

Appendix. Online Appendix

A. Briefing Documents and Screen Shots of Software

Situation

- Determine order quantity: 28 rounds
- Ordering and receiving products before selling period
- Selling of products in selling period
- Revenue = 100 talers/unit
- Wholesale price = E talers/unit
- Buyback price = R talers/unit
 - Buyback of products for R talers each
- Exact demand is unknown, probabilities are known:
 - Demand between 1 and 100 uniformly distributed
 - Demand is independent between rounds

Example 1

Revenue 100 talers/unit
 Wholesale price 60 talers/unit
 Buyback price 30 talers/unit

Order quantity 10 units } Units sold = 10 units
 Demand 80 units } Overage quantity = 0 units

Profit 400 talers

Revenue	+ 1,000 talers
Costs	- 600 talers
Buyback-value	+0 talers
Total	400 talers

Example 2

Revenue 100 talers/unit
 Wholesale price 60 talers/unit
 Buyback price 30 talers/unit

Order quantity 70 units } Units sold = 20 units
 Demand 20 units } Overage quantity = 50 units

Profit -700 talers

Revenue	+2,000 talers
Costs	-4,200 talers
Buyback-value	1,500 talers
Total	-700 talers

Exercise 1

Revenue 100 talers/unit
 Wholesale price 70 talers/unit
 Buyback price 10 talers/unit

Order quantity 70 units } Units sold = 70 units
 Demand 80 units } Overage quantity = 0 units

Profit 2,100 talers

Revenue	+7,000 talers
Costs	-4,900 talers
Buyback-value	+0 talers
Total	2,100 talers

Exercise 2

Revenue 100 talers/unit
 Wholesale price 70 talers/unit
 Buyback price 10 talers/unit

Order quantity 70 units } Units sold = 20 units
 Demand 20 units } Overage quantity = 50 units

Profit -2,400 talers

Revenue	+2,000 talers
Costs	-4,900 talers
Buyback-value	+500 talers
Total	-2,400 talers

Experiment

- 5 trial rounds (do not count for the payment!)
- 28 rounds in the experiment
- Calculation of average profit per round after finishing the experiment
- Payments = € 2.50 + € 1.00 per 100 talers 'average profit'

Decision 1 of 5

Revenue: 100.00 talers/unit

Wholesale Price: 65.00 talers/unit

Buyback Price: 3.00 talers/unit

Your Order quantity:

OK

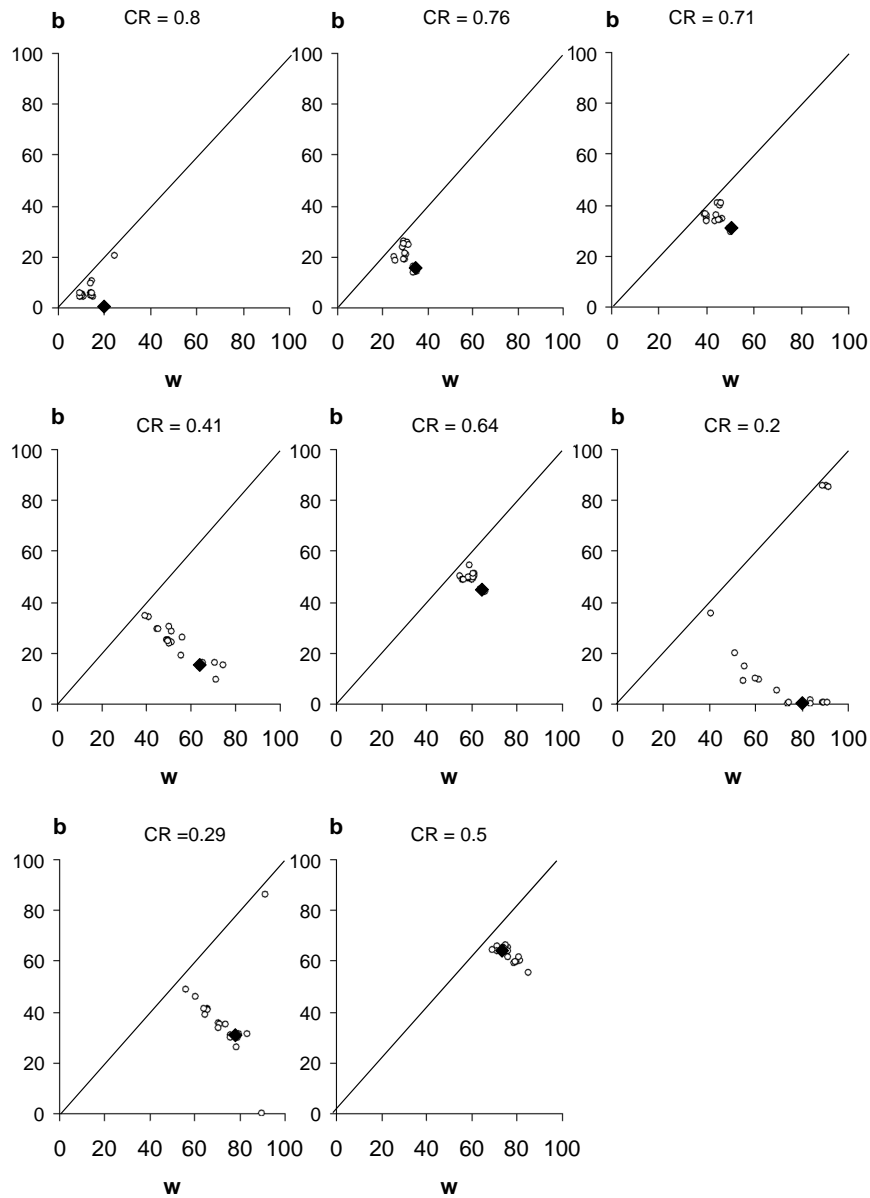
Overview of the decisions and the resulting profits

Round	Revenue	Wholesale price	Buyback price	Your Order quantity	Demand	Your Profit
2	100.00	49.00	20.00	XX	YY	ZZ
3	100.00	65.25	25.00	XX	YY	ZZ
4	100.00	16.00	3.75	XX	YY	ZZ
5	100.00	79.00	10.25	XX	YY	ZZ

Your average profit: AA
 Your payment: BB

B. Contract Parameters used in the Validation Experiment

The following graphs show the contract parameters used in Phase 2 of the first validation experiment for each of the eight critical ratios used. Each circle represents a contract parameter combination of one subject. The contract parameters are chosen with a step size of 5. To visualize multiple subjects who are offered the same contract parameters, we add a noise term with a uniform distribution between -0.5 and +0.5 to the wholesale and buyback prices of each subject. The diamonds show the parameter values of the newsvendor contract.



C. Training Documents

SITUATION

- Newsvendor
- Distribution of demand is known
- Newspaper cost purchasing price E Taler per unit
- Selling price is V Taler per unit
- Unsold newspapers can be returned for buyback price R Taler per unit
- Order quantity must be determined before selling period
- No Re-ordering possible

DEMAND

Example:
Demand = Uniform (1;10)

EXAMPLE

Example:
Order quantity = 6

ILLUSTRATION CALCULATION INDICATORS

Order Quantity = 6 units

V = 100 Taler
E = 67 Taler
R = 40 Taler

	1	2	3	4	5	6	7	8	9	10	Σ
Units ordered	6	6	6	6	6	6	6	6	6	6	6
Units sold	1	2	3	4	5	6	6	6	6	6	4,5
Units returned	5	4	3	2	1	0	0	0	0	0	1,5
Ordering costs	402	402	402	402	402	402	402	402	402	402	402
Selling revenue	100	200	300	400	500	600	600	600	600	600	450
Buyback revenue	200	160	120	80	40	0	0	0	0	0	60
Profit											108

Loss probability = 20%

ILLUSTRATION CALCULATION INDICATORS

Order Quantity = 7 units

V = 100 Taler
E = 67 Taler
R = 40 Taler

	1	2	3	4	5	6	7	8	9	10	Σ
Units ordered	7	7	7	7	7	7	7	7	7	7	7
Units sold	1	2	3	4	5	6	7	7	7	7	4,9
Units returned	6	5	4	3	2	1	0	0	0	0	2,1
Ordering costs	469	469	469	469	469	469	469	469	469	469	469
Selling revenue	100	200	300	400	500	600	700	700	700	700	490
Buyback revenue	240	200	160	120	80	40	0	0	0	0	84
Profit											105

Loss probability = 30%

ILLUSTRATION CALCULATION INDICATORS

Order quantity = 5 units

V = 100 Taler
E = 67 Taler
R = 40 Taler

	1	2	3	4	5	6	7	8	9	10	Σ
Units ordered	5	5	5	5	5	5	5	5	5	5	5
Units sold	1	2	3	4	5	5	5	5	5	5	4
Units returned	4	3	2	1	0	0	0	0	0	0	1
Ordering costs	335	335	335	335	335	335	335	335	335	335	335
Selling revenue	100	200	300	400	500	500	500	500	500	500	400
Buyback revenue	160	120	80	40	0	0	0	0	0	0	40
Profit											105

Loss probability = 20%

GENERAL INDICATORS FOR UNIFORM DEMAND*

		For S increasing
Expected units sold	$S - \frac{1}{2U} \cdot S^2$	↑ konkav
Expected units returned	$\frac{1}{2U} \cdot S^2$	↑ konkav
Expected Revenue	$(S - \frac{1}{2U} \cdot S^2) \cdot V$	↑ konkav
Expected Buyback revenue	$\frac{1}{2U} \cdot S^2 \cdot R$	↑ konkav
Ordering costs	$E \cdot S$	↑ linear
Minimum profit	$(R - E) \cdot S$	↓ linear
Maximum profit	$(V - E) \cdot S$	↑ linear
Loss probability	$\frac{1}{U} \cdot \frac{E - R}{V - R} \cdot S$	↑ linear
Expected profit	$(V - E) \cdot S - \frac{(V - R)}{2 \cdot U} \cdot S^2$	↑ konkav

* Indicators for continuous demand (OU). Approximate for discrete demand (IU).

EXAMPLE

Maximizing expected profit:
 $S = F^{-1} \left(\frac{V - E}{V - R} \right)$

For Uniform demand:
 $S = U \cdot \left(\frac{V - E}{V - R} \right)$

* Indicators for continuous demand (OU). Approximate for discrete demand (IU).

EXERCISE

$V = 100$
 $E = 80$
 $R = 60$
Demand = Uniform (1;100) $\rightarrow U=100$

- What order quantity maximizes the expected profit?
- If you order 50, what is your expected number of units sold?
- If you order 50, what is your expected number of units returned?
- If you order 50, what is your loss probability?
- If you order 50, what is your minimum profit?
- If you order 50, what is your maximum profit?

EXERCISE

$V = 100$
 $E = 80$
 $R = 60$
Demand = Uniform (1;100) $\rightarrow U=100$

- If you order 40, what is your expected number of units sold?
- If you order 40, what is your expected number of units returned?
- If you order 40, what is your loss probability?
- If you order 40, what is your minimum profit?
- If you order 40, what is your maximum profit?