

1.3 a. Demand functions:

$$Q_F = 25 \left(198 + \frac{n_C}{20,000} - p_F \right) \quad (1)$$

$$Q_T = \frac{100(150 - p_T)}{3} \quad (2)$$

Supply functions:

$$Q_F = 50 p_F - 10 p_T \quad (3)$$

$$Q_T = 50 p_T - 10 p_F \quad (4)$$

The solution to the four equations above is:

$$\left\{ \begin{array}{l} Q_F^* = \frac{1,497,600}{523} + \frac{87}{104,600} n_C \\ Q_T^* = \frac{2,988,000}{523} - \frac{3}{20,920} n_C \\ p_F^* = \frac{43,650}{523} + \frac{7}{418,400} n_C \\ p_T^* = \frac{68,490}{523} + \frac{1}{2,092,000} n_C \end{array} \right.$$

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If $n_C = 40,000$, then the equilibrium prices and quantities are:

$$\begin{cases} Q_F^* = 2,897 \\ Q_T^* = 5,707 \\ p_F^* = 84.13 \\ p_T^* = 130.97. \end{cases}$$

The effects of n_C on the equilibrium prices are:

$$\begin{cases} \frac{dp_F^*}{dn_C} = \frac{7}{418,400} \\ \frac{dp_T^*}{dn_C} = \frac{1}{2,092,000}. \end{cases}$$

- b. Now $p_F = 10$ in the demand equations, and $p_F = 35$ in the supply equations.

Demand side:

$$Q_F = 25 \left(198 + \frac{n_C}{20,000} - 10 \right) \quad (1')$$

$$Q_T = \frac{100(150 - p_T)}{3} \quad (2')$$

Supply side:

$$Q_F = 50 * 35 - 10 p_T \quad (3')$$

$$Q_T = 50 p_T - 10 * 35 \quad (4')$$

The solution to equations (2'), (3') and (4') is:

$$\begin{cases} Q_F^{**} = 454 \\ Q_T^{**} = 6128 \\ p_T^{**} = 129.57. \end{cases}$$

- c. Assume all the revenues go to the salary. Then in the competitive medical checkup market, the equilibrium salary of dentists per day is: $p_T^* Q_T^* = 130.97 \times 5,707 = 747,445.79$, while in the insurance-company-dictated medical-doctor payments, the equilibrium salary of dentists per day is: $p_T^{**} Q_T^{**} = 129.57 \times 6,129 = 794,134.53 > 747,445.79$; therefore the equilibrium salary of dentists increases after the shift.

- 2.4 See the figure below. At point A , the individual's indifference curves are tangent. At point B , however, Joe is indifferent to point A , but Mary is happier, making the allocation implied by B Pareto-superior to that at A .

