

$$P_f = 100 - Q_f$$

$$P_d = 40 - 0.5 Q_d$$

$$TC = 10 + 20Q$$

$$Q_f = 40, P_f = 60$$

$$TR_d = P_d \times Q_d = 40 Q_d - 0.5 Q_d^2$$

$$\rightarrow -Q_d + 40 = 20 \Rightarrow Q_d = 20, P_d = 30$$

$$\rightarrow MC = 20, TR_p = P_f \times Q_f = 100 Q_f - Q_f^2$$

$$P_f \left(1 - \frac{1}{e_d}\right) = P_d \left(1 - \frac{1}{e_d}\right) \rightarrow E_f = -3, e_d = -1.5$$