Response to Professor R. Duncan Luce's report

First, I would like to thank Professor R. Duncan Luce for his careful readings and important comments, which will be very helpful for me to improve the paper.

There are mainly five problems pointed out in my paper:

(1) Why is λ a constant in the mathematical demonstration for the relation between logarithmic law and Klein-Rubin utility function?

(2) Why do the data in Table 1 support the threshold property in ultimatum game?

(3) Why did nearly 50% of the subjects fail to deliver complete valid data?

(4) The literature foundation needs to be substantiated.

(5) The paper is written in very poor English.

I intend to clarify problems (1)~(3) right away below, and eliminate problems (4) and (5) finally in my revised version that will be delivered later.

1. Why is λ a constant?

The mathematical demonstration in "2.3.1" aims to reveal the relation between the logarithmic law and Klein-Rubin utility function. It is enough for the demonstration to follow the condition under which K-R utility function is applied. Two famous econometric models Linear Expenditure System (LES) and Extended Linear Expenditure System (ELES) are the most important applications of K-R utility function. So the demonstration just lays its foundation on the basis for deriving LES and ELES.

LES and ELES are derived from the maximization of K-R utility function by assuming $b_i = \dfrac{q_i - r_i}{\sum(q_i - r_i)}$ to be a constant (here, q_i is counted by the monetary value, so price p_i disappears, and r_i is a constant, called "basic consumption share"), and treating b_i independent from differential variable q_i (e.g. see Thomas, R. L. 1985, Introductory Econometrics: Theory and Applications. Longman Inc. New York). b_i is called "marginal consumption propensity", which determines the distribution of consumption proportions for a consumer's consumed commodities above his basic consumption share and is well approximately constant in market empirical data, especially for the consumers with the same income level (it is the empirical basis for assuming b_i as a constant).

The relation defined for λ and b_i is (see p.8 of my paper)

$$b_i = \frac{q_i - r_i}{\sum(q_i - r_i)} = \frac{q_i - r_i}{\lambda(Q + a)},$$

where, $Q = \sum q_i$, a and r_i are constant. Based on the above interpretation for b_i, λ defined in this relation is naturally a constant.

In my paper, I overlook the detailed interpretation of b_i, and thus, result blurred understanding. I will improve it in the revised version according to Professor Luce's suggestions.

2. Why do the data in Table 1 support the threshold property in ultimatum game?

The argument on pp.4-5 is to present an analogy between the utility judgment in an ultimatum game and the "yes-no" sensation threshold judgment in a psychophysical measurement. This analogy is based on such an observation: in the ultimatum game experiment, there always exists a threshold value for the proportional proposal, below which the rate of responders' rejections will evidently increase, while, above which will evidently decrease. What the data in Table 1 show to us is just such a property.

Table 1. Data of rejection and offer in Cameron's experiment

n = 101 pairs in three 5,000-experiments; n = 35 pairs in 40,000-experiment; n = 37 pairs in 200,000-experiment

		Proposer's proportional offer interval (p_o/p)					
Stake		0-0.09	0.1-0.19	0.2-0.29	0.3-0.39	0.4-0.49	0.5-0.59
5,000	Rejection rate	100%	50%	55%	20%	19%	3%
	Number of proposals	4	2	11	5	31	40
40,000	Rejection rate			25%	29%	0%	0%
	Number of proposals			4	7	3	20
200,000	Rejection rate	100%	100%	50%	0%	0%	0%
	Number of proposals	1	1	2	3	11	16

In Table 1, the results of Cameron's three experiments are all presented. 40,000-stake experiment cannot be used to interpret the threshold property, because no proposal is given in the intervals above the interval "0.2-0.29". 5,000- and 200,000-stake experiments can be used to interpret the threshold property in the ultimatum game. Divided by the interval of "0.2-0.29", there exist two different rejection-rate regions. Above "0.2-0.29", the region of "0.3-0.39" to "0.5-0.59" is a low rejection-rate interval, and below "0.2-0.29", the region of "0-0.09" and "0.1-0.19" is a high rejection-rate interval. The weighted average rejection rates are respectively calculated as the following

For 5,000-experiment: $\frac{5}{76}\times 0.2+\frac{31}{76}\times 0.19+\frac{40}{76}\times 0.03\approx 0.11$ in the intervals above "0.2-0.29";

$\frac{4}{6}\times 1.0+\frac{2}{6}\times 0.5\approx 0.83$ in the intervals below "0.2-0.29".

For 200,000-experiment: $\frac{3}{30}\times 0.0+\frac{11}{30}\times 0.0+\frac{16}{30}\times 0.0=0.0$ in the intervals above "0.2-0.29";

$\frac{1}{2}\times 1.0+\frac{1}{2}\times 1.0=1.0$ in the intervals below "0.2-0.29".

Evidently, a threshold appears in the interval "0.2-0.29". Namely, the data of Table 1 show a threshold property for the utility judgment in the ultimatum game, which can be analogized with the property revealed in "yes-no" judgment of the sensation threshold measurement.

3. Why did nearly 50% of the subjects fail to deliver complete valid data in experiments?

Every subject was asked to experience three sets of measurements, labeled Meas. 1, 2, and 3. Each set of measurements asks a subject to report five judgments. If a subject's report for a set of measurements contains four or more valid judgments, his data for this set of measurements will be valid, otherwise, will not. A valid subject must deliver valid data for all three sets of measurements.

Subjects' performances were measured as consumption behaviors, which must base on their free will and cannot be compelled, or even cannot be suggested by a hint. Some subjects were sensitive to the electrical-power massage stimulus and were often pained by the stimulus (some did so at the first stimulus, more after several stimuli). The measurement had to end midway for them. If a subject failed to deliver four or more valid judgments in only one set of measurements, all his data would have to be discarded. This is the pricipal reason causing low valid rate in the experiments.