Problem 13-42

Given the information provided for *Rockland, Inc.*:

Annual Demand (D)	Price per Unit (P)	Oversight Cost per Unit (O)	Transport Cost per Unit (C_t)	Order Cost (C_o)	Cost to Store One Unit One year (C_h)	Time in Days (L)
200,000	\$7.87	\$0.40	\$4.54	\$340	\$9.00	25

If order quantity $Q = 16,000$ unit, and the supply chain operates 250 days per year. We can calculate the following:

Total procurement cost $(D \cdot P)$

$$= 200000 \cdot 7.87$$
$$= 1574000$$

Total management oversight cost $(D \cdot O)$

$$= 200000 \cdot 0.40$$
$$= 80000$$

Total annual transportation cost $(D \cdot C_t)$

$$= 200000 \cdot 4.54$$
$$= 908000$$

Annual order cost $(\frac{D}{Q} \cdot C_0)$

$$= \frac{200000}{16000} \cdot 340$$
$$= 4250$$

Annual holding cost $(\frac{Q}{2} \cdot C_h)$

$$= \frac{16000}{2} \cdot 9.00$$
$$= 72000$$

Average annual pipeline inventory cost $(\frac{D}{250} \cdot L \cdot C_h)$

$$= \frac{200000}{250} \cdot 25 \cdot 9.00$$
$$= 180000$$

Total supply chain costs:

$$= 2818250$$

If the supplier increases the order quantity to 40,000 units for a price discount of one percent, we have $D = 40000$, $P = 7.7913$. Using the same formulas for part (a), we have:

Total procurement cost $(D \cdot P) = 1558,260$

Total management oversight cost $(D \cdot O) = 80000$

Total annual transportation cost $(D \cdot C_t) = 908000$

Annual order cost $(\frac{D}{Q} \cdot C_0) = 1700$

Annual holding cost $(\frac{Q}{2} \cdot C_h) = 180000$

Average annual pipeline inventory cost $(\frac{D}{250} \cdot L \cdot C_h) = 180000$

Total supply chain costs: $= 2907960$

We can see that the total supply chain costs would increase, so you should reject the new deal.