Prof. Gustavo Indart Department of Economics University of Toronto

## ECO 209Y MACROECONOMIC THEORY Problem Set 13

1. Consider the following model of a closed economy:

<u>Goods Market</u> C = 100 + 0.80 YD YD = Y - TA TA = 10 + 0.30 Y I = 100 - 10 i + 0.04 Y G = 8 <u>Labour Market</u> Demand: W / P = 12 / N<sup> $\frac{1}{2}$ </sup> Supply: W / P = 0.75 N<sup> $\frac{1}{2}$ </sup> <u>Money Market</u> L = 200 + 0.6 Y - 10 iM = 120

 $\frac{\text{Production Function}}{\text{Y} = 24 \text{ N}^{\frac{1}{2}}}$ 

- a) Derive an expression for the IS curve.
- b) Derive an expression for the LM curve.
- c) Derive an expression for the AD (aggregate demand) curve.
- d) Given the expressions for labour demand and supply curves, do workers and/or firms suffer from money illusion? Explain.
- e) Calculate the equilibrium levels of employment (N), output (Y), prices (P), nominal wages (W) and interest rate (i).
- f) Given this model, suppose that there is an increase in government spending. Briefly explain, in words, how the endogenous variables in question e) would change.
- 2. Consider the following model of the economy:

Production function:	F(N) = 20 N <sup>1/2</sup>
Marginal product of labour:	$MP_N = 10 / N^{1/2}$
Supply of labour:	$W/P = 5 N^{1/2} / 2$

- a) What is the equation for the demand for labour in this model?
- b) What is the equilibrium level of employment in this model?
- c) What is the equation for the AS curve in this model?
- d) Sketch the AS supply curve.
- e) Sketch the demand for labour and the supply of labour curves corresponding to P = 1 and P = 2.

3. Consider the following model of the economy:

Production function:	F(N) = 20 N <sup>1/2</sup>
Marginal product of labour:	$MP_N = 10 / N^{1/2}$
Supply of labour:	$W = N^{1/2} / 10$
Aggregate demand:	Y = 800 / P <sup>1/2</sup>

- a) What is the equation for the AS curve in this model?
- b) What are the equilibrium level of income and the equilibrium price level in this model?
- c) What is the equilibrium level of employment in this model?
- d) What are the equilibrium nominal and real wage rates in this model?
- e) Sketch the AD and AS curves.
- f) Sketch the demand for labour and the supply of labour curves corresponding to the equilibrium price level.
- Consider the model in problem 3 above. Suppose that aggregate demand increases and is given now by the expression Y = 1800 / P<sup>1/2</sup>.
  - a) What are the new equilibrium level of income and equilibrium price level?
  - b) What is the new equilibrium level of employment?
  - c) What are the new equilibrium nominal and real wage rates?
  - d) Sketch the new AD in your diagram for Problem 2.
  - e) Sketch the demand for labour and the supply of labour curves corresponding to the new equilibrium price level in your diagram for Problem 2.