MIDTERM 3

Microeconomic Theory III
ECO 3153A

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November 18, 2015

Notes

There are 5 questions and 50 points in total. This means that you should budget **about 1.5 minutes** per mark.

Read over all of the questions. **Do the questions that you know well first**, then go to the ones of which you are less sure. I do not care in which order you answer the questions.

Basic calculators are allowed. No electronic device that can be programmed with text, or that has transmitting possibilities can be used.

No cellular phones are allowed.

1. Answer TRUE or FALSE and explain. Marks awarded only for a careful, detailed, explanation. (3 marks each: 15 marks in total)

a) Suppose that firms make their supply decisions based on last period's prices. Equilibrium is stable only when their price expectations are correct.

b) The role of imputed (shadow) prices in a Robinson-Crusoe economy is to ensure that an equilibrium exists.

c) A sufficient condition for the existence of a Walrasian general equilibrium is that excess demand functions are downward sloping and pass through the price axis.

d) Edgeworth exchange model assumes that all allocations within the "box" are possible exchange outcomes as long as all parties agree to it.

e) Walras' law states that excess demand functions (E_i^*) equal zero in equilibrium (as long as equilibrium prices (p_i^*) are positive) and that $\sum_i^n E_i^* p_i^* = 0$.

2. At the profit maximizing output, the marginal cost of the monopolist is \$10.

a) If the price elasticity of demand at profit maximizing output is -2, then what price will the monopolist charge? (4 marks)

b) If the market could be separated into two segments: one has a price elasticity of -3 and the other has a price elasticity of -1.5. What will the monopolist do? Explain carefully the conditions under which this strategy will work. (6 marks)

3. Suppose a Giffen good, and the slope of the inverse demand curve is greater than the slope of the inverse supply curve. Use a formal rule with a distance function approach to determine if the equilibrium is stable when the market follows a Marshallian quantity adjustment process? (8 marks)

4. Is the following set of excess demand functions legitimate? Why or why not? (6 marks)

$$E_1(p) = \frac{p_3}{p_1}$$

$$E_2(p) = \frac{p_3}{p_2}$$

$$E_3(p) = -2$$

5. Let's suppose that $U^a=x_1{}^a x_2{}^a$ and $U^b=x_1{}^b x_2{}^b$ are the utility functions for individuals a and b. Individual **a** is endowed with 3 units of good 1 and 2 units of good 2 (i.e., allocation for **a** is (3, 2)) and individual **b** is endowed with 1 unit of good 1 and 6 units of good 2 (**b**=(1,6)). We have an Edgeworth Exchange economy.

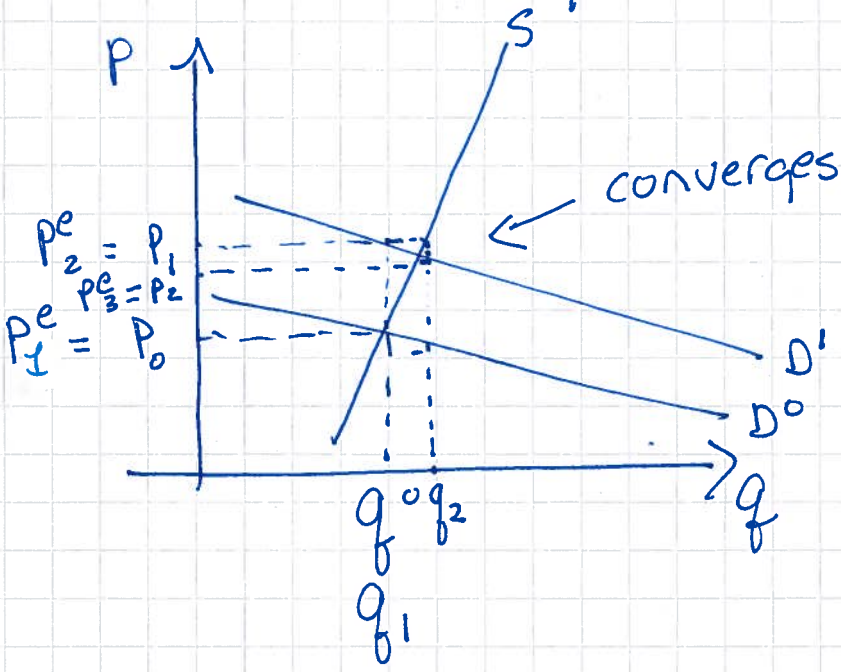
a) Draw a well-labelled Edgeworth box, show the Endowment point and sketch the contract curve. (5 marks)

b) Does the allocation $(2,4)^a$ and $(2,4)^b$ lie on the contract curve? Explain carefully. (6 marks)

(1) M/t 3. Nov 18/15

FALSE

a) If $q_t = f(P_{t-1})$ then equilibrium is stable IFF $\left|\text{slope inverse demand}\right| < \left|\text{slope inverse supply}\right|$



Could also demonstrate what would happen if $\left|\text{slope inverse dem}\right| > \left|\text{slope inverse supply}\right|$

b) FALSE: Imputed (shadow) prices, p_i, allow us to separate the cons. dec'n (Max U(x)) from the producer's dec'n (max $\pi(q)$).

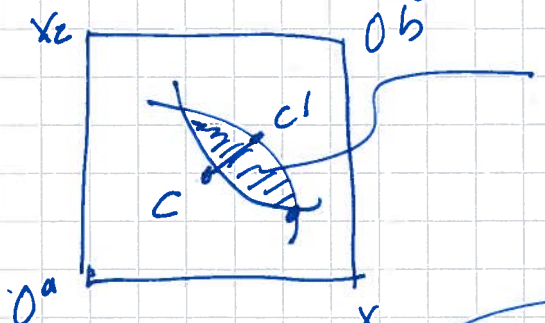
From Max $\pi(q)$ get $\frac{\phi_i}{\phi_j} = \frac{p_i}{p_j}$ and from max U(x) get $\frac{u_i}{u_j} = \frac{p_i}{p_j}$ $\Rightarrow$ of course then $\frac{\phi_i}{\phi_j} = \frac{u_i}{u_j}$

(2) a)

1 c)

see next pg.

d) FALSE. All allocations in the box are "attainable" BUT only allocations that render no one worse off are possible exchange outcome



these are possible exchange outcomes. NOTE → will end up on c → c' but the question asks about possible exchanges. (not equil).

equilibrium outcome.

2b/1c.

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The existence of a Walrasian General Equil requires that each $E_i(P)$ fn is continuous from the normalized price vecto (J) to the real line.

Continuity $\Rightarrow$ sufficient condition is that ϕ^h is strictly concave and U^h is strictly quasi-concave.

- I will also accept that gross substitutability across goods is sufficient to ensure that the equilibrium is stable. If $P_i \uparrow$ then $X_i \downarrow$ [$E_i \downarrow$] and $X_j \uparrow$ [$E_j \uparrow$].

3.

e) False. Walras' Law $\Rightarrow \sum_i E_i P_i = 0$ for ANY Price. The question says (1) $E_i^* = 0$ in equil (which is true) AND (2) $\sum_i E_i^* P_i^* = 0$ which is true BUT is not Walras' law.

(2) Monopoly prices at: $p = \frac{MC}{1 + \frac{1}{\eta}}$ where

η is elasticity of demand (negative).

$\therefore$ a) $p = \frac{10}{1 - 1/2} = \$20$

b) $p^1 = \frac{10}{1 - 1/3} = 15$

$p^2 = \frac{10}{1 - 2/3} = 30$

P. discrim can take place as long as

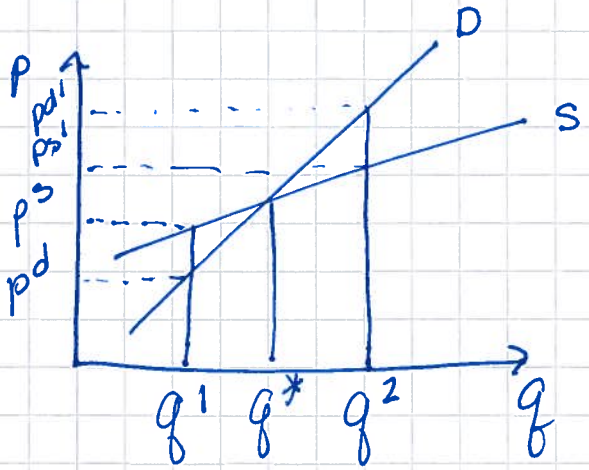
(1) η's are different across MKts.

(2) No selling across MKts (no arbitrage).

(3) good is transferable (not a service).

4.

Q3. Giffen



Marshallian quantity adjustment $\Rightarrow \frac{dq}{dt} = \lambda(p^d - p^s)$

↑ consumers willing to pay for given q.

↑ suppliers willing to accept

$p^d = p^s$ in equilibrium.

distance fn: $\delta(q(t), q^*(t)) = (q(t) - q^*)^2$

Want this distance to $\to 0$ over time $\therefore$ get smaller

$\therefore \frac{d\delta}{dt} = 2(q(t) - q^*)\frac{dq(t)}{dt} < 0$ ←

$\therefore \underbrace{2(q(t) - q^*)}_{A} \underbrace{\lambda(p^d - p^s)}_{B} < 0$

(A) & (B) need to go in opposite directions

A $q^1 < q^*$ (see diagram) then $(p^d - p^s) < 0 \therefore q \downarrow$ but $q \downarrow$ does not lead to q^*; Similarly, at $q^2 > q^* \Rightarrow p^{d'} > p^{s'} \Rightarrow q \uparrow \therefore$ NOT STABLE

(5) 2 conditions

Q4: $E_1(p) = \frac{P_3}{P_1}$

$E_2(p) = \frac{P_3}{P_2}$

$E_3(p) = -2.$

(1) Walras' Law: $\sum_i E_i P_i = 0$ Let's verify if this holds

$$\left(\frac{P_3}{P_1}\right)P_1 + \left(\frac{P_3}{P_2}\right)P_2 - 2P_3 = 0 \quad \checkmark$$

(2) E_i's are homog. of degree zero in prices.

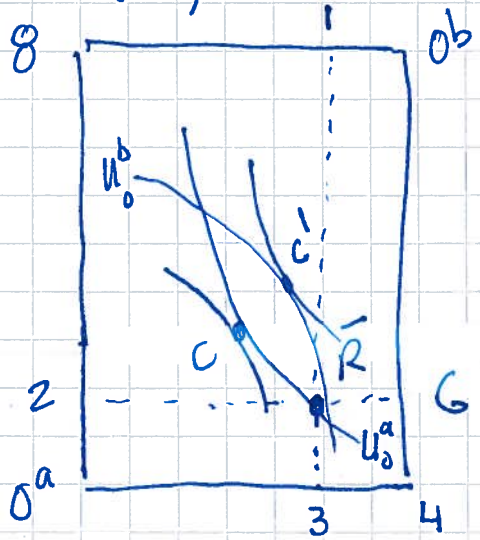
The above system is

∴ Legitimate system.

Q5. $u^a = x_1^a x_2^a$, $u^b = x_1^b x_2^b$.

(3, 2) (1, 6)

a)



Well labelled = all axes, endowment pt; Indiff curves + pts C → C' (with tangency at each pt).

(6)

b) does the allocation $(2,4)^a$ and $(2,4)^b$ lie on contract curve?

We know that all pts on the contract curve are defined by 2 criteria

① $MRS^a = MRS^b$.

② $u^a \geq u_0^a$; $u^b \geq u_0^b$ $\quad u_0$ = starting utility.

$-MRS^a = \frac{x_2^a}{x_1^a}$ $\quad -MRS^b = \frac{x_2^b}{x_1^b}$

$\frac{2}{4} = \frac{2}{4}$ ✓ first criterion met.

② $u_0^a = 6.$ $\quad u^{*a} = 8$ ✓

$u_0^b = 6$ $\quad u^{*b} = 8$ ✓

∴ this allocation is on the contract curve.