Sequential Fundraising and Social Insurance

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- Seed fundraising for a venture often takes place by sequentially approaching potential contributors, who may *invest* or *decline*.
- The fundraising succeeds only if a required sum is raised.
- Those who invested in a funded venture gain if it succeeds, lose if it failed. Non-investors neither gain nor lose.
- Contributor decisions are observed by other contributors.
- Contributors have noisy signals about the outcome of the venture, and imperfect information about how well others are informed.
- What is their expected behavior if they maximize their utility?

- Related, but different fields
  - Information Cascades: Agent's utility does not depend on future agents.
  - Social Choice: The choice affects all agents, not only investors.

Model

- An entreprenuer approaches a set of n potential investors.
- Investors are approached by a predetermined order. Each publicly decides whether to invest.
- Rewards apply only to investors, and are realized only if $B \leq n$ investors commited to invest.
- The project can be "good" ($\omega = 1$) or "bad" ($\omega = 0$). Agent utility from investing in a "good" project is 1 and from investing in a "bad" project is -1.
- Agents have a common public likelihood $L = \frac{\Pr(\omega=1)}{\Pr(\omega=0)}$.
- Each agent receives a private signal $s_i \in \{0, 1\}$ independent conditionally on ω. The quality of each agent signal is private $q_i = \Pr(s_i = \omega)$, and is i.i.d. drawn from a commonly known distribution $\boldsymbol{q} \in \Delta([R, Q])$ where $\frac{1}{2} \leq R < Q < 1$.
- We study Markov-Perfect equilibria in this game.
- The payoff-relevent state is described by the triplet (L, B, n).

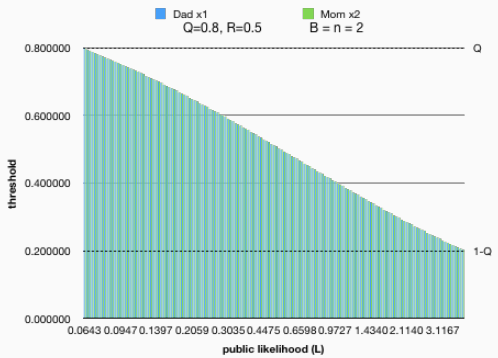
Main Results

In the general problem $B \leq n$, with public likelihood L

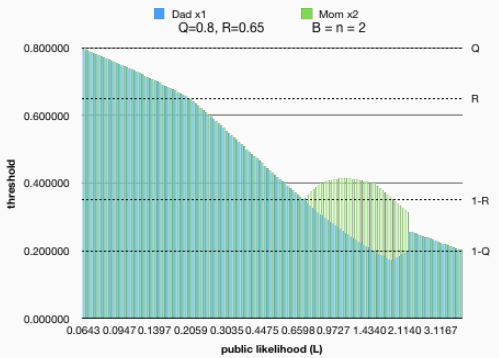
- Threshold Strategy: All strategies are unique, pure, threshold strategies.
- Up-Cascade: The fundraising is in an up-cascade when $L \geq \frac{Q}{1-Q}$. (Therefore) learning stops above $\Pr[\omega = 1] = Q$.
- Down-Cascade: The fundraising is in a down-cascade when $L \leq \left(\frac{1-Q}{Q}\right)^B$.
- Social Insurance: Players shade their threshold for investment *lower* (relative to when in last position).
  - In other words, players enter in positions that would be losing if not "protected" by future players' behavior.
- Delegation: A player *may* herd on investment, i.e., "waste" her information and *delegate* the decision to others, even though *not in a cascade*.
- Reverse Cascades: Often, a fundraising starts with all early contributors delegating (investing unconditionally).

$B = n = 2$ Threshold Strategies in Equilibrium

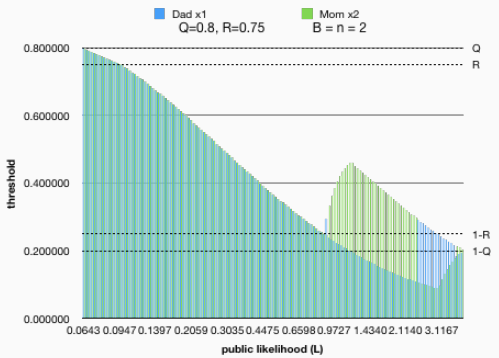
Two players (called "Dad" and "Mom"), needing a unanimous decision, with uniformly-distributed qualities $U(R, 0.8)$, for $R = 0.5, 0.65, 0.8$.



$n = B = 2, \boldsymbol{q} \sim U(0.5, 0.8)$



$n = B = 2, \boldsymbol{q} \sim U(0.65, 0.8)$



$n = B = 2, \boldsymbol{q} \sim U(0.75, 0.8)$

Observations:

- The players often, but not always, play the same threshold.
- No delegation (threshold $\leq 1 - Q$) takes place for $R \leq 0.620...$, or at low L (public likelihood).