QUESTION 1

Consider the model economy developed in Blanchard chapter 7. Assume that the money demand schedule is perfectly elastic with respect to the interest rate, i.e. horizontal, and in the other behavioral equations are:

$$C^d = c_0 + c_1(Y-T) + gM/P,$$
$$I^d = I - bi,$$
$$G^d = G,$$

and that aggregate supply is upward sloping in the short and medium run.

A) (2 points) In two **separate** AS-AD diagrams draw the AD curve so that we have short run equilibrium at the natural level of real GDP (Y^N) for the case (i) g=0, and (ii) g>0.

Let's first consider the money market, which is independent of the value of g. Agents demand any amount of money for a given interest rate (let's define it as R^*), for any level of output Y. They demand infinite money for $R<R^*$ and demand zero money for $R>R^*$. Hence, equilibrium in the money market holds when $R=R^*$, for any given level of output Y. So, **the LM is horizontal at $R=R^*$.**
Let's consider changes in M/P (either changes in M, in P, or both). Clearly, **the LM doesn't shift after changes in M/P** because given our assumptions, agents are willing to demand *any* level of money when $R=R^*$, for any given of output.

Let's now consider the goods market. For a give level of M/P, the IS curve is downward sloping given that all the standard assumptions on parameter values are being satisfied. Moreover, **when g>0, an increase in M/P shifts the IS curve to the right**. The reason is that g M/P acts as an autonomous component of goods demand (through consumption demand).

When g=0, a change in P has no effects on equilibrium output: neither the IS nor the LM curves shift. Hence, **the aggregate demand is vertical at Y^N when g=0**.

When g>0, an increase in P *does* have effects on equilibrium output. The decrease in M/P after the increase in P shifts the IS curve to the left, reducing the level of equilibrium output (given that the LM curve doesn't shift). Hence, **the aggregate demand is negatively sloped when g>0**.

(b) (2 points) On the same diagrams show the new curves and equilibrium level of price and real GDP when there is an increase in money supply for cases (i) and (ii) above.

We know that the equilibrium of this model depends on *M/P* rather than on M and P separately.

We saw before that a change M/P has no effects on equilibrium Y when g=0. Hence, **the aggregate demand won't shift after a change in M when g=0**.

Now, when g>0, a change in M/P *does* change the equilibrium level of output. Namely, we saw before that a increase in M/P (either through a fall in P or an increase in M) increases the level of output. Hence, for a given level of P, an increase in M increases the level of output. So**, when g>0 the aggregate demand shifts to the right after an increase in M**. (see picture below)

g=0

Price

AD=AD'

AS

Y^N Real GDP

g>0

Price

AS

AD'

AD

Y^N Real GDP
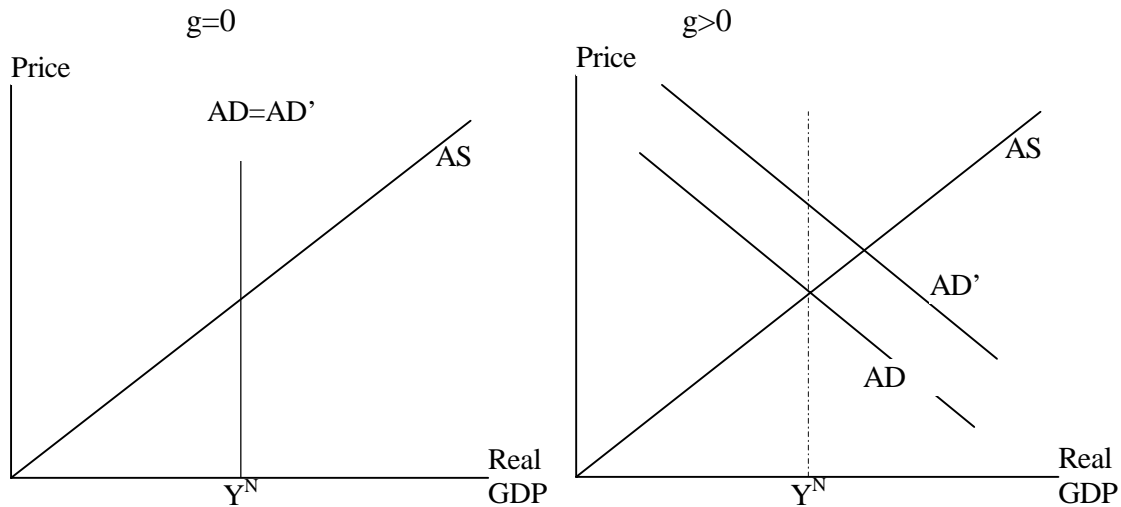
QUESTION 2 (5 points)

Blanchard, page 147, question 5, points b-f.

Suppose that investment is not responsive to the interest rate. We assume that consumption *does not* depend on the level of the interest rate.

(b) IS curve: the demand for goods does not respond to the interest rate. So, for any level of interest rate, the same level of output (call it Y^N) delivers equilibrium in the goods market. Hence, the IS curve is vertical at $Y=Y^N$.

(c)LM curve: demand for money is independent from the goods market. Hence, assuming the standard parameter values in the money demand function, the money market has the standard features: an increase in Y requires a higher R for a given M/P. Hence the LM curve is, as usual, positively sloped.

(d)AD curve: clearly, given that the IS is vertical, AND that it doesn't shift after changes in M/P (M/P doesn't enter into the goods demand), the AD curve is vertical at $Y=Y^N$ (ie: changes in P do not affect the level of Y).

Suppose that there is a *transitory* increase of z (for only one period, returning then to its previous value).

(e) The AS is given by: $P = P^e (1 + miu) * F (1 – Y / L , z)$. Clearly, given P^e, the AS shifts up. The exact position can be computed as follows: we know that a higher z implies a lower natural output level ($Y^{N'}<Y^N$). The new AS crosses this level of output at the previous period's price level (see figure). Given the vertical AD (at $Y=Y^N$), the price level increases without changes in Y.

(f) When z returns to its initial level, the natural level of output also returns to its previous value. We know that the AS will cross Y^N at the previous price level. Hence, it will cross the AD curve at the same point as the first period after the shock. Hence, the price level will permanently stay equal to the first period's high level.
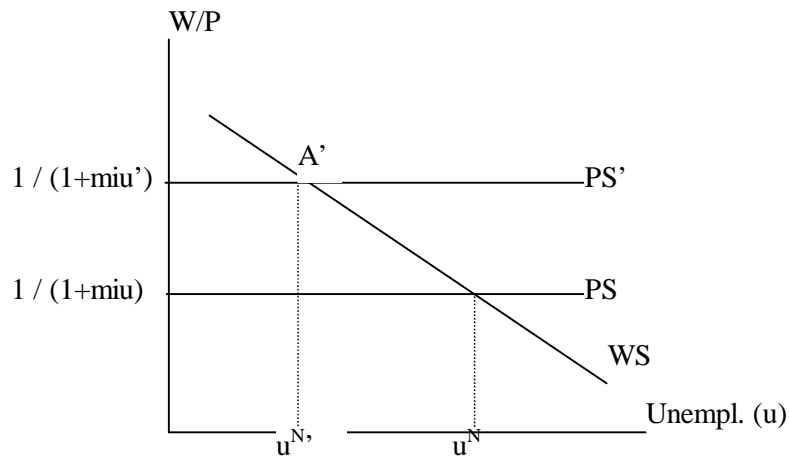
Price

AS'

AD

AS

P'

P

$Y^{N'}$

Y^N

Real
GDP
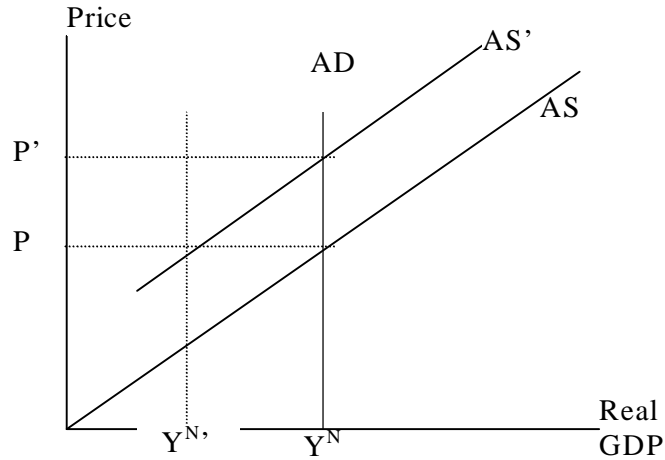
QUESTION 3 (1 point)

Blanchard, page 147, question 3, point b.

Consider a decrease in the price of oil. This can be seen as a decrease in miu.

(i) The PS curve shifts up, and the natural unemployment rate falls from u^N to $u^{N'}$ (and the natural output level increases from Y^N to $Y^{N'}$).

W/P

A'

$1 / (1+\text{miu}')$ ——————————————PS'

$1 / (1+\text{miu})$ ——————————————PS

WS

Unempl. (u)

$u^{N'}$

u^N

(ii) In period 1, the AS shifts down (AS').
This can be seen from $P = P^e (1 + \text{miu}) * F (1 - Y / L, z)$. For the same P^e, the price level is lower for every Y. Given a fixed AD, output increases and P falls (B is the new equilibrium point).

Price

AD   AS

A   AS'

B

Real
Y^N $Y^{N'}$ GDP
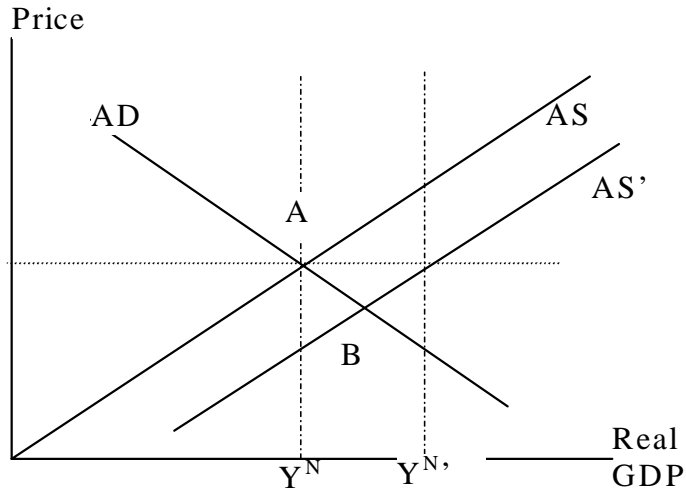
(iii) During the subsequent periods, the AS curve continues shifting downwards, until the new steady state (point C) is reached. During this transition, Y keeps increasing (till it reaches $Y^{N'}$) and P continues decreasing.

Price

AD   AS

A   AS''

C

Real
Y^N $Y^{N'}$ GDP
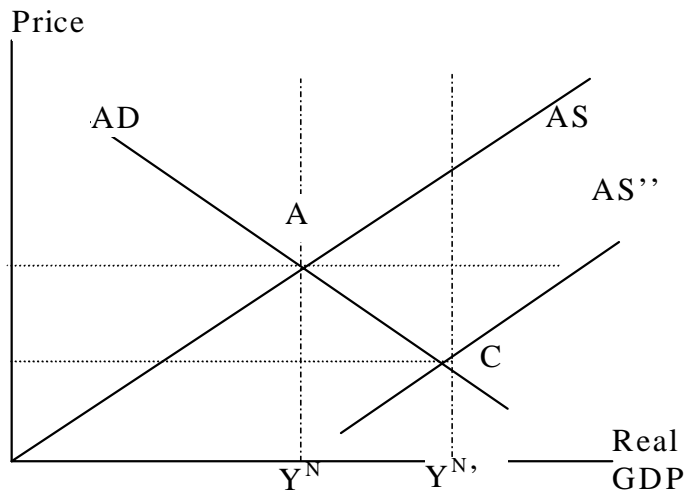
(iv) During the whole transition, the AD curve remains constant. However, as the price level falls, given that M/P increases, the LM curve shifts downwards. The IS curve remains fixed. So, the interest rate falls over time.

R

IS

LM

A

LM''

C

Y^N $Y^{N'}$

Real
GDP