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ECO 209Y
MACROECONOMIC THEORY
Solution to Problem Set 8
(Odd numbers only)

1. a) First, we must obtain the aggregate expenditure function:

$AE = C + I + G$

$= (60 + 0.8YD) + (200 - 20\,i + 0.2\,Y) + 300$

$= 560 + 0.8\,YD - 20\,i + 0.2\,Y$

where $YD = Y - 0.25\,Y + 50 = 50 + 0.75\,Y$

$= 560 + 0.8\,(50 + 0.75Y) - 20\,i + 0.2\,Y$

$= 600 + 0.8\,Y - 20\,i.$

In equilibrium, $Y = AE$:

$Y = 600 + 0.8\,Y - 20\,i$

$Y = 3000 - 100\,i.$

And solving for i we obtain the equation for the IS curve:

$i = 30 - 0.01\,Y.$

b) The LM curve is found from the money market equilibrium:

$L = M/P \rightarrow 0.2\,Y - 10\,i = 300 \rightarrow Y = 1500 + 50\,i.$

And solving for i we obtain the equation for the LM curve:

$i = 0.02\,Y - 30.$

c) To find the equilibrium Y* we must equate the IS and LM curves:

$30 - 0.01\,Y = 0.02\,Y - 30 \rightarrow 0.03\,Y = 60 \rightarrow Y^* = 60 / 0.03 = 2000.$

And the equilibrium i* is found by substituting Y* into either the IS or LM curve:

from the IS curve: $i^* = 30 - 0.01\,(2000) = 10$

from the LM curve: $i^* = 0.02\,(2000) - 30 = 10.$

d) The vertical intercept of the IS curve is equal to $\overline{AE} / b$. Therefore, the vertical intercept will increase by $120/20 = 6$ and the new expression for the IS curve will be:

$i = 36 - 0.01\,Y.$

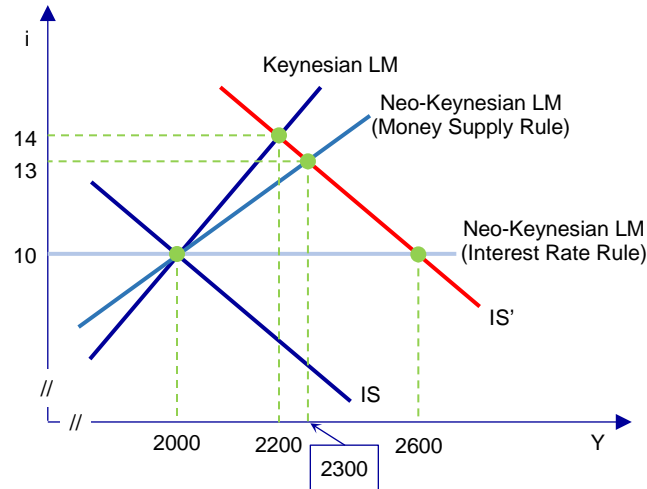e) To find the equilibrium Y* we must equate the IS and LM curves:

$36 - 0.01\,Y = 0.02\,Y - 30 \rightarrow 0.03\,Y = 66 \rightarrow Y^* = 66 / 0.03 = 2200.$

And the equilibrium i* is found by substituting Y* into either the IS or LM curve:

IS $\rightarrow$ $i^* = 36 - 0.01\,(2200) = 14$

LM $\rightarrow$ $i^* = 0.02\,(2200) - 30 = 14.$

3. a)

b) As shown above, the initial equilibrium is the same in the three models: $Y^* = 2000$ and $i^* = 10$. The increase in government purchases of goods and services increases overall AE and has therefore an expansionary effect on the level of equilibrium income. As Y rises, the real demand for money increases.

In the Keynesian (exogenous money supply) model the money supply is independent of both income and the rate of interest, and thus doesn't change as Y increases. With no change in the money supply and an increase in money demand, the rate of interest rises. There is therefore a partial crowding out effect (the investment component of AE decreases as the rate of interest rises): Y^* increases to 2200 and the rate of interest rises to 14, causing investment to fall.

In the Neo-Keynesian model with money supply rule, the supply of money is an increasing function of the rate of interest (i.e., commercial banks are willing to lend more money – and create more money – as the rate of interest rises). Therefore, the increase in the demand for money as Y rises causes a lower increase in the rate of interest (only to 13) compared to the Keynesian model with fixed money supply. There is, therefore, a lower crowding out effect – which explains the greater increase in Y^* to 2300.

In the Neo-Keynesian model with interest rate rule, the rate of interest remains constant at 10 as the demand for money increases when Y rises. That is, commercial banks are willing to lend all the money demanded at $i = 10$. Therefore, there is no crowding out effect whatsoever and Y^* increases further (to $Y^* = 2600$) when government purchases increase.