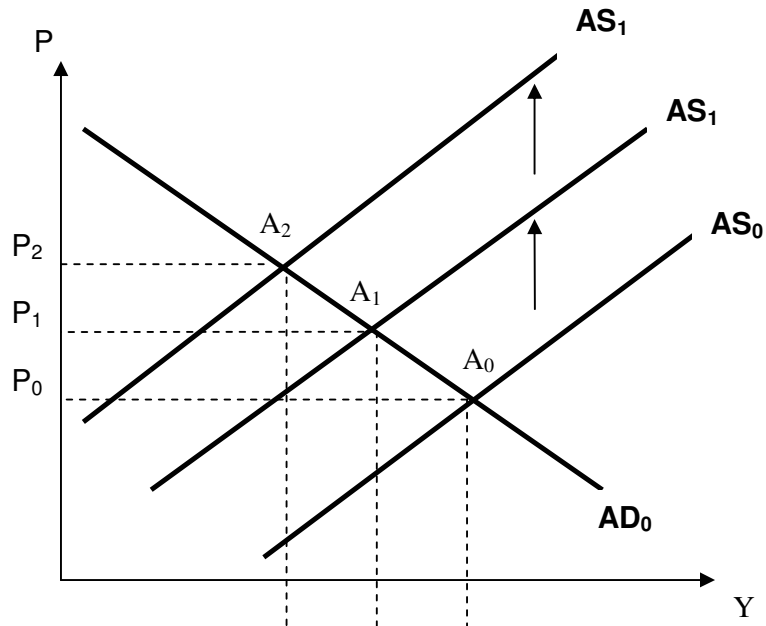
$P=P^e(1+\mu)F(u,z)$

or

$P=P^e(1+\mu)F(1-Y/L,z)$

The exogenous variables here are P^e, μ, z, which can shift the AS curve up or down. As we know, an oil shock (increase in oil price, which is a negative exogenous supply shock) causes an increase in markup, μ, by firms. The increase in μ generated an increase in the price level and also generated a change in the natural level of output to a lower natural level.

Government policy can lead to similar effects to the increase in markup. Such labour market policies would include employment protection (a long period of notice when dismissing a worker) or unemployment insurance, both expressed by the "catch-all" variable z.

If z increases, the employees' bargaining power increases. The employees set higher nominal wages which induce a cost increase by firms, who in turn increase their prices. In the end the increase in z leads to an increase in price level. Graphically, because of z↑ the AS curve is shifting up by given output.

P

AS$_1$

AS$_1$

AS$_0$

A$_2$

P$_2$

P$_1$

A$_1$

P$_0$

A$_0$

AD$_0$

Y

i

LM$_2$ (for P$_2$)

LM$_1$ (for P$_1$)

LM$_0$ (for P$_0$)

A$_2$

i$_2$

A$_1$

i$_1$

A$_0$

i$_0$

IS$_0$

Y$_n$'   Y$_1$ Y$_n$

Y

Looking first at the AS-AD-diagram we can see that the increase in z shifts the AS curve up from AS_0 to AS_1. At this point, the price level, P_1 is higher. Higher price leads to decrease in real money supply (M/P) and LM curve shifts up from LM_0 to LM_1. This causes an increase in interest rate from i_0 to i_1 and a decrease in output from Y_0 to Y_1. The economy moves along the AD curve to A_1, the **short run equilibrium**.

I**n the medium run,** although output has fallen, the natural level of output has fallen even more from Y_n to Y_n'. This is specific to prevailing labour market conditions. Because of z↑ the WS curve shifts up for a given PS line. The unemployment rate has to increase from u_n to u_n' to keep the real wage at the level given by $1/(1+\mu)$. An increase in u_n' means also a decrease in the natural level of output $Y_n' < Y_n$.
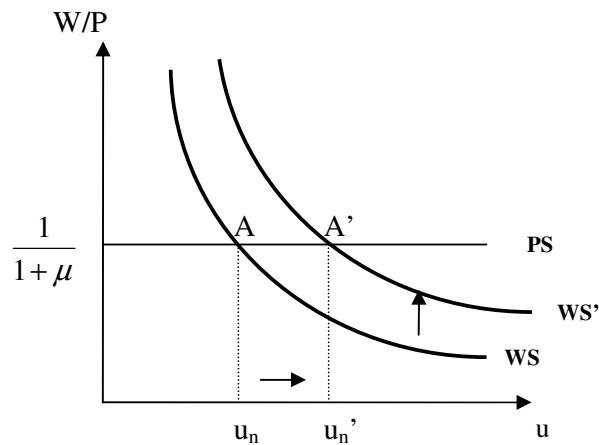
Looking at the AS-AD-diagram at point A_1, output Y_1 is below its natural level and the price level, P_1 is higher than expected. The wage setters revise their expectations and expected price level increases, shifting the AS curve further up, from AS_1 to AS_2. The wage setters also set higher nominal wages which in turn induce higher prices set by firms. The process of adjustment continues until AS curve reaches point A_2, **medium run equilibrium**. Here the expected price level equals the actual price level, P_2 and output returns to its new natural level Y_n', which is lower than before due to the labour policy intervention.

Looking at IS-LM-diagram, an increase in the price level moves the LM curve further up, from LM_1 to LM_2, increasing the interest rate and therefore decreasing the output to its lower natural level. Although the IS curve does not move, the output and interest rate change because of labour market conditions represented by the AS curve.

The government's labour policy can be fully effective both in the short run and medium run. The increase in z leads to similar effect as an increase in markup μ, by firms.

Summing up, we can say that labour market policy (z↑) causes:

in the short run:
- increase in the interest rate (it rises to i_1),
- decrease in the level of output (is lower than its natural level),
- increase in the price level.

in the medium run:
- increase in the interest rate (it rises to i_2),
- decrease in the level of output (it changes to its new lower natural level) ,
- higher price level than at the outset.

The key results from the analysis of monetary and fiscal policy, labour market policy and oil shock, both in the medium and short run, are summarised in the table below*:

	Short Run			Medium Run		
	Y	i	P	Y	i	P
Monetary policy						
M ↑	+	-	+	No change	No change	+
M ↓	-	+	-	No change	No change	-
Fiscal policy						
G↑ or T↓	+	+	+	No change	+	+
G↓ or T↑	-	-	-	No change	-	-
Labour market policy						
z↑	-	+	+	-	+	+
z↓	+	-	-	+	-	-
Oil Shock						
μ↑	-	+	+	-	+	+

* Effect of a policy on Y, i and P: "+" indicates an increase,"-" indicates a decrease, "no change" indicates no effect