EXAMINATION: MARKETING MODELS & ANALYSIS SS 2007
EXAMINER: PROF. DR. B. ERICHSON, NUMBER OF LECTURE: 2683

You are allowed to use a non-programmable pocket calculator without communication functions.
The answers to all questions should be made in one language, please use English or German.
All of the 5 exam questions must be answered (the estimated time for each question is given).
This examination has 3 pages.

Attention: Instead of a decimal "." point in numbers we use a comma "," here!

Question 1: Basics **(5 Min.)**

a) What is a model?

b) Name purposes of models!

c) Which methods (principles) can be used for the calibration of models, i.e. fitting them to empirical data?

Question 2: Laboratory Price Research **(15 Min.)**

Experiments are often performed in a "laboratory" (test studio) for studying price response behavior. One approach for competitive brands is the Brand/Price-Trade-Off method (BPTO).

A regression analysis of individual BPTO-data has yielded the following function:

$$\hat{r} = -48{,}0\, x_a - 60{,}0\, x_b - 12{,}0\, x_c + 12{,}0\, p$$

a) Derive monetary scaled utility values for the three brands!

b) Assume that prices of the three brands are equal. Derive purchase probabilities for the brands by use of the

b1) Max-Utility-Model

b2) Attraction Model (BTL: Bradley/Terry/Luce)

$$prob_a = \frac{y_a}{\sum_{b=1}^{A} y_b} \qquad (a, b = 1, ..., A)$$

c) Assume the following prices: $p_a = 2$, $p_b = 2$, $p_c = 1$

Which purchase probabilities yields the BTL-model for this situation?

Please turn the page

Question 3: Growth Models (15 Min.)

The company Clean&Proper plans for the coming year a promotion action by couponing for his fabric softener "Softy" and wants to know the growth (penetration) of buyers. From panel research they got the following figures:

purchase frequency for Softy: 1,2 units/year, number of potential buyers: 20 Mio.

a) Estimate the incremental number of buyers s_t and the cumulative number of buyers y_t of Softy for the first three months of the year! Use the following table:

t	$M - y_{t-1}$	s_t	y_t
1			
2			
3			

where $s_t = y_t - y_{t-1}$ and $y_{t-1} = 0$.

Help: The Geometric Model has the following form:

$$y_t = M \cdot \left[1 - (1-c)^t\right] \qquad (0<c<1)$$

b) How many buyers will be reached by the couponing action until the end of the coming year?

c) For modeling the diffusion of mobile phones in Germany the following growth models have been calibrated on the basis of historical data:

c1) $\hat{y}_t = \dfrac{80,9}{1+e^{5,8 - 0,64 \cdot t}}$ c2) $\hat{y}_t = 88,2 \cdot e^{-22,6 \cdot 0,69^t}$

Identify and compare the two models!

d) How could you estimate the parameters of the two models above on the basis of historical data for y_t? Describe the estimation criterion and how you could use your PC for the necessary computations!

Question 4: Advertising Models (10 Min.)

By using regression analysis the following advertising response function is estimated:

$$x_t = 150 + 0,3 \cdot W_t + 0,6 \cdot x_{t-1}$$

x_t = sales in peridod t

W_t = advertising spendings in period t

a) What are the problems of estimating advertising response?

b) Which type of model is used here? Explain the model!

c) Which increase of sales will be caused by a single increase of advertising spendings about 100 money units in the relevant period? What will be the longterm effect on sales caused by this single increase of advertising spendings?

Please turn the page

Question 5: Regression Analysis (15 Min.)

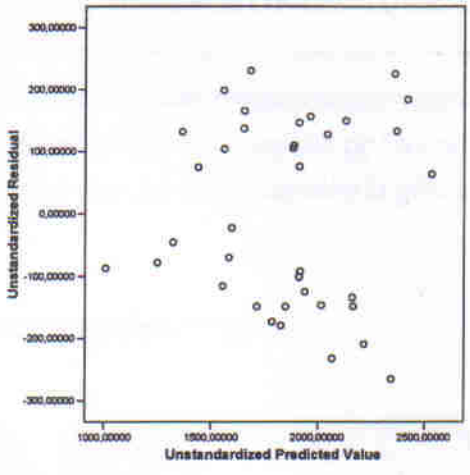
The following SPSS-Output is given:

ANOVA(b)

Model		Sum of Squares
1	Regression	4395065
	Residual	796097
	Total	5191162

a Predictors: (Constant), visits, price, promotion
b Dependent Variable: sales

Durbin/Watson Statistic
2,020



Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	764	223,946		3,410	,002		
	price	-45,18	16,102	-,191	-2,806	,008	,998	1,002
	promotion	,55	,050	,753	10,925	,000	,978	1,023
	visits	9,70	1,658	,404	5,854	,000	,976	1,024

a Dependent Variable: sales

a) Write down the estimated function and judge the global goodness of fit of this function by computing R^2!

b) Check the multicollinearity of the multiple regression model!

c) Interpret the scatterplot of unstandardized residuals and unstandardized predicted values! Which consequences can you draw?

d) Interpret the Durbin/Watson Statistic!

e) The Stepwise Regression method is one option to specify the "right" model. What is the criteria to enter a variable to a model? Discuss shortly the danger of this method!

Good Luck!