ECON4260 Spring 2013. Second lecture, topic 3: Inequity aversion

Readings:
Fehr and Schmidt (1999)
Camerer (2003), Ch. 2.8, pp.101-104

Compared to self-interest model:
• Too much generosity & cooperation
  • Dictator, public good, trust games
  • Ultimatum games (genuine/strategic generosity?)
• Too much sanctioning
  • Ultimatum games, public good games
• Too conditional on others’ behavior
  • Ultimatum, public good, and trust games
• Too context dependent
  • Dictator games, Prisoners’ dilemma
Strange things happen in labs - so what?

- **Internal validity**: Replicability
  - Will others get the same result?
  - Was the experiment conducted professionally?

- **External validity**: Will similar results occur outside the lab?
  - Similarities between lab and outside world?
  - Dissimilarities: Which of them *matter*?
  - Refer to existing theories: Which differences would we, theoretically, expect to matter?
  - E.g.: "In the real world, stakes are higher"
  - New experiment: Higher stakes!

Proposed explanations

- Inequity aversion
  - A preference for equal payoffs

- Reciprocity
  - A preference for repaying kindness with kindness and meanness with meanness

- Altruism
  - Caring for others’ payoff, or others’ utility

- Preferences for social approval
  - Prefers to be liked by others

- All of these involve "non-standard" preferences (note: not irrationality!).
Preferences as explanations

• Anything can be "explained" by ad hoc assumptions on preferences!
  – Bill sleeps on the street
  – «Explanation»: Bill likes sleeping on the street
• For preferences to «explain» things: must be consistent with a wide array of data, not just one case!
• Can assumptions be grounded in knowledge from other disciplines (psychology, anthropology, biology, neurology)?

Preferences for equity

• What if some individuals dislike inequity?
  – Utility: Increasing in own income and in equity
• For example:
• I dislike any earning differences
• I dislike that others earn more than me
• I dislike earning too much more than others
• Several models proposed in literature, see Sobel’s paper.
Fehr & Schmidt’s (1999) model of inequity aversion

- Individuals care about own income, advantageous inequity, and disadvantageous inequity
  - Disadvantageous counts most!
  - Simplification: Linearity, 2 persons
    \[ U_i = x_i - \alpha_i \max\{x_j - x_i, 0\} - \beta_i \max\{x_i - x_j, 0\} \]
    - Can alternatively be written:
      \[
      \begin{align*}
      U_i &= x_i - \beta_i(x_i - x_j) \text{ if } x_i > x_j \\
      U_i &= x_i - \alpha_i(x_j - x_i) \text{ if } x_i \leq x_j
      \end{align*}
      \]

2-person inequity aversion model

\[ U_i = x_i - \alpha_i \max\{x_j - x_i, 0\} - \beta_i \max\{x_i - x_j, 0\} \]

where \( i \neq j \), and \( \beta_i \leq \alpha_i \), \( 0 \leq \beta_i < 1 \)

\( i \)'s utility as a function of j’s income, for a given \( x_i \)

All else given, \( i \) prefers j’s income to equal hers; i’s utility declines in their income difference, more so if \( i \) herself is worst off.
Ultimatum game: Inequity averse responder

- Responder, B, prefers high payoff to himself, and equality between himself and the proposer, A.
  - Reject: \( \{x_A, x_B\} = \{0,0\} \)
  - Accept: \( \{x_A, x_B\} = \{(1- s)X, sX\} \)
- If A offers \( s = 0.5 \):
  - Accept: same income difference as reject.
  - Accept: more income than reject.
  - B accepts.
- If A offers \( s > 0.5 \):
  - Accept: higher income difference than reject.
  - Accept: more income (for both) than reject.
  - Assumption \( \beta_i < 1 \): One will never throw away income to avoid advantageous inequality
  - B accepts.

Inequity averse responder (cont.)

- Offered share \( s < 0.5 \):
  - Accept: higher income difference than reject.
  - Accept: more income (for both).
  - No upper boundary on \( \alpha_i \): We may throw away income to avoid disadvantageous inequality.
    \[
    U_i = x_i - \alpha_i(x_j - x_i) \text{ if } x_i \leq x_j
    \]
    \[
    U_B(\text{accept}) = sX - \alpha_B[(1- s)X - sX] = sX - \alpha_B[X - 2sX] = X[s - \alpha_B(1-2s)]
    \]
    \[
    U_B(\text{reject}) = 0
    \]
- Reject is preferred if \( X[s - \alpha_B(1-2s)] < 0 \)
- i.e. if \( s < \frac{\alpha_B}{1 + 2\alpha_B} \)
- Note: \( X \) doesn’t matter!
Example

- \( \alpha_B = 2, \beta_B = 0.4 \)
- Offer from Proposer (A): \( s = 0.2 \)

\[
U_i = x_i - \alpha_i \max\{x_j - x_i, 0\} - \beta_i \max\{x_i - x_j, 0\}
\]

\[
U_B(accept) = 0.2X - 2 \max\{0.8X - 0.2X, 0\} - 0.4 \max\{0.2X - 0.8X, 0\}
\]

\[
= 0.2X - 2 \cdot 0.6X
\]

\[
= X (0.2 - 1.2)
\]

\[
= -X
\]

\[
U_B(reject) = 0
\]

- B will reject, regardless of the size of the "pie" to be shared.

Inequity averse Proposer (A)

- Prefers high payoff to himself (A) and equality between himself and the responder (B).
- If A offers \( s = 0.5 \):
  - If B accepts: max. equality, less than max. income
  - Both self-interested and inequality-averse responders will accept \( s = 0.5 \)
- Offered share \( s > 0.5 \):
  - If B accepts: less income to A than \( s = 0.5 \), and less equality
  - Proposer will never offer \( s > 0.5 \)
Inequity averse Proposer (cont.)

- If A offers $s < 0.5$:
  - If B accepts: The lower $s$, the higher income for A, but the more inequality
  - Which is most important?
  - A’s utility when $s \leq 0.5$, given that B accepts:
    \[
    U_A = x_A - \alpha_A \max \{x_B - x_A, 0\} - \beta_A \max \{x_A - x_B, 0\}
    = (1-s)X - \beta_A[(1-s)X - sX]
    = X(s(2\beta_A - 1) + 1 - \beta_A)
    \]
    - This is increasing in $s$ whenever $\beta_A > 0.5$
    - If acceptance were not a concern (dictator game), A would offer $s = 0$ if $\beta_A < 0.5$, $s = 0.5$ if $\beta_A > 0.5$, and be indifferent between any offer $s \in [0, 0.5]$ if $\beta_A = 0.5$.

Strategic interaction

- A must take into account: will B accept?
- Assume inequity averse preferences, common knowledge:
  \[\alpha_A = \alpha_B = 2, \, \beta_A = \beta_B = 0.4\]
- Since $\beta_A < 0.5$, A would prefer to keep all of X himself, despite his inequity aversion.
- However, B will reject if
  \[s < \frac{\alpha_B}{1 + 2\alpha_B} = \frac{2}{5} = 0.4\]
- Knowing this, A offers $s = 0.4$ (or: slightly more).
- B accepts.
Self-interested Proposer, inequity-averse Responder

- Let $\alpha_A = 0$, $\beta_A = 0$, $\alpha_B = 2$, $\beta_B = 0.4$
  - Common knowledge
- Responder will reject if $s < 0.4$
  - Threat is credible, due to B's inequity aversion
- Knowing this, Proposer will offer 0.4
- No difference between the behavior of self-interested and inequity-averse Proposers!

If Proposer does not know Responder’s type

- A must consider the probability that $B$ is inequity-averse.
- If possible (in the lab, it is usually not!), a self-interested $B$ would pretend being inequity-averse.
- The existence of inequity-averse types can make self-interested types behave as if they were inequity-averse too.
Competition

• Responder or proposer competition:
  – Observed outcomes usually very inequitable
  – 1 person reaps (almost) all gains, others get (almost) nothing.

• Double auction markets:
  – Observed outcomes usually conform nicely to the self-interest model

• Do such results contradict the assumption that (at least some) players are inequity averse?

n-person inequity aversion

• Fehr-Schmidt model with \( n \) individuals:
  – Normalizes inequity aversion by the number of others (otherwise every new player \( k \) would decrease \( i \)'s utility unless \( x_k = x_i \))
  – Self-oriented: compares himself to everyone else, but does not care about inequality between others
  – Crucial question: What’s the relevant peer group?

\[
U_i(x_i) = x_i - \alpha_i \frac{1}{n-1} \sum_{j \neq i} \max \{x_j - x_i, 0\} \\
- \beta_i \frac{1}{n-1} \sum_{j \neq i} \max \{x_i - x_j, 0\}
\]
Proposer competition

• You’re selling a house with market value X. If not sold, your gain is 0 (you’re moving, no rental market). For any interested buyer: value is X.

• Sales process:
  1. Potential buyers i give sealed offers $s_iX$
  2. You reject all offers (no sale), or accept preferred offer. If indifferent, buyer picked randomly.
  3. Sale: your payoff is $s_hX$ ($h$ is the buyer). Buyer’s gain is $(1-s_h)X$. No sale: All get payoff 0.

• If only 1 potential buyer: Standard ultimatum game.
  – Buyer: Proposer. Seller: Responder. (Sequence!)

• Assume:
  – 10 potential buyers.
  – Your $\beta_B < 0.5$, so you will pick the highest offer.

Proposer competition – cont.

• Self-interest prediction:
  – Several proposers offer $s=1$, which is accepted
  – If several buyers value house at X, you will get X.

• Assume: Every player is inequity-averse
  – If buyer i’s offers is rejected, he will experience unfavourable inequity: His payoff=0, someone else’s>0
  – If his offer is accepted, there will be inequity anyway, but his income will increase, and the inequity can be turned to his advantage
  – The only (subgame perfect) Nash equilibrium is that at least two proposers offer $s=1$, of which one is accepted.
Why doesn’t inequity aversion affect outcome with proposer competition?

- "No single player can enforce an equitable outcome. Given that there will be inequality anyway, each proposer has a strong incentive to outbid his competitors in order to turn part of the inequality to his advantage and to increase his own monetary payoff." (Fehr and Schmidt 1999, p.834)

- No buyer can secure less disadvantageous inequality between himself and the monopolist (you) by offering you a relatively low share: If he tries, you can just pick someone else’s offer. Thus, inequity aversion becomes irrelevant.

Criticisms of Fehr-Schmidt model

- Linearity
  - Dictator games: Dictator A will give either 0 (if $\beta_A < 0.5$) or 0.5 (if $\beta_A > 0.5$)
  - Possible modification: Utility concave in inequity
- Who is the reference group?
  - Lab: All subjects in experiment? Opponent(s)?
  - Outside lab...?
- Flaws and aggressive marketing?
  - Binmore and Shaked (JEBO 2010)
  - See http://www.wiwi.uni-bonn.de/shaked/rhetoric/
- Micro data across games not consistent with fixed individual $\alpha$’s and $\beta$’s (Blanco, Engelmann, Normann 2011)
Next time: Reciprocity

- A preference to repay kind intentions by kind actions, and mean intentions by mean actions
- Readings:
  - Camerer, C. (2003), pp. 105-117 (Compendium; Ch. 2.8.4 can be skipped).
  - Sobel, J. (2005), Section 3.4