RISK PREFERENCES & LOTTERIES

# Holt-Laury Risk Task

A widely used lottery-choice procedure for measuring individual attitudes toward risk.



10 ROWS
**Paired lotteries**

OPTION A
**Lower variance**

OPTION B
**Higher variance**

Participants make ten paired choices between a safer and a riskier lottery. The probability of the high payoff rises row by row, revealing where each person switches from the safer option to the riskier one.

01 THE QUESTION
02 THE CHOICE
03 THE MECHANISM
04 THE EVIDENCE

A practical guide to the experimental design, the economic intuition, and the interpretation of results.

# Ten choices, one switching point

Each row asks participants to choose between Option A (safer) and Option B (riskier). The probability of receiving the high outcome increases from 10% to 100%.

### THE TWO OPTIONS

A: (p, \$2.00; 1−p, \$1.60)  B: (p, \$3.85; 1−p, \$0.10)
Across rows, $p_j = j/10$ for j = 1, …, 10; the complementary probability is $1-p_j$.

| ROW | p_j | OPTION A: PAYOFFS | OPTION B: PAYOFFS | EV A | EV B |
|---|---|---|---|---|---|
| 1 | 10% | 10%: \$2.00 \| 90%: \$1.60 | 10%: \$3.85 \| 90%: \$0.10 | \$1.64 | \$0.475 |
| 2 | 20% | 20%: \$2.00 \| 80%: \$1.60 | 20%: \$3.85 \| 80%: \$0.10 | \$1.68 | \$0.850 |
| 3 | 30% | 30%: \$2.00 \| 70%: \$1.60 | 30%: \$3.85 \| 70%: \$0.10 | \$1.72 | \$1.225 |
| 4 | 40% | 40%: \$2.00 \| 60%: \$1.60 | 40%: \$3.85 \| 60%: \$0.10 | \$1.76 | \$1.600 |
| 5 | 50% | 50%: \$2.00 \| 50%: \$1.60 | 50%: \$3.85 \| 50%: \$0.10 | \$1.80 | \$1.975 |
| 6 | 60% | 60%: \$2.00 \| 40%: \$1.60 | 60%: \$3.85 \| 40%: \$0.10 | \$1.84 | \$2.350 |
| 7 | 70% | 70%: \$2.00 \| 30%: \$1.60 | 70%: \$3.85 \| 30%: \$0.10 | \$1.88 | \$2.725 |
| 8 | 80% | 80%: \$2.00 \| 20%: \$1.60 | 80%: \$3.85 \| 20%: \$0.10 | \$1.92 | \$3.100 |
| 9 | 90% | 90%: \$2.00 \| 10%: \$1.60 | 90%: \$3.85 \| 10%: \$0.10 | \$1.96 | \$3.475 |
| 10 | 100% | 100%: \$2.00 \| 0%: \$1.60 | 100%: \$3.85 \| 0%: \$0.10 | \$2.00 | \$3.85 |

### EXPECTED-VALUE CHECK

$EV_A(p) = 2p + 1.60(1-p) = 1.60 + 0.40p$
$EV_B(p) = 3.85p + 0.10(1-p) = 0.10 + 3.75p$
Set $EV_A(p^*) = EV_B(p^*)$: $p^* = 1.50/3.35 \approx 0.448$. At row 5 (p = 0.50), $EV_B = \$1.975 > EV_A = \$1.800$.

# What the switching point tells you

The number of safer choices is a convenient summary of risk-taking. Under expected utility, the switching row reflects the curvature of utility over monetary outcomes.

### THE EXPECTED-UTILITY COMPARISON

$$EU_A(p) = p \cdot u(2.00) + (1-p) \cdot u(1.60)$$
$$EU_B(p) = p \cdot u(3.85) + (1-p) \cdot u(0.10)$$

Choose A if $EU_A(p) \geq EU_B(p)$; otherwise choose B.

### LATER SWITCH

The participant chooses the safer lottery in more rows. Under the expected-utility interpretation, this is consistent with greater risk aversion over the payoff range used.

### EARLIER SWITCH

The participant switches to the riskier lottery at a lower probability of the high payoff. Under the same framework, this is consistent with lower risk aversion or risk neutrality/seeking, depending on the switch.

### THE TYPICAL RISK-NEUTRAL BENCHMARK

The risk-neutral crossover is $p^* \approx 0.448$. Thus, the benchmark is A in rows 1-4 and B from row 5 onward ($p = 0.50$). This is not an answer key for every participant.

For CRRA utility, $u(x) = [x^{1-r} - 1]/(1-r)$ when $r \neq 1$, and $u(x) = \ln(x)$ when $r = 1$. The parameter r measures relative risk aversion; estimate it by fitting the choice inequalities and allowing for response error.

# A practical protocol with real incentives

The standard procedure uses ten choices, then randomly selects one row for payment. Participants should not know in advance which decision will count.

## PROCEDURE

- Explain the probabilities. Use a ten-sided die or an equivalent visual device to make 10%, 20%, ... 100% intuitive.
- Present all ten rows. In every row, participants choose A or B. Do not reveal expected values unless that is part of the design.
- Select a row at random. After all choices, randomly choose one of the ten rows for payment.
- Draw the outcome. Use the selected lottery's probabilities to determine the paid outcome.
- Pay privately. Make payment rules and timing clear before the task begins.

## DATA AND QUALITY CHECKS

- Record the choice in every row, not just the switch row.
- Flag multiple switching as a possible inconsistency; do not silently delete it.
- Check probability comprehension and whether participants understand the payment procedure.
- Keep stake size, currency, and payment conditions consistent across participants.

## MEASUREMENT

Primary summary: number of safe A choices or the first row switching to B. Also report monotonicity and the full choice pattern.

Relate row-level choices to treatment, stakes, and participant covariates. Account for repeated choices within each participant using participant-level or clustered inference.

## INCENTIVE NOTE

The original Holt-Laury study compared incentive levels, including low and higher stakes. Changing the scale of payoffs can itself change measured risk-taking, so state the stake treatment clearly.

# Limits, variants, and key readings

The Holt-Laury task is popular because it is compact and incentivized. Its interpretation still depends on assumptions about utility, probability perception, and response consistency.

### WHAT YOU CAN CONCLUDE

- The switching pattern provides a simple measure of choices between relatively safe and risky lotteries.
- Under expected utility and the stated payoffs, later switching is consistent with greater risk aversion.
- Comparing randomized stake treatments can test whether risk choices change with incentives.

### LIMITATIONS

- Probability weighting can affect choices, not just utility curvature.
- Multiple switching may reflect noise or misunderstanding.
- Results depend on stake size and payoff range.
- Ten choices give a coarse measure for each person.

### USEFUL EXTENSIONS

- Compare low- and high-stakes versions.
- Vary gains and losses or use loss-domain lotteries separately.
- Add measures of probability understanding and ambiguity attitudes.
- Randomize row order only with a clear plan for comparability.

### FOUNDATIONAL READINGS

Holt, C. A. & Laury, S. K. (2002). “Risk Aversion and Incentive Effects.” American Economic Review, 92(5), 1644-1655.

Holt, C. A. & Laury, S. K. (2005). “Risk Aversion and Incentive Effects: New Data without Order Effects.” American Economic Review, 95(3), 902-912.

The table on page 2 reproduces the standard low-payoff lottery structure in a readable classroom format. If adapting it to another currency, preserve the probability structure and document the payoff conversion.