

EXAMPLE WITH POSITIVE EXTERNALITY

$$u_1(m_1, x_2, h) = m_1 + 5 \ln(1+x_2) + 10h - \frac{h^2}{2}$$

$$u_2(m_2, x_2, h) = m_2 + 3 \ln(1+x_2) + 20h - \frac{h^2}{2}$$

OR $\phi_1(h) = 10h - \frac{h^2}{2}$ AND STILL ASSUME AGENT 2 GENERATES EXTERNALITY
WHILE AGENT 2 BENEFITS

$$\phi_2(h) = 20h - \frac{h^2}{2}$$

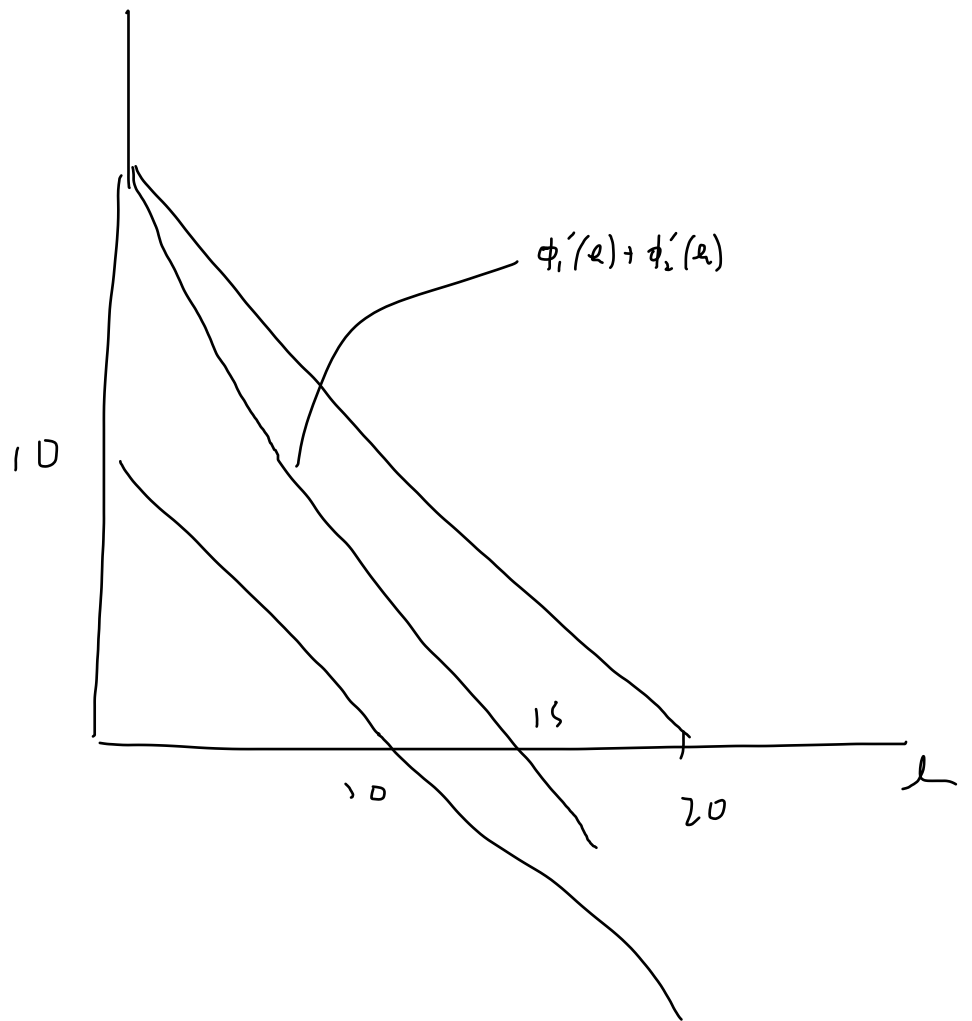
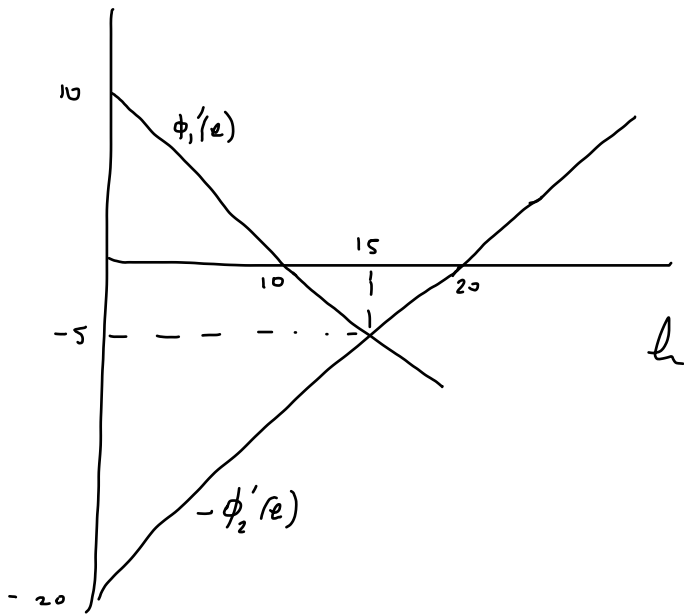
NOTE IN THIS CASE EXTERNALITY IS PUBLIC GOOD UNLESS
IN NEGATIVE EXTERNALITY WE TREAT IT AS A DETERMINABLE
EXTERNALITY (PRIVATE GOOD) THOUGH THAT WOULD DEPEND ON
WHETHER MORE THAN ONE IS HARMED (JOINTLY OR NOT)

$$\text{Max}_L \phi_1(h) + \phi_2(h)$$

$$\Rightarrow \phi_1'(h) = -\phi_2'(h)$$

$$\Rightarrow 10 - h = -20 + h$$

TWO WAYS TO SHOW DIAGMATICALLY



FIRST DIAGRAM SHOWS THAT AGENT 1 WANTS TO PRODUCE THE EXTERNALITY
AT A LEVEL THAT IS LOWER THAN THE ONE IN ORDER TO ACCOUNT FOR THE
BENEFIT PROVIDED TO AGENT 2 (TO ACTIVATE P.O.)

AGENT 1 WOULD WANT TO GET PAID TO PROVIDE THIS ADDITIONAL BENEFIT
(AND WOULD BE PAID FOR INITIAL GENERATION TOO)

SECOND DIAGRAM SHOWS THE PUBLIC GOOD NATURE OF THE EXTERNALITY (JOINTNESS)
WHICH BOTH 'JOINTLY' 'CONSUME' THE GOOD

THERE IS ESSENTIALLY ZERO COST IN PRODUCING THIS GOOD UP TO THE FIRST
20 UNITS BUT BEYOND THAT AGENT 2 FINDS IT 'COSTLY' TO GENERATE
MORE. AS LONG AS THIS COST IS LOWER THAN THE BENEFIT TO AGENT 2
EFFICIENCY REQUIRES THAT PRODUCTION CONTINUE TO 15 UNITS

THERE ARE SUBTLE INTERPRETATION ISSUES HERE THAT CAN BE CLARIFIED
WITH A DISCUSSION OF 'MISSING RESOURCES', SEE MY ARTICLE

ALSO THINK OF AGENT ONE PRODUCING TWO 'JOINT' GOODS, E.G. I PLAY WITH
MY CAT AND THE SCANS AWAY YOUR MICE