Embarrassment Aversion

Rick Harbaugh, Indiana University

Michigan State University
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Classic literatures

Prospect theory (Kahneman & Tversky, 1979, 1992)

- People often take actions that seem inconsistent with expected utility maximization
- They are "loss averse", like "long-shots", are affected by "framing"

Career concerns (Holmstrom, 1982/1999)

- Managers often take actions that are inconsistent with profit maximization
- They avoid some types of risks, but like others, chase bad money with good, etc.

Both predict deviations from simple maximization... for very different reasons

Prospect theory

- People have perceptual biases
- Expected utility maximization asks too much of people

Career concerns

- Managers also care about looking competent (skill signaling)
- Expected utility maximization over monetary outcomes too narrow

How similar are the predicted behaviors?

Pretty similar for simplest possible career concerns models

Another example of information economics “rationalizing” a psychological phenomenon?

- Signaling, herding, group think, polarization, sunk costs, option values, self-confidence, status concerns ...

Or maybe just a coincidence – both factors can be present

- Empirical analyses could confound effects
- Particularly important for managerial and financial contexts where skill is important

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Social psychology approach to understanding risk

Want to avoid looking bad to self and others

- Self-esteem (James, 1890)
- Achievement motivation (Atkinson, 1957)
- Self-handicapping (Jones and Berglas, 1978)

Experiments found behaviors we now associate with prospect theory

- Verbal and reduced form models to explain them
- No formal Bayesian updating of information
- No formal signaling of private information

Some classic risk anomalies

Loss aversion – Kahneman and Tversky (1979)

- Excessive risk aversion for small gambles - Rabin (2000)
- But also overconfidence - Barber and Odean (2001)

Probability weighting – Kahneman and Tversky (1979)

- Long shot bias – Thaler and Ziemba (1988)
- Simultaneous purchase of insurance, lottery tickets – Friedman and Savage (1948)
- Allais Paradox – Allais (1953)

Framing – Tversky and Kahneman (1981)

- More likely to gamble if winning is reference point
- So how frame the status quo matters

Why so risk averse for small gambles?

Small gamble:

- **A. $0**
- B. 50-50 lose $100 or win $110

Larger gamble:

- A. $0
- **B. 50-50 lose $1000 or win $718,190**

Rabin (2000): For standard utility function, if refuse small gamble then should refuse larger gamble too

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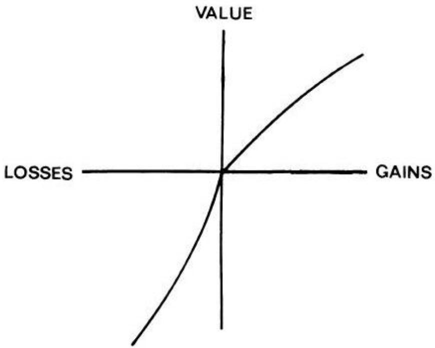
Loss aversion?



- Loss aversion can explain this behavior
- Marginal utility not continuous at status quo
- So substantial risk aversion even for small gambles
- But assuming loss aversion just begs the question...

Why are people so averse to losing?

"Nonmonetary consequences" of losing (Schlaifer, 1969)

- But what are they?
- Could be boring – just don't like to lose

Achievement motivation literature (Atkinson, 1957)

- Most gambles involve some skill
- People don't want to look unskilled
- So avoid gambles that might reveal lack of skill

Career concerns literature (Holmstrom, 1982/1999)

- Managers' careers depend on appearing skilled
- So choose investments to reduce risk of appearing unskilled

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People are even stranger ... favor long-shots

Gamble or not?

- A. Get $10 for sure
- **B. 10% chance win $100**

Gamble or not?

- **A. Get $90 for sure**
- B. 90% chance win $100

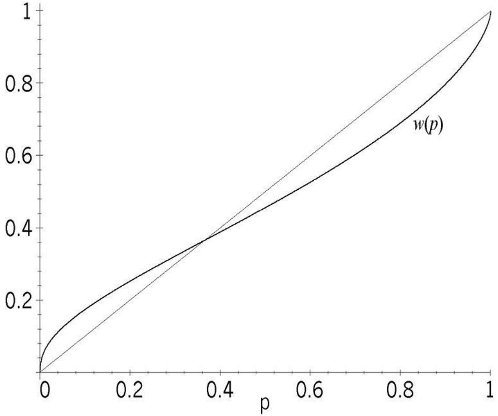
Gamble or not?

- **A. Lose $10 for sure**
- B. 10% chance lose $100

Gamble or not?

- A. Lose $90 for sure
- **B. 90% chance lose $100**

Probability weighting function captures this bias



- $p = Pr[win]$
- If $w(p) > p$ then act like overweighting the true odds - take fair gambles
- If $w(p) < p$ then act like underweighting the true odds - refuse fair gambles

Framing of gamble affects choices

- Different groups given same situation
- But differently framed choices
- Willingness to "gamble" depends on the reference point
- Are you saving people...? Or letting them die?

Framing of gamble affects choices

Problem 1 [N = 152]: Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:

If Program A is adopted, 200 people will be saved. [72 percent]

If Program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved. [28 percent]

Which of the two programs would you favor?

If Program A is adopted 400 people will die. [22 percent]

If Program B is adopted there is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die. [78 percent]

Which of the two programs would you favor?

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Performance skill

- Decider faces a binary gamble
- Skilled decider more likely to win
- Decider does not know own skill
- Variation: decider has signal of own skill
- Observer observes choice to gamble, outcome of gamble
- Decider is risk neutral in wealth (small gamble)
- But decider is also embarrassment averse

Performance skill with uninformed decider

- Decider is skilled or unskilled, $q \in \{s, u\}$
- Decider and observer know $0 < \Pr[s], \Pr[u] < 1$
- Take gamble with payoff $x \in \{lose, win\}$ or keep z
- Performance skill: $\Pr[win|s] > \Pr[win|u]$
- Observer estimates probability skilled μ

- Quasilinear utility, $U = y + v(\mu)$
- Want to look skilled, $v' > 0$
- Risk averse in skill estimate, $v'' < 0$
- And also downside risk averse, $v''' > 0$

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Posterior skill estimate

Skill updated based on outcome of gamble:

$$\begin{aligned}
\Pr[s|win] &= \frac{\Pr[s,win]}{\Pr[win]} = \Pr[s] + \frac{\Pr[s,win] - \Pr[s]\Pr[win]}{\Pr[win]} \\
&= \Pr[s] + \frac{\Pr[win|s] - \Pr[win|u]}{\Pr[win]}\Pr[s]\Pr[u]
\end{aligned}$$

$$\Pr[s|x] = \Pr[s] + \frac{\Pr[x|s] - \Pr[x|u]}{\Pr[x]}\Pr[s]\Pr[u]$$

$$\Pr[s|lose] = \Pr[s] - \frac{\Pr[win|s] - \Pr[win|u]}{\Pr[lose]}\Pr[s]\Pr[u]$$

Posterior skill estimate

Skill updated based on outcome of gamble:

$$\Pr[s|x] = \Pr[s] + \frac{\Pr[x|s] - \Pr[x|u]}{\Pr[x]} \Pr[s] \Pr[u]$$

Example:

- $\Pr[s] = \Pr[u] = \frac{1}{2}$
- $\Pr[win|s] = \Pr[win] + \varepsilon$, $\Pr[win|u] = \Pr[win] - \varepsilon$
- $\Pr[s|win] = \frac{1}{2} + \frac{2\varepsilon}{\Pr[win]} \frac{1}{2} \frac{1}{2} = \frac{1}{2} + \frac{\varepsilon}{2\Pr[win]}$
- $\Pr[s|lose] = \frac{1}{2} - \frac{\varepsilon}{2\Pr[lose]}$

Relation to loss aversion

Decider accepts gamble if:

$$E[x] + E[v(\Pr[s|\text{accept}])] \geq z + v(\Pr[s|\text{refuse}])$$

Decider risk neutral in wealth so "embarrassment premium" just:

$$\begin{aligned}\pi &= v(\Pr[s|\text{refuse}]) - E[v(\Pr[s|\text{accept}])] \\ &= v(\Pr[s]) - E[v(\Pr[s|x])] \\ &= v(\Pr[s]) - (\Pr[win]v(\Pr[s|win]) + \Pr[lose]v(\Pr[s|lose])) \\ &> 0\end{aligned}$$

where inequality follows by Jensen's inequality since $v'' < 0$

Relation to loss aversion

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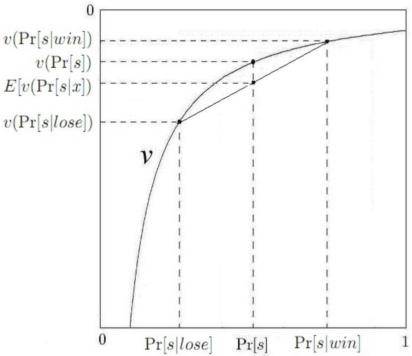
If ignore embarrassment aversion, utility function in money not locally linear around status quo



- $Pr[s] = Pr[win] = 1/2$
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- $Pr[s|win] = \frac{1}{2} + \frac{1/2}{1/2}\frac{1}{2}\frac{1}{2} = 3/4$
- $Pr[s|lose] = 1/4$
- $U = y - 1/\mu$

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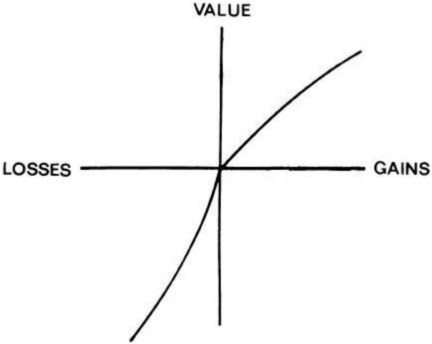

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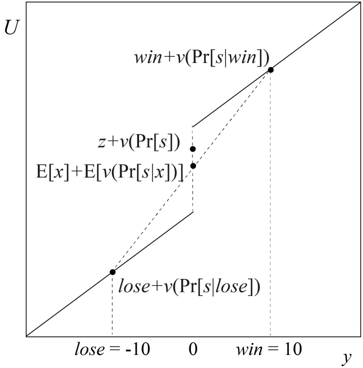

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Does embarrassment aversion also generate long-shot bias?

Low probability of success

- Success is rare and a strong signal that one is skilled
- Failure is common and a weak signal that one is unskilled

High probability of success

- Success is common and a weak signal that one is skilled
- Failure is rare and a strong signal that one is unskilled

Low probability gambles have both more upside potential and less downside risk

- Winning is more impressive and losing less embarrassing
- But winning is less common and losing is more common
- So unclear what effect dominates

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What gambles are more impressive/embarrassing?

- Is winning really more impressive for low $\Pr[win]$?
- Is losing really more embarrassing for high $\Pr[win]$?

$$\Pr[s|win] = \Pr[s] + \frac{\Pr[win|s] - \Pr[win|u]}{\Pr[win]} \Pr[s] \Pr[u]$$

$$\Pr[s|lose] = \Pr[s] - \frac{\Pr[win|s] - \Pr[win|u]}{1 - \Pr[win]} \Pr[s] \Pr[u]$$

- $\Pr[s|win]$ bigger for lower $\Pr[win]$
- $\Pr[s|lose]$ smaller for higher $\Pr[win]$

Example

Symmetric:

- $\Pr[s] = \Pr[u] = \frac{1}{2}$
- $\Pr[win|s] = \Pr[win] + \varepsilon$, $\Pr[win|u] = \Pr[win] - \varepsilon$

Probabilities bounded:

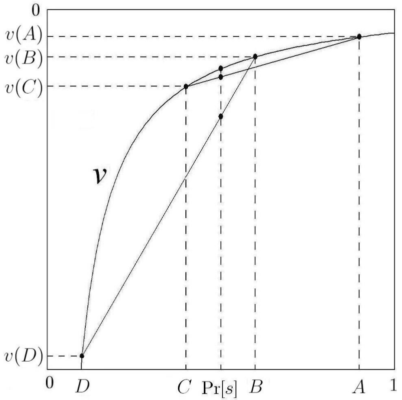
- $\varepsilon = \Pr[win] \Pr[lose]$
- So skill gap $\Pr[win|s] - \Pr[win|u] = 2 \Pr[win] \Pr[lose]$

So better to win than lose

- $\Pr[s|win] = \frac{1}{2} + \frac{1}{2}(1 - \Pr[win])$
- $\Pr[s|lose] = \frac{1}{2} - \frac{1}{2} \Pr[win]$

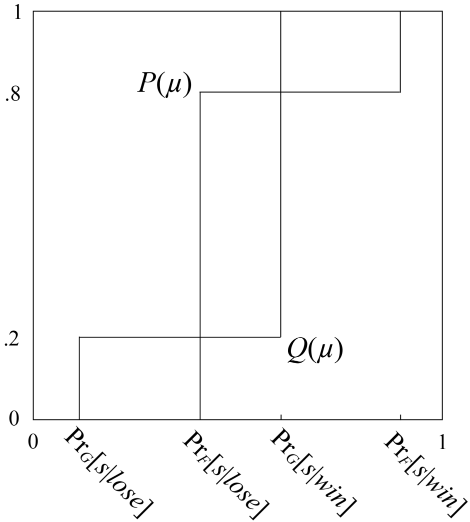
And winning is most impressive for low $\Pr[win]$
While losing is most incriminating for high $\Pr[win]$

Downside risk aversion implies lower risk premium from "long-shot"



- $\frac{v(A)-v(D)}{A-D} > \frac{v(B)-v(C)}{B-C}$
- $pA + (1-p)C = E[s]$
- $(1-p)B + pD = E[s]$
- $p(A-D) = (1-p)(B-C)$
- Therefore longshot favored: $pv(A) + (1-p)v(C) > (1-p)v(B) + pv(D)$

Orderings of Posterior Skill Distributions



Posterior Skill Distributions from any Two Gambles Never FOSD Ordered

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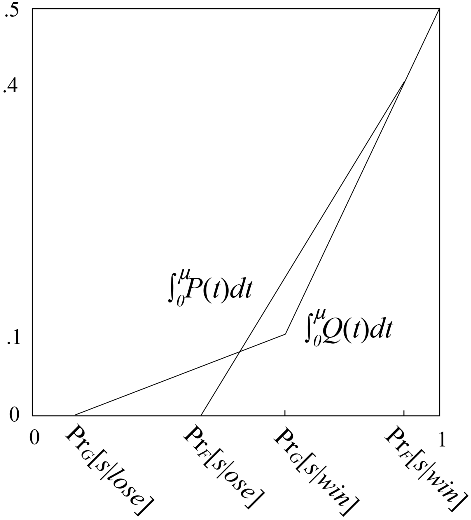

Posterior Skill Distributions from Equal Skill Gap Gambles Never SOSD Ordered

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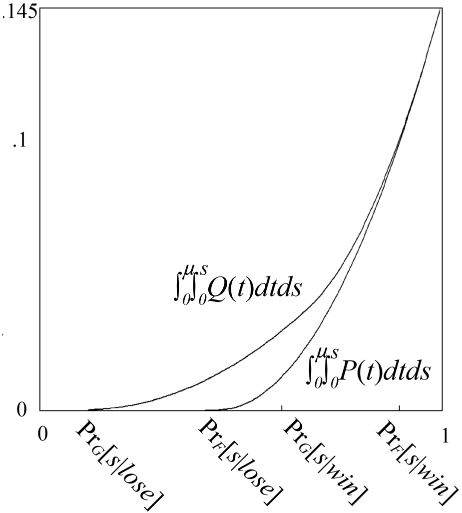

Posterior Skill Distributions
from Equal Skill Gap Gambles
TOSD Ordered if
$Pr_F[win]+Pr_G[win] \geq 1$

Long-shots favored over sure-things

Two gambles F and G where $\Pr_F[win] < \Pr_G[win]$, same skill gap

- (1) Expected skill estimate always the prior $\Pr[s]$
- (2) $\Pr_F[s|win] - \Pr_F[s|lose] = \Pr_G[s|win] - \Pr_G[s|lose]$
- (3) $\Pr_F[s|lose] > \Pr_G[s|lose]$ so F has less downside risk
- (4) $\Pr_F[win] + \Pr_G[win] \geq 1$

- Same expected skill, same variance, but F has less "downside risk"
- $F \succ_{TOSD} G$ so If $v' > 0$, $v'' < 0$, $v''' > 0$ then F has higher expected utility

Proposition

For performance skill without private information: (i) the embarrassment premium π is always positive, and (ii) the embarrassment premium π is lower for long-shot gamble F than complementary sure-thing gamble G.

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Imputing w(p) from risk premia

- Recall risk premium π is just how much money decider would forego to avoid skill update from gamble
- Probability weight that would be calculated if ignore embarrassment aversion is then, for $p = \Pr[win]$,

$$w(p) = p - \frac{\pi}{win - lose}$$

- We have found π is smaller for $p < 1/2$ than $p > 1/2$
- But prospect theory says $w(p) > p$ for small p and $w(p) < p$ for large p, so negative π for small p

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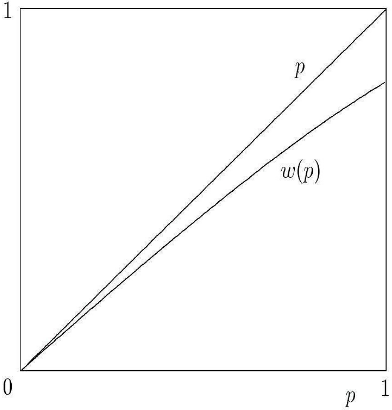
Imputed w(p) for example

- $lose = 0$, $win = 10$, $v = -1/\Pr[s]$, $\Pr[s], \Pr[g] = 1/2$
- $\Delta = \Pr[win|s] - \Pr[win|u] = 2\Pr[win]\Pr[lose]$



Now suppose decision maker has private info on skill

Sees noisy signal $\theta \in \{g, b\}$ of skill
Signal correlated with skill, skill correlated with winning

- $\Pr[s|g] > \Pr[s|b]$, $\Pr[win|s] > \Pr[win|u]$

No extra information about winning given skill

- So $\Pr[win|q, \theta] = \Pr[win|q]$

Updating may condition on both θ and $x \in \{win, lose\}$

- $\Pr[s|x, \theta] = \Pr[s|\theta] + \frac{\Pr[x|s,\theta] - \Pr[x|u,\theta]}{\Pr[x|\theta]} \Pr[s|\theta] \Pr[u|\theta]$

Now have signaling game

Look at perfect Bayesian equilibria

- Separating equilibrium infers $\theta = g$ if accept, $\theta = b$ if refuse
- Both-gamble eq: refusal by type b (D1 or seq eq)
- Neither-gamble eq: acceptance by type g (D1 or seq eq)

Separating equilibrium:

- $E[x|g] - z \geq v(\Pr[s|b]) - E[v(\Pr[s|x,g])|g]$
- $E[x|b] - z < v(\Pr[s|b]) - E[v(\Pr[s|x,g])|b]$

Separating equilibrium risk premia:

- $\pi_g = v(\Pr[s|b]) - E[v(\Pr[s|g,x])|g]$
- $\pi_b = v(\Pr[s|b]) - E[v(\Pr[s|g,x])|g]$

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"Overconfidence" or loss aversion both possible

If decider has information about skill then faces a tradeoff

- Take a chance and maybe look bad
- Avoid the gamble and definitely look bad

Skill signal very weak then avoiding gamble not so embarrassing

- In limit: $\pi_\theta = v(\Pr[s]) - E[v(\Pr[s|x])] > 0$

Skill signal very strong then avoiding gambling very embarrassing

- $\pi_\theta = v(0) - v(1) < 0$

If gamble is a long shot then taking gamble not so risky

- $\pi_\theta = v(\Pr[s|b]) - E[v(\Pr[s|g,x])|\theta] <?0$

"Overconfidence" or loss aversion both possible

If decider has information about skill then faces a tradeoff

- Take a chance and maybe look bad
- Avoid the gamble and definitely look bad

Skill signal very weak then avoiding gamble not so embarrassing

- In limit: $\pi_\theta = v(\Pr[s]) - E[v(\Pr[s|x])] > 0$

Skill signal very strong then avoiding gambling very embarrassing

- $\pi_\theta = v(0) - v(1) < 0$

If gamble is a long shot then taking gamble not so risky

- $\pi_\theta = v(\Pr[s|b]) - E[v(\Pr[s|g,x])|\theta] <?0$

Still have long-shot bias

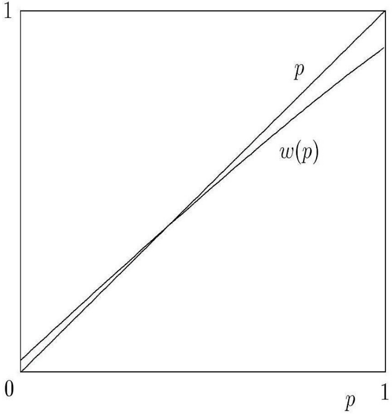
Gambles F and G are *complementary* if $\Pr_F[win] = \Pr_G[lose]$, $\Pr_F[win|s,\theta] - \Pr_F[win|u,\theta] = \Pr_G[win|s,\theta] - \Pr_G[win|u,\theta]$, $\Pr_F[q|\theta] = \Pr_G[q|\theta]$.

Proposition

For performance skill with private skill signal θ, in any equilibrium the measurable embarrassment premia π_θ are (i) positive for sufficiently weak signal θ, (ii) negative for sufficiently strong signal θ or sufficiently small skill gap Δ, and (iii) lower for long-shot F than complementary sure-thing G.

Imputed w(p) for performance skill with informed decision maker

- $lose = 0$, $win = 10$, $v = -1/\Pr[s]$, $\Pr[s] = \Pr[g] = 1/2$
- $\Delta = \Pr[win|s] - \Pr[win|u] = 2\Pr[win]\Pr[lose]$
- $\Pr[s|g] - \Pr[s|b] = 1/10$



Multiple equilibria captures aspect of "framing"?

Binary signal so multiple equilibria hard to refine away

- If expect neither-gamble equilibrium then not gambling is safe
- But if expect separating or both-gamble equilibrium then not gambling reveals of lack of confidence
- Can framing of the gamble suggest receiver's beliefs about which equilibrium is being played?

Subjects refuse gamble when outcomes are framed as gains

- No need to prove anything - neither-gamble eq

Subjects accept gamble when outcomes are framed as losses

- Try to prove you are good - separating or both-gamble eq

So framing can "dare" subject into taking a gamble

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Evaluation skill

"Evaluation skill": some people better at evaluating odds

- Talented manager picks better projects
- Skilled investor picks better investments

Holmstrom (1982/1999) considered both types of skill

- Evaluation skill: distorted investments (Holmstrom, 1982/1999), herding (Scharfstein and Stein, 1990), anti-herding (Avery and Chevalier, 1999), sunk costs (Kanodia, Bushman, and Dickhaut, 1989), conservatism and overconfidence (Prendergast and Stole, 1996), political correctness (Stephen Morris, 2001) ...
- Performance skill: Rat race career incentives (Holmstrom, 1982/1999), excessive risk-taking (Bengt Holmstrom and Joan Costa, 1986), corporate conformism (Jeffrey Zwiebel, 1995) ...

Decider has private information on gamble (not own skill)

Sees noisy signal $\theta \in \{g, b\}$ where $\Pr[win|g] > \Pr[win|b]$

- Signal more informative of true odds if decider is skilled: $\Pr[win|s,g] > \Pr[win|u,g]$, $\Pr[win|s,b] < \Pr[win|u,b]$
- No independent information about skill: $\Pr[s|g] = \Pr[s|b]$
- No performance component: $\Pr[win|s] = \Pr[win|u]$

Example:

- True probability of success equal chance $p + \varepsilon$ or $p - \varepsilon$
- $\Pr[win|s,g] = p + \frac{\varepsilon}{2}$
- $\Pr[win|s,b] = p - \frac{\varepsilon}{2}$
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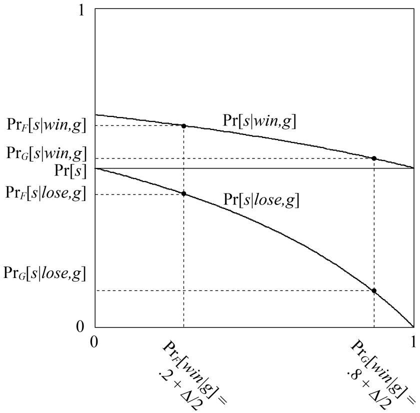
Skill estimates from taking gamble



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Relative long-shot bias, and more gambling with long-shots

Proposition

With evaluation skill when the outcome of a refused gamble is not observed: (i) the embarrassment premia π_θ in all standard equilibria are non-negative (ii) the embarrassment premia π_θ are lower in any standard equilibrium for long-shot F than complementary sure-thing G.

What if also observe outcome of a refused gamble?

For evaluation skill refusing a successful gamble looks bad

- Didn't invest in an asset that does really well
- Didn't pursue a project that competitor succeeds with

In separating equilibrium refusing or taking gamble can be more embarrassing – depends on odds

- Refusing long-shot like taking near sure-thing – large downside
- Refusing near sure-thing like taking long-shot – small downside

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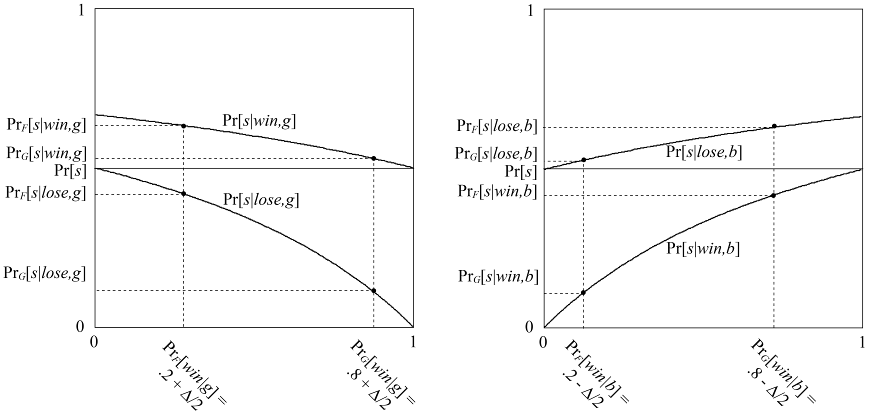
Skill estimates from taking and refusing gamble



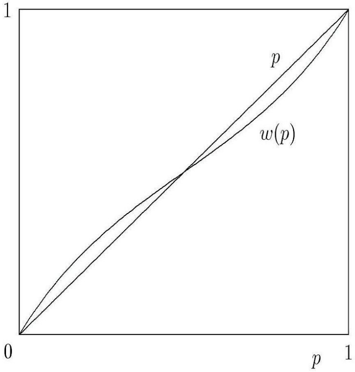
Effect on risk premia and long-shot bias?

Proposition

With evaluation skill when the outcome of a refused gamble is observed: (i) in the separating equilibrium where g types gamble and b types refuse the average embarrassment premium π is negative for $\Pr[win|g] < 1/2$ and positive for $\Pr[win|b] > 1/2$, (ii) in the both-gamble equilibrium the embarrassment premium π_θ is non-positive, and (iii) in the both-refuse equilibrium the embarrassment premium π_θ is non-negative.

Imputed w(p) for evaluation skill with outcomes always observed

- $lose = 0$, $win = 1$, $v = -1/\Pr[s]$, $\Pr[s] = \Pr[g] = 1/2$
- True odds $p + \varepsilon$ or $p - \varepsilon$, skilled decider's signal θ is accurate with probability $3/4$, $\varepsilon = p(1-p)$
- $\Pr[win|s, g] = p + \frac{\varepsilon}{2}$, $\Pr[win|s, b] = p - \frac{\varepsilon}{2}$, $\Pr[win|u, \theta] = p$



Relevance for prospect theory and career concerns

Does career concerns provide a foundation for prospect theory?

- Experiments done without any explicit skill component
- Early tests were thought experiments without real stakes so subjects had to imagine what they would do - and in real world almost all risk has skill component
- Even in experiments with real stakes expect some spillover from real world

Is prospect theory a good reduced form model of career concerns?

- Lots of evidence that managers do engage in skill signaling
- And that their behavior is consistent with prospect theory
- So why not just use prospect theory?
- Skill signaling is simplest career concern model - can get very different behavior as change information and incentives

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Self-Esteem and Impression Management

Self-Esteem (James, 1890)

- Self-esteem ratio of successes to “pretensions”
- Raise self-esteem “as well by diminishing the denominator as increasing the numerator”
- Skill signaling model shows that odds of gamble matter too

Impression Management (Goffman, 1967)

- Presentation of self to others
- Unexpected failure is main source of embarrassment

Atkinson Achievement motivation model

- Decider chooses a gamble with a p chance of success
- Constants $m_s > 0$ and $m_f > 0$ are strength of motives to gain success and avoid failure
- Benefit from success is $1 - p$, from failure is $-p$

- Expected payoff $pm_s(1-p) + (1-p)m_f(-p)$
- Or simplifying $\left(m_s - m_f\right) p \left(1 - p\right)$
- Max at $p = 1/2$ for $m_s > m_f$, at $p \in \{0, 1\}$ for $m_s < m_f$
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Reconstructed Atkinson model

Linear updating

- $\Delta = \Pr[win|s] - \Pr[win|u] = \alpha p(1-p)$
- $\Pr[s|win] = \Pr[s] + \alpha(1-p)\Pr[s]\Pr[u]$
- $\Pr[s|lose] = \Pr[s] - \alpha p \Pr[s]\Pr[u]$

So in our skill signaling model $E[v] = pv(\Pr[s] + \alpha(1-p)\Pr[s]\Pr[u]) + (1-p)v(\Pr[s] - \alpha p \Pr[s]\Pr[u])$

Suppose v piecewise linear

- Kink at $\Pr[s]$, slopes m_s and m_f
- Normalize $v(\Pr[s]) = 0$

$E[v] = pm_s\alpha(1-p)\Pr[s]\Pr[u] + (1-p)m_f\alpha(-p)\Pr[s]\Pr[u]$
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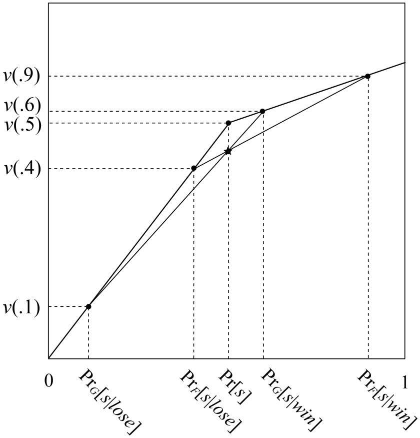
Implied expected utility in achievement motivation model



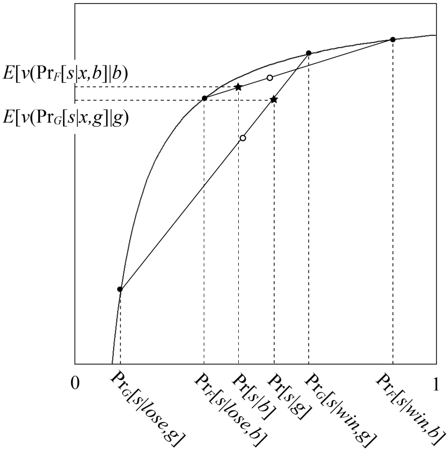
Atkinson gets risk aversion by effectively using piecewise linear utility function

But doesn't allow for downside risk aversion

If add downside risk aversion then predicts data

Realizes Atkinson's insight that there is "little embarrassment in failing" at difficult tasks and a great "sense of humiliation" in failing at easy tasks

Self-Handicapping (Jones and Berglas, 1978)



People make gambles deliberately hard

So failure is less of a bad sign - but more common!

And self-handicapping is itself a bad signal

Different predictions from Prospect Theory?