

Nested-Logit Beispiel aus Skript: NL-Analyse

Jedes Choice-Set hat vier Alternativen:

- Alt. $i = 1$ bzw. $(l, m) = (1, 1)$: Emma+OEV,
- Alt. $i = 2$ bzw. $(l, m) = (1, 2)$: Emma+MIV,
- Alt. $i = 3$ bzw. $(l, m) = (2, 1)$: Discounter+OEV,
- Alt. $i = 4$ bzw. $(l, m) = (2, 2)$: Discounter+MIV

Modell

Gesamtnutzen:

$$V_{ni} = V_{nlm} = W_{nl} + \tilde{V}_{nlm}$$

Nester $l = 1$: Emma und $l = 2$: Discounter:

$$\tilde{V}_{n1m}/\lambda_1 = \beta_1 T_{n1m} + \beta_2 \delta_{m1},$$

$$\tilde{V}_{n2m}/\lambda_2 = \beta_3 T_{n2m} + \beta_4 \delta_{m1}$$

Top-Level:

$$W_{nl} = \beta_5 F_n \delta_{l1} + \beta_6 \delta_{l1} + \lambda_1 I_{nl} \delta_{l1} + \lambda_2 I_{nl} \delta_{l2}$$

Inklusionswerte (effektive Nutzen der Nests):

$$I_{n1} = \ln \left[\sum_m \exp \left(\hat{\beta}_1 T_{n1m} + \hat{\beta}_2 \delta_{m1} \right) \right]$$

$$I_{n2} = \ln \left[\sum_m \exp \left(\hat{\beta}_3 T_{n2m} + \hat{\beta}_4 \delta_{m1} \right) \right]$$

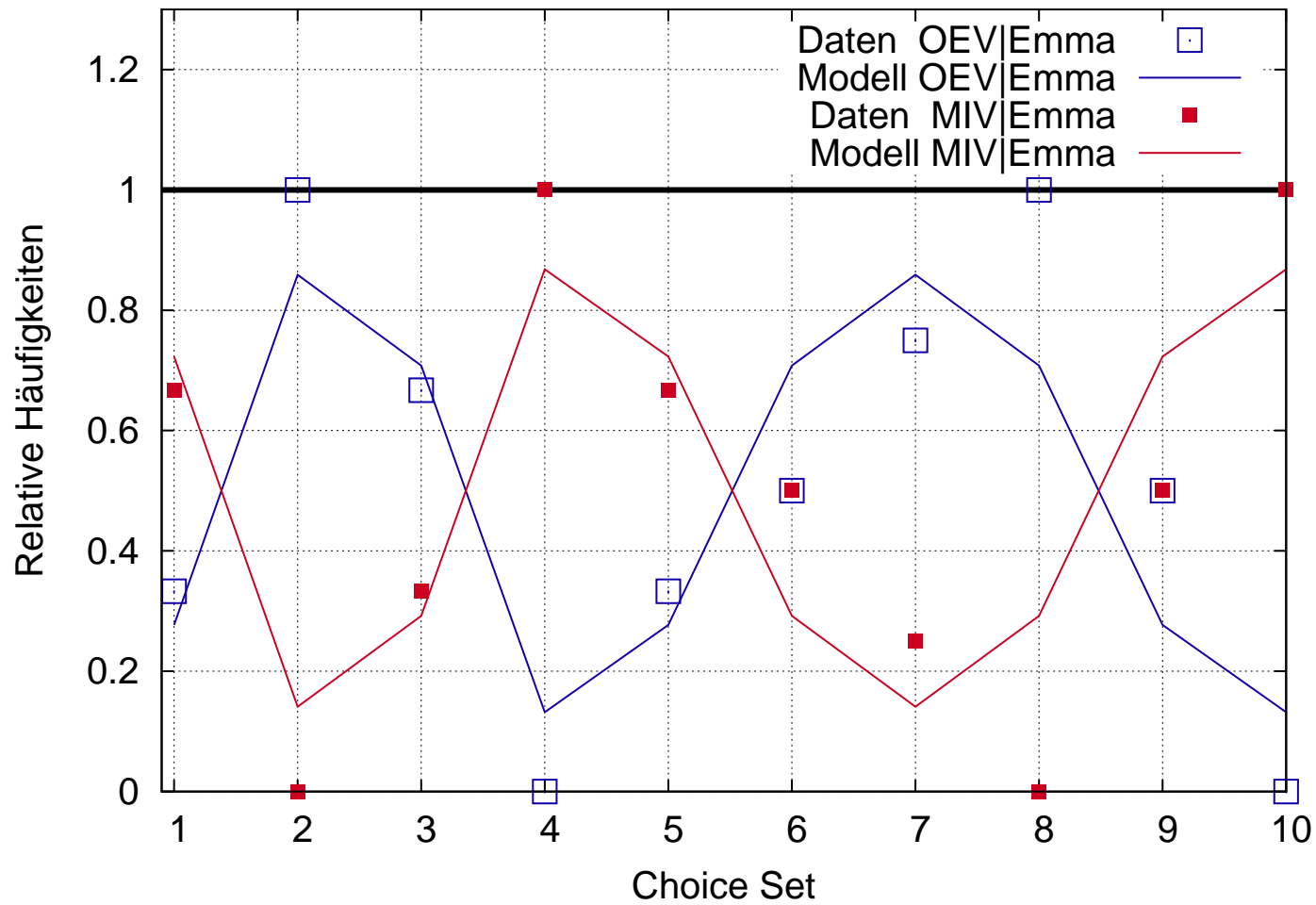
Ergebnisse der Erhebung

#	T1=Cdata[0]	T2=Cdata[1]	T3	T4	F	y1	y2	y3	y4
25		15	25	20	0.9	1	2	0	0
25		30	40	30	0.8	3	0	0	1
20		20	30	30	0.7	2	1	1	1
25		10	25	10	0.6	0	3	0	2
15		5	30	20	0.5	1	2	0	2
15		15	25	20	0.4	1	1	0	1
15		20	45	45	0.3	3	1	0	1
15		15	15	15	0.2	1	0	2	3
25		15	40	30	0.1	1	1	0	1
25		10	25	20	0.0	0	1	1	3

Aus Effizienzgründen wurde die Stated-Choice-Erhebung simultan durchgeführt; in "echten" Erhebung ist eine Einzelbefragung nötig, um ggf "Panel-Struktur" der Daten zu berücksichtigen.

Nest 1

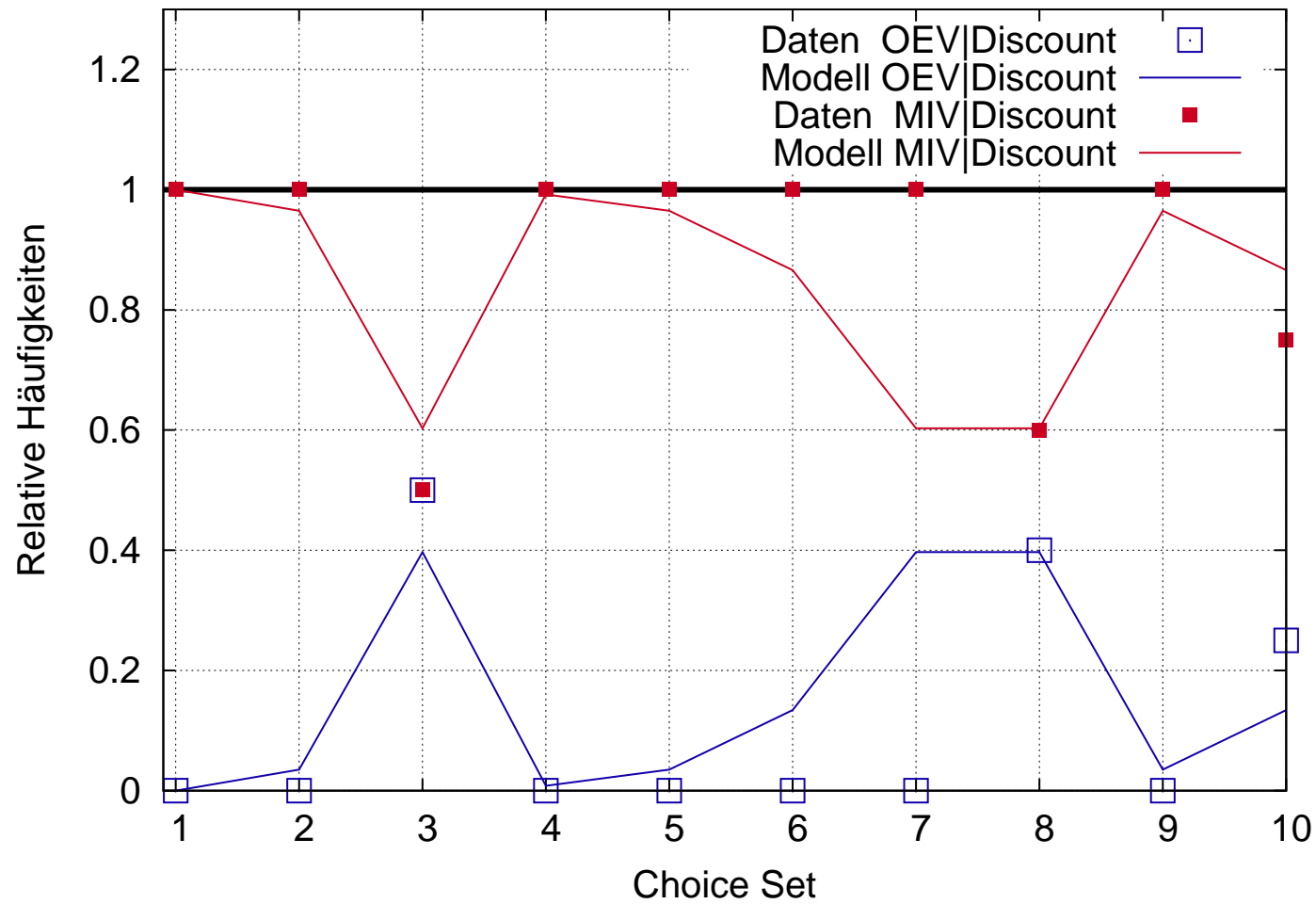
$$\tilde{V}_{1m}/\lambda_1 = \beta_1 T_{1m} + \beta_2 \delta_{m1}$$



$$\beta_1 = -0.18 \pm 0.07,$$
$$\beta_2 = 0.9 \pm 0.6$$

Nest 2

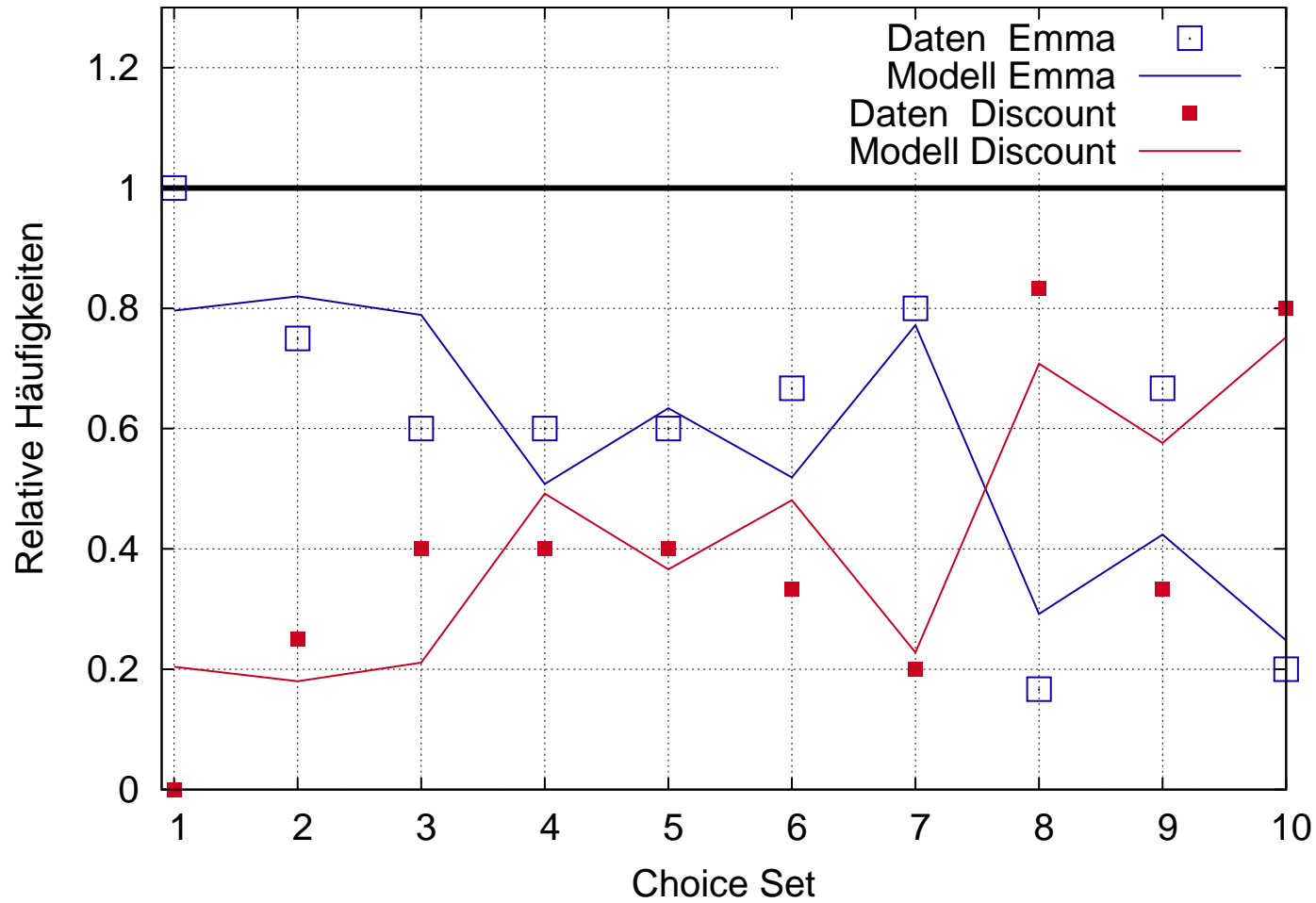
$$\tilde{V}_{2m}/\lambda_2 = \beta_3 T_{2m} + \beta_4 \delta_{m1}$$



$$\beta_3 = -0.29 \pm 0.20,$$
$$\beta_4 = -0.4 \pm 0.7$$

Top-Level

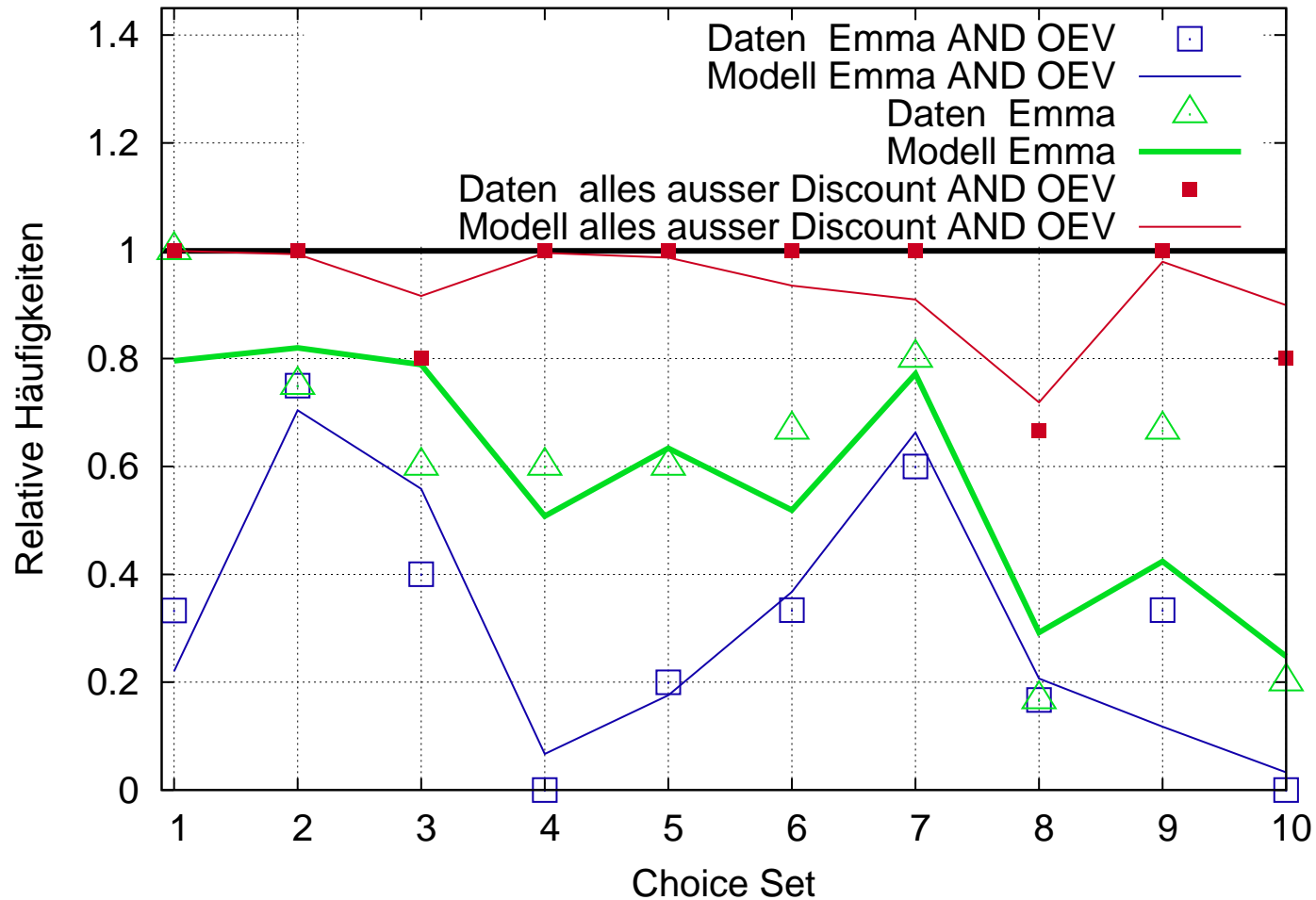
$$W_l = (\beta_5 F + \beta_6) \delta_{l1} + \lambda_1 I_l \delta_{l1} + \lambda_2 I_l \delta_{l2}$$



$$\begin{aligned}\beta_5 &= 2.9 \pm 1.4, \\ \beta_6 &= -2.0 \pm 1.1, \\ \lambda_1 &= 0.17 \pm 0.53, \\ \lambda_2 &= 0.21 \pm 0.13\end{aligned}$$

Fitgüte gesamt Toplevel*Nest

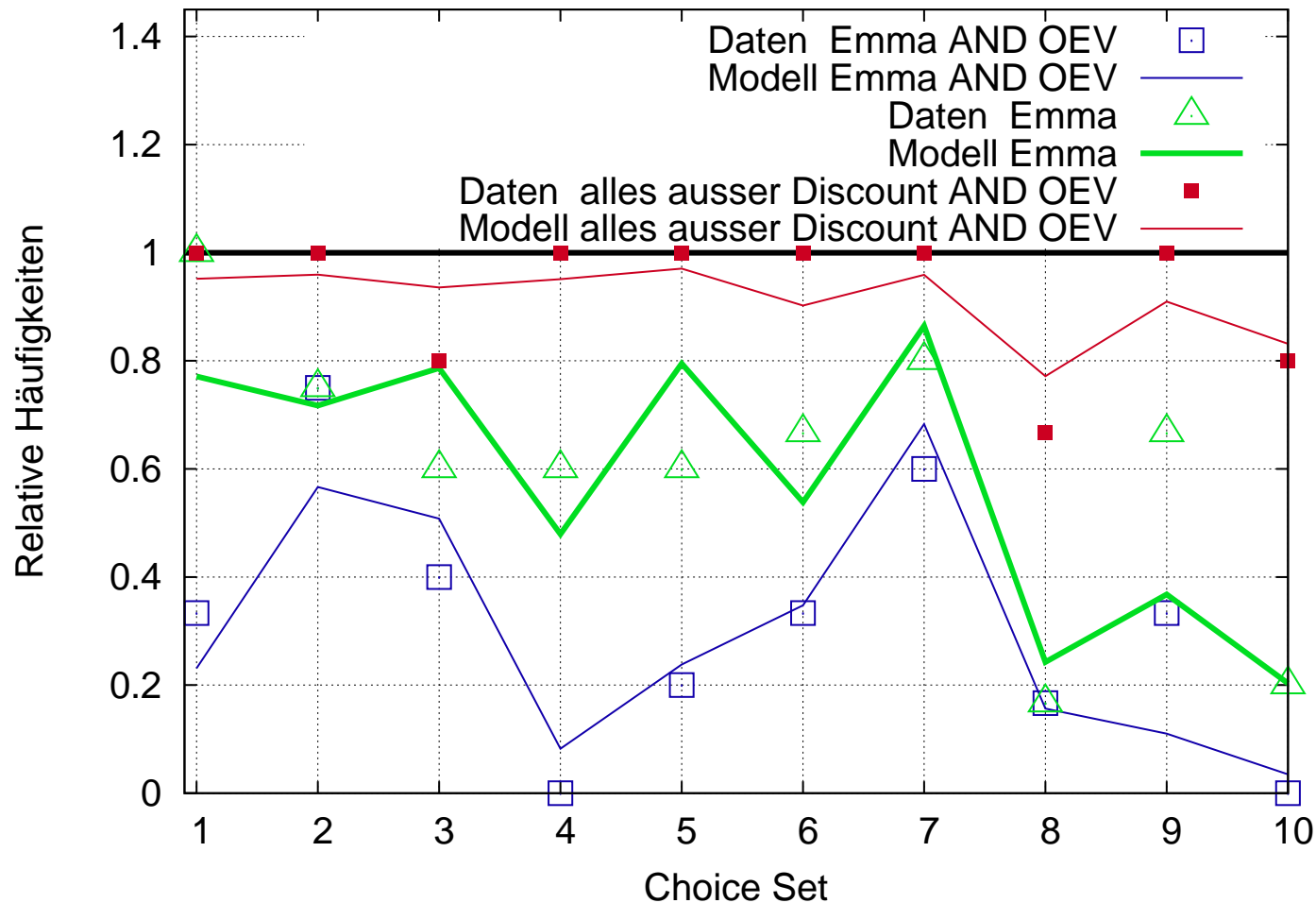
$$\begin{aligned}\tilde{V}_{1m}/\lambda_1 &= \beta_1 T_{1m} + \beta_2 \delta_{m1} \\ \tilde{V}_{2m}/\lambda_2 &= \beta_3 T_{2m} + \beta_4 \delta_{m1} \\ W_l &= (\beta_5 F + \beta_6) \delta_{l1} + \lambda_1 I_l \delta_{l1} + \lambda_2 I_l \delta_{l2}\end{aligned}$$



$$\begin{aligned}\beta_1 &= -0.18 \pm 0.07, \\ \beta_2 &= 0.9 \pm 0.6, \\ \beta_3 &= -0.29 \pm 0.20, \\ \beta_4 &= -0.4 \pm 0.7 \\ \beta_5 &= 2.9 \pm 1.4, \\ \beta_6 &= -2.0 \pm 1.1, \\ \lambda_1 &= 0.17 \pm 0.53, \\ \lambda_2 &= 0.21 \pm 0.13\end{aligned}$$

Vergleich Fitgüte des MNL

$$V_i = \beta_1 T(\delta_{i1} + \delta_{i2}) + \beta_2 \delta_{i1} + \beta_3 T(\delta_{i3} + \delta_{i4}) + \beta_4 \delta_{i3} + \beta_5 F(\delta_{i1} + \delta_{i2}) + \beta_6 (\delta_{i1} + \delta_{i2})$$



$$\beta_1 = -0.15 \pm 0.06,$$

$$\beta_2 = 0.6 \pm 0.5,$$

$$\beta_3 = -0.09 \pm 0.04,$$

$$\beta_4 = -0.8 \pm 0.6,$$

$$\beta_5 = 3.5 \pm 1.3,$$

$$\beta_6 = -1.8 \pm 1.1,$$