Home office frequency and mobility tool ownership choice

Findings from the pre-test

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BK-meeting

Outline

Outline

Two survey instruments

Background information:

- Structure:
    - Screening employment and WFH
    - Person
    - Household
    - Residence
    - Work
    - Mobility (including reference distances for work, leisure and shopping)
    - WFH (including references for SP and measurement indicators)
    - Psychometric scales

- Exclusion criterion: Student, unemployed, self-employed, professional drivers

Stated preference experiments:

- Structure:
    - Detailed explanations (experiments, context, attributes, and levels)
    - 6 choice sets (blocked design with random assignment)

- One experiment consists of:
    - Home office arrangement choice
    - Constrained home office frequency choice
    - Mobility tool bundle choice
    - Distance adjustments and modal splits

Example of a linked choice experiment

	A	B
Allowed home office days	2 days	4 days
Co-ordination	Fixed	Free choice
Core hours	Regular working hours	
Help-desk and training	No	Yes
Salary adjustment		+5%
Additional costs		50% participation
Hardware budget	100% of the necessary expenses	
Work from anywhere	allowed	not allowed
Desk sharing	No	Yes
Your choice:	○	○

$\Rightarrow$

	A	B
Car		
Type	Small car	Medium to large car
Fuel	Plug-in hybrid	Plug-in hybrid
Reach		
Fixed cost	880 CHF/month	1039 CHF/month
Variable cost	1.09 CHF/km	0.69 CHF/km
Car sharing		
Distance to station	1 km or less	
Membership fee	12 CHF/month	
Km tariff	0.8 CHF/km	
Time tariff	4 CHF/h	
E-Bike		
Type	Up to 25 km/h	
Cost	65 CHF/month	
Public transport		
Type	GA	Regional Season Ticket
Class	First	Second
Commute		
Zones		2 zones
Fixed cost	210 CHF/month	46 CHF/month
Variable cost		
Your choice:	○	○

Outline

Response rates

Survey	Response indicator	Response rate [%]
main	n responses / n contacts	41.5
sp	n responses sp / n responses main	33.4
sp	n responses / n contacts	13.9

High dropout in SP survey
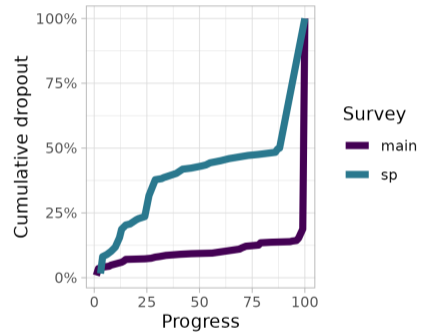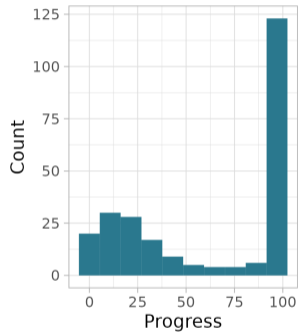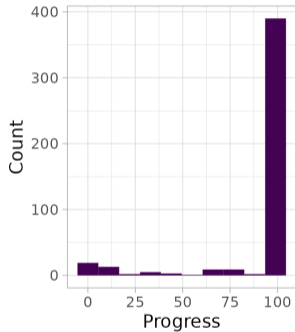
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Discrete distributions over home office dimensions I

Can	May No	Yes	COVID-19	Budget 1	2	3	4	5+	Want 0	1	2	3	4	5+
0%	16.22	2.03	2.7	0	0	0	0	0	0	0	0	0	0	0
1 - 25%	1.35	13.51	1.35	3.7	3.7	0.93	0	9.26	1.71	11.97	5.98	0.85	0	0
26 - 50%	1.35	25	0.68	4.63	15.74	0	0	12.96	5.98	4.27	17.09	6.84	0	0
51 - 75%	0	10.81	0	0	5.56	1.85	0	7.41	2.56	0.85	2.56	5.13	2.56	0
76 - 99%	0	18.92	0	3.7	3.7	5.56	0.93	12.04	0	1.71	1.71	7.69	10.26	2.56
100%	0	6.08	0	0.93	1.85	2.78	0	2.78	1.71	0.85	2.56	0.85	0.85	0.85

Want	May No	Yes	COVID-19	Budget 1	2	3	4	5+	Do 0	1	2	3	4	5+
0	0.85	11.11	0	0.93	5.56	1.85	0	3.7	11.82	7.27	4.55	0	0	0
1	0.85	16.24	2.56	3.7	5.56	0.93	0	7.41	0	8.18	13.64	3.64	1.82	0
2	0.85	29.06	0	5.56	10.19	0.93	0	12.96	0	1.82	10	6.36	0	0
3	0.85	20.51	0	1.85	6.48	1.85	0	12.04	0	0	2.73	7.27	5.45	0
4	0	13.68	0	0.93	2.78	4.63	0.93	5.56	0	0	0	2.73	2.73	0.91
5+	0	3.42	0	0	0	0.93	0	2.78	0	0	0	1.82	4.55	2.73

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Discrete distributions over home office dimensions II

- Those who can and want, may
- If home office budget $\Rightarrow$ more or less unilaterally with 2 days being the most common constraint
- Oversupply of home office? (This was different in the pre-study!)

Contributions of *camawa* to the home office frequency choice I
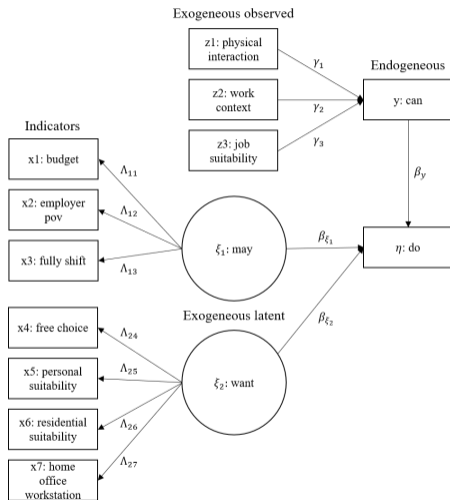
Contributions of *camawa* to the home office frequency choice II

Parameter Estimates:

	Latent Variable	Indicator	Loading	Std.Err
Latent Variables:	may	budget	1.000	
		employer pov	0.197^{*}	0.082
		fully shift	0.234^{*}	0.101
	want	free choice	1.000	
		personal suitability	1.256^{***}	0.235
		residential suitability	0.803^{***}	0.182
		homeoffice workstation	0.787^{***}	0.176

	Dependent Variable	Predictor	Estimate	Std.Err
Regressions:	can	physical interaction	-0.378	0.237
		work context	-0.344	0.244
		job suitability	1.007^{***}	0.223
	do	can	0.402^{***}	0.092
		may	2.439^{*}	1.333
		want	1.628	1.120

Goodness of Fit:			
	Comparative Fit Index (CFI)	0.702
	Tucker-Lewis Index (TLI)	0.616
	RMSEA	0.122

Model Characteristics:		
	Number of model parameters:	23
	Number of observations:	108

Note: $^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Measurement indicators for latent constructs (mainly *can*)

Outline

Model building strategy
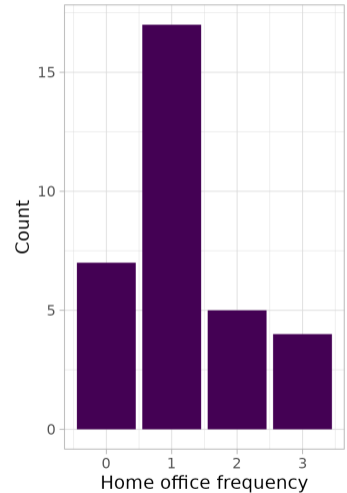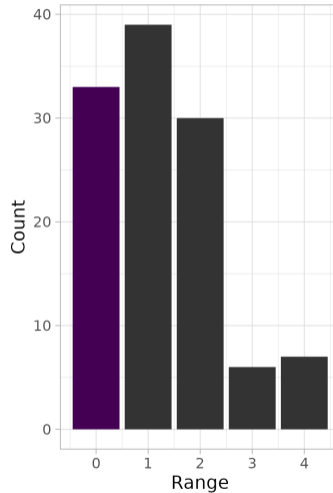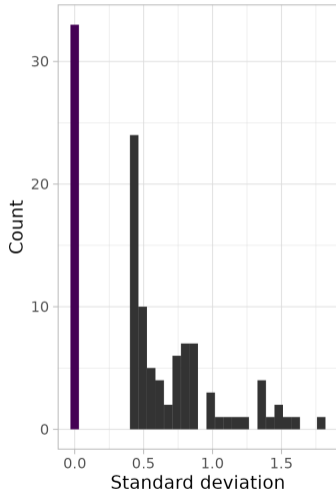
MNL models with SP attributes only

1. Home office budget as a continuous variable

   – **Significant and negative**
   – Budget $\neq$ home office frequency (indifference between 3 and 5 if preferred frequency is 2)

2. Random coefficient for home office budget

   – **Substantial and significant preference heterogeneity**
   – Expected, as no sociodemographic variables are included

3. Home office as indicator with 3 days as reference

   – **Very meaningful and intuitive coefficients**
   – Now reflects the fact that more freedom (no choice constraint) is better

WFH model coefficients and MPE

Coefficient	Estimate	Standard error	MPE [pp]
co_ordination	0.1524	0.1615	2.20
core_hours	-0.2655^{**}	0.1286	-4.88
days_budget_1	-0.7178^{***}	0.1987	-14.35
days_budget_2	-0.1046	0.2025	-3.68
days_budget_4	0.1807	0.1943	0.09
days_budget_5	0.7920^{*}	0.4455	11.98
desk_sharing	-0.2249^{*}	0.1234	-4.54
hardware_budget_50	0.2360^{*}	0.1336	3.91
hardware_budget_100	0.7748^{***}	0.1862	12.61
help_and_training	0.2858^{***}	0.1009	5.20
nk	0.5292^{***}	0.1403	9.06
salary_adjustments_m5	-0.9654^{***}	0.1588	-15.43
salary_adjustments_p5	0.7297^{***}	0.1914	13.94
work_from_anywhere	0.7086^{***}	0.1183	12.94
ASC_B	-0.0512	0.1037	

Note: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

WFH frequency choice variation

Outline

Model building strategy

MNL models with SP attributes only

1. Availability only (car, car sharing, e-bike, PT)
    - All significant and positive except for car sharing (p-value of 0.16 and negative)
2. Random coefficient for car sharing availability
    - Still negative and no significant variation. However, coefficient might be positive for some individuals
3. Adding mobility tool attributes
    - Both generic and type-specific (e.g., cost sensitivity for an electric car might be different than for non-electric)
    - **Wrong signs for (some) cost coefficients**
4. Adding home office frequency
    - **Recall: Little home office variation (Problem?)**
    - Both for very minimal availability model as well as more complex ones
    - As continuous, indicator variables and binary indicator (with different cutoff values)
    - No significant effects except for negative preference for e-bike for fully remote workforce (e-bike as commute mode)

Distributions of distance adjustments I
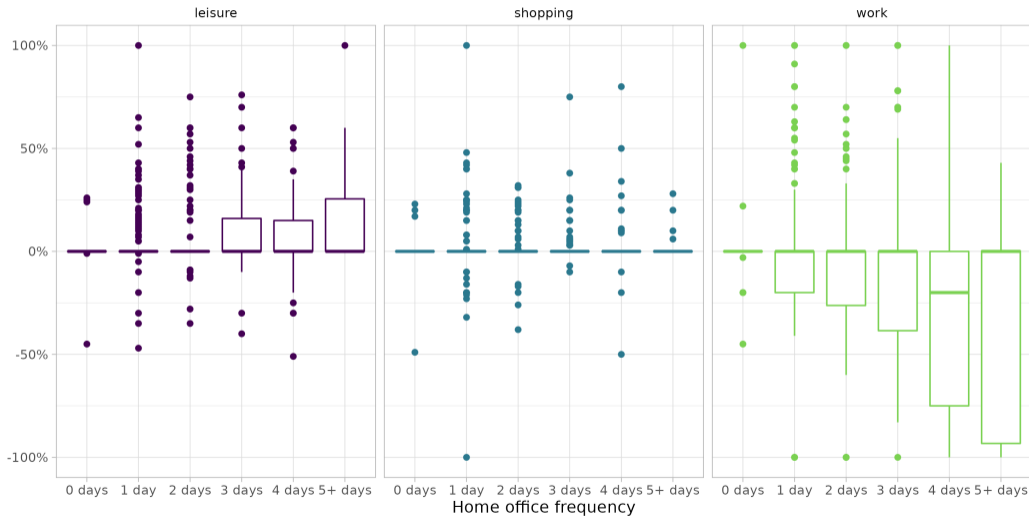
Distributions of distance adjustments II

Home office frequency	Mean distance change [%]		
	Leisure	Shopping	Work
0 days	0.42	0.16	0.20
1 day	5.12	1.79	0.25
2 days	4.78	1.28	-9.47
3 days	7.71	2.25	-9.18
4 days	6.81	2.60	-32.70
5+ days	18.00	3.20	-30.40

Take aways

- Complex interaction effects within mobility tool (e.g., cost-sensitivities: car fixed cost x car type or PT fixed cost x pt class, etc.) and between mobility tools (e.g., car and car sharing availability) $\Rightarrow$ many parameters and complex model specifications

- Even more difficult when incorporating sociodemographic variables

- Difficult to use for prediction and pooled estimation (RP)

- Distance adjustments and shares difficult to analyze (signal non-relevance of alternative)

- People might focus on availability rather than other attributes (including home office frequency) and struggle with irrelevant mobility tools

Proposition

Focus should lie on generic preferences for mobility tools depending on home office frequency. How many cars will drive on the road, and not what type of cars. The latter would require separate SPs for individual mobility tools.

Outline

Proposed adjustments

- **Full abstraction**
- Multivariate probit model
    - Do not include any attributes! Only home office frequency as a scenario variable
    - Binary choice for each mobility tool {car, car sharing, bike, e-bike, GA, regional subscription}
    - Accounts for correlations between tools
    - Allows for pooled estimation (MZMV) and simple prediction
    - Simultaneous choice (no implied direction of causality)
- No questions regarding distance adjustments and shares $\Rightarrow$ TU+
    - Or only **direction** of adjustments

Next steps

- Model the home office frequency decision with a latent consideration approach (STRC)
- Survey adjustments
- Addresses (BFS) and ethics commission
- Main study

Questions?

Swiss New Normal

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