Theory Field Examination
August 2015
Problem for Econ 207B

There are three questions for this problem. Answer them all.

1. Prove Knuth's result about opposing interests over stable matchings. That is, show that given a marriage market and two stable matchings μ and ν, all the men weakly prefer μ to ν if and only if all the women weakly prefer ν to μ.

2. Consider a model of indivisible objects where each agent can consume exactly one object. There are six agents $\{1,2,3,4,5,6\}$ and six objects $\{a,b,c,d,e,f\}$. The initial endowment vector μ_E and the preference profile P are given by:

$$\mu_E = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ a & b & c & d & e & f \end{pmatrix}$$

P_1	P_2	P_3	P_4	P_5	P_6
b	a	b	c	b	a
a	b	f	d	d	f
$\vdots$	$\vdots$	e	$\vdots$	e	$\vdots$
		c		$\vdots$	
		$\vdots$			

Find the unique core allocation. Characterize the price vectors that support it as a Walrasian equilibrium.

3. Consider a pairwise kidney-exchange problem with binary preferences that involves nine patient-donor pairs. The compatibility graph is given in Figure 1. Identify the underdemanded, overdemanded, and perfectly matched pairs. Characterize the Pareto efficient matchings.

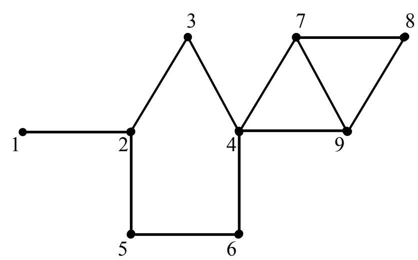

Figure 1: Pairwise Kidney Exchange Compatibility Graph

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Problem for Econ 219A

Recall the Köszegi-Rabin (KR) model of expectations-based reference dependence. Consider individuals faced with a choice set $\mathcal{D}$ over lotteries F that give a distribution of possible consumption outcomes. We denote the realized consumption vector from that distribution as c. The distribution of reference points (i.e., expectations of possible outcomes) is given by G and the realized reference points across consumption categories from that distribution are denoted r. The KR model establishes the utility of distribution F as the expectation:

$$U(F|G) = \int \int u(c|r)dF(c)dG(r) \tag{1}$$

KR define an Unacclimating Personal Equilibrium (UPE) as follows: A lottery choice $F \in \mathcal{D}$ is a UPE if

$$U(F|F) \geq U(F'|F) \, \forall \, F' \in \mathcal{D}. \tag{2}$$

1. Explain briefly and in intuitive terms what the definition of UPE given in Equation 2 means.

Consider the classic endowment-effect experiments. Suppose that individuals have utility defined over both mugs, denoted as $m \in \{0,1\}$ and money, denoted as w. As such, we can denote the consumption vector $c = (m, w)$ and the reference-point vector as $r = (r_m, r_w)$. We denote utility of a mug-money outcome given a particular reference-point vector as

$$u(c|r) = u(m, w|r_m, r_w) = m + \alpha w + \mu(m - r_m) + \mu(\alpha(w - r_w)), \tag{3}$$

where

$$\mu(x) = \begin{cases} \eta x & \text{if } x \geq 0 \\ \eta \lambda x & \text{if } x < 0. \end{cases}$$

2. Interpret Equation 3 in intuitive terms, making sure to discuss the interpretation of the parameters α, η and λ. Also briefly touch on the features of original prospect theory (if any) that are not captured in the utility specification given in Equation 3.

3. Consider a subject endowed with a mug and not money – a "seller". Solve for an expression for the highest price, P_S, such that a seller can support a plan to keep the mug and not sell at that price in an Unacclimating Personal Equilibrium. [Technical note: we are assuming here that the seller is able to rationally forecast the available selling price with no uncertainty. Introducing uncertainty about the selling price complicates things, so do not go down that road.]

4. Consider a subject endowed with some money P and not a mug – a "buyer". Solve for the lowest money endowment, P_B, such that a buyer can support a plan to keep her money endowment instead of trading it for a mug (i.e., not buy). [Technical note: again, assume that the buyer is able to forecast the price with no uncertainty when setting her plan.]

5. Compare P_S and P_B to each other and discuss how the comparison is in line with willingness-to-pay vs willingness-to-accept gap that is frequently observed in endowment-effect experiments. Make sure to also discuss the values of P_S and P_B when either $\eta = 0$ or $\lambda = 1$.

The result in (5) just above asked you to verify that the KR model can generate the endowment effect under personal equilibrium when "sellers" expect to retain the mug (not sell) and "buyers" expect to retain the money (not buy). The endowment effect itself, however, is not evidence in favor of the reference-points-as-expectations hypothesis in the KR model that is embodied in the personal equilibrium concept because a simple status-quo reference-point formulation of the model generates the same prediction.

In order to more directly test the KR-model hypothesis that reference points are based on rational expectations of possible final outcomes, Goette, Harms and Sprenger (2015) propose a tweak to the standard endowment-effect experiment. In their experiment they institute a random probability π of forced exchange. So consider a possible transaction price z. A seller who plans not to sell at this price has an expectations-based reference lottery of a $(1-\pi)$ of $m=1$ and $w=0$ and a π chance she will instead be forced to exchange and have $m=0$ and $w=z$. Similarly a buyer who planned not to buy at that price now has a reference lottery of a $(1-\pi)$ chance of $m=0$, $w=z$ and a π chance of $m=1$, $w=0$.

6. Derive a new expression for the highest price, $P_s^{'}(\pi)$, such that a "seller" can support a plan to keep the mug and not sell in an Unacclimating Personal Equilibrium given the probability of forced exchange π.

7. Derive a new expression for the lowest price, $P_B^{'}(\pi)$, such that a "buyer" can support a plan to keep that amount of money and not buy a mug in an Unacclimating Personal Equilibrium given the probability of forced exchange π.

8. Verify that $P_s^{'}(.5) = P_B^{'}(.5)$, so that at forced exchange probability $\pi = .5$ the prediction of personal equilibrium is that there will be no willingness-to-pay/willingness-to-accept gap (i.e., no endowment effect).

9. Attempt to give a brief intuition for the result in (8) that at $\pi = .5$ there is no endowment effect under personal equilibrium.

The figure below shows the main experimental result from the Goette, Harms and Sprenger (2015) paper.

10. Based on your results in parts 7-9, discuss what these findings suggests about the nature of reference points generating the endowment effect. Specifically, what do these results say about the KR hypothesis that reference points are based on rational expectations about the distribution of potential final outcomes?

Figure 1: Mean Valuations with Forced Exchange