

# Chapter Twelve

## Uncertainty

# Uncertainty is Pervasive

- What is uncertain in economic systems?
  - tomorrow's prices
  - future wealth
  - future availability of commodities
  - present and future actions of other people.

# Uncertainty is Pervasive

- What are rational responses to uncertainty?
  - buying insurance (health, life, auto)
  - a portfolio of contingent consumption goods.

# Decision Under Uncertainty

- Buy insurance or not
- Buy futures contract on tickets for vacation or not

# Important Details to Consider

- Nature of uncertainty: States of Nature, nature of risk, nature of payoffs
- Preferences over uncertain payoffs

# States of Nature

- Possible states of Nature:
  - “car accident” (a)
  - “no car accident” (na).
- Accident occurs with probability  $\pi_a$ , does not with probability  $\pi_{na}$  ;
$$\pi_a + \pi_{na} = 1.$$
- Accident causes a loss of \$L.

# Preferences Under Uncertainty

- Think of a lottery.
- Win \$90 with probability  $1/2$  and win \$0 with probability  $1/2$ .
- $U(\$90) = 12$ ,  $U(\$0) = 2$ .
- Expected utility is

# Preferences Under Uncertainty

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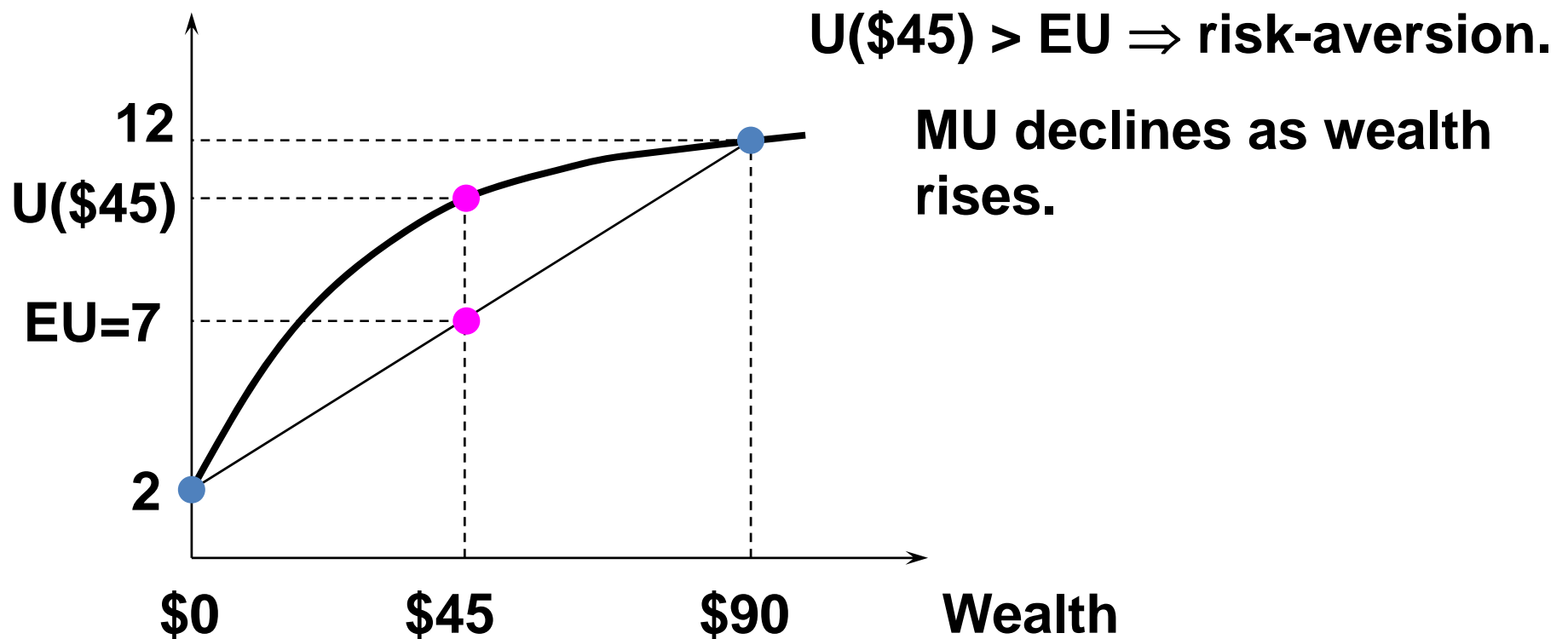
# Preferences Under Uncertainty

- Think of a lottery.
- Win \$90 with probability  $1/2$  and win \$0 with probability  $1/2$ .
- Expected money value of the lottery is

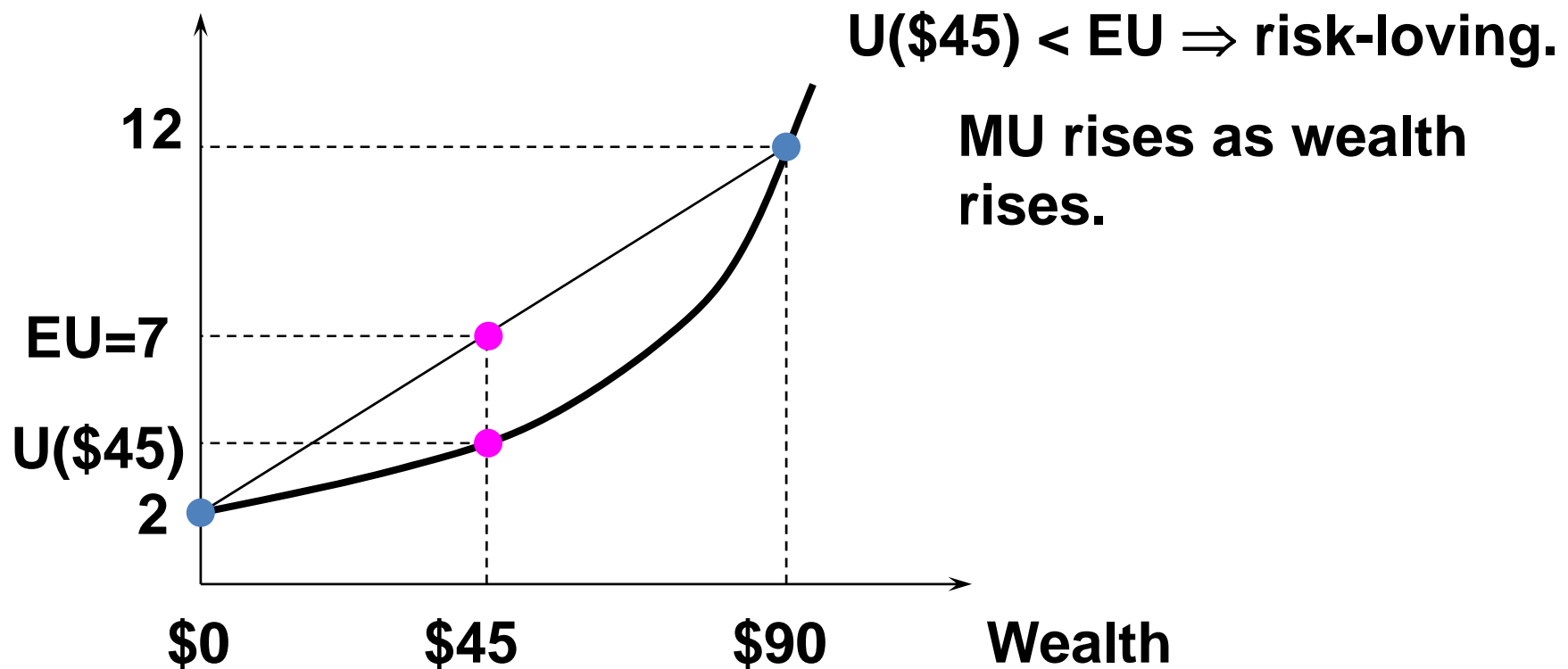
# Preferences Under Uncertainty

- $EU = 7$  and  $EM = \$45$ .
- $U(\$45) > 7 \Rightarrow \$45$  for sure is preferred to the lottery  $\Rightarrow$  risk-aversion.
- $U(\$45) < 7 \Rightarrow$  the lottery is preferred to  $\$45$  for sure  $\Rightarrow$  risk-loving.
- $U(\$45) = 7 \Rightarrow$  the lottery is preferred equally to  $\$45$  for sure  $\Rightarrow$  risk-neutrality.

# Preferences Under Uncertainty



# Preferences Under Uncertainty



# Preferences Under Uncertainty

