Investigating alternative non-attendance and other decision processing strategies in food choice

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Introduction

- Different decision processing strategies have been identified in the Choice Experiment literature
  - For example, attribute non-attendance
- Respondents might invoke such a heuristic for different reasons
- But might the respondents also ignore one or more of the choice task *alternatives* rather than just ignoring *attributes*?
- We investigate this issue empirically in a food choice context

Treatment of alternative non-attendance

- In previous *attribute* stated non-attendance literature
  - Ignored attributes are often assigned a zero-contribution to the LL
- First instinct might be to adopt a similar approach when considering *alternative* stated non-attendance
- But is this a suitable approach?

Methods

- Follow-up questions targeting alternative non-attendance
    - Following each choice task, respondents are asked to state whether they ignored any of four alternatives from the choice task
- We incorporate these underlying behavioural mechanisms in the econometric model

Choice Experiment survey

- Danish consumer's preferences for cheese
- Sample
  - Approximately 900 respondents
- Internet panel sampling
- Design
  - D-efficiency criterion used
  - Bayesian updating based on pilot survey

Attributes and attribute levels

- 500 g medium strength taste cheese ("45+")

Attribute	Attribute levels
Production method	Unspecified
	Increased animal welfare
	Organic
Place of origin	Abroad
	Denmark
	Local
Purchase location	Supermarket
	Speciality shop
	Farm shop, market
Price	20, 30, 40, 55, 70, 90 DKK

- 4 alternatives per choice task including a status-quo alternative

- 12 choice tasks per respondent

Follow-up questions

- "Were there any of the alternatives 1, 2, 3 or 4 that you did not take into consideration when making your choices?"

	Alt 1	Alt 2	Alt 3	Alt 4
I did not consider at all	❑	❑	❑	❑

- "In previous surveys it has been shown that many people don't use all attributes when they choose between the different alternatives. Are there any of the attributes that you have not considered in the 12 choices you have just made?"

Production method	❑
Place of origin	❑
Purchase location	❑
Price	❑

Results – Ignored alternatives

	Alt 1		Alt 2		Alt 3		Alt 4	
Choice Task	Number	%	Number	%	Number	%	Number	%
1	384	43.10	117	13.13	115	12.91	294	33.00
2	349	39.17	125	14.03	83	9.32	330	37.04
3	49	5.50	464	52.08	212	23.79	293	32.88
4	155	17.40	93	10.44	421	47.25	262	29.41
5	416	46.69	63	7.07	325	36.48	261	29.29
6	396	44.44	104	11.67	102	11.45	294	33.00
7	116	13.02	382	42.87	99	11.11	301	33.78
8	407	45.68	121	13.58	97	10.89	306	34.34
9	167	18.74	70	7.86	409	45.90	286	32.10
10	167	18.74	152	17.06	122	13.69	333	37.37
11	38	4.26	483	54.21	204	22.90	273	30.64
12	104	11.67	430	48.26	207	23.23	255	28.62

Results – Ignored attributes

Attribute	Number of respondents	% of respondents
Production method	170	19.08
Place of origin	213	23.91
Purchase location	185	20.76
Price	107	12.01

Number of attributes ignored	Number of respondents	% of respondents
Zero	372	41.75
One	381	42.76
Two	121	13.58
Three	16	1.8
Four	1	0.11

Econometric models

- 6 different Random Parameter Logit models
  - Model 1: Non-attendance information disregarded
  - Model 2: Restricting non-attended attributes to zero LL-contribution
  - Model 3: Restricting non-attended alternatives to zero LL-contribution
  - Model 4: Restricting both non-attended attributes and alternatives to zero LL-contribution
  - Models 5 and 6: equivalent to models 3 and 4, but excluding respondents stating they have ignored 3 alternatives in a choice task

Results – Models I

	Model 1 – standard RPL, no NA		**Model 2 – attribute NA**		**Model 3 – alternative NA**		**Model 4 – alternative and attribute NA**	
Mean	Estimate	t-ratio	Estimate	t-ratio	Estimate	t-ratio	Estimate	t-ratio
ASC – Alt.1	0.065	1.56	0.0683	1.83	0.369	7.7	0.561	13.4
ASC – Alt.2	0.018	0.47	0.0829	2.29	0.465	11.38	0.654	17.33
ASC – SQ	-1.97	-15.66	-1.9	-15.52	1.63	16.14	1.29	13.06
Price	-0.0369	-29.43	-0.0364	-31.63	-0.00925	-17.69	-0.00706	-14.36
Standard deviations								
ASC – Alt.1	0.201	2.04	0.0747	0.79	0.463	6.08	0.307	3.95
ASC – Alt.2	0.00337	0.04	0.0818	0.87	0.106	1.19	0.0689	0.83
ASC – SQ	2.27	21.88	2.26	21.71	1.97	18.07	1.86	19.58
Price	0.0369	29.43	0.0364	31.63	0.00925	17.69	0.00706	14.36
LL (b)	-9276.2		-9648.4		-9054.8		-9781.4	
Adj R2	0.373		0.348		0.388		0.339	

- Other attribute parameter estimates left out of table for simplicity

Results – Models II

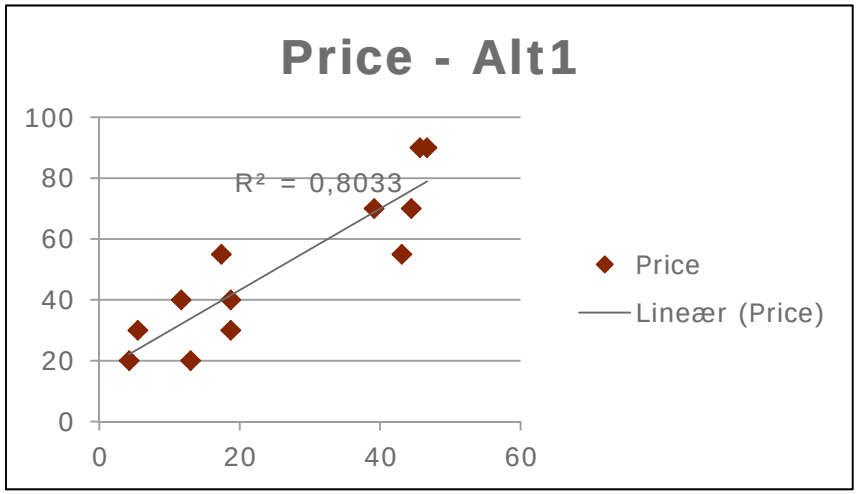
	Model 3 – alternative NA		**Model 4 – alternative and attribute NA**		**Model 5 – alternative NA (trade)**		**Model 6 – alternative and attribute NA (trade)**	
Mean	Estimate	t-ratio	Estimate	t-ratio	Estimate	t-ratio	Estimate	t-ratio
ASC – Alt.1	0.369	7.7	0.561	13.4	0.349	7.52	0.52	12.43
ASC – Alt.2	0.465	11.38	0.654	17.33	0.449	10.98	0.612	16.32
ASC – SQ	1.63	16.14	1.29	13.06	1.48	14.28	1.09	11.23
Price	-0.00925	-17.69	-0.00706	-14.36	-0.0104	-19.01	-0.00766	-15.81
Standard deviations								
ASC – Alt.1	0.463	6.08	0.307	3.95	0.291	2.3	0.32	4.31
ASC – Alt.2	0.106	1.19	0.0689	0.83	0.0612	0.6	0.0035	0.03
ASC – SQ	1.97	18.07	1.86	19.58	1.99	18.93	1.89	19.85
Price	0.00925	17.69	0.00706	14.36	0.0104	19.01	0.00766	15.81
LL (b)	-9054.8		-9781.4		-9569.9		-10265	
Adj R2	0.388		0.339		0.353		0.306	

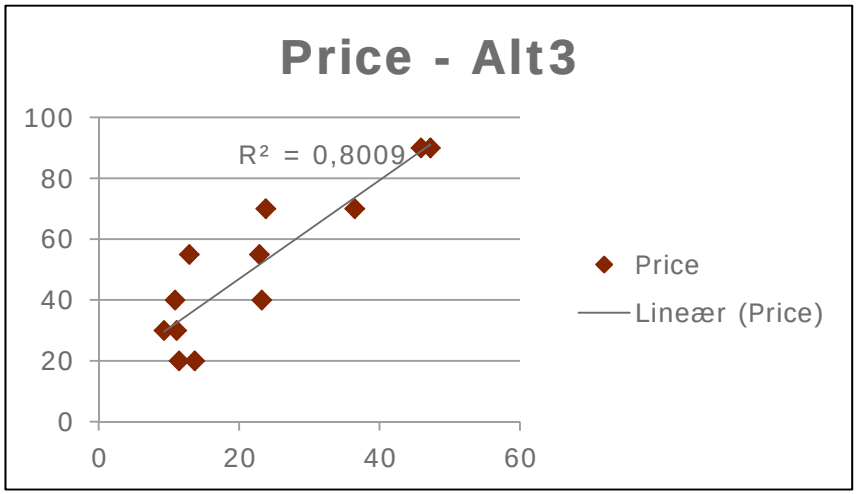
- Models 5 and 6 have been adjusted for respondents stating they have ignored 3 alternatives in a choice set, so that model fit is not inflated by these (deterministic) observations.

Results – Mean WTP

	Model 1 – standard RPL, no NA		Model 2 – attribute NA		Model 3 – alternative NA		Model 4 – alternative and attribute NA		Model 5 – alternative NA (trade)		Model 6 – alternative and attribute NA (trade)	
	Estimate	st.err.	Estimate	st.err.	Estimate	st.err.	Estimate	st.err.	Estimate	st.err.	Estimate	st.err.
ASC – Alt.1	1.8	1.1	1.9	1.0	39.9	5.4	79.5	7.6	33.6	4.6	67.9	6.4
ASC – Alt.2	0.5	1.1	2.3	1.0	50.3	5.3	92.6	8.1	43.2	4.5	79.9	6.7
ASC – SQ	-53.4	3.4	-52.2	3.4	176.2	14.3	182.7	18.5	142.3	11.9	142.3	15.2
Inc. animal welfare	19.6	1.6	23.5	1.6	197.8	11.9	257.8	19.0	171.2	9.6	228.5	15.4
Produced in Denmark	52.6	2.2	42.9	2.1	261.6	13.6	274.8	18.6	229.8	11.3	244.1	15.3
Produced in local area	33.3	2.4	28.3	2.2	303.8	17.6	337.1	24.8	265.4	14.4	300.3	20.3
Sold in marketplace	-28.7	1.9	-25.9	1.9	-112.4	9.6	-94.2	11.7	-103.8	8.3	-86.6	10.4
Organic	23.8	2.2	26.0	2.1	253.0	14.8	315.9	23.2	218.3	11.9	282.0	18.9
Sold in speciality shop	-26.0	1.7	-20.8	1.7	-130.8	10.2	-111.9	12.6	-113.5	8.4	-94.6	10.6

Price attribute vs. ignored alternatives





Preliminary conclusion

- Fixing stated ignored alternatives to zero LL-contribution in the utility expression
  - Leads to unacceptably high WTP estimates
  - Converts negative SQ effect to positive SQ effect
  - Increases ordering effect

- We believe the problem is the alternative non-attendance eliciting question
  - Strong indications that a significant portion of respondents stating to have ignored an alternative, have done so due to a high price in that alternative
    - This is essentially the opposite of non-attendance
      - Choke-price reached / very steep indifference curve / Lexicographical preferences
    - Fixing these strong price signals to zero leads to severe underestimation of price parameter

Preliminary conclusion

- Others might have actually completely ignored the stated alternatives to reduce complexity when processing the choice decision (”True” non-attendance)
  - In which case the approach would still seem relevant

- The question is whether we can seperate the underlying reasons for stating alternative non-attendance?
  - Work in progress…

Further ideas

- Attempt to infer *alternative* non-attendance from the econometric models rather than merely relying on respondents' statements
  - Latent Class Models
  - Independent Availability Logit
  - ...other ideas welcome

Thank you for your attention