ECON 2A: Level 2 Microeconomics

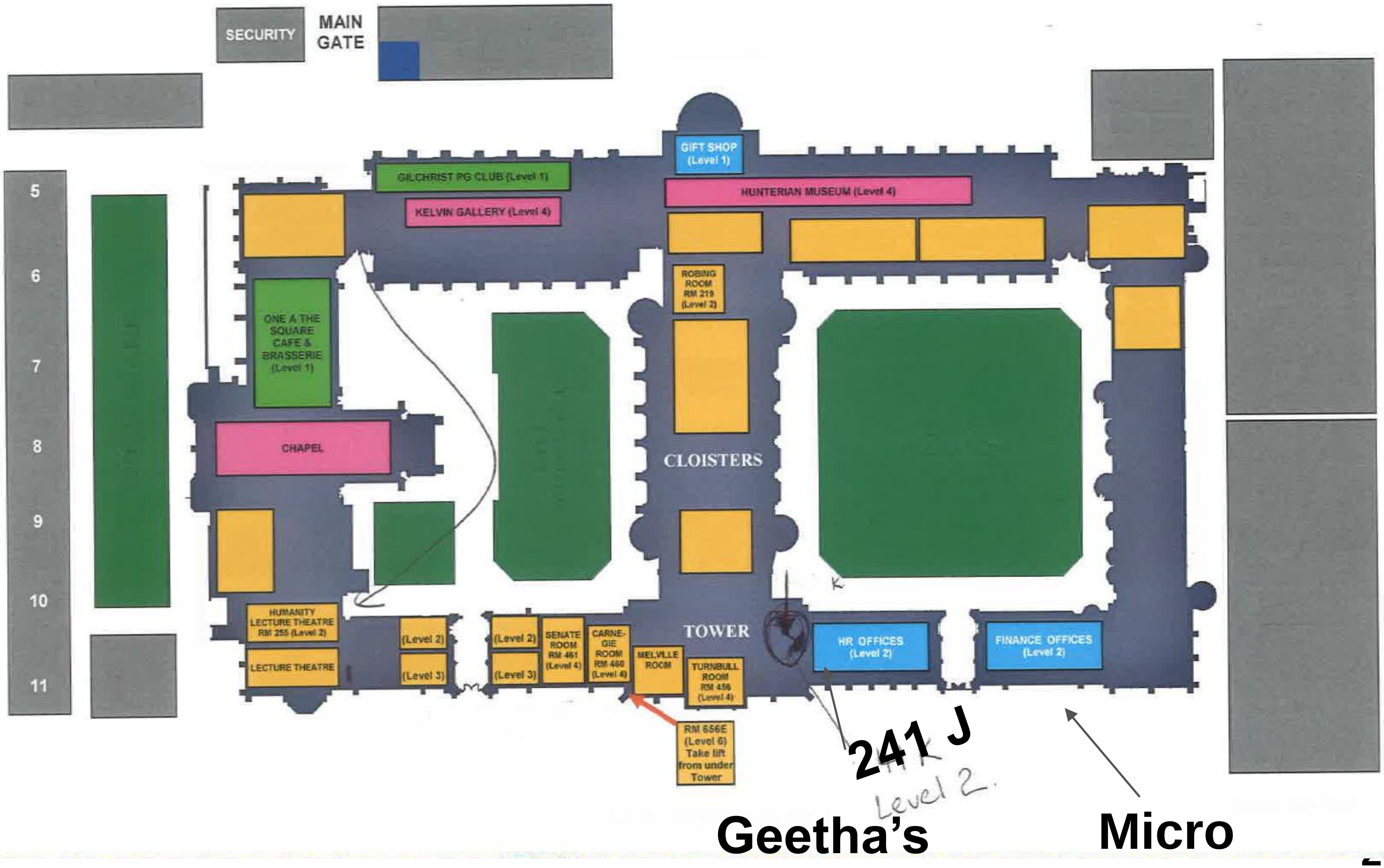
Contact details (available on moodle):

- **Dr Geethanjali Selvaretnam (Geetha)**
- **Office Hours for queries and Feedback:**

  2.15 – 3.15 on Tuesdays, Thursdays, Fridays
- **Email: Geethanjali.Selvaretnam@glasgow.ac.uk**
- **Phone: 0141 330 4496**

  (better to have this in case you are unable to find my office)
- **Skype: sese.geethanjali**

University of Glasgow



Uncertainty

(Reading: Varian Chapter 12)

Can you think of some examples :

- what is uncertain in economic systems?

- what are rational responses to uncertainty?

What is uncertain in economic systems?

- tomorrow's prices
- future wealth
- future availability of commodities
- present and future actions of other people
- …..

What are rational responses to uncertainty?

- buying insurance (health, life, auto)
- a portfolio of contingent consumption goods - diversification
- Increasing the probability of the positive outcome (if you can)
- ….

Diversification

- You have £100 to invest.
- Two firms, A and B. Shares of both firms cost £10 each
- With probability ½,

A's profit is £100

B's profit is £20.

- With probability ½

A's profit is £20

B's profit is £100.

(A) If you buy only firm A's stock

£100/10 = 10 shares of A.

Expected earning: 0.5*£100*10 + 0.5*£20*10 = £600

(B) If you buy only firm B's stock

£100/10 = 10 shares.

Expected earning: 0.5*£20*10 + 0.5*£100*10 = £600

(C) If you buy 5 shares in each firm

Expected earning

= 0.5*(100*5 + 20*5)+0.5*(20*5 + 100*5) = 600

Notice that you **earn £600 for sure**, irrespective of the state

- **diversification has reduced the risk**.

(But bear in mind that unlike this example, typically, diversification lowers risk in exchange for lowered expected earnings).

Preference and Utility functions under Uncertainty

Think of a lottery:

- Outcome of the monetary winnings are:

  - win £90 with probability 1/2

  - £0 with probability 1/2.

Therefore the Expected money value (EM) of the lottery:

$$EM = \frac{1}{2} \times £90 + \frac{1}{2} \times £0 \quad = 45$$

◆ Let Utility of the outcomes be: U(£90) = 12,   U(£0) = 2.

So, Expected Utility (EU):

$$EU = \frac{1}{2} \times U(£90) + \frac{1}{2} \times U(£0)$$

$$EU = \frac{1}{2} \times 12 + \frac{1}{2} \times 2$$

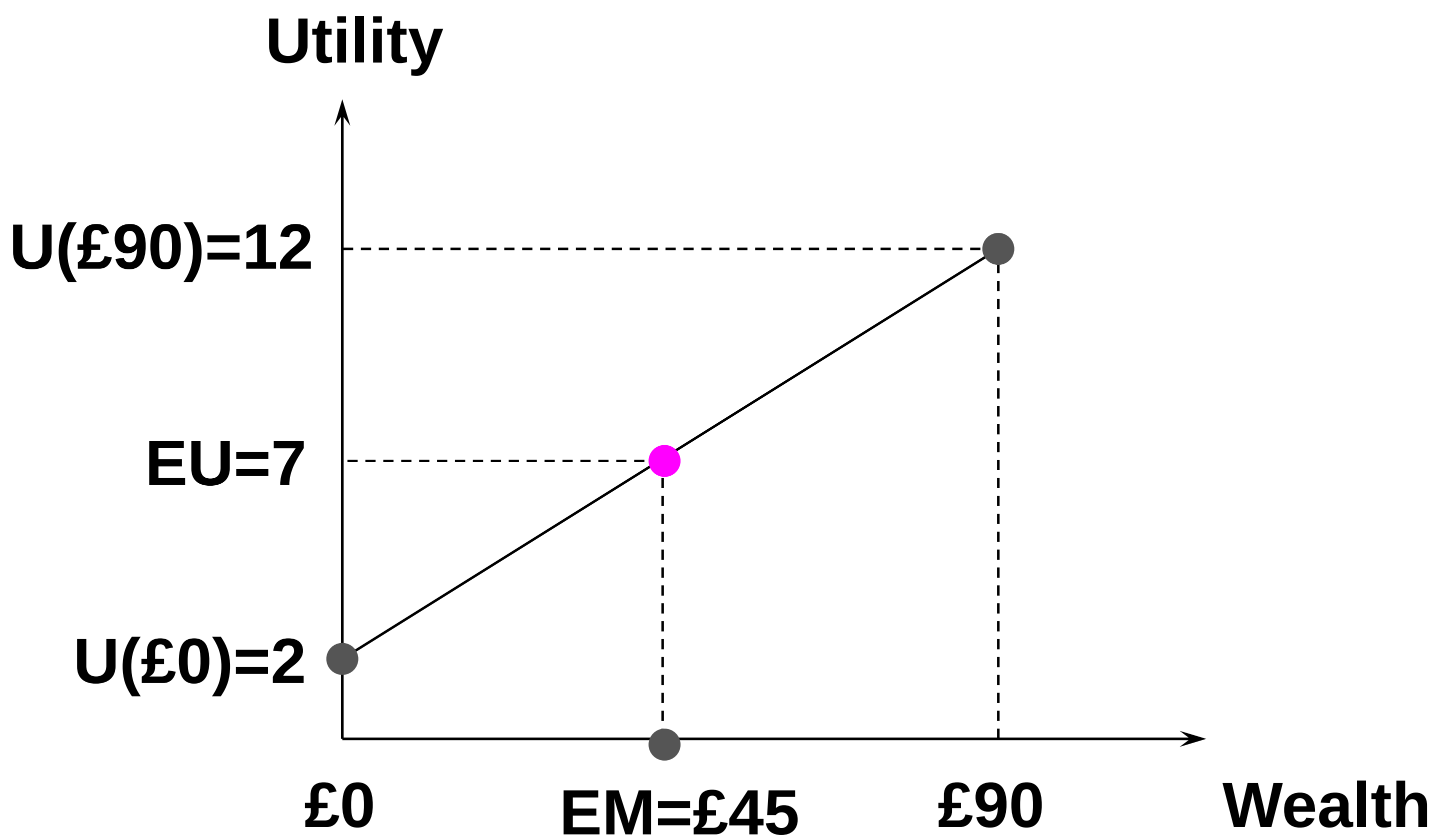
$$= 6 + 1 = 7$$

What will be the EU if probability of winning is 75%?

(Each person’s risk preference is different.)

$$EU = \frac{1}{2} \times U(£90) + \frac{1}{2} \times U(£0) = 7$$

$$EM = \frac{1}{2} \times £90 + \frac{1}{2} \times £0 \quad = 45$$

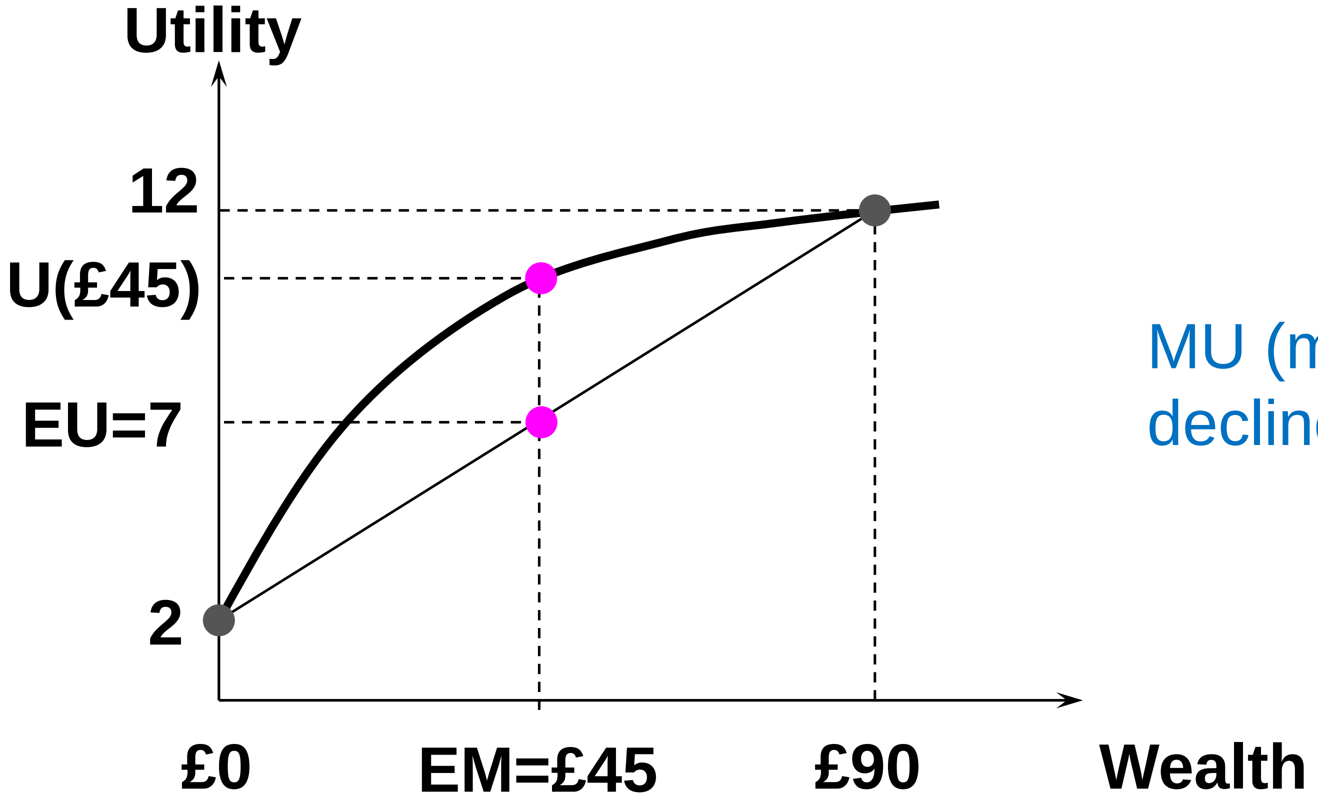


Risk Averse:

If U(£45) > 7, receiving £45 for sure is preferred to the lottery

U(£45) > EU ⇒ risk-aversion.

U(EM) > EU ⇒ risk-aversion.



MU (marginal utility) declines as wealth rises.

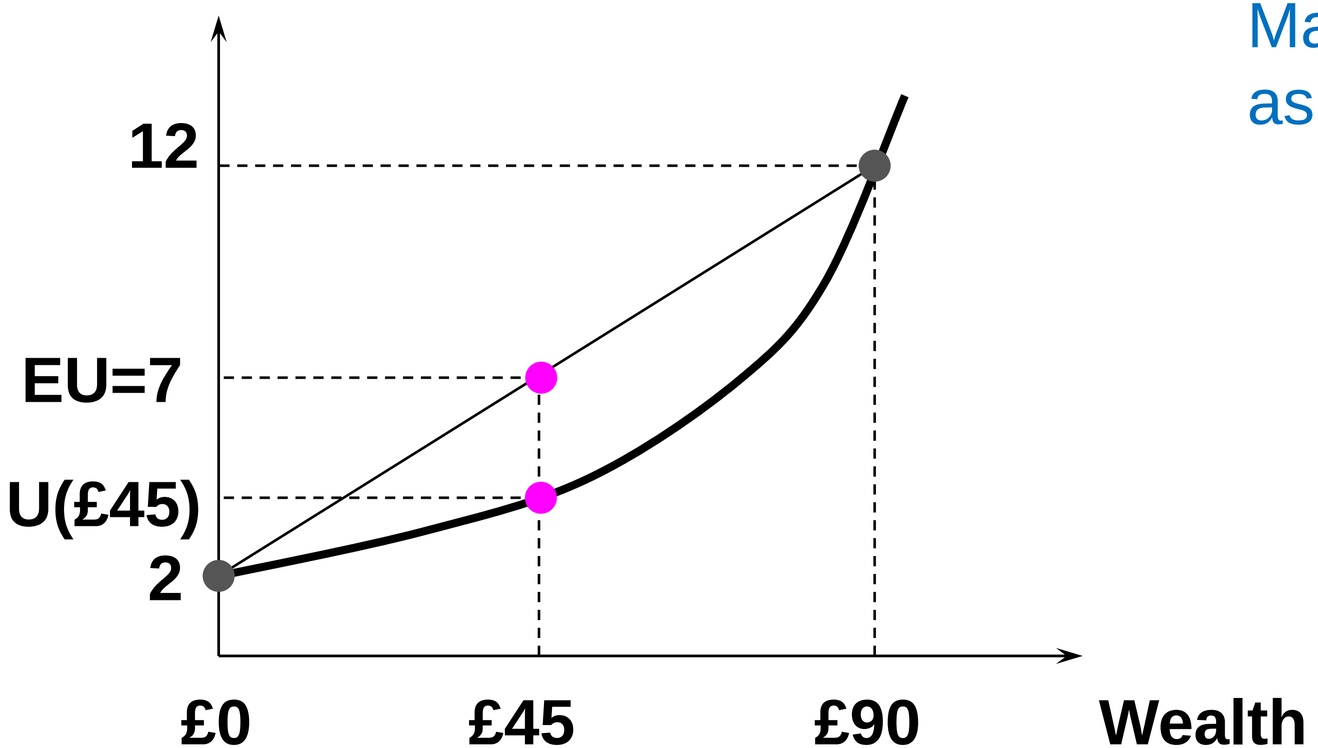
Risk-loving

If U(£45) < 7, the lottery is preferred to receiving £45 for sure

U(£45) < EU ⇒ risk-loving.

U(EM) < EU ⇒ risk-loving.

Marginal utility rises as wealth rises.

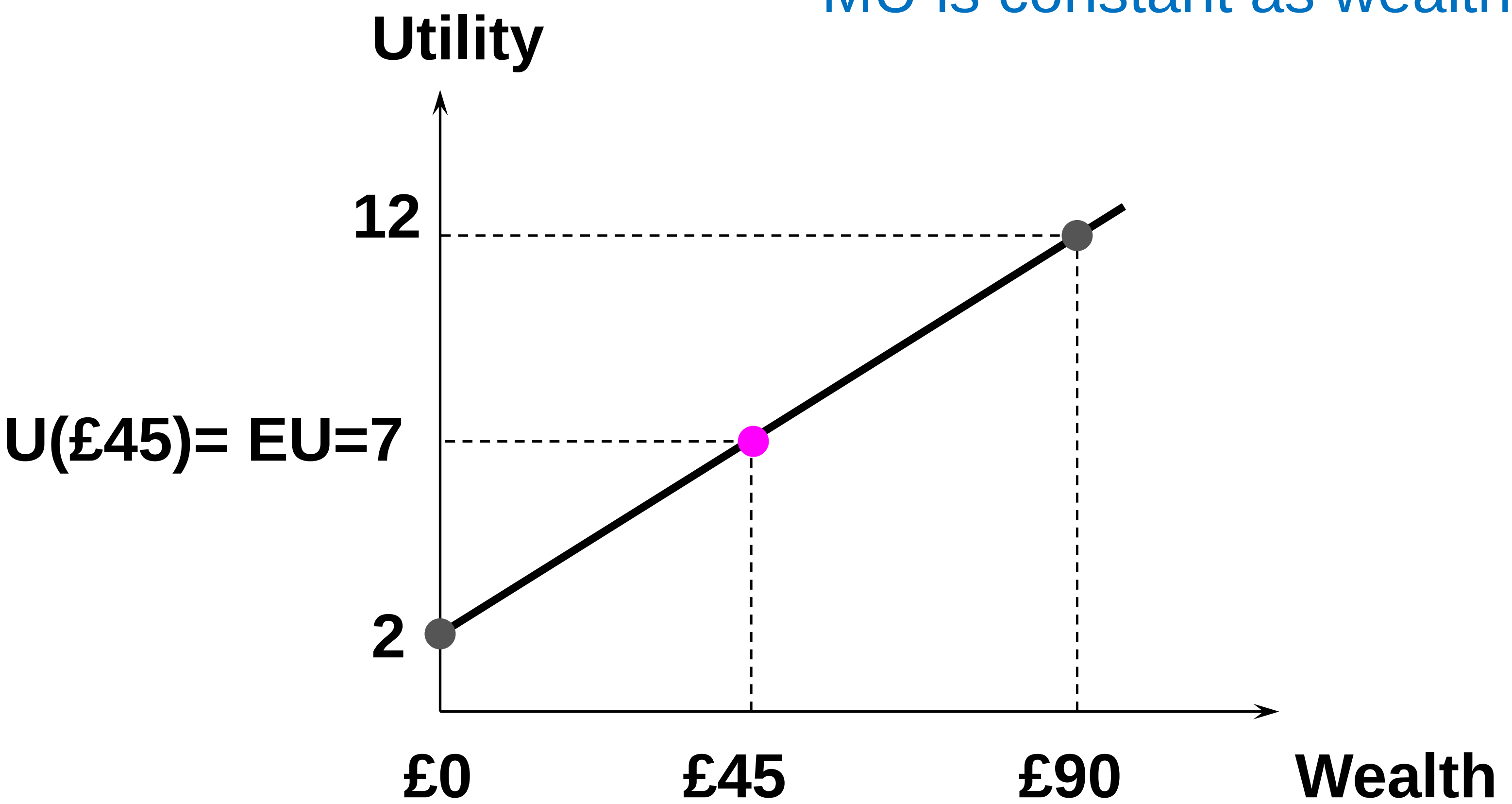


Risk-neutral

If U(£45) = 7, there is indifference between receiving £45 for sure and lottery.

U(£45) = EU $\Rightarrow$ risk-neutrality.

MU is constant as wealth rises.



Von Neumann-Morgenstern utility function

This is an expected utility function under uncertainty – when playing a lottery.

Geetha is thinking of betting on Roger Federer winning the ATP World Tour Finals.

She thinks the probability that he will not win is π_1

and will win is π_2.

If she does not bet, she is **certain** to retain what she would have spent on betting.

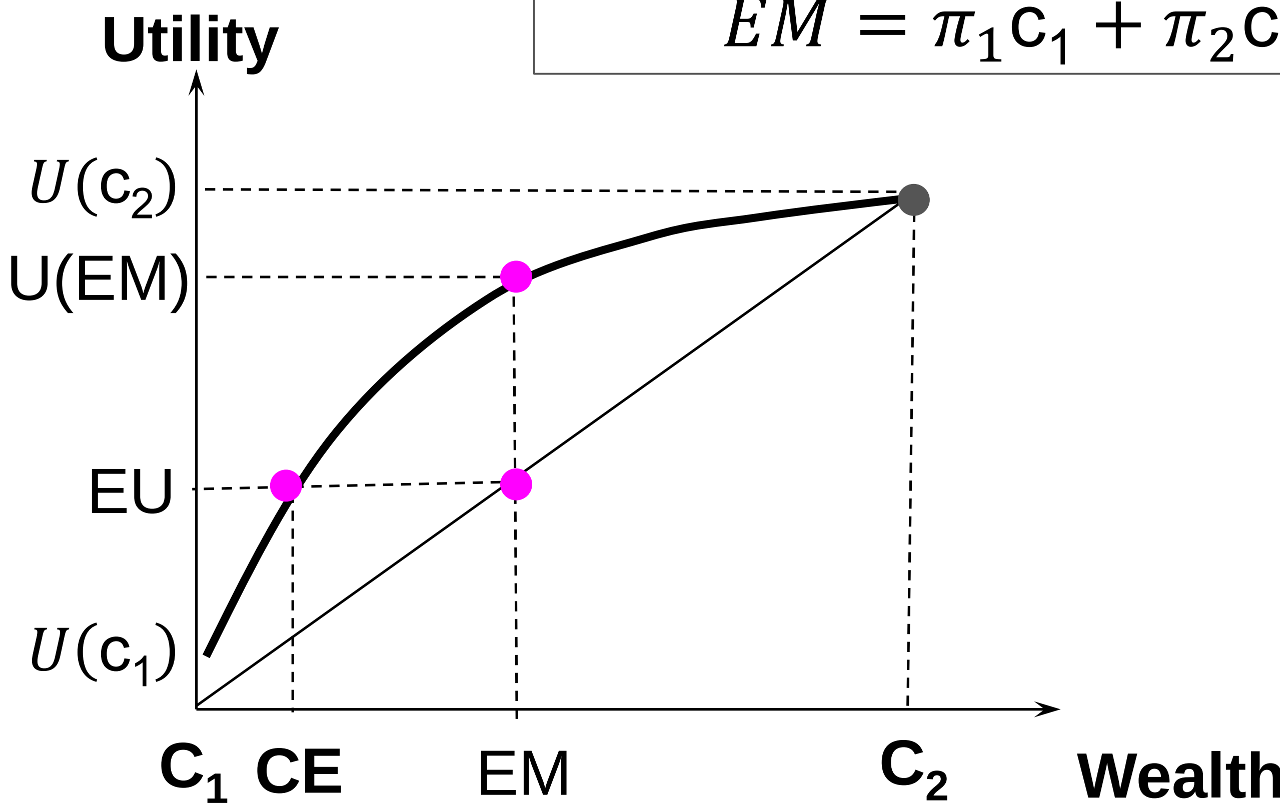
She gains c_2 if she wins the bet, and c_1 if she loses.

Expected utility function

(or the von-Neumann-Morgenstern utility function):

$$EU = \pi_1 U(c_1) + \pi_2 U(c_2)$$

$$EM = \pi_1 c_1 + \pi_2 c_2$$



Certainty Equivalent (CE) is the value which will give the same utility as the expected utility.

U(CE)=EU

$$U(CE) = \pi_1 U(c_1) + \pi_2 U(c_2)$$

(If you know the functional form of U(.), you can solve for CE).