

THE MINIMUM WAGE AND THE MONOPSONIST

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$$\text{PROFIT} = \text{REVENUE} - \text{COST}$$

total profit: $\pi(L) = p \cdot Q(L) - w(L) \cdot L$

production function: $Q(L) = 100 \cdot \sqrt{L}$

inverse labor supply: $w(L) = L \cdot \sqrt{L}$

price of product: $p = 5$

so total profit of the monopsonist is:

$$\begin{aligned}\pi(L) &= 5 \cdot 100 \cdot \sqrt{L} - L \cdot \sqrt{L} \cdot L \\ &= 500 \cdot L^{0,5} - L^{2,5}\end{aligned}$$

1. marginal revenue is the derivative of total revenue:

$$TR(L) = 500 \cdot L^{0,5}$$

$$\frac{dTR(L)}{dL} \equiv MR(L) = 0,5 \cdot 500 \cdot L^{-0,5} = \frac{250}{L^{0,5}}$$

2. marginal cost is the derivative of total cost:

$$TC(L) = L^{2,5}$$

$$\frac{dTC(L)}{dL} \equiv MC(L) = 2,5 \cdot L^{1,5}$$

3. necessary condition for profit max: $MR(L) = MC(L)$

4. sufficient condition for profit max: $\frac{dMR(L)}{dL} < \frac{dMC(L)}{dL}$

5. the value of L that maximizes profit

$$MR(L) = MC(L)$$

$$\frac{250}{L^{0,5}} = 2,5 \cdot L^{1,5}$$

$$100 = L^2 \Rightarrow \boxed{L^* = 10}$$

wage when $L=10$

$$w(L) = L\sqrt{L} = L^{1,5}$$

$$w(10) = 10 \cdot \sqrt{10} = 31,62$$

profit when $L=10$

$$\pi'(L) = 500 \cdot L^{0,5} - L^{2,5}$$

$$\pi(10) = 500 \cdot \sqrt{10} - 10 \cdot 10 \cdot \sqrt{10} = 1264,91$$

SUMMARY

in the
absence
of a
minimum
wage

$$L^* = 10$$

$$w = 31,62$$

$$\pi = 1264,91$$

MINIMUM WAGE + MONOPSONIST

7.3

6. imposition of minimum wage only affects cost
so marginal revenue remains unchanged:

$$MR(L) = \frac{250}{L^{0,5}}$$

7. marginal cost of increased employment is
now the cost of hiring at minimum wage

$$MC = 65$$

8. necessary condition $MR = MC$

9. sufficient condition: $\frac{dMR}{dL} < \frac{dMC}{dL}$

10. the new value of L that maximizes profit

$$MR = MC$$

$$\frac{250}{L^{0,5}} = 65$$

$$\frac{50}{13} = \frac{250}{65} = \sqrt{L}$$

$$L^* = \left(\frac{50}{13}\right)^2 = 14,79$$

10. (continued)

profit when $L = 14,79$

$$\pi'(L) = 500 \cdot L^{0,5} - 65 \cdot L$$

$$\pi(14,79) = 500 \cdot 3,85 - 65 \cdot 14,79 = 961,54$$

SUMMARY

when the
minimum
wage

$$W_{\min} = 65$$

$$L^* = 14,79$$

$$\pi = 961,54$$

11. Imposing the minimum wage

INCREASED total employment

from 10 to 14,79 employees

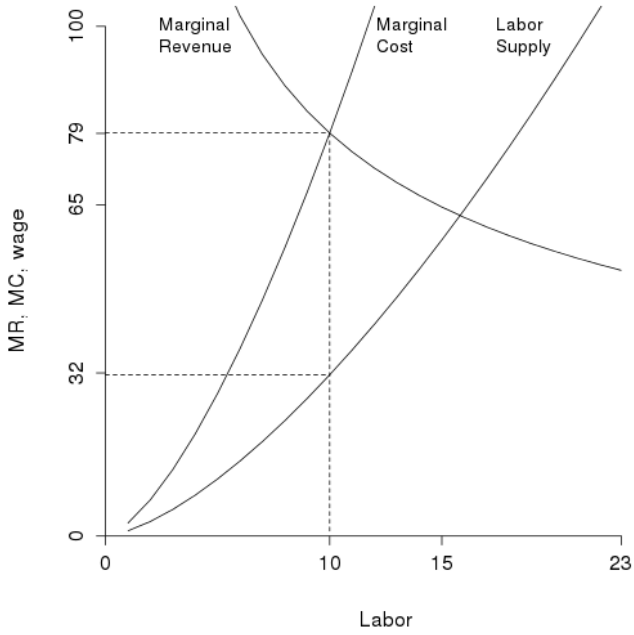
12. Imposing the minimum wage

REDUCED the monopolist's profit

from 1264,91 to 961,54

MINIMUM WAGE + MONOPSONIST

Monopsonist



Minimum Wage

