

Supply Contracts at SkiRetail (Questions and Answers)

Navneet Vidyarthi (April 10, 2019)

Q 1: Under vertical integration, the answers are as follows:

- Optimal production quantity = 15,000
- Expected profit for “the company” = \$1,122,813

Refer to the excel sheet below:

Vertically Integrated Company									Shortage Cost	\$ 110
Selling Price	\$ 250								Excess Cost	\$ 80
			Production Cost	\$ 140					Service Level	57.89%
Salvage Value	\$ 60		Fixed Cost	\$ 70,000					Optimal Qty.	15000
Firm's Profit										
Demand	Frequency	Frequency	Cum. Freq	Q*	Rev. (1)	Rev. (2)	Total Rev.	Total Cost (FC+VC)	Profit	
9000	8	25.00%	25.00%	15000	\$2,250,000	\$360,000	\$2,610,000	\$2,170,000	\$440,000	
10000	1	3.13%	28.13%	15000	\$2,500,000	\$300,000	\$2,800,000	\$2,170,000	\$630,000	
11000	3	9.38%	37.50%	15000	\$2,750,000	\$240,000	\$2,990,000	\$2,170,000	\$820,000	
12000	3	9.38%	46.88%	15000	\$3,000,000	\$180,000	\$3,180,000	\$2,170,000	\$1,010,000	
13000	1	3.13%	50.00%	15000	\$3,250,000	\$120,000	\$3,370,000	\$2,170,000	\$1,200,000	
14000	1	3.13%	53.13%	15000	\$3,500,000	\$60,000	\$3,560,000	\$2,170,000	\$1,390,000	
15000	2	6.25%	59.38%	15000	\$3,750,000	\$0	\$3,750,000	\$2,170,000	\$1,580,000	
16000	1	3.13%	62.50%	15000	\$3,750,000	\$0	\$3,750,000	\$2,170,000	\$1,580,000	
17000	2	6.25%	68.75%	15000	\$3,750,000	\$0	\$3,750,000	\$2,170,000	\$1,580,000	
18000	5	15.63%	84.38%	15000	\$3,750,000	\$0	\$3,750,000	\$2,170,000	\$1,580,000	
19000	5	15.63%	100.00%	15000	\$3,750,000	\$0	\$3,750,000	\$2,170,000	\$1,580,000	
TOTAL	32	100%							Retailer's Expected Profit	
									\$1,122,813	

Q 2: Consider the current scenario where the supplier “Skieksz” and the retailer “SkiRetail” are not vertically integrated.

Purchase (Wholesale) price for the retailer= \$200 per unit (given)

- What is your estimate of the quantity for ski jackets that Bergard (SkiRetail) shall place an order for?
 - Optimal order quantity = 10,000
- Expected profit for SkiRetail based on your estimate of order quantity.
 - Using empirical method = \$452,500
- Expected profit for Skieksz based on estimate of order quantity.
 - Using empirical method = \$530,000
- Total supply chain profit
 - Using empirical method = \$982,500
- How does this profit compare to the vertically integrated case (Q 1).
 - As expected, the profit is lower by \$1,122,813 - \$982,500 = 140,313. This is a decrease of 12.5% compared to the vertically integrated case.

Refer to the excel sheet below:

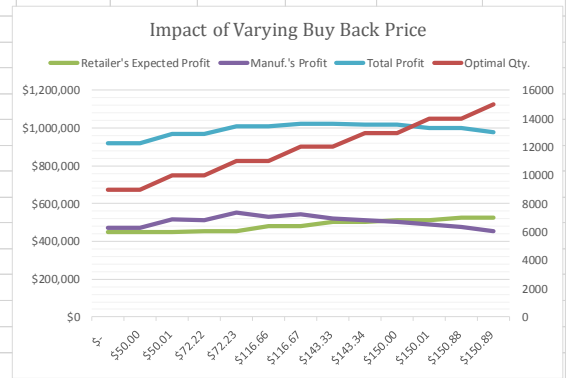
SkiRetail (The Retailer)				Skieksz (The Manufacturer)						Shortage Cost	\$	50				
Selling Price	\$	250			Wholesale Price	\$	200			Excess Cost	\$	140				
Purchase Price	\$	200			Variable Cost	\$	140			Service Level	26.32%					
Salvage Value	\$	60			Fixed Cost	\$	70,000			Optimal Qty.	10000					
					SkiRetail					Skieksz						
Demand	Frequency	Frequency	Cum. Freq	Q*	Rev. (1)	Rev. (2)	Total Rev.	Cost	Profit	Rev.	Total. Cost	Profit				
9000	8	25.00%	25.00%	10000	\$2,250,000	\$60,000	\$2,310,000	\$2,000,000	\$310,000	\$2,000,000	\$1,470,000	\$530,000				
10000	1	3.13%	28.13%	10000	\$2,500,000	\$0	\$2,500,000	\$2,000,000	\$500,000	\$2,000,000	\$1,470,000	\$530,000				
11000	3	9.38%	37.50%	10000	\$2,500,000	\$0	\$2,500,000	\$2,000,000	\$500,000	\$2,000,000	\$1,470,000	\$530,000				
12000	3	9.38%	46.88%	10000	\$2,500,000	\$0	\$2,500,000	\$2,000,000	\$500,000	\$2,000,000	\$1,470,000	\$530,000				
13000	1	3.13%	50.00%	10000	\$2,500,000	\$0	\$2,500,000	\$2,000,000	\$500,000	\$2,000,000	\$1,470,000	\$530,000				
14000	1	3.13%	53.13%	10000	\$2,500,000	\$0	\$2,500,000	\$2,000,000	\$500,000	\$2,000,000	\$1,470,000	\$530,000				
15000	2	6.25%	59.38%	10000	\$2,500,000	\$0	\$2,500,000	\$2,000,000	\$500,000	\$2,000,000	\$1,470,000	\$530,000				
16000	1	3.13%	62.50%	10000	\$2,500,000	\$0	\$2,500,000	\$2,000,000	\$500,000	\$2,000,000	\$1,470,000	\$530,000				
17000	2	6.25%	68.75%	10000	\$2,500,000	\$0	\$2,500,000	\$2,000,000	\$500,000	\$2,000,000	\$1,470,000	\$530,000				
18000	5	15.63%	84.38%	10000	\$2,500,000	\$0	\$2,500,000	\$2,000,000	\$500,000	\$2,000,000	\$1,470,000	\$530,000				
19000	5	15.63%	100.00%	10000	\$2,500,000	\$0	\$2,500,000	\$2,000,000	\$500,000	\$2,000,000	\$1,470,000	\$530,000				
TOTAL	32	100%						Retailer's Expected Profit		\$452,500	Manuf.'s Profit:		\$530,000			
										Total Value Chain Profit		\$982,500				

Q 3: Skiekz and SkiRetail would like to explore the option of buy-back contract, in which Skiekz would buy unsold goods from SkiRetail at an agreed upon price (referred as “buy-back price”).

- Analyze the impact of different buy-back prices on the optimal order quantity, retailer’s expected profit, supplier’s expected profit, as well as the total supply chain profit? Show your results using some plots.

Refer to the snapshot of excel sheet below:

SkiRetail (The Retailer)			Skiekz (The Manufacturer)			Shortage Cost											
Selling Price	\$	250				Selling Price	\$	200				Excess Cost	\$	57			
Purchase Price	\$	200				Variable Cost	\$	140				Service Level	46.874%				
Buy back	\$	143.33				Fixed Cost	\$	70,000				Optimal Qty.	12000				
						SkiRetail					Skiekz						
Demand	Frequency	Frequency	Cum. Freq	Q*	Rev. (1)	Rev. (2)	Total Rev.	Cost	Profit	Rev.	Cost	Cost 2	Profit				
9000	8	25.000%	25.000%	12000	\$2,250,000	\$429,990	\$2,679,990	\$2,400,000	\$279,990	\$2,400,000	\$1,750,000	\$ 429,990	\$220,010				
10000	1	3.125%	28.125%	12000	\$2,500,000	\$286,660	\$2,786,660	\$2,400,000	\$386,660	\$2,400,000	\$1,750,000	\$ 286,660	\$363,340				
11000	3	9.375%	37.500%	12000	\$2,750,000	\$143,330	\$2,893,330	\$2,400,000	\$493,330	\$2,400,000	\$1,750,000	\$ 143,330	\$506,670				
12000	3	9.375%	46.875%	12000	\$3,000,000	\$0	\$3,000,000	\$2,400,000	\$600,000	\$2,400,000	\$1,750,000	\$ -	\$650,000				
13000	1	3.125%	50.000%	12000	\$3,000,000	\$0	\$3,000,000	\$2,400,000	\$600,000	\$2,400,000	\$1,750,000	\$ -	\$650,000				
14000	1	3.125%	53.125%	12000	\$3,000,000	\$0	\$3,000,000	\$2,400,000	\$600,000	\$2,400,000	\$1,750,000	\$ -	\$650,000				
15000	2	6.250%	59.375%	12000	\$3,000,000	\$0	\$3,000,000	\$2,400,000	\$600,000	\$2,400,000	\$1,750,000	\$ -	\$650,000				
16000	1	3.125%	62.500%	12000	\$3,000,000	\$0	\$3,000,000	\$2,400,000	\$600,000	\$2,400,000	\$1,750,000	\$ -	\$650,000				
17000	2	6.250%	68.750%	12000	\$3,000,000	\$0	\$3,000,000	\$2,400,000	\$600,000	\$2,400,000	\$1,750,000	\$ -	\$650,000				
18000	5	15.625%	84.375%	12000	\$3,000,000	\$0	\$3,000,000	\$2,400,000	\$600,000	\$2,400,000	\$1,750,000	\$ -	\$650,000				
19000	5	15.625%	100.000%	12000	\$3,000,000	\$0	\$3,000,000	\$2,400,000	\$600,000	\$2,400,000	\$1,750,000	\$ -	\$650,000				
TOTAL	32	100%															
Retailer's Expected Profit									\$503,330	Manuf.'s Profit				\$520,107			
														Total Value Chain profit			\$1,023,438



- What is the “optimal” range of buy-back price that you would propose to the firms?

The optimal, range implies the “profit maximizing” buy-back price, which is \$116.67 to \$143.33 as shown in the table below. The total profit is \$1,023, 438

buy back price	Service Level	Optimal Qty.	Retailer's Expected Profit	Manuf.'s Profit	Total Profit
\$ 116.67	37.501%	12000	\$479,170	\$544,268	\$1,023,438
\$ 143.33	46.874%	12000	\$503,330	\$520,107	\$1,023,438

- Determine the expected profit for the “retailer” under the proposed buy-back contract.

The expected profit of the retailer ranges from \$479,170 to \$503,330.

- Determine the expected profit for the “supplier” under the proposed buy-back contract.

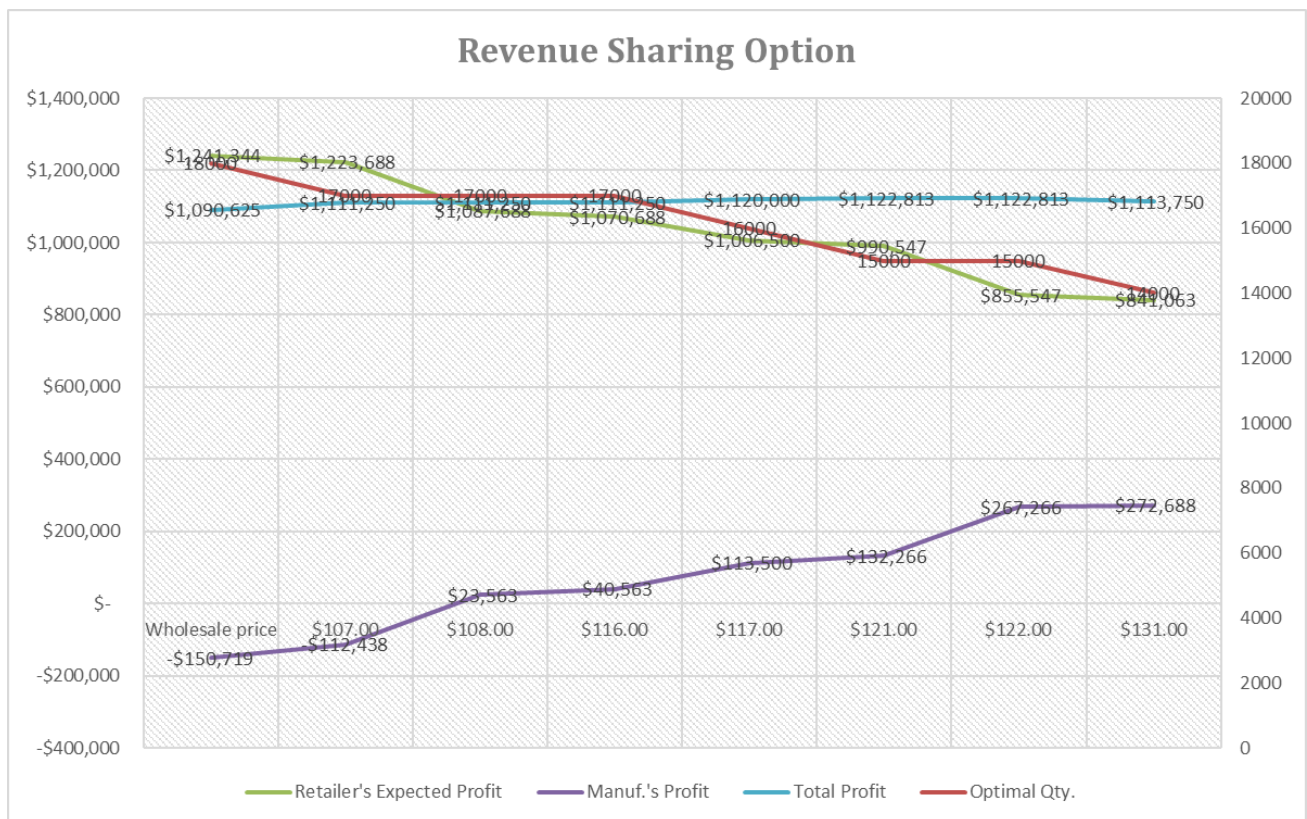
The expected profit of the supplier (or manufacturer) ranges from \$544,268 to \$520,107.

Q 4: Skiekz and SkiRetail would like to explore the option of revenue-sharing contract, in which SkiRetail is willing to share 15% of its revenues from regular sales for a reduced purchase /wholesale price.

- Analyze the impact of varying wholesale price on the optimal order quantity, retailer’s expected profit, supplier’s expected profit, as well as the total supply chain profit? Show your results using some plots.

Refer to the snapshot of excel sheet below:

Wholesale price	Ser.Level	Optimal Qty.	Retailer's Expec	Manuf.'s Profit	Total Profit
\$ 107.00	69.18%	18000	\$ 1,241,344	\$ 150,719	\$ 1,090,625
\$ 108.00	68.52%	17000	\$ 1,223,688	\$ 112,438	\$ 1,111,250
\$ 116.00	63.28%	17000	\$ 1,087,688	\$ 23,563	\$ 1,111,250
\$ 117.00	62.62%	17000	\$ 1,070,688	\$ 40,563	\$ 1,111,250
\$ 121.00	60.00%	16000	\$ 1,006,500	\$ 113,500	\$ 1,120,000
\$ 122.00	59.34%	15000	\$ 990,547	\$ 132,266	\$ 1,122,813
\$ 131.00	53.44%	15000	\$ 855,547	\$ 267,266	\$ 1,122,813
\$ 132.00	52.79%	14000	\$ 841,063	\$ 272,688	\$ 1,113,750
\$ 136.00	50.16%	14000	\$ 785,063	\$ 328,688	\$ 1,113,750
\$ 137.00	49.51%	13000	\$ 771,813	\$ 326,938	\$ 1,098,750
\$ 141.00	46.89%	13000	\$ 719,813	\$ 378,938	\$ 1,098,750
\$ 142.00	46.23%	12000	\$ 707,797	\$ 370,016	\$ 1,077,813
\$ 155.00	37.70%	12000	\$ 551,797	\$ 526,016	\$ 1,077,813
\$ 156.00	37.05%	11000	\$ 540,484	\$ 498,578	\$ 1,039,063
\$ 169.00	28.52%	11000	\$ 397,484	\$ 641,578	\$ 1,039,063
\$ 170.00	27.87%	10000	\$ 386,875	\$ 595,625	\$ 982,500
\$ 174.00	25.25%	10000	\$ 346,875	\$ 635,625	\$ 982,500
\$ 175.00	24.59%	9000	\$ 337,500	\$ 582,500	\$ 920,000
\$ 212.00	0.33%	9000	\$ 4,500	\$ 915,500	\$ 920,000



- What is the optimal purchase /wholesale price that Skiekz should propose?
The range of optimal purchase /wholesale price that Skiekz is [122,131]. The maximum profit is \$1,122,813.
- Determine the expected profit for the “retailer” under the proposed revenue-sharing contract.

Refer to the table below:

- Determine the expected profit for the “supplier” under the proposed revenue-sharing contract.

Refer to the table below:

Wholesale price	Service Level	Optimal Qty.	Retailer's Expected Profit	Manuf.'s Profit	Total Profit
\$ 122.00	59.34%	15000	\$ 990,547	\$ 132,266	\$ 1,122,813
\$ 131.00	53.44%	15000	\$ 855,547	\$ 267,266	\$ 1,122,813

Q 5: Skiekz and SkiRetail would like to explore *optimal revenue-sharing contract(s)* that will maximize the total expected supply chain profit as opposed to their individual expected profits. The two decision variables of interests are the *wholesale price* and the *proportion of primary revenue shared*. Determine the optimal combination of wholesale price and the percentage of revenue sharing agreements that will maximize the total expected supply chain profit.

This is a very interesting question.

From the previous questions, we have already established that the order quantity that yields the highest total supply chain profit is 15,000 units, which gives a total supply chain profit of \$1,122,813.

The next step is to find different combination of wholesale price and the proportion of primary revenue shared that yields an order quantity of 15,000 units. The desired service level for this is in the range [53.14%, 59.38%]. The several combinations of wholesale price and the proportion of primary revenue shared in the service level range [53.14%, 59.38%] can be found in the excel worksheet “Question 5”. **Sample combinations are shown (and highlighted) as follows:**

		Revenue Sharing Percentage									
		1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
Wholesale Price	\$ 123	66.40%	65.95%	65.48%	65.00%	64.51%	64.00%	63.48%	62.94%	62.39%	61.82%
	\$ 124	65.87%	65.41%	64.93%	64.44%	63.94%	63.43%	62.90%	62.35%	61.79%	61.21%
	\$ 125	65.33%	64.86%	64.38%	63.89%	63.38%	62.86%	62.32%	61.76%	61.19%	60.61%
	\$ 126	64.80%	64.32%	63.84%	63.33%	62.82%	62.29%	61.74%	61.18%	60.60%	60.00%
	\$ 127	64.27%	63.78%	63.29%	62.78%	62.25%	61.71%	61.16%	60.59%	60.00%	59.39%
	\$ 128	63.73%	63.24%	62.74%	62.22%	61.69%	61.14%	60.58%	60.00%	59.40%	58.79%
	\$ 129	63.20%	62.70%	62.19%	61.67%	61.13%	60.57%	60.00%	59.41%	58.81%	58.18%
	\$ 130	62.67%	62.16%	61.64%	61.11%	60.56%	60.00%	59.42%	58.82%	58.21%	57.58%
	\$ 131	62.13%	61.62%	61.10%	60.56%	60.00%	59.43%	58.84%	58.24%	57.61%	56.97%
	\$ 132	61.60%	61.08%	60.55%	60.00%	59.44%	58.86%	58.26%	57.65%	57.01%	56.36%
	\$ 133	61.07%	60.54%	60.00%	59.44%	58.87%	58.29%	57.68%	57.06%	56.42%	55.76%
	\$ 134	60.53%	60.00%	59.45%	58.89%	58.31%	57.71%	57.10%	56.47%	55.82%	55.15%
	\$ 135	60.00%	59.46%	58.90%	58.33%	57.75%	57.14%	56.52%	55.88%	55.22%	54.55%
	\$ 136	59.47%	58.92%	58.36%	57.78%	57.18%	56.57%	55.94%	55.29%	54.63%	53.94%
	\$ 137	58.93%	58.38%	57.81%	57.22%	56.62%	56.00%	55.36%	54.71%	54.03%	53.33%
	\$ 138	58.40%	57.84%	57.26%	56.67%	56.06%	55.43%	54.78%	54.12%	53.43%	52.73%
	\$ 139	57.87%	57.30%	56.71%	56.11%	55.49%	54.86%	54.20%	53.53%	52.84%	52.12%
	\$ 140	57.33%	56.76%	56.16%	55.56%	54.93%	54.29%	53.62%	52.94%	52.24%	51.52%
	\$ 141	56.80%	56.22%	55.62%	55.00%	54.37%	53.71%	53.04%	52.35%	51.64%	50.91%
	\$ 142	56.27%	55.68%	55.07%	54.44%	53.80%	53.14%	52.46%	51.76%	51.04%	50.30%
	\$ 143	55.73%	55.14%	54.52%	53.89%	53.24%	52.57%	51.88%	51.18%	50.45%	49.70%
	\$ 144	55.20%	54.59%	53.97%	53.33%	52.68%	52.00%	51.30%	50.59%	49.85%	49.09%
	\$ 145	54.67%	54.05%	53.42%	52.78%	52.11%	51.43%	50.72%	50.00%	49.25%	48.48%
	\$ 146	54.13%	53.51%	52.88%	52.22%	51.55%	50.86%	50.14%	49.41%	48.66%	47.88%
	\$ 147	53.60%	52.97%	52.33%	51.67%	50.99%	50.29%	49.57%	48.82%	48.06%	47.27%
	\$ 148	53.07%	52.43%	51.78%	51.11%	50.42%	49.71%	48.99%	48.24%	47.46%	46.67%

For example, with 10% of the revenue sharing, \$128 as wholesale price (less than the variable cost), and a profit of \$1,122,813, the calculations are as follows:

									Rev. Sharing	10%				
SkiRetail (The Retailer)			Skiezk (The Manufacturer)						Shortage Cost	\$ 97.00				
Selling Price	\$ 250		Selling Price	\$ 128					Excess Cost	\$ 68.00				
Purchase Price	\$ 128	new VVP	Variable Cost	\$ 140					Service Level	59%				
Salvage Value	\$ 60		Fixed Cost	\$ 70,000					Optimal Qty.	15000				
					SkiRetail					Skiezk				
Demand	Frequency	Frequency	Cum. Freq	Q*	Rev. (1)	Rev. (2)	Total Rev.	Cost	Profit	Rev.	Rev.2	Cost	Profit	
9000	8	25.00%	25.00%	15000	\$2,025,000	\$360,000	\$2,385,000	\$1,920,000	\$465,000	\$1,920,000	\$225,000	\$2,170,000	-\$25,000	
10000	1	3.13%	28.13%	15000	\$2,250,000	\$300,000	\$2,550,000	\$1,920,000	\$630,000	\$1,920,000	\$250,000	\$2,170,000	\$0	
11000	3	9.38%	37.50%	15000	\$2,475,000	\$240,000	\$2,715,000	\$1,920,000	\$795,000	\$1,920,000	\$275,000	\$2,170,000	\$25,000	
12000	3	9.38%	46.88%	15000	\$2,700,000	\$180,000	\$2,880,000	\$1,920,000	\$960,000	\$1,920,000	\$300,000	\$2,170,000	\$50,000	
13000	1	3.13%	50.00%	15000	\$2,925,000	\$120,000	\$3,045,000	\$1,920,000	\$1,125,000	\$1,920,000	\$325,000	\$2,170,000	\$75,000	
14000	1	3.13%	53.13%	15000	\$3,150,000	\$60,000	\$3,210,000	\$1,920,000	\$1,290,000	\$1,920,000	\$350,000	\$2,170,000	\$100,000	
15000	2	6.25%	59.38%	15000	\$3,375,000	\$0	\$3,375,000	\$1,920,000	\$1,455,000	\$1,920,000	\$375,000	\$2,170,000	\$125,000	
16000	1	3.13%	62.50%	15000	\$3,375,000	\$0	\$3,375,000	\$1,920,000	\$1,455,000	\$1,920,000	\$375,000	\$2,170,000	\$125,000	
17000	2	6.25%	68.75%	15000	\$3,375,000	\$0	\$3,375,000	\$1,920,000	\$1,455,000	\$1,920,000	\$375,000	\$2,170,000	\$125,000	
18000	5	15.63%	84.38%	15000	\$3,375,000	\$0	\$3,375,000	\$1,920,000	\$1,455,000	\$1,920,000	\$375,000	\$2,170,000	\$125,000	
19000	5	15.63%	100.00%	15000	\$3,375,000	\$0	\$3,375,000	\$1,920,000	\$1,455,000	\$1,920,000	\$375,000	\$2,170,000	\$125,000	
TOTAL	32	100%					Retailer's Expected Profit		\$ 1,057,969		Manuf.'s Profit		\$64,844	
Enter:		\$ 128.00	15000	\$1,057,969	\$64,844	\$1,122,813					Total Value Chain profit			\$1,122,813

Another example, with 10% of the revenue sharing, \$137 as wholesale price (less than the variable cost), and a profit of \$1,122,813, the calculations are as follows:

									Rev. Sharing	10%				
SkiRetail (The Retailer)			Skieksz (The Manufacturer)						Shortage Cost	\$ 88.00				
Selling Price	\$	250		Selling Price	\$	137			Excess Cost	\$ 77.00				
Purchase Price	\$	137	new WVP	Variable Cost	\$	140			Service Level	53%				
Salvage Value	\$	60			Fixed Cost	\$	70,000			Optimal Qty.	15000			
					SkiRetail					Skieksz				
Demand	Frequency	Frequency	Cum. Freq	Q*	Rev. (1)	Rev. (2)	Total Rev.	Cost	Profit	Rev.	Rev.2	Cost	Profit	
9000	8	25.00%	25.00%	15000	\$2,025,000	\$360,000	\$2,385,000	\$2,055,000	\$330,000	\$2,055,000	\$225,000	\$2,170,000	\$110,000	
10000	1	3.13%	28.13%	15000	\$2,250,000	\$300,000	\$2,550,000	\$2,055,000	\$495,000	\$2,055,000	\$250,000	\$2,170,000	\$135,000	
11000	3	9.38%	37.50%	15000	\$2,475,000	\$240,000	\$2,715,000	\$2,055,000	\$660,000	\$2,055,000	\$275,000	\$2,170,000	\$160,000	
12000	3	9.38%	46.88%	15000	\$2,700,000	\$180,000	\$2,880,000	\$2,055,000	\$825,000	\$2,055,000	\$300,000	\$2,170,000	\$185,000	
13000	1	3.13%	50.00%	15000	\$2,925,000	\$120,000	\$3,045,000	\$2,055,000	\$990,000	\$2,055,000	\$325,000	\$2,170,000	\$210,000	
14000	1	3.13%	53.13%	15000	\$3,150,000	\$60,000	\$3,210,000	\$2,055,000	\$1,155,000	\$2,055,000	\$350,000	\$2,170,000	\$235,000	
15000	2	6.25%	59.38%	15000	\$3,375,000	\$0	\$3,375,000	\$2,055,000	\$1,320,000	\$2,055,000	\$375,000	\$2,170,000	\$260,000	
16000	1	3.13%	62.50%	15000	\$3,375,000	\$0	\$3,375,000	\$2,055,000	\$1,320,000	\$2,055,000	\$375,000	\$2,170,000	\$260,000	
17000	2	6.25%	68.75%	15000	\$3,375,000	\$0	\$3,375,000	\$2,055,000	\$1,320,000	\$2,055,000	\$375,000	\$2,170,000	\$260,000	
18000	5	15.63%	84.38%	15000	\$3,375,000	\$0	\$3,375,000	\$2,055,000	\$1,320,000	\$2,055,000	\$375,000	\$2,170,000	\$260,000	
19000	5	15.63%	100.00%	15000	\$3,375,000	\$0	\$3,375,000	\$2,055,000	\$1,320,000	\$2,055,000	\$375,000	\$2,170,000	\$260,000	
TOTAL	32	100%					Retailer's Expected Profit		\$ 922,969		Manuf.'s Profit		\$199,844	
Enter:		\$ 137.00	15000	\$922,969	\$199,844	\$1,122,813					Total Value Chain profit			\$1,122,813

Another example, with 1% of the revenue sharing, \$145 as wholesale price (more than the variable cost), and a profit of \$1,122,813, the calculations are as follows:

										Rev. Sharing	1%				
SkiRetail (The Retailer)					Skieks (The Manufacturer)										
Selling Price	\$	250			Selling Price	\$	145			Shortage Cost	\$	102.50			
Purchase Price	\$	145	new VVP		Variable Cost	\$	140			Excess Cost	\$	85.00			
Salvage Value	\$	60			Fixed Cost	\$	70,000			Service Level		55%			
										Optimal Qty.		15000			
SkiRetail										Skieks					
Demand	Frequency	Frequency	Cum. Freq	Q*	Rev. (1)	Rev. (2)	Total Rev.	Cost	Profit	Rev.	Rev.2	Cost	Profit		
9000	8	25.00%	25.00%	15000	\$2,227,500	\$360,000	\$2,587,500	\$2,175,000	\$412,500	\$2,175,000	\$22,500	\$2,170,000	\$27,500		
10000	1	3.13%	28.13%	15000	\$2,475,000	\$300,000	\$2,775,000	\$2,175,000	\$600,000	\$2,175,000	\$25,000	\$2,170,000	\$30,000		
11000	3	9.38%	37.50%	15000	\$2,722,500	\$240,000	\$2,962,500	\$2,175,000	\$787,500	\$2,175,000	\$27,500	\$2,170,000	\$32,500		
12000	3	9.38%	46.88%	15000	\$2,970,000	\$180,000	\$3,150,000	\$2,175,000	\$975,000	\$2,175,000	\$30,000	\$2,170,000	\$35,000		
13000	1	3.13%	50.00%	15000	\$3,217,500	\$120,000	\$3,337,500	\$2,175,000	\$1,162,500	\$2,175,000	\$32,500	\$2,170,000	\$37,500		
14000	1	3.13%	53.13%	15000	\$3,465,000	\$60,000	\$3,525,000	\$2,175,000	\$1,350,000	\$2,175,000	\$35,000	\$2,170,000	\$40,000		
15000	2	6.25%	59.38%	15000	\$3,712,500	\$0	\$3,712,500	\$2,175,000	\$1,537,500	\$2,175,000	\$37,500	\$2,170,000	\$42,500		
16000	1	3.13%	62.50%	15000	\$3,712,500	\$0	\$3,712,500	\$2,175,000	\$1,537,500	\$2,175,000	\$37,500	\$2,170,000	\$42,500		
17000	2	6.25%	68.75%	15000	\$3,712,500	\$0	\$3,712,500	\$2,175,000	\$1,537,500	\$2,175,000	\$37,500	\$2,170,000	\$42,500		
18000	5	15.63%	84.38%	15000	\$3,712,500	\$0	\$3,712,500	\$2,175,000	\$1,537,500	\$2,175,000	\$37,500	\$2,170,000	\$42,500		
19000	5	15.63%	100.00%	15000	\$3,712,500	\$0	\$3,712,500	\$2,175,000	\$1,537,500	\$2,175,000	\$37,500	\$2,170,000	\$42,500		
TOTAL	32	100%					Retailer's Expected Profit	\$	1,086,328			Manuf.'s Profit	\$36,484		
Enter:		\$ 145.00	15000	\$1,086,328	\$36,484	\$1,122,813						Total Value Chain profit	\$1,122,813		

Q 6: What is your recommendation to the companies: buy-back contract or revenue-sharing contract? Why? What are the potential benefits and risks associated with each?

Revenue sharing is what I would recommend, as the total supply chain profit can be as high as the vertically integrated supply chain. See all the calculations above.

I will let you think about the rest.