PROBLEM SET 3

ETHAN LIGON

Questions marked $(\mathbf{T}, \mathbf{F}, \mathbf{U})$ should be answered "True," "False," or "Uncertain," and your answer should be briefly justified. Note that points will be awarded based only on your reasoning, not on the answer itself, even if correct.

- (1) (**T**,**F**,**U**) The Marshallian demand function for X_1 derived from a utility function $U(X_1, X_2, X_3)$ is homogeneous of degree zero in P_1, P_2 and P_3 (P_1, P_2 and P_3 are the corresponding prices of X_1, X_2 and X_3).
- (2) (**T,F,U**) Although John and Jane have different tastes, their indifference curves can never cross since it is one of the properties of indifference curve.
- (3) (Two periods consumption) Adam Smith has an intertemporal utility function:

$$U(C_1, C_2) = C_1 * C_2$$

Where is consumption at period 1 (present) and is consumption at period 2 (future). Mr. Smith has an income of 100 dollars at period 1, and no income at period 2. However, Mr. Smith could save some of his income and get the deposit plus accrued interest at period 2. The pre-tax interest rate is 10%, but a tax of 20% on interest income.

- a) What is the price of 1 dollar of future consumption (measured in terms of present consumption)?
- b) Draw Mr. Smith's budget constraint and describe it using an equation.
- c) What levels of present consumption and saving will Mr. Smith choose? What level of consumption in the future will result? Show the equilibrium condition you used in deriving this result.
- d) The President wants to eliminate the tax on Mr. Smith's interest income in order to encourage him to save. Would such a policy be successful? How does your answer depend

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on the specific characteristics of Mr. Smith's utility function?

- (4) Consider the plight of two different people, Ann and Bill. Ann and Bill are both equally skilled network administrators. Ann lives in Ohio, where she pays a monthly rent of \$1000 for a 1000 square foot apartment; Bill lives in Oakland, where his monthly rent is \$2000 for an otherwise identical apartment. Assume that prices of goods other than housing are the same in the 2 regions.
 - a) Suppose that Ann and Bill both have ordinal utility functions $U(h, z) = \alpha \log(h) + (1 - \alpha) \log(z)$, where h is housing services (measured in square feet occupied per month) and z is a composite of other commodities, the prices of which satisfy the conditions of the Composite Commodity Theorem. Derive Ann and Bill's Marshallian Demands for housing and other goods. Give an interpretation of the parameter α ; How does it affect choices between housing services and other goods?
 - b) Suppose preferences are as in (a), but with $\alpha = .25$. What are the locally prevailing monthly salaries for network administrators in Ohio and Oakland?
 - c) Now suppose that Ann and Bill's incomes are equal to the numbers derived in part (b), but that we don't know what the value of α is. Furthermore, Ann's α may be different from Bill's α . Either Ann or Bill *could* choose to move to the other's location and get a job as a network administrator at the prevailing local salary, yet they choose not to. What can you say about the value of Ann's α relative to Bill's α ?
 - d) A pollster surveys a random sample of Ohio residents and California residents, and asks each respondent, "Would you say that you're a) Very happy; b) Pretty happy; c) Not so happy?" After tabulating the results, the pollster finds that on average people in Ohio are just as happy as people in California. Is there anything surprising about this finding? Explain.