The Allais Paradox

Notes on Behavioural Economics

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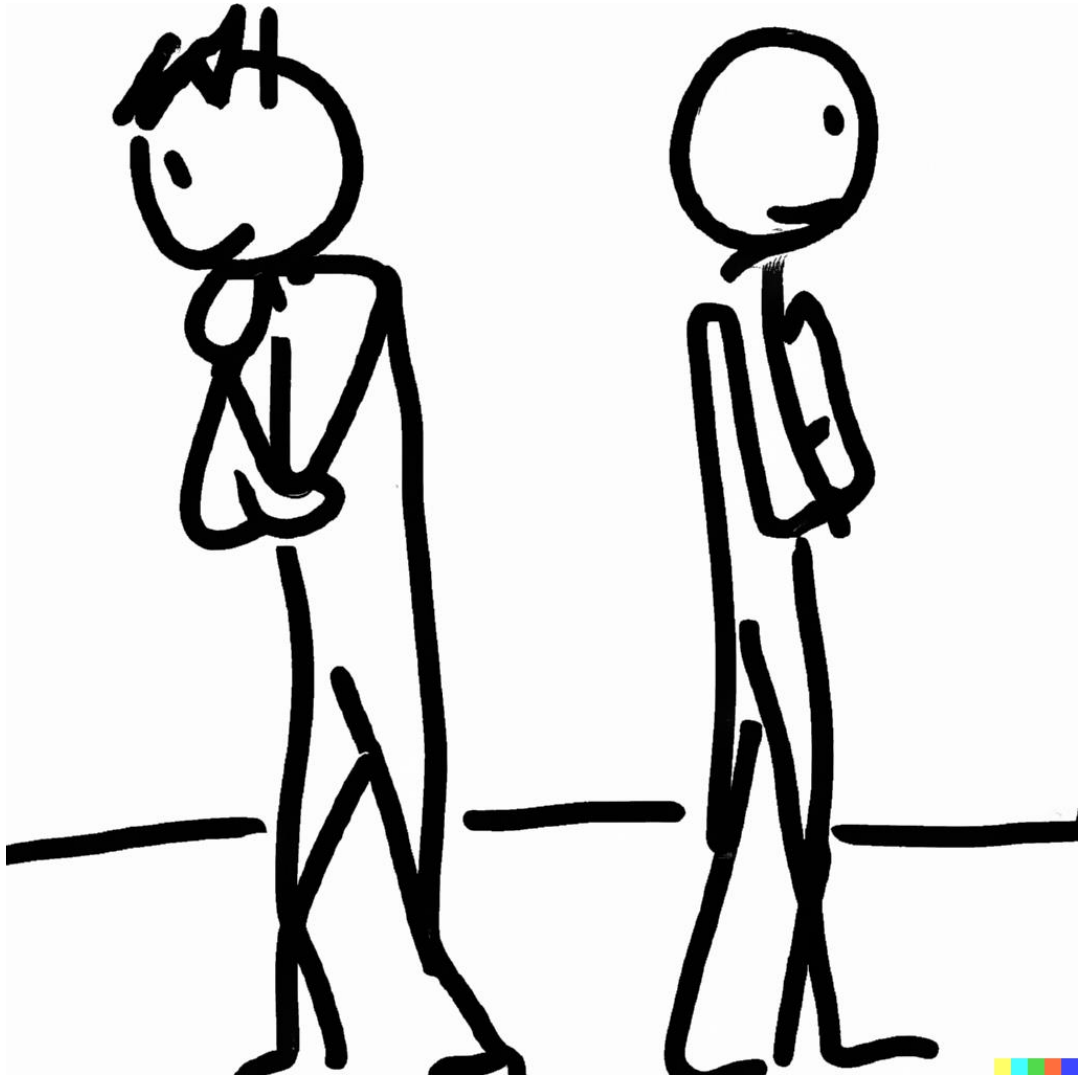

Choice 1

Bet A:

$2500 with probability 33%

$2400 with probability 66%

$0 with probability 1%

Bet B:

$2400 with probability 100%

Choice 2

Bet C:

$2500 with probability 33%

$0 with probability 67%

Bet D:

$2400 with probability 34%

$0 with probability 66%

Choice 1

Bet A:

$2500 with probability 33%

$2400 with probability 66%

$0 with probability 1%

Bet B:

$2400 with probability 100%

Choice 1

Bet A:

$2500 with probability 33%

$2400 with probability 66%

$0 with probability 1%

Bet B:

$2400 with probability 100%

$$U(2400) > 0.33U(2500) + 0.66U(2400) + 0.01U(0)$$

Choice 1

Bet A:

$2500 with probability 33%

$2400 with probability 66%

$0 with probability 1%

Bet B:

$2400 with probability 100%

$$U(2400) > 0.33U(2500) + 0.66U(2400) + 0.01U(0)$$

$$0.34U(2400) > 0.33U(2500) + 0.01U(0)$$

Choice 2

Bet C:

$2500 with probability 33%

$0 with probability 67%

Bet D:

$2400 with probability 34%

$0 with probability 66%

Choice 2

Bet C:

$2500 with probability 33%

$0 with probability 67%

Bet D:

$2400 with probability 34%

$0 with probability 66%

$$0.33U(2500) + 0.67U(0) > 0.34U(2400) + 0.66U(0)$$

Choice 2

Bet C:

$2500 with probability 33%

$0 with probability 67%

Bet D:

$2400 with probability 34%

$0 with probability 66%

$$0.33U(2500) + 0.67U(0) > 0.34U(2400) + 0.66U(0)$$

$$0.33U(2500) + 0.01U(0) > 0.34U(2400)$$

The Allais Paradox

If an agent chooses B:

$$0.34U(2400) > 0.33U(2500) + 0.01U(0)$$

If an agent selects C:

$$0.33U(2500) + 0.01U(0) > 0.34U(2400)$$

Choice 1				Choice 2			
A		B		C		D	
Payoff	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**
$2400	66%	$2400	100%	$0	67%	$0	66%
$0	1%					$2400	34%
$2500	33%			$2500	33%		

Choice 1				Choice 2			
A		B		C		D	
Payoff	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**
$2400	66%	$2400	100%	$0	67%	$0	66%
$0	1%					$2400	34%
$2500	33%			$2500	33%		

Choice 1				Choice 2			
A		B		C		D	
Payoff	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**
$2400	66%	$2400	66%	$0	66%	$0	66%
$0	1%	$2400	34%	$0	1%	$2400	34%
$2500	33%			$2500	33%		

Choice 1				Choice 2			
A		B		C		D	
Payoff	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**
$2400	66%	$2400	100%	$0	67%	$0	66%
$0	1%					$2400	34%
$2500	33%			$2500	33%		

Choice 1				Choice 2			
A		B		C		D	
Payoff	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**
$2400	66%	$2400	66%	$0	66%	$0	66%
$0	1%	$2400	34%	$0	1%	$2400	34%
$2500	33%			$2500	33%		

The Allais Paradox

Let x, y and z be lotteries with $x \succcurlyeq y$ and let p be the probability that a third option z is present. Then:

$$pz + (1-p)x \succcurlyeq pz + (1-p)y$$

For each of the choices in our lottery:

x is a 1 in 34 chance of \$0 and a 33 in 34 chance of \$2500

y is a 100% chance of \$2400

z is \$2400 in choice 1 and \$0 in choice 2.

Choice 1				Choice 2			
A		B		C		D	
Payoff	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**	**Payoff**	**Chance**
$2400	66%	$2400	66%	$0	66%	$0	66%
$0	1%	$2400	34%	$0	1%	$2400	34%
$2500	33%			$2500	33%		