Z^* = 11 Million 11,000,000. 4000 hrs

Z_1^* = 11,002,000. 4001 hrs

→ Shadow price 2000

→ Marginal price

Shadow price $2000/hr (4000 hrs)

$2500/hr (2500 hrs)

Shadow price depends on the amount of the resource available.

Shadow price of one resource also may depend on the amount of OTHER resources available.

OBSERVATION

SHADOW PRICES OF ALL RESOURCES ARE INTERCONNECTED

Engine assy

$$1.\ m_1 + 2.\ m_2 \leq 4000 \quad \text{(hrs)}$$

$$\frac{1}{4000} m_1 + \frac{2}{4000} m_2 \leq \frac{4000}{4000} \quad \left[\begin{array}{c} 4000 \text{ hrs} \\ \text{i.e} \\ \text{full cap} \end{array}\right]$$

Max $3000\, m_1 + 5000\, m_2$

S.t

$$\frac{1}{4000} m_1 + \frac{2}{4000} m_2 \leq 1$$

$$\frac{2}{6000} m_1 + \frac{2}{6000} m_2 \leq 1$$

$$\frac{2}{5000} m_1 \leq 1$$

$$\frac{3}{4500} m_2 \leq 1$$

$$m_1, m_2 \geq 0$$

4000hrs
per unit increase in E.A. cap increases contribution by 1 million

D

per hour = $\frac{1000\,000}{4\,000} = \$250$

OBSERVATION 2.

DIFFERENT SCALING OF A MODEL CAN GIVE US WRONG ANSWERS

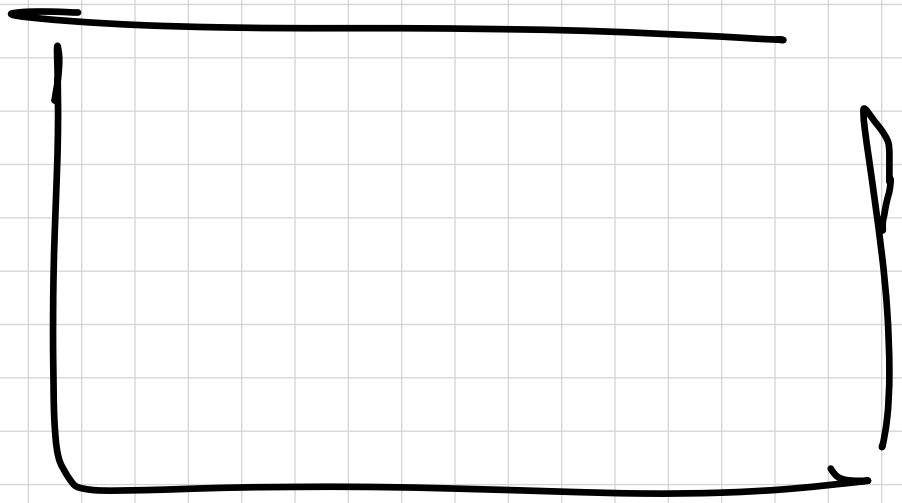
Minimize the amount I will pay

1% of 4000 p_{EA}
1% of 6000 p_{MS}
1% of 5000 p_{101}
1% of 4500 p_{102}

Ex $(4000 p_{EA} + 6000 p_{MS} + 5000 p_{101} + 4500 p_{102})$

Max $0.01(3000m_1 + 5000m_2)$

S.t



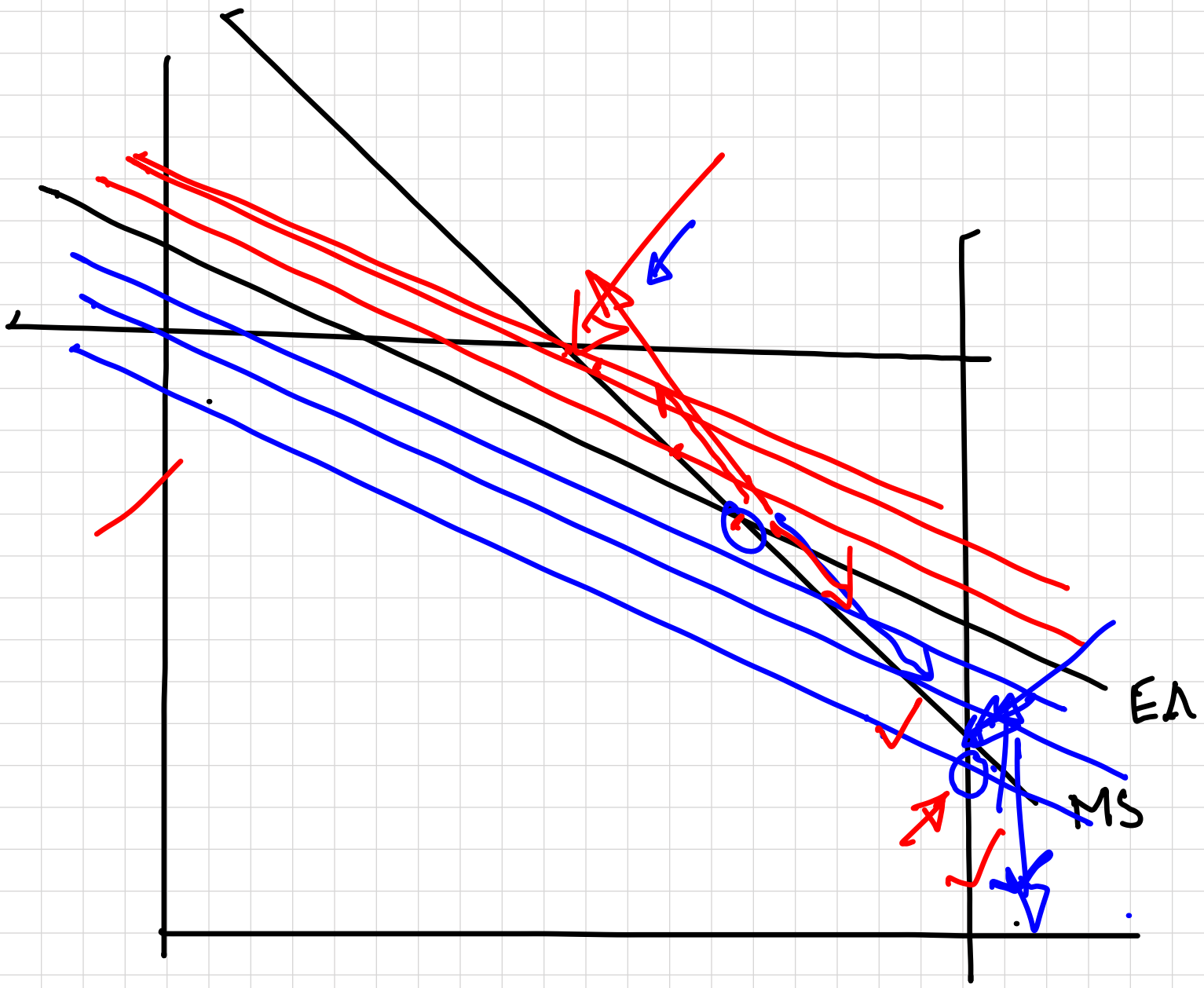
$11 Million

EA: $2000 ✓

MS: $500 ✓

101A: $0 ✓

102A: $0 ✓



first 500 hrs @ 2000/hr 1 000 000

next 3500 hrs @ 0/hr 0

4000 hrs 1 000 000

per hour $\frac{1\,000\,000}{4000}$

= $250/hr

ON AVERAGE

Max $3000m_1 + 5000m_2 + 2000m_3$

$$
\begin{aligned}
m_1 + 2m_2 + 0.8m_3 &\leq 4000 \\
2m_1 + 2m_2 + 1.5m_3 &\leq 6000 \\
2m_1 + m_3 &\leq 5000 \\
3m_2 &\leq 4500 \\
m_1, m_2, m_3 &\geq 0
\end{aligned}
$$

You do not produce 10's

$\frac{1}{-4} = \frac{y-9}{y-5}$ $\quad y-5 =$

$\frac{6-5}{6-10}$

$= \frac{y-9}{y-5}$

$3m_1 + 5m_2$

22.5
35
57.5