

niversität

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- Modal choice is a decision process to choose between different transports alternatives
- Knowledge from determinants of modal choice gives insights to policymakers to address the potential for changing travel behavior



Socio-demographic factors

- Age
- Gender
- Income levels
- Level of education
- Household Size
- Driver license
- Employment

Spatial factors

- Population Density
- Type of Area (Urban & Rural)
- Access to Public transport

Travel attributes

- Reason of Travel
- Distance & Duration of travel







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bus_stop
railway_station
Eisenbahn
Stadtbahn
U-Bahn

Figure 2: Case study and available transport system Source: Esri, DigitalGlobe, Geo Eye, Earthstar Geographic, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and GIS User Community & Open Street Map & own representation

Figure 1: Transport system & population density in case study Source: Open street map and own calculation





Motivation

- Why this region?
 - Limited interconnections between three countries
 - High number of travels
- Feature of Bodensee-Alpenrhein region
 - Polycentric settlement system
 - Characterized by urban sprawl
 - Not clear spatial boundaries
 - Mixture of urban and rural settlement patterns with urban function
 - Part of a Cross-border region



Main questions in this study

- Which factors and to what extend do impact on modal choice in each sub-region and the whole region?
- How do differences in these factors results in the dissimilarity of travel behavior in the whole region?



Methods & Hypothesis

- Empirical Study
 - Vorarlberg →Based on the survey from Mobility survey "Österreich Unterwegs"
 - German part \rightarrow Based on the survey from MiD
 - Switzerland part \rightarrow FSO, Mikrozensus Mobilität und Verkehr
- Approach:
 - Statistical Analysis (Descriptive statistics)
 - Regression Analysis (Model: Multinomial Logit)
 - Expert interview



Multinomial Logit Model

Dependent variable (Modal choice e.g. public transport, car and bike-walking)

Independent variables e.g. age, gender, income, access to public transport

- A common model for modal choice analysis
- Linear regression which determines the impact of each factor in selecting mode
- The probability of choosing each transportation mode

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Figure 3.21: Percentage of modal share by gender in Austrian sub-region



Figure 3.22: Percentage of modal share by Age category in Austrian sub-region

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Results

- Dominant usage of car for whole area
- Factors with significant impact on modal choice
 - I. Car ownership

Less car ownership per household \rightarrow more usage of public transport

• II. Reason of travel

In Vorarlberg, travelers with business reason choose more public

transport compared to ones with leisure reason

• III. Age of traveler

Young generation use public transport more than seniors



Results

Factors	Austrian sub-region	Swiss sub-region	German sub-region
Population Density	High*	High	Low
Settlement	Compact	Scattered	Mixed
Average Travel distance	Short	Long	Middle-Long
Bike usage	Higher	Lower	Lower
Main travel reason	Leisure	Business	Business & Leisure

Table 1: comparison among sub-regions

* relative to other sub-regions



Conclusion

- The sub-regions develop along their own lines and principles
- Differences in the travel behavior among sub-regions are not only because of different transport policies and infrastructures in each country,

but also because of

- Different cultures, life styles, and attitudes toward leisure activities
- Different landscapes in sub-regions
- Different urban sprawl among sub-regions
- Different industrialization level among sub-regions



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Thank you!



• Hypothesis: Random Utility Theory

Individual makes a choice from set of discrete alternatives, he always selects the best option which has the highest utility for him. If every factor considered by the individual were known to the analyst for every alternative, discrete choice model could be developed to predict with certainty every choice (McFadden, 1974).



Population Structure in Case study



Vorarlberg 2013 (6214 observations)



Switzerland 2015 (3591 observations)

