# Chapter II

## Related study and model

### 2.1    Mudita and Benevolence

Mudita:

"The negative impulses in man, like aggression, envy, jealousy, etc., are much more in evidence than one's positive tendencies towards communal service, mutual aid, unselfish joy, generous appreciation of the good qualities of his fellow-men, etc. Yet, as all these positive features are definitely found in man (though rarely developed), it is quite realistic to appeal to them, and activate and develop that potential by whatever means we can, in our personal relationships, in education, etc. "If it were impossible to cultivate the Good, I would not tell you to do so," said the Buddha. Mudita is indeed a positive and optimistic assurance." [Mudita: The Buddha's Teaching on Unselfish Joy; by Nyanaponika Thera, Natasha Jackson, C.F. Knight, and L.R. Oates 2005-2010]

The virtue of Mudita "pronounced as [muditaa]", i.e., finding joy in the happiness and success of others, has not received sufficient attention either in expositions of Buddhist ethics, itself is one of the very best Buddhism notion. Anyway it doesn't mean that Mudita can not be performed by Non-Buddhisms. "Man's nature at birth is good" by the ancient Chinese ideologist Mencius; and Mudita is seemed as one of the basic nature of human being as well.

Mudita is usually used in the psychological field, but rarely in economics. Since we are going to consider people's moves as part of the shocks that will probably affect the UG outcome; Mudita is of course an absolute opposite attitude of Envy.

Benevolence:

Benevolence as a matter of fact is the same notion of Mudita; however since Mudita is one of the Buddhism religious basic ideas, benevolence may become a much easier notion to understand and accept. Anyhow, in many contexts the two are practically independent, but not as rivals.

Regarded as a part of the moral and religious education of modern world, benevolence is becoming more and more influential to people's actions. In our ultimatum game experiment for instance: whenever a pair of close friends or a couple was interviewed, they will be mostly generous to each other or acting extremely unfair just for fun or to access their power. However, not only love and/or conversant emotion can generate benevolence; one may have benevolence without love and/or conversant emotion, since benevolence is mere desire of another's happiness; same as mudita.

Model for study:

(2.1)

$$U = \gamma \times V(X_{self}) + \delta \times V(X_{others})$$

The utility function of Mudita (benevolence) could be very different from both Envy and Risk Aversion. The joyful of one individual is not only based on

oneself, but also on others' being. Thus the utility here is not only satisfied physically but also psychologically.

This kind of notion (benevolent action) triggers mostly between close related populations; since it is not only generated by conversant notion. Since people are close to each other either physically or psychologically, they can be very generous to others. People may feel uncomfortable while a perfect stranger takes advantage of them, but they can be totally benevolent to the close ones and this kind of action can generate much stronger satisfactory feelings. Thus the notion will definitely change the outcomes of the game.

As it is the opposite factor of benevolence, Inequity Aversion shall be studied before we start the experiment. Inequity aversion is broadly consistent with observations of behavior in three standard economics experiments:

1. Dictator Game – The subject chooses how a reward should be split between himself and another subject. If the dictator acted self-interestedly, the split would consist of 0 for the partner and the full amount for the dictator. While the most common choice is indeed to keep everything, many dictators choose to give, with the second most common choice being the 50:50 split.

2. Ultimatum Game – The dictator game is played, but the recipient is allowed to veto the entire deal, so that both subjects receive nothing. The partner typically turns down the deal when low offers are made. People consistently prefer getting nothing to receiving a small share of the pie. Rejecting the offer is in effect paying to punish the dictator which is also called the proposer.

3. Trust Game – The same result as found in the dictator game shows up when the dictator's initial endowment is provided by his partner, even though this requires the first player to trust that something will be returned (reciprocity). This experiment often yields a 50:50 split of the endowment, and has been used as evidence of the inequity aversion model.

In 2005, John List modified these experiments slightly to determine if something in the construction of the experiments was prompting specific behaviors. When given a choice to steal money from the other player, even a single dollar, the observed altruism all but disappeared. In another experiment, the two players were given a sum of money and the choice to give or take any amount from the other player. In this experiment, only 10% of the participants gave the other person any money at all, and fully 40% of the players opted to take all of the other player's money.

The last such experiment was identical to the former, where 40% were turned into a gang of robbers, with one catch: the two players were forced to earn the money by stuffing envelopes. In this last experiment, more than two thirds of the players neither took nor gave a cent, while just over 20% still took some of the other player's money.

Other research in experimental economics addresses risk aversion in decision making and the comparison of inequality measures to subjective judgments on perceived inequalities. [http://en.wikipedia.org/wiki/Inequity_aversion]

According to Fehr and Schmidt's Inequity Aversion we can assume the following utility functions for the responder in the ultimatum game.

(2.2)

$$U_J(\{x_i\}) = x_j - \frac{\alpha}{n-1} \times \sum \max(x_j - x_i, 0) - \frac{\beta}{n-1} \times \sum \max(x_j - x_i, 0)$$

"Specifically, consider a setting with individuals {1, 2, ..., $n$} who receive pecuniary outcomes $x_i$., and where α parameterizes the distaste for disadvantageous inequality in the first nonstandard term, and β parameterizes the distaste for advantageous inequality in the final term."

For the case of two persons, the formula (2.2) reduces to:

(2.3)

$$U = X_{self} - \alpha \times (X_{self} - X_{others})^+ - \beta \times (X_{others} - X_{self})^+$$

$$(x)^+ = \begin{cases} x, & if \quad x \geq 0 \\ 0, & otherwise \end{cases}$$

Thus, one person's utility is usually depending on others' choices or utilities. Not only can the own gaining generate positive effect to the person's utility, but also the comparison with others. If the circle of your comparison is respectively worse off, then you are able to gain more satisfactory for the utility.

## 2.2 Reciprocity

"Reciprocity means that people reward kind actions and punish unkind ones. The theory takes into account that people evaluate the kindness of an action not only by its consequences but also by the intension underlying this action. The theory explains the relevant stylized facts of a wide range of experimental games." [A Theory of Reciprocity, by Armin Falk and Urs Fischbacher, 2000]

As a matter of fact reciprocity determinant people's behavior quite distinguishedly not only in the psychological way but also many other fields which included economics. The reciprocity can be divided into the positive reciprocity which means reward and the negative reciprocity which means punishment and unkind treatment. "Importantly, reciprocity means a behavior that can not be justified in terms of selfish and purely outcome oriented preferences"

However in the economical approach, the negative reciprocity is as effective and available as the positive reciprocity. "According to the inequity approach, a person will punish another person if and only if this reduces the inequity between the person and his opponent(s). Reciprocity on the other hand dictates to punish in order to reciprocate an unkind act. The aim of the reciprocating subject is not to reduce inequity but to lower the opponent's pay-off. Reciprocity driven punishments are therefore not restricted to situations where inequity can be reduced. Instead it occurs whenever a person is treated unkindly and is given a chance to pay back." [A Theory of Reciprocity, by Armin Falk and Urs Fischbacher, 2000] Somehow in Falk, Fehr and Fischbacher's experiment sometimes some subjects even punish others without reducing the inequality. So that it is feasible for us to believe reciprocity is a much more powerful concept than inequality aversion.

We know that the positive reciprocity rewards someone being generous and kind to others and even reduces the superiority complex for this person. "In the Ultimatum Game, numerous studies have shown that people contrary to their material self-interest – reject low offers in order to punish the unkindness of proposer." Thus reciprocity is the kind of behavior to determinant either kind or unkind. "The more an

action is considered as kind or unkind, the more it will be rewarded or punished, respectively. There are two aspects are essential for people to evaluate whether an experienced action is kind or unkind: (1) the out come or the consequences of an action and (2) the underlying motivation." [A Theory of Reciprocity, by Armin Falk and Urs Fischbacher, 2000]

In addition, for this experimental study the reciprocity theory does give a surprising forecast of acceptance probabilities. People love kindness and punish selfishness for sure and they do make their decisions by the book. Thus it can be identified as subgame perfect equilibria in psychological game theory [Falk & Fischbacher, *loc cit*]; which conduct symmetric in positive and negative kindness.

Later on, works in many fields can be united to this study. The models used to incorporate reciprocity are often complicated and/or ad-hoc. We will be arguing whether the perceived kindness or perceived weakness concept will be applicable in the Ultimatum Game.

## 2.3    Other Related Fields

- Perceived Weakness

Usually in the real world situation the weaker side is always been consumed by relatively stronger side, it happens in economic world as well. When there are two players are pitted against each other, the relatively weaker side will always be perceived by the other side.

In our study, generally speaking the proposer is seized of natural advantage; they can propose any percentage of shares to the responder. Thus if the responder is vulnerable then the proposer is always able to lower the risk level and get a higher

return in shares. In order to achieve the goal of perceive the weakness, there can be two approaches either to find close related person to be the opponent or acting stronger by one's own. Either way the notion follows the law of nature, the weaker is always been taken advantage of the stronger opponents.

- Disappointment Aversion

In the Ultimatum Games study, usually offers are being rejected just because they are too small. If so, disappointment aversion can explain why sometimes offers are turned down. It is apparently compatible with individualism.

Disappointment aversion is a problematic response that people prove more likely to choose a sure reward than to risk a higher one while at the same time being willing to attempt a greater reward with lower possibility when both options include some risk.

For instance:

Machina's example: Win either

1. A journey to Venice, or

2. A cinema ticket for a film about Venice

Assume the second alternative turns out. If the probability of the first alternative was very high (99%), some people might want to watch the film no more.

So that it's clear to see one's expectation is highly contacted to the outcome; if there's a gap between the reality and the expectation then it's highly possible for someone to turn down the deal without been reasonable.

- Envy

The Economics of Envy can be very helpful for this research as well. Usually we define **"Envy"** as a kind of emotion that makes someone to jealous when that someone is lack of something, such as quality, wealth, achievement and so on.

However in philosophy, Aristotle (in Rhetoric) defined Envy as "the pain caused by the good fortune of others, while Kant defined it as "a reluctance to see our own well-being overshadowed by another's because the standard we use to see how well off we are is not the intrinsic worth of our own well-being but how it compares with that of others" (in Metaphysics of Morals). In Buddhism the third of the four divine abiding is Mudita, taking joy in the good fortune of another. This virtue is considered the antidote to envy and the opposite of schadenfreude."

However, we will need the very basic motion of people - envy as one important aspect for measuring the utilities of commodities, so the motion of envy will help people to make irrational choices sometimes and it is quite important for us to keep is in mind.

- Risk aversion (Risk attitude)

Risk aversion is the attitude for people to make a rational or sometimes self-protected choice while facing the challenge of risks. "It is the reluctance of a person to accept a bargain with an uncertain payoff rather than another bargain with a more certain, but possibly lower, expected payoff."

[http://en.wikipedia.org/wiki/Risk_aversion]

Example:

A person is given the choice between two scenarios, one with a guaranteed payoff and one without. In the guaranteed scenario, the person receives $50. In the uncertain scenario, a coin is flipped to decide whether the person receives $100 or nothing. The expected payoff for both scenarios is $50, meaning that an individual who was insensitive to risk would not care whether they took the guaranteed payment or the gamble. However, individuals may have different risk attitudes.

In the Ultimatum Game case, if someone would accept an unfair payoff which is less than $50 (for example, $40) with no uncertainty, rather than taking the gamble and possibility of receiving nothing then she must be Risk Averser.

Essentially in gambling or any kind of venture investment, high risky rate can generate better pay-off (risk preference) and yet much cautious money distribution and supervision can also generate better pay-off. Thus in the risk attitude field we separate the different behaviors into three categories:

- Risk-Averse (or risk-avoiding) - if he or she would accept a certain payment (certainty equivalent) of less than $50 (for example, $40), rather than taking the gamble and possibly receiving nothing.

- Risk-Neutral - if he or she is indifferent between the bet and a certain $50 payment.

- Risk-Loving (or risk-seeking) - if the guaranteed payment must be more than $50 (for example, $60) to induce him or her to take the guaranteed option, rather than taking the gamble and possibly winning $100.

This kind of actions in facing risks happen in everyday life, and it definitely is one major aspect for changing one's behavior respectively.

## 2.4    Models

A large variety of models have been proposed to model the behavior in the Ultimatum Game. They can be roughly assigned to two categories. The first type amends preferences to depend on parameters different from the personal payoff, such as expected or fair or other player's outcomes, in order to retain classical game theory. Typically, these preferences involve some kind of disappointment aversion component build into the utility function generating disutility upon falling short to reach a certain expected outcome.

The two major models for ultimatum game behavior are:

1.    Inequality aversion [Schmidt & Fehr]

2.    Reciprocal behavior [Rabin, Falk & Fischbacher]

Both models assume individualism to be violated. However, this has never been empirically tested (and it can not be tested for constant-sum games).

A quite general class of such models can be given by:

(2.4)

$$U(x, y_1, \ldots y_n) = u(x) - \sum_{i=1}^{n} \alpha_i \cdot (u(y_i) - u(x))^+ - \sum_{i=1}^{n} \beta_i \cdot (u(x) - u(y_i))^+$$

with $(z)+ = max\ (0, z)$, where x denotes the player's payoff, and $y_1, \ldots, y_n$ depend both on the actual outcomes as well as reference points given by other available alternatives. Observe that the Schmidt-Fehr preferences (2.2) are a special case of it. The dependence on alternative outcomes is necessary for the model to be consistent with the observed violation of consequentialism. The above class of model has the advantage of being applicable to other intensively studied cases of reference-dependent preferences, such as prospect theory or stated fairness and (non-)reciprocating behavior in the ultimatum game conspicuous consumption [Schoch

2010]. Compared with other classes of reference-dependent preferences it has the distinctive property that a positive affine transformation of the basic utility function u translates to the same transformation of the utility function U. This allows for a determination of the basic utility independent of the game under investigation in a context of choices under risk. This is valuable in particular for competitive market situations, where preferences generally loose their reference-dependencies and effectively reduce to basic utilities [Fehr and Schmidt 2004]. Basic utilities $u\ (x)$ can be extracted from (2.4) by setting:

$$x\ =\ y_1\ =\ \ldots\ =\ y_n$$

For linear basic utility, the model reduces to the Schmidt-Fehr preferences for inequality aversion [Rohde 2010],

(2.5):

$$U\ (x,\ y_1,\ldots\ y_n) = x - \sum_{i=1}^{n} \alpha_i \cdot (y_i - x)^+ - \sum_{i=1}^{n} \beta_i \cdot (x - y_i)^+$$

Despite their consequentialist character, Schmidt-Fehr preferences still provide an important foundation for empirical research [Engel and Strobel 2000][Bellemare at al. 2008]. The model (2.1) predicts that if parameters $y_1, \ldots, y_n$ are outcome independent (thus reference points), then indifference classes under basic utilities are preserved under the reference-dependent preferences. This allows in principle to test the model by determining whether disappointments related to non-monetary outcomes have their cause in the object or, as this theory predicts, in the utility it generates. The second class of models of reciprocating behavior involves a modification of classical game theory. Psychological game theory has been developed

to explicitly model higher-order reflexive expectations on the other person's move. The general structure (2.1) of our preferences can still be adapted to psychological game theory if we relate the coefficients $\alpha_i$ and $\beta_i$ to the intentions of other players and see them as functions depending on former moves of the other players and possible outcomes. An example of a model of the second type is Falk and Fischbacher's model of reciprocity [Falk and Fischbacher 2006]. A remarkable property of this model is that it predicts acceptance rates p (c) for the ultimatum game as a function of the offer c in a psychological Nash equilibrium

(2.6):

$$p\,(c) = \{ \min(\ 1, \frac{c}{p_2 \cdot (1 - 2c)(1 - c)}),\ c < \frac{1}{2}$$
$$1, \quad else .$$

The model depends on a universal positive reciprocity parameter $\rho_2$, which "captures the strength of the [second] player's reciprocal preferences." It is set by the authors equal to 2 in their examples.

In particular, rational expectation theory predicts that deviation from the rationally expected price p* form unimodal distributions:

(2.7):

$$p = p * + \varepsilon \quad \text{with} \quad \varepsilon \sim \log N\ (0, \sigma)$$