

Uncertainty



Our Typical Problem

- A consumer has income of I
- Choose between spending on x_1 and x_2
- Prices are certain: p_1 and p_2

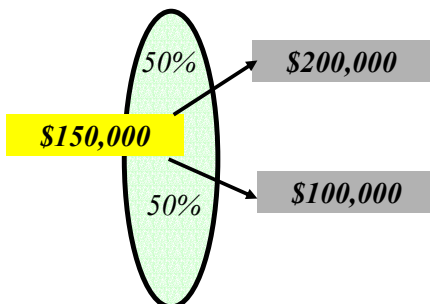
Life is Uncertain

- I must choose
 - Whether to buy insurance
 - Between my current job and another job with an uncertain future.
- In short, many economic choices involve uncertainty.

The Choice

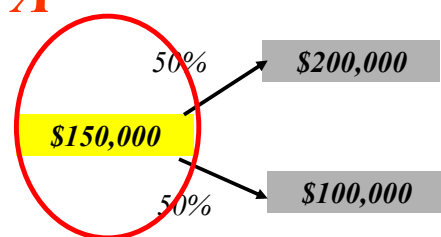
\$150,000

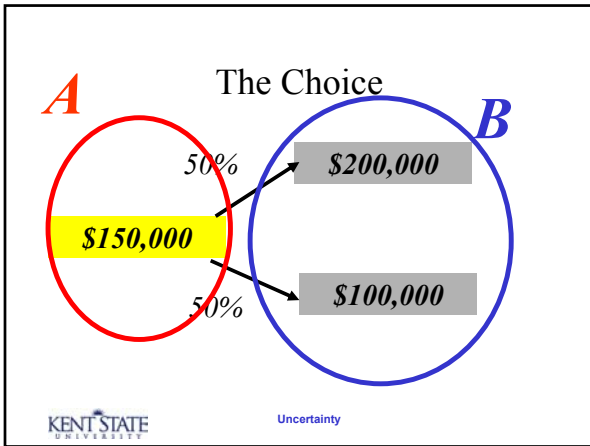
The Choice



A

The Choice





The Economics of Uncertainty

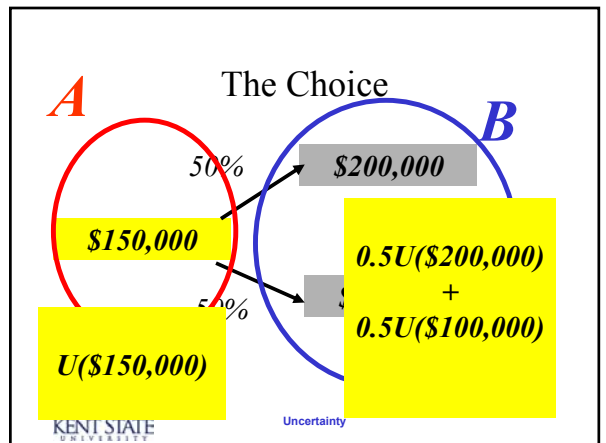
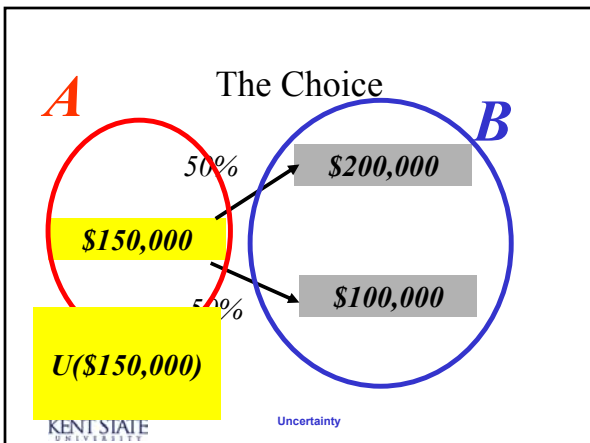
- Utility is a function of income.
- The higher the level of income, the higher the level of utility.

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The Economics of Uncertainty

- Utility is a function of income.
- The higher the level of income, the higher the level of utility.
- Decisions are based on *expected* utility, not expected income.

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The Economics of Uncertainty

$$U(\$150,000) > \frac{1}{2}U(\$200,000) + \frac{1}{2}U(\$100,000)$$

The Economics of Uncertainty

$$U(\$150,000) > \frac{1}{2}U(\$200,000) + \frac{1}{2}U(\$100,000)$$

Don't flip

The Economics of Uncertainty

$$U(\$150,000) < \frac{1}{2}U(\$200,000) + \frac{1}{2}U(\$100,000)$$

The Economics of Uncertainty

$$U(\$150,000) < \frac{1}{2}U(\$200,000) + \frac{1}{2}U(\$100,000)$$

Flip!

The Difference

- $U(\$200,000) > U(\$150,000) > U(\$100,000)$

The Difference

- $U(\$200,000) > U(\$150,000) > U(\$100,000)$
- $U(\$200,000) = 30$
- $U(\$150,000) = 24$
- $U(\$100,000) = 17$

The Difference

- $U(\$200,000) >$
 $U(\$150,000) >$
 $U(\$100,000)$
 - $U(\$200,000) = 30$
 - $U(\$150,000) = 24$
 - $U(\$100,000) = 17$
- $$H = U^2$$

The Difference

- $U(\$200,000) >$
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 - $U(\$200,000) = 30$
 - $U(\$150,000) = 24$
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- $$H = U^2$$
- $H(\$200,000) = 900$
 - $H(\$150,000) = 576$
 - $H(\$100,000) = 289$

The Difference

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- $900 > 576 > 289$**

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- ~~$900 > 576 > 289$~~**

Utility is Ordinal

$$H = aU + b$$

- I can add a constant and multiply by a constant. Period.

Acceptable Transformations

$$H = 2U + 5$$

- $U(\$200,000) = 30$
- $U(\$150,000) = 24$
- $U(\$100,000) = 17$
- $H(\$200,000) = 65$
- $H(\$150,000) = 53$
- $H(\$100,000) = 39$

Acceptable Transformations

$$H = 2U + 5$$

- $U(\$200,000) = 6$ 30
- $U(\$150,000) = 7$ 24
- $U(\$100,000) = 7$ 17
- $H(\$200,000) = 12$ 65
- $H(\$150,000) = 12$ 53
- $H(\$100,000) = 14$ 39

Acceptable Transformations

$$H = 2U + 5$$

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$$6 < 7$$

Marginal Utility Declines

Acceptable Transformations

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- $U(\$150,000) = 7$ 24
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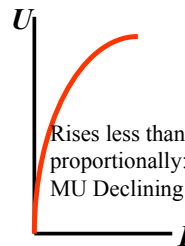
$$6 < 7$$

Marginal Utility Declines

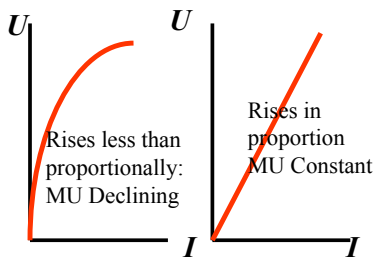
$$12 < 14$$

Marginal Utility Declines

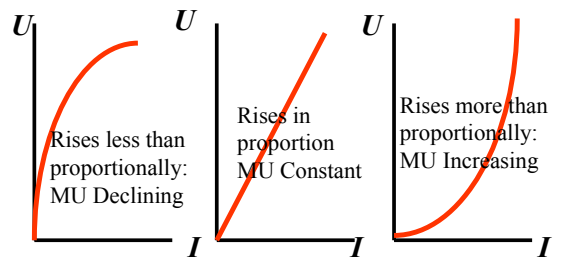
Income and Utility



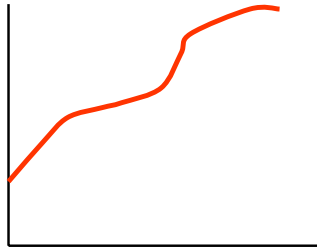
Income and Utility



Income and Utility



And Of Course...



End

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