Course 004: Macroeconomic Theory

Problem Set 1: Keynes & the Classics

1. Consider a modified version of the Classical System, where the aggregate production function is linear in K and N: $Y = AN + \bar{K}$; $A > 0$. Notice that labour is now associated with a constant marginal product given by A. Obviously, a profit maximising producer will be willing to employ as much labour as is available in the economy provided $A \geqq \frac{W}{P}$. On the other hand, they will demand zero labour if the real wage rate $\frac{W}{P} > A$. Let us assume that the maximum labour supply available in this economy is given by N^{max}. Then the labour demand schedule can be represented by a step function as described below:

$$N^d : N = \begin{cases} N^{max} & \text{for } \frac{W}{P} \leqq A; \\ 0 & \text{for } \frac{W}{P} > A. \end{cases}$$

Suppose all the other equations of the Classical system (except for the production function and the corresponding labour demand function) remain unchanged.

(i) Draw the AS curve for this economy in the Y-P plane, explaining the economic logic behind the derived shape of the AS curve.

(ii) Comment on the effectiveness of the standard monetary and fiscal policy in this set up.

(iii) Discuss how the equilibrium output will change if

(a) there is an increase in the parameter A (i.e., labour becomes more productive);

(b) there is an increase in the parameter $\bar{K}$ (i.e., the stock of capital gets augmented).

2. Consider a modified version of the Keynesian System, where the households' consumption demand depends not just on income but also on the amount of real money holding $\left(\frac{M}{P}\right)$ such that the goods market demand equation is now given by:

$$Y = C\left(Y; \frac{M}{P}\right) + I(r) + \bar{G}; \quad 0 < C_Y < 1; \ C_{M/P} > 0; \ I'(r) < 0$$

Notice that as we have specified the function, household consumption goes up as their real money holding goes up. This particular specification is due to Pigou and therefore is known as the **Pigou Effect** or the **Wealth Effect** or the **Real Balance Effect**.

Suppose all the other equations of the Keynesian system (except for the consumption function) remain unchanged.

(i) Draw the AD curve for this economy in the Y-P plane. Will the new AD curve be steeper/ flatter than the AD curve without the Pigou effect? Explain the economic logic behind your answer.

(ii) Discuss the effectiveness of standard monetary policy in this modified Keynesian framework compared to the standard one. Which framework would be more responsive to monetary policy stimuli (in raising equilibrium level of output) and why?

3. Consider a modified version of the Keynesian System, where the central bank is targeting the interest rate (i.e. the LM curve is horizontal at some $r = \bar{r}$, and the money supply is not exogenous; it always adjusts to the money demand for every value of Y). (This case has already been discussed in the class.)

(i) Draw the AD curve and AS curve for this economy in the Y-P plane.

(ii) Discuss the effectiveness of monetary policy vis-à-vis fiscal policy in the framework. Which one is more effective in raising equilibrium output and why?

(iii) What happens to equilibrium output and employment if the exogenous rate of interest ($\bar{r}$) rises?

4. Consider the interest rate targeting in the Keynesian System, as discussed above (in Question 3). Now let us further modify the system by postulating that households consumption demand depends not just on income but also on the amount of real money holding $\left(\frac{M}{P}\right)$, i.e., there is a Pigou effect (as defined in Question 2).

(i) Draw the AD curve for this economy in the Y-P plane and compare it with the AD curve drawn for the interest-rate targeting case (in Question 3).

(ii) Comment on the effectiveness of fiscal policy in this framework vis-à-vis the interest rate targeting case.

5. Consider the Neo-Keynesian (Disequilibrium Macro.) version of the Keynesian system where both nominal wage rate and the nominal price level is fixed.

(i) What happens to equilibrium output and employment in this economy there is an increase in the exogenous price level $\bar{P}$?

(ii) How is this effect different from the effect of an increase in the exogenous wage rate $\bar{W}$?

6. Consider the Lucas version of the classical system where the workers determine their labour supply on the basis of the expected price level (P^e) rather than the actual one. Consider with an equilibrium scenario for a given set of $P^e; \bar{M}$ and $\bar{G}$. Now suppose the money supply increases from $\bar{M}$ to $\bar{M}'$ but this change in money supply also brings in a change in the expectation of the workers such that P^e also goes up to $P^{e'}$.

(i) What happens to equilibrium output and employment due to this increase in money supply?

(ii) How is this effect different from the effect of an increase in the exogenous money supply which **does not** entail a concomitant increase in P^e?