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Motivation

- Warming of the climate system is unequivocal" (IPCC Report 2007, 2)
- Carbon dioxide (CO₂) contributes notably to global warming
- CO₂ accounts for 75% of human-generated global warming (Stern 2008)
- Dietary patterns & private consumption cause 40% of climate relevant emissions in Germany (UBA 2007); likely to be similar elsewhere
- Consumption patterns can only be adjusted if consumers can identify ecological sustainable products**
- Ecological footprint concept: "nutrition label for the planet" (Rees 1992)
 - Carbon footprint: "amount of CO₂ created..."
 - Water footprint: "amount of water used..."
- ...during food production, processing, storage, packaging and distribution"
- Some countries are establishing pilot projects to encourage reduced CO₂ emissions by product labeling
 - For example: Carbon Counted, Canada; Carbon Trust label, UK
- Carbon footprint label introductions, e.g. by Tesco in the UK
- Such labels are slowly being introduced into the Canadian market

Research question

To what extent do consumers prefer food products labeled with carbon and water footprints?

Design of survey

- Apply an online consumer survey of Canadian adults, Winter 2011, n=1500
- Measure respondent preferences by introducing hypothetical market scenarios through attribute-based stated choice questions & analysis
- Attributes: price, carbon emission equivalents in kg, water usage in liters
- Products queried: ground beef and potatoes
- Example Question:

Imagine you are in your usual grocery store and you would like to purchase 1 kg of ground beef you usually buy. Do you choose Alternative A, Alternative B or Alternative C?

	Alternative A	Alternative B	Alternative C
1 kg of ground beef			
Carbon (CO ₂) emission equivalents	22.93 kg	26.37 kg	
Water usage	120.05 l	120.05 l	
Price	6.25 CAD \$	6.14 CAD \$	
I would choose:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Data analysis

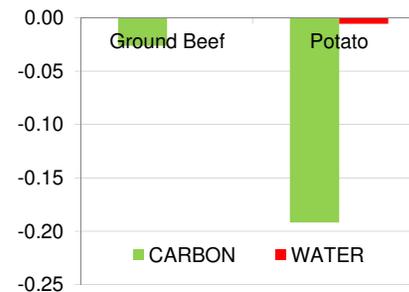
- Mixed logit models are estimated in order to measure respondent's willingness to pay (WTP) for less carbon emitted and less water used in these foods.

Results: Mixed logit estimates

	Ground Beef		Potatoes	
	Coeff.	SE	Coeff.	SE
PRICE (M)	-1.33	0.05***	-0.80	0.03***
CARBON (M)	-0.18	0.02***	-1.34	0.11***
CARBON (SD)	0.18	0.03***	1.11	0.18***
WATER (M)	0.00	0.287D-04***	-0.04	0.00***
WATER (SD)	.255D-05	0.376D-04	0.01	0.01
NONE (M)	-25.90	1.24***	-22.43	1.00***
NONE (SD)	5.72	0.69	3.19	0.57***
Rest. LL	-3410.09		-3410.09	
R2	0.32		0.45	
Chi2	2208.58		3071.38	

p<0.1 * ; p<0.05 ** ; p<0.01 ***

Discounts for more carbon and water used by ground beef and potato (WTP, CAD\$/kg)



Conclusions

- Significant WTP for lower carbon use
- Significant coefficient for water footprint (but very low WTP)
- Higher WTP footprint reduction for potato than meat
- Heterogeneity in WTP for less carbon (but not for less water use)

Outlook

- Why is the carbon footprint seen as more important than water use in Canada?
- Labeling supports consumer actions that show their preferences: *If real numbers are provided, consumers are able to compare products*
- Environmental issues such as CO₂ emission and water usage have potential impacts on consumer choices
- Labeling with respect to climate issues, should promote consumption patterns supporting environmental sustainability

References

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