Spatio-temporal changes in travel behavior: Analyzing external and internal temporal effects on destination choices

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1. Research on Travel Behavior
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Destination Choice Process:

- total set
- available awareness set
- unawareness set
- inert set (foggy/hold)
- relevant set (evoked set)
- inaction set
- action set
- destination

Time.
Research Project

- Funded by the Deutsche Forschungsgemeinschaft (DFG)

- Tourist travel behavior in a spatio-temporal context: Statistical analysis for the identification and development of behavioral patterns (01.05.2019 - 30.04.2022)

- Research Questions:
  1. What patterns in the travel behavior of German tourists are discernible from a static perspective and from a dynamic perspective over time?
  2. What role do temporal effects (age effects, period effects and cohort effects) play in the changes in the travel behavior of German tourists?
  3. How can changes in the travel behavior of German tourists also be explained by external influencing factors or social trends?
A national survey

Holiday travel behavior of the German-speaking population

More than 10,000 population-representative interviews:
- 7,000 face-to-face interviews
- 5,000 online interviews

Carried out yearly since 1970 annually

Basic program and changing thematic modules

Content: - Holiday and travel behavior
  - Holiday motivations and interests
  - Potential demand for destinations and types of holidays
  - Holiday activities
  - Attitudes towards travelling etc.
**Research Task:**
How are the three temporal dimensions age, period and cohort related to altering travel distances?

**Problem:**
- Age, period and cohort linearly dependent (e.g. age = period – cohort)
- No unique estimation of linear effects for all temporal dimensions possible
- Simultaneous consideration of all temporal dimensions required

**General Strategy:**
- Exploitation of the structure of a Lexis diagram
- Estimation of a two-dimensional surface defined by age and period with cohort implicitly represented along diagonals
- Method: Generalized Additive Model (GAM) with bivariate tensor product spline
Key idea of analysis derived from structure of a Lexis diagram (left plot).

Ridgeline matrix (right plot) as a descriptive visualization tool for different APC groups.
Estimated effects for travels distances “> 6,000 km”

- Younger age groups, recent periods and younger cohort with highest chance to travel long-distance.
- Highest uncertainty for age groups 90 or higher.
- Comparison of specific APC groups rather difficult.
Results: Marginal Age, Period and Cohort Effects

➢ Differences between short- and long-distance for all temporal dimensions.
➢ Age: younger people with more distant trips, results in line with life cycle theory.
➢ Period: reverse of effect structure in the 1990s, increase of long-distance travels.
➢ Comparison of effect strength possible.
Summary and Conclusion

➢ Short-distance travels mainly associated with age differences (internal factors), long-distance travels with developments over time period (external factors).

➢ Descriptive visualization tools and modeling approach for APC analysis.

➢ Interrelations between temporal effects taken into account

➢ Flexible modeling approach which is adaptable to various research settings.

➢ Simple integration of additional covariates on individual or aggregate level.

➢ Improved model fit through model with additional covariates (household net income, household size, trip duration)

➢ Future research: Integration of relevant factors from tourism demand modeling together with further individual travel information to make accurate predictions of travel demand
References


References


