

# **Consumer Inertia in the market for mobile telephony**

IO group seminar

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  - Mental gaps: forgetting, beliefs, overconfidence, loss/risk aversion, present bias, trust

## Latest Policies against inertia

- EU: directive 2018/1972 “European Electronic Communications Code”
- AUT: Telekommunikationsgesetz Oct 2021 “TKG 2021”
  - 1 month cancellation period (maximum)
  - 24 months commitment (maximum)
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- Empirical question if they work if consumers have limited consideration

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- Measure: how pervasive are mental gaps?
- Do consumers support policies that “help them out”?

- **Structural models of demand with switching cost.** E.g., Shcherbakov (2016)
- **Structural models of demand with limited consideration.** Sovinsky Goeree (2008), Heiss et al. (2021), Abaluck and Adams-Prassl (2021), Barseghyan et al. (2021), Dressler and Weiergraeber (2023)
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*Gap: structural model of mobile telephony plan choice with limited consideration*

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Further assumptions: static model; usual restriction that only own characteristics affect utility expands to consideration here

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$$\pi_C(\mathbf{p}) = \prod_{j \in C} \phi_j(p_j) \prod_{j' \notin C} (1 - \phi_{j'}(p_{j'}))$$

where  $\phi_j$  is the probability that a consumer *considers* good  $j$

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- with variation in observational data need structure for  $\phi, \mu, s_j^*$

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- (number of brand shops in zip code), users of price comparison websites

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- Assume standard logit model:

$$\begin{aligned}u_{itj} &= \mathbf{x}'_{tj}\beta - \alpha p_{tj} + \zeta \cdot \textit{SwitchPlan} + \xi_j + \epsilon_{itj} \\ &= \delta_{itj} + \epsilon_{itj}\end{aligned}$$

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$$s_{itj}^*(\mathbf{p} \mid C) = \begin{cases} \frac{\exp(\delta_{itj})}{\sum_{k \in \mathbb{P}(C)} \exp(\delta_{itk})} & j \in C \\ 0 & \text{otherwise} \end{cases}$$

- Can add more flexibility by adding observed and unobserved consumer heterogeneity (incl. interactions with demographics) in taste, e.g.,  $\beta_i = \beta + \sigma\zeta_i$

Plan characteristics other than price:

- provider
  - MNO dummy
  - network
  - (network quality from RTR Netztest)
  - prepaid, postpaid
  - minimum contract duration
  - minutes
  - sms
  - data allowance
  - speed
  - 5G
  - roaming
- Often 4 types of plans per provider: low, medium, high, and power user plans

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- Unobservable determinants of attention and utility ( $\epsilon_{itj}, \eta_{itj}$ ) are uncorrelated
- $\eta_{itj}$  is drawn i.i.d., so no correlated shocks



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Need to adjust ML estimation, e.g., use control function and bootstrap SE

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**Attention:** Price could correlate with (unobserved) advertising that affects attention.



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- Abaluck and Adams-Prassl (2021) suggest problems with BLP instruments here
- Lagged prices?

**Attention:** Price could correlate with (unobserved) advertising that affects attention.

- what moves price but not attention and advertising?

## Challenges when price is endogenous

Need to adjust ML estimation, e.g., use control function and bootstrap SE

**Utility:** Price could correlate with time varying unobserved product characteristic that affects choice.

- index of wages (not plan specific)?
- CPI (for indexed MNO plans)?
- Abaluck and Adams-Prassl (2021) suggest problems with BLP instruments here
- Lagged prices?

**Attention:** Price could correlate with (unobserved) advertising that affects attention.

- what moves price but not attention and advertising?
- Market size, advertising costs (Honka), media cost (Sovinsky)?

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- inflation (MNO plans are indexed, exogenous!)
- also plan characteristics change over time, e.g., addition of 5G
- consumers have different default plans

ML with (log) likelihood function:

$$\log \mathcal{L}(\psi) = \sum_{i=1}^N \sum_{t=1}^T \sum_{j=0}^J y_{itj} \log(s_j(\mathbf{p}_{it}; \psi))$$

where  $y_{itj}$  indicates observed choice and  $s_j$  is the model's choice probability.

Want to estimate parameters  $\psi = (\zeta, \xi, \beta, \gamma)$ .

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- Sample from possible consideration sets (importance sampling)
- Use indirect inference



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## Research Question

- How important are taste, switching cost and limited consideration for inertia?
- After Policy change: Are consumers considering more than their current plan?

- How important are taste, switching cost and limited consideration for inertia?
- After Policy change: Are consumers considering more than their current plan?
- Counterfactual: How would consumers choose in a frictionless world?

# Appendix

Sovinsky Goeree (2008) constructs an importance sampler by using the initial choice set weight to smooth the simulated choice probabilities. The initial choice set weight is the product over the  $\phi$ s for products in the choice set (computed at initial parameter values) multiplied by the product of  $(1 - \phi)$  for all products not in the choice set.

### § 135 (7)

*Anbieter nach Abs. 1 haben Endnutzern, in den Fällen einer automatischen Verlängerung nach einer Befristung, zumindest einmal jährlich, jedenfalls aber zum Zeitpunkt einer Information nach Abs. 6, über den anhand ihres Nutzungsverhaltens im vergangenen Jahr bestmöglichen Tarif in Bezug auf ihre Dienste zu informieren.*

# Daly-Zachary Conditions

Intuition: all cross-derivate asymmetries are due to imperfect consideration

- partial derivative of latent choice probability wrt to all other goods prices (compounded) exists, is non-negative and continuous
- cross-price derivatives of latent choice probabilities are symmetric
- no nominal illusion (latent choice probabilities are invariant to price shifts across the board)

Back

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