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The impact of travel time savings on shopping location choice or how far do people go to shop cheaply?

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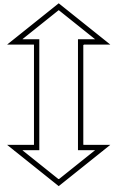
Shopping Location Choice

Equally interesting for:

- Transport planning
- Retailing industry

Decision:

To shop **near, pricey with limited** range of products



To shop **farther, cheap, full range** of products

Motivation and Objectives

Motivation:

- Pretest of the Value of Travel Time Savings Study in Switzerland indicates unexpected high values
- Market entry of german discounter chains Aldi & Lidl
- Market knowledge for consulting in retailing and competition

Objectives:

- Verification of pretest results
- Quantitative evaluation of the shopping location choice decision
- Comparison between countries

Literature Review

Huff's (1964) aggregate level analysis

- Distance and store size

Statistically more sophisticated studies indicate

- Large basket shoppers are more price sensitive (Bell *et al.* (1998))
- Shopping chain loyality with strong influence (Knox *et al*. (2000))
- Different user segments value variables differently (Davies *et al*. (2001))
- Consistency over years (USA) and between countries (USA Canada) (Severin et al. 2001)

Data: One survey each in Switzerland and Germany

General:

- Weekly shopping trips only
- Recruiting directly in shopping centers
- Stated preference surveys with socio-demographic part
- Not representative

Swiss Survey:

- Tri-national Area of Basel (Switzerland, Germany, France)
- One survey in each country
  Switzerland: Migros 141 Persons
  Germany: Marktkauf 141 Persons
  France: Géant 91 Persons
- Only Swiss costumers surveyed
- 2 steps: verbal and written part

German Survey:

- 405 Persons
- Goettingen: University town with high proportion of students
- Both survey parts filled out in supermarket

Survey: socio-demographic questionnaire

- Place of residence
- Travel time spent to come to the shop
- Mode of Transport
- Favourised supermarket
- Importance of different supermarket attributes
- Age
- Sex
- Income

Swiss stated preference-experiment

Supermarket A	Supermarket B
Trave time to A: 10 minutes	Trave time B: 45 minutes
Price of goods: 400 CHF	Price of goods: 200 CHF
Quality of shop: 4 ‚Top Quality'	Quality of shop: 1 ‚Discounter's paradise

☐ ← **Your Choice** → ☐

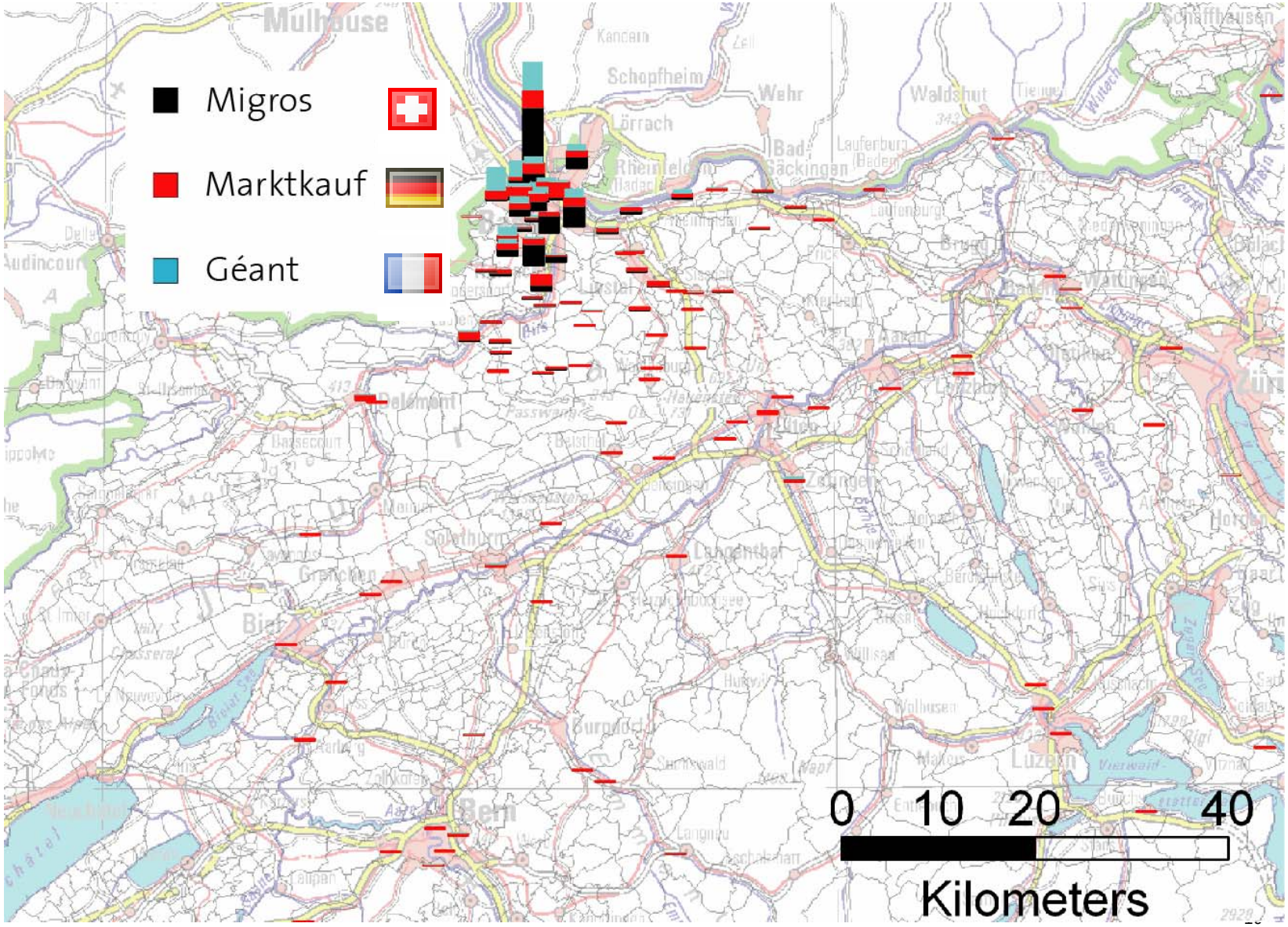
German sp-Experiment

Supermarket	Real	Kaufland	Herkules	Aldi	Lidl
Basket Price	55 €	40 €	45 €	55 €	60 €
Non Food Choice	very limited	limited	large	very large	very limited
Travel Time to supermarket	5 minutes	10 minutes	15 minutes	20 minutes	5 minutes
Time spent in supermarket	20 minutes	25 minutes	35 minutes	40 minutes	20 minutes
Number of item per Catergory	2 per catergory	3 per category	5 per category	8 per category	2 per category
Quality of produce	above average	below average	above average	below average	above average

Your Choice (only ONE cross!)

Supermarket	Real ☐	Kaufland ☐	Herkules ☐	Aldi ☐	Lidl ☐

Results – Places of residence



Model results - Swiss survey

U_i = β_{Price} * (Income/8586)$^{\varepsilon Inc}$ * (Traveltime/34.09)$^{\varepsilon TT}$ *
(1 + $\beta_{Discount}$* Dummy 'conventional prefered') * Price +
β_{TT} * Travel time +
$\beta_{Quality}$ * Dummy 'Better Quality'+
β_{Const} * Const

	Unit	Koeff.	Sign.
Travel time	Min	-0.024	*yes*
Price of goods	CHF	-0.023	*yes*
Quality of shop class1	-	1.48	yes
Dummy for convent. preference	-	-0.57	*yes*
ε_{Inc}	-	-0.42	*yes*
ε_{TT}	-	-0.078	*no*
Constant	-	-1.28	yes
VTTS for covent. Costumer (β_{TT}/ β_{Cost})	CHF/h	149.51	
VTTS for discount Costumer	CHF/h	64.27	
N		857	
ρ^2		0.14	

Modelling - German survey

$U_i =$ β_p * (1 + $\beta_{D,Price}$* DummyDiscount) * Price +

β_{TT}* (1 + $\beta_{D,TT}$* DummyDiscount) * Travel Time +

β_R * Choice Range + β_{ST} * Shopping Time +

β_Q * ‘Quality of produce’+

β_{NF} * ‘Non-Food-Choice’

$\beta_{In,i}$ * ‘Inertia prefered shop’

$\beta_{ASC,i}$ * Constant,i

Model results - German survey

	Unit	Koeff.	Sign.
Travel time	Min	-0.042	*y*
Price of goods	EUR	-0.057	*y*
Dummy for Discount Preference, TT		-0.66	*y*
Dummy for Discount Preference, Price		0.44	*y*
Number of products in each group		0.08	*y*
Upper average Quality of fresh goods		0.58	*y*
Time in shop	Min	0.02	*y*
Non Food offer “very limited”		0.16	*y*
Non Food “limited”		0.03	*n*
Non Food “wide”		-0.17	*y*
Non Food “very wide”		0.02	*n*
Inertia Aldi		0.82	*y*
Inertia Herkules		1.56	*y*
Inertia Kaufland		0.21	*n*
Inertia Lidl		0.85	*y*
Inertia Real		-0.41	*y*
VTTS for Discount Costumer	CHF/h	16.17	
VTTS for others	CHF/h	69.38	
N		1608	
ρ^2		0.14	

Attempt for joint modelling: VTTS ratio

Mutual Variables:

- Travel Time
- Price
- Preference between ‚normal' and ‚discount' supermarket
- Quality

Precondition for joint modelling: **Preference homogenity**

Comparison between Swiss an German results

	Preferred Supermarket	
VTTS	Conventional	Discount
Switzerland	149.51 CHF/h	64.27 CHF/h
Germany	69.38 CHF/h	16.17 CHF/h

Elasticities		Conventional	Discount
Switzerland	Price	-0.8	-1.86
	Traveltime	-0.43	-0.43
Germany	Price	-2.38	-3.43
	Traveltime	-0.42	-0.14

Joint Model – Performance test

- Joint parameters only for Swiss Discount and German ‘normal’ costumers
- χ^2-test (Swait *et al.* 1993) to account for preference inequality
- No inequality at a 90% significance level
- But, inequality at a 95% significance level!

➔ Shopping behaviour differences between countries and user segments!

Conclusion and recommandation

- Relatively low ρ^2
  - ➲ Difficulties to decide with given parameters
  - ➲ Other, probably consumer specific factors also relevant
- High values of VTTS
  - ➲ Shopping location has to be close to apartment
- Relevance for Transport Planning
  - ➲ Parameters for location choice for weekly shopping trips differ strongly to other activities
  - ➲ Assignment for route choice questionnable
- Relevance for Retailing
  - ➲ Different strategies for different countries or regions advisable
  - ➲ Importance of market and strategy definiton
  - ➲ User segmentation difficult