



BUSINESS ECONOMICS

Slides by CAO Thi Hong Vinh



Chapter 6:

RISK & UNCERTAINTY

- 
- Required: *Business Economics and Managerial Decision Making*, C.3

STRUCTURE

- 1. Definition & Measurement**
- 2. Attitudes to Risk & Uncertainty**
- 3. Decision making**

1. Definition & Mea.

a. Definition

- **Risk:** “Outcomes where the range of potential future outcomes is **known** from past experience”
 - ? Information about outcome dis.
 - Past experience

1. Definition & Mea.

a. Definition

- **Uncertainty**: “Outcomes where estimates have been made but **no probabilities** can be attached to the expected outcomes”
 - ? Information about outcome dis.
 - Subjective confidence level

1. Definition & Mea.

b. Measurement

- Expected value
- Variance
- Standard deviation
- Coefficient of variation: $\text{std}/E[]$

	1	2	3	4	5	6	7	8
	Profit (π)	Expected value (EV)	Deviation $D = \pi - EV$	D^2	Likeli- hood (p)	Variance $D^2 * p$	Standard deviation	Coefficient of variation
Decision A	4,000	5,000	-1,000	1,000,000	0.1	100,000		
	5,000	5,000	0	0	0.8	0		
	6,000	5,000	1,000	1,000,000	0.1	100,000		
						200,000	447	0.089
Decision B	1,000	5,000	-4,000	16,000,000	0.1	1,600,000		
	5,000	5,000	0	0	0.8	0		
	9,000	5,000	4,000	16,000,000	0.1	1,600,000		
						3,200,000	1,789	0.358
Decision C	101,000	105,000	-4,000	16,000,000	0.1	1,600,000		
	105,000	105,000	0	0	0.8	0		
	109,000	105,000	4,000	16,000,000	0.1	1,600,000		
						3,200,000	1,789	0.017

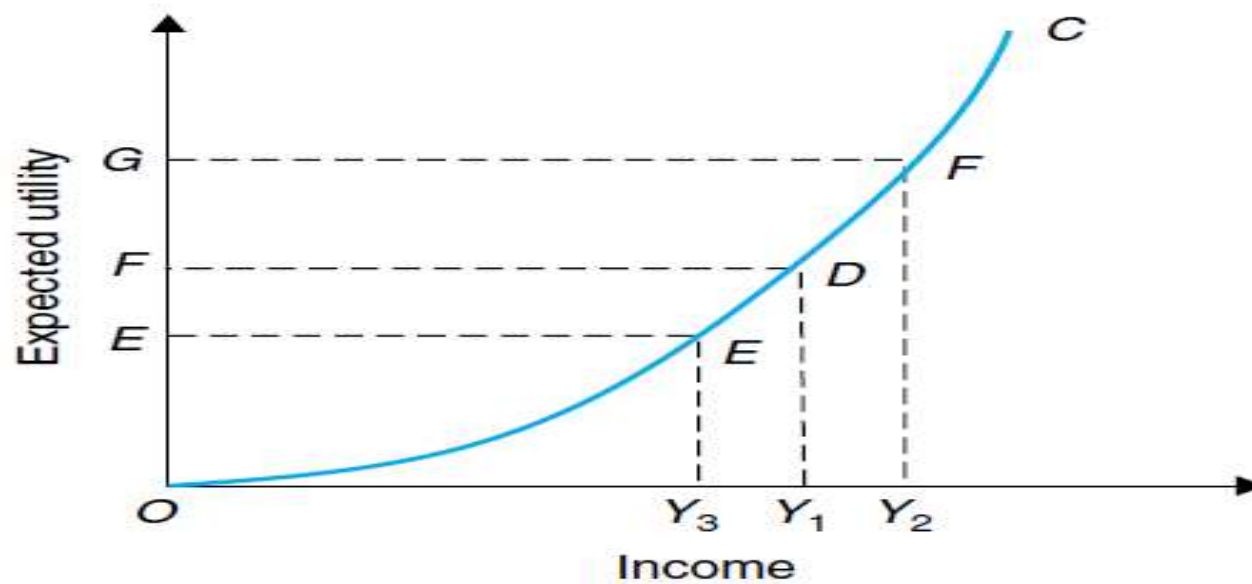
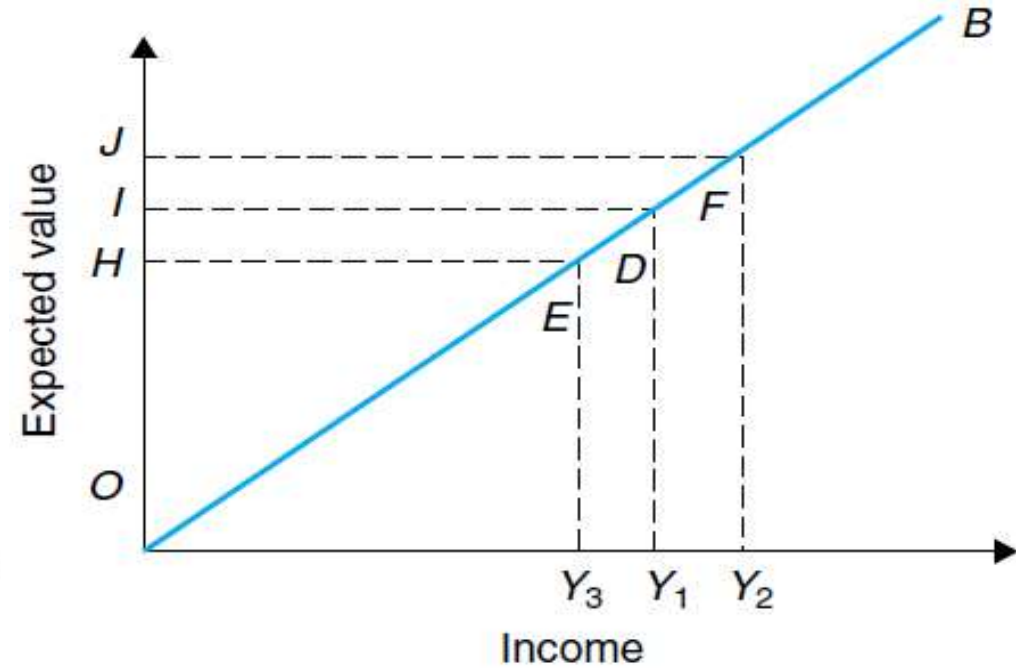
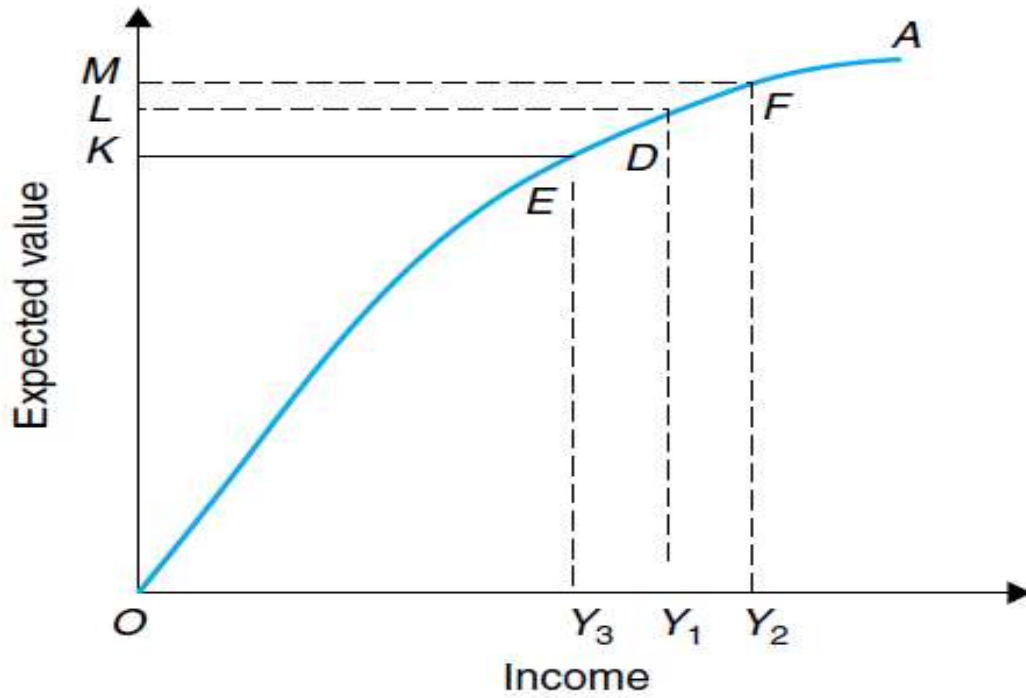
2. Attitudes to R&U

Risk-averse → Risk-neutral →
Risk-loving

*2.1 Based on MU of income
/money*

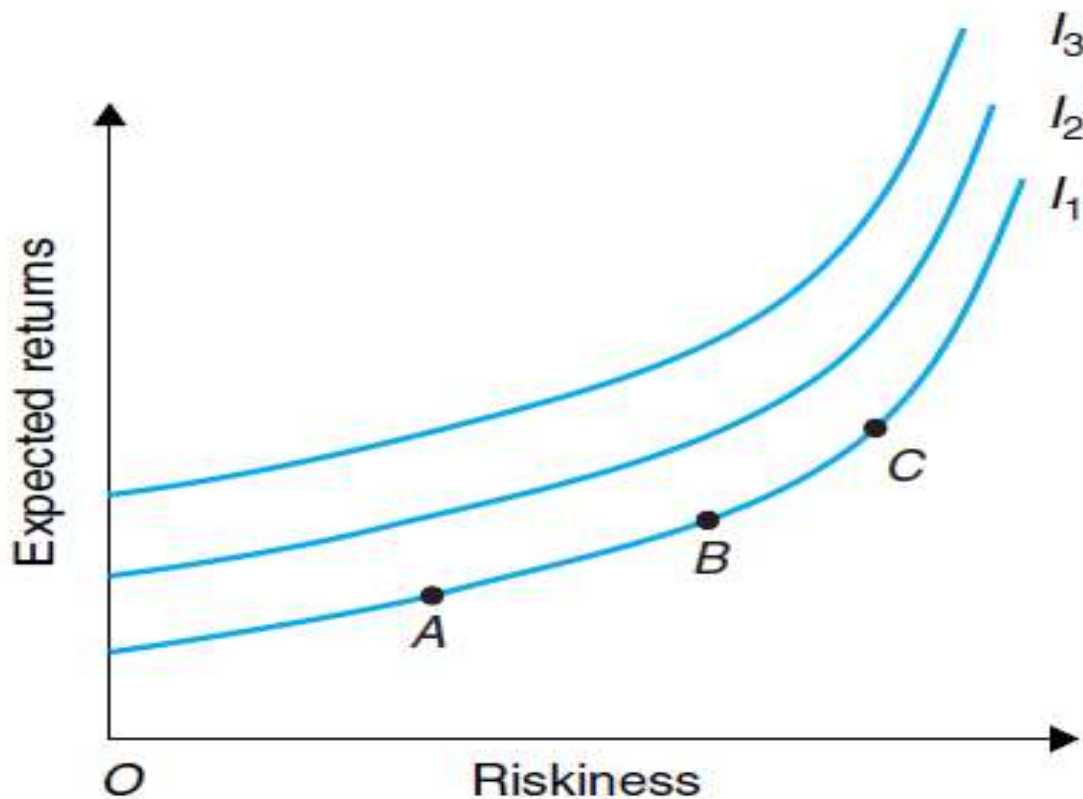
*2.2 Based on indifference curve
of risk and return*

2.1 Based on MU

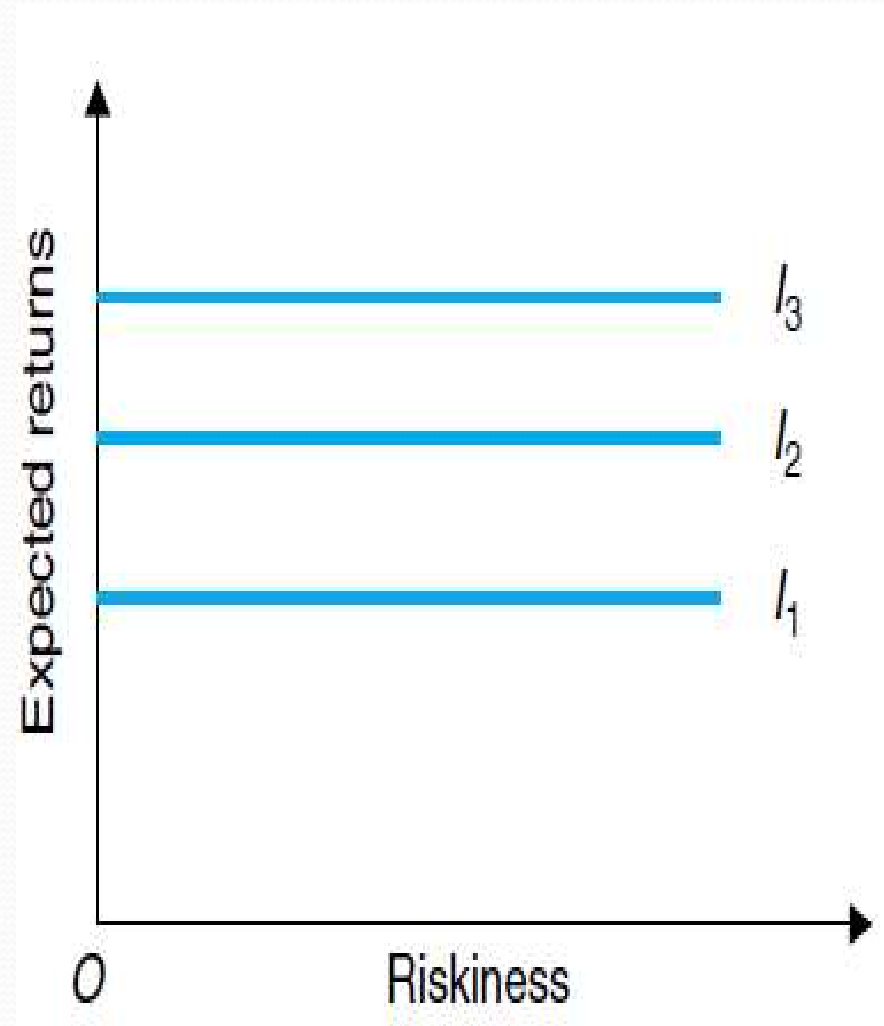


2.2 Based on Indifference cur.

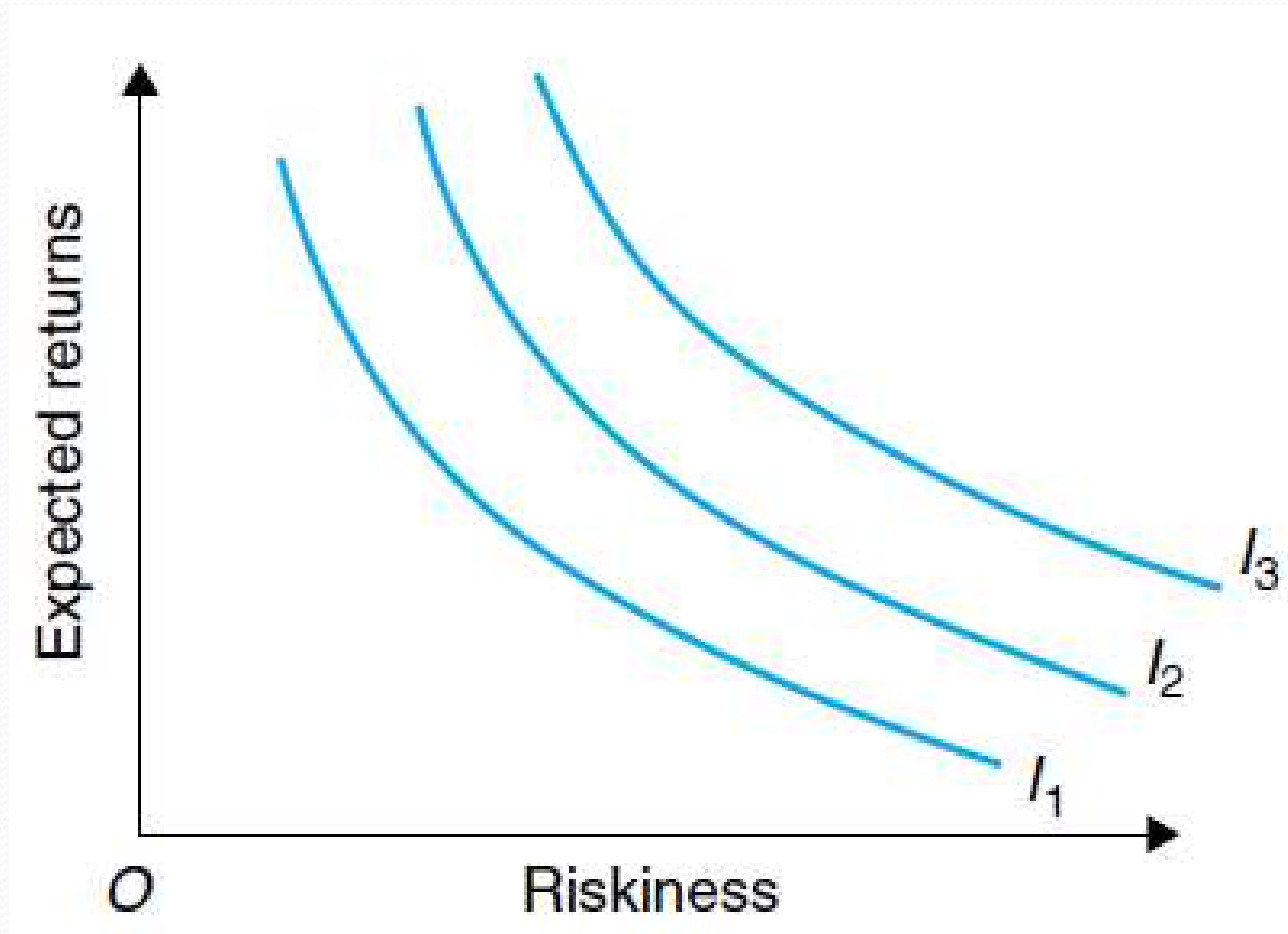
(Return, risk) \rightarrow same U



Given return, Risks?



2.2 Based on Indifference cur.



Given return, Risks?

3. Decision making

Project payoffs given different economic conditions

a. Maxi-min

b. Maxi-max

c. Mini-max regret

d. Bayes (Laplace)

e. Hurwicz

a. Maxi-min

The best of the worst

	State of the Economy				
	Recession	Existing	Boom	Minimum outcome	Maximum outcome
Project					
A	12,000	16,000	20,000	12,000	20,000
B	13,000	14,000	15,000	13,000	15,000
C	11,000	16,000	21,000	11,000	21,000

b. Maxi-max

The best of the best

Project	State of the Economy			Minimum outcome	Maximum outcome
	Recession	Existing	Boom		
A	12,000	16,000	20,000	12,000	20,000
B	13,000	14,000	15,000	13,000	15,000
C	11,000	16,000	21,000	11,000	21,000

c. Min-max regret

**Econ. Condition → opportunity cost
of the best choice?**

Project	State of the economy			Maximum regret
	Recession	Existing	Boom	
A	1,000	0	1,000	1,000
B	0	2,000	6,000	6,000
C	2,000	0	0	2,000

d. Bayes (Laplace)

No information → simple average for each project

Risk * Outturn

Project	Recession	Existing	Boom	Weighted average
A	$1/3 * 12,000$	$1/3 * 16,000$	$1/3 * 20,000$	16,000
B	$1/3 * 13,000$	$1/3 * 14,000$	$1/3 * 15,000$	14,000
C	$1/3 * 11,000$	$1/3 * 16,000$	$1/3 * 21,000$	16,000

e. Hurwicz

**No information → weighted average
for each project (just the worst and best)**

Project	Min	Max	Min * 0.3	Max * 0.7	Weighted average
A	12,000	20,000	3,600	14,000	17,600
B	13,000	15,000	3,900	10,500	14,400
C	11,000	21,000	3,300	14,700	18,000