ECON 300
Advanced Macroeconomics   **2 December 2014**
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Midterm Exam

1. (**10 Points**) Calculate the GDP of Farmland, a fictitious economy whose numbers are listed below. Do so using all three methods (value added approach (**3 points**), expenditure approach (**3 points**), and income approach (**3 points**)).

FarmLand, Year 2014

Farmer Jones, (private firm)		FoodCo, Inc (private firm)	
Corn sold to Singapore	$30	Corn Flakes Sold to Consumers	$100
Corn sold to FoodCo, Inc	$20	Corn Flakes Sold to Japan	$10
Paid workers	$40	Corn bought from Farmer Jones	$20
Pesticide bought from Turkey	$10	Corn Inventory	
		Beginning of Year	$20
		End of Year	$10
		Paid workers	$20
Farmland Govt		Households	
Tax Revenue	$25	Taxes on wage income	$25
Wage payments for defense	$25		

2. **(15 Points- Work-Leisure tradeoff--PARTIAL EQUILIBRIUM)** Suppose that utility function u of a representative agent is $u = c^{0.25} l^{0.75}$, where c is consumption of physical goods and l is consumption of leisure. Suppose also that profit income of the representative consumer is $\bar{\bar{\pi}} > 0$ and that there is no government in the economy.

(a) **<u>Illustrate</u>** the representative consumer's optimization problem. (**5 points**)
(b) **<u>Find</u>** optimal values of c and l **<u>in terms of</u>** $\bar{h}$, $\bar{w}$, and $\bar{\bar{\pi}}$. (**10 points**) **Hint**: Assume an interior solution.

3. **(25 Points- Work-Leisure tradeoff-- GENERAL EQUILIBRIUM)** Suppose that utility function u of a representative agent is $u = c^{0.20} l^{0.80}$, where c is consumption of physical goods and l is consumption of leisure. Suppose also that production technology is represented by $y = (0.5)\overline{K}^{0.5} \cdot N^{0.5}$ where $\overline{K} = 4$ is the physical capital stock and N is labor. We assume that $\overline{h} = 24$, $\overline{h} = l + N$ and that there is no government in the economy. Whenever required, use w and π to denote the real wage and real profits, respectively. Find the optimal values of c, l, N, y, w, π, and u under the competitive equilibrium assumption.

4. (25 Points--Two-Period/consumption-saving tradeoff-PARTIAL EQUILIBRIUM)
Suppose that Ahmet has income of $Y_1 = 800$ when he is young and $Y_2 = 997.5$ when he is old. The real interest rate is $r = 0.05$ and that subjective rate of discount is $\rho = 0.04$ (hence the discount factor is $1/1.04$). The overall utility function of Ahmet is
$U = Ln[C_1] + \left(\dfrac{1}{1.04}\right)Ln[C_2]$.

(i) Find the optimal values of C_1, C_2 and s. Is this representative agent borrower or a lender? (**15 points**)

(ii) Suppose now that the interest rate increases to $\rho = 0.05$. Find the new optimal values of C_1, C_2 and s. **Interpret your results** (changes in endogenous variables) (**10 points**).

HINT: $\dfrac{\partial Ln[C_1]}{\partial C_1} = \dfrac{1}{C_1}$ and $\dfrac{\partial Ln[C_2]}{\partial C_2} = \dfrac{1}{C_2}$

5. (15 Points) Using the *general equilibrium* model of **WORK-LEISURE** tradeoff, determine the effects of a **DECREASE** in the total factor productivity in AgroLand on *aggregate output*, *consumption*, *employment*, and the *real wage*. Hint: Do not forget to draw a figure and discuss in detail the impact of the exogenous shock.

6. **(15 Points)** Using the *partial equilibrium* model of **TWO-PERIOD/ CONSUMPTION-SAVING** tradeoff model, determine the effects of an **increase in real interest rate** on *current consumption*, *future consumption* and *the saving rate* for a **LENDER**. Hint: Do not forget to draw a figure and discuss in detail the impact of the exogenous shock.