Influenced Preferences: Consumption under Uncertainty

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Abstract

This work studies the impact of uncertainty on an agent's decision-making process in the interdependent preference context. Mainly, it analyses the influence of society on the agent's consumption level when the agent is uncertain about the consumption level of the society. This issue is modeled in a hypothetical economy with two consumers and one good, where one of the consumers is the decision maker (DM), and the other is a peer. The primary result of this research proves that under uncertainty about the peer's consumption level, the inequity averse DM increases her consumption level.

Introduction

The idea that the well-being of the DM depends not only on her material consumption but also on her peer's consumption level dates back to Veblen (1899) [7]. He argued that " ...it is extremely gratifying to possess more than others...". People frequently compare themselves with others and try to be at least as "good" as theirs peers. In the economics literature, this phenomenon is well known as the relative income hypothesis (Duesenberry, 1949 [1]) and "Keeping up with the Joneses" (Gali, 1994 [3]). However, sometimes, the DM has to make a decision without knowing the peer's choices. In other words, the DM tries to keep up with the Joneses without knowing the "social level" of the Joneses. The existence of uncertainty is novel in the interdependent preference literature and will be the cornerstone of this work.
The objective of this work is to show that when an inequity averse DM is uncertain about the peer's consumption level, then she will increase her consumption level.

The Framework

Suppose we have,

- an economy consisting of two consumers and one type of material good.
- a set of alternatives, $X[=[0,X]; X \in R_+]$.
- a preference relation over $[(x,s) \in]X \times X$, (where x and s correspond to the DM's and the peer's choices respectively).
- a real-valued, cardinal, noncontinuous utility function $v : X \times X \to \mathbb{R}^+$ which represent the preference relation.

Assumption 1. *For all $x \in X, v(x,\cdot)$ is a continuous, linear and strictly increasing function on $[0,x]$ and is a continuous, linear and strictly decreasing function on $(x,X]$.*

Assumption 2. *For all $x,y \in X$, if $y > x$ then*

$$v(y,y) \geq v(x,x).$$

Assumption 3. *For all $x \in X$ and for all feasible $s,t > 0$,*

$$v(x,x+s) - v(x,x+s+t) > v(x,x-s) - v(x,x-s-t).$$

Assumption 4. *For all $x,y \in X$ and*
a) *for all feasible $s,t \geq 0$ if $y > x$ then*

$$v(x,x-s) - v(x,x-s-t) > v(y,y-s) - v(y,y-s-t),$$

b) *for all feasible $s,t > 0$ if $y > x$ then*

$$v(x,x+s) - v(x,x+s+t) > v(y,y+s) - v(y,y+s+t).$$

Assumption 5. *For all $x \in X$ and for all feasible $s \geq 0, t > 0$*

$$v(x,x-s) > v(x,x+t).$$

Assumption 6. *For all $x,y \in X$ if $y > x$ then*

$$v^o(y,y) \geq v^o(x,x).$$

where $v^o(x,x)$ denotes the $\lim_{\epsilon \to 0} v(x,x+\epsilon)$ for $\epsilon > 0$.

The Theorem

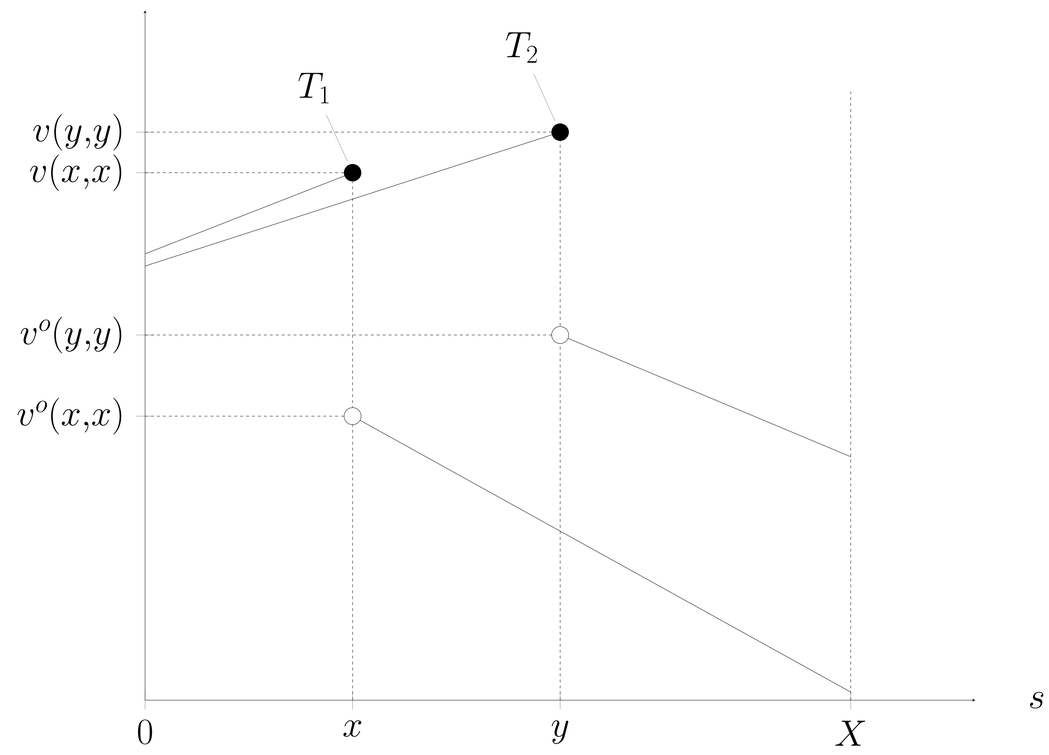

Figure 1: The projection of the DM's utility function onto the $s \times v(\cdot,\cdot)$-plane, corresponding to x and y consumption levels of the DM. T_1 and T_2 are projections of the points where the DM's consumption equal to the peer's consumption.

Definition 1: *The real valued function $v : X \times X \to \mathbb{R}^+$ is called inequity averse (IA) cardinal utility if and only if it satisfies assumptions 1-6.*

Definition 2: *For each $\bar{s} \in X$, the probability distribution p, on X, is called an exaggerated belief with respect to $\bar{s}$ ($EB_{\bar{s}}$) if and only if the median of p is greater or equal than $\bar{s}$, i.e.*

$$p \text{ is a } EB_{\bar{s}} \text{ iff } \int_{\bar{s}}^{X} dp(s) \geq \int_{0}^{\bar{s}} dp(s).$$

Theorem: *Let the peer's choice be $\bar{s}$. If the DM's preferences over X is given by the function (1), where v is a IA cardinal utility function and p is a continuous probability distribution on X and $EB_{\bar{s}}$, then the DM's consumption, x, is strictly greater than his consumption under certainty, $\bar{s}$.*

$$u_p(x) = \int_{s \in X} v(x,s) dp(s), \tag{1}$$

Conclusion

In this paper, I discussed issues concerning the decision-making process when the agent's utility depends on her peer's choice. I studied it under the assumption of uncertainty; that is, the agent does not know the choice of her peer and only has some given type of beliefs about it.
What I have shown is that when an agent does not know her peer's consumption level, then she increases her consumption level to compensate for the disutility from the possible inequity. The inequity is possible since there is uncertainty about the peer's choice. Hence, by providing information to the agents, it is possible to influence agents to consume less, without harming the her well-being.

References

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