Someone likes it Skewed
An Experimental Analysis of Skewness and Risk Aversion

Anna Bassi, Ric Colacito, and Paolo Fulghieri
Motivation

- Classical portfolio theory and mean-variance framework.
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  - Kahneman and Tversky (1979): positively skewed lotteries more attractive to loss-averse decision makers;
  - agents favor riskier option which offer a small probability of large gains (positive skewness).
Findings

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- Results are robust for changing the $ amount at stake in the lotteries (skewness is insensitive to the magnitudes at stake).

- The behavior of the “Skew Lovers” cannot be reconciled with standard globally concave utility functions.

- “Skew lovers” display a lower degree of risk aversion in the Holt-Laury task, but it is still consistent with the prediction of standard utility functions.
Experimental Design

- Controlled experiment where subjects were exposed to different lottery tasks (treatments).
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- 3X2 within-subject design
  - Tasks treatments (Risk/Skewness/Risk+Skewness);
  - Payoff treatments (High/Low).
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- Last, subjects were asked to complete a questionnaire.
Questionnaire

- Age, Gender, Marital status, Employment status
- Income: Personal income, Family income
- Education: Major, year, highest education of parents
- Voting: vote cast in last election, intention to vote in next
- Risky actions: gambling, playing lotteries
- Religion
- Political leaning
Holt and Laury Treatment

<table>
<thead>
<tr>
<th>Option A</th>
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<tbody>
<tr>
<td>Decision 1 : $2.00 w.p 10% , $1.60 w.p 90%</td>
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<tr>
<td>Decision 2 : $2.00 w.p 20% , $1.60 w.p 80%</td>
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<tr>
<td>Decision 3 : $2.00 w.p 30% , $1.60 w.p 70%</td>
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<tr>
<td>Decision 4 : $2.00 w.p 40% , $1.60 w.p 60%</td>
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<td>Decision 5 : $2.00 w.p 50% , $1.60 w.p 50%</td>
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<td>Decision 6 : $2.00 w.p 60% , $1.60 w.p 40%</td>
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<td>Decision 7 : $2.00 w.p 70% , $1.60 w.p 30%</td>
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<td>Decision 8 : $2.00 w.p 80% , $1.60 w.p 20%</td>
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<tr>
<td>Decision 9 : $2.00 w.p 90% , $1.60 w.p 10%</td>
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<tr>
<td>Decision 10 : $2.00 w.p 100% , $1.60 w.p 0%</td>
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<td>0.85 1.50 1.50 3.25</td>
</tr>
<tr>
<td>Decision 3 : 1.72 0.18 0.87 1.76</td>
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<tr>
<td>Decision 4 : 1.76 0.19 0.41 1.17</td>
<td>1.60 1.84 0.41 1.17</td>
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<tr>
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<td>1.98 1.88 0.00 1.00</td>
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Notes - The top panel reports the paired choices for the risk aversion treatment. The bottom panel shows mean, volatility, skewness, and kurtosis for each lottery.
## Skewness Treatment

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<td>0.28</td>
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<td>1.17</td>
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<tr>
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Skewness Treatment
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![Skewness Treatments Graph]

- Low Payoffs
- High Payoffs
- Power-expo

Percentage of A choices vs Skewness Treatments

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Skewness Decomposed

**Skewness Treatment (Skew Averse)**

- Low Payoffs
- High Payoffs
- Estimate

**Skewness Treatment (Skew Lover)**

- Low Payoffs
- High Payoffs
- Estimate
Skewness Decomposed

\[ \gamma = 0.84 \]

\[ \gamma = -0.80 \]
Holt and Laury Treatment

Risk Aversion Treatment (Low Payoffs)

Risk Aversion Treatment (High Payoffs)
Holt and Laury Treatment

\[ \gamma_{\text{Skew Averse}} = 0.69 \]
\[ \gamma_{\text{Skew Lover}} = 0.19 \]

\[ \gamma_{\text{Skew Averse}} = 0.99 \]
\[ \gamma_{\text{Skew Lover}} = 0.57 \]
Skewness and Variance Treatment

Risk and Skewness Treatment (Low Payoffs)

Risk and Skewness Treatment (High Payoffs)
Skewness and Variance Treatment

\[ \gamma_{\text{Skew Averse}} = 0.98 \]
\[ \gamma_{\text{Skew Lover}} = 0.48 \]

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\[ \gamma_{\text{Skew Lover}} = 0.56 \]
Changing Risk Aversion

\[ u(x) = \frac{x^{1-\gamma_1}}{1-\gamma_1} \cdot I(x \leq \theta) + \left[ \frac{x^{1-\gamma_2}}{1-\gamma_2} - \kappa \right] \cdot I(x > \theta) \]
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- Risk Aversion changes before and after the point \( \theta \)
- Estimate \( \gamma_1, \gamma_2, \) and \( \theta \) for the two groups
Utility functions

Skew Averse

Skew Lover
Utility functions

\[ \gamma_1 = 0.9024 \quad \gamma_1 = -8.390 \]
\[ \gamma_2 = 0.9022 \quad \gamma_2 = 0.509 \]
\[ \theta = 0.676 \quad \theta = 0.234 \]
Concluding Remarks

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- Preference for skewness is insensitive to the magnitudes at stake.

Why do we care? Individuals' behavior in the face of negatively skewed gambles is a key ingredient in the "rare events" literature.

What happens if the economy is populated by skew averse and skew loving agents?

How is wealth distributed between the two groups?

What happens to the compensation for risk?
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  - What happens if the economy is populated by skew averse and skew loving agents?
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