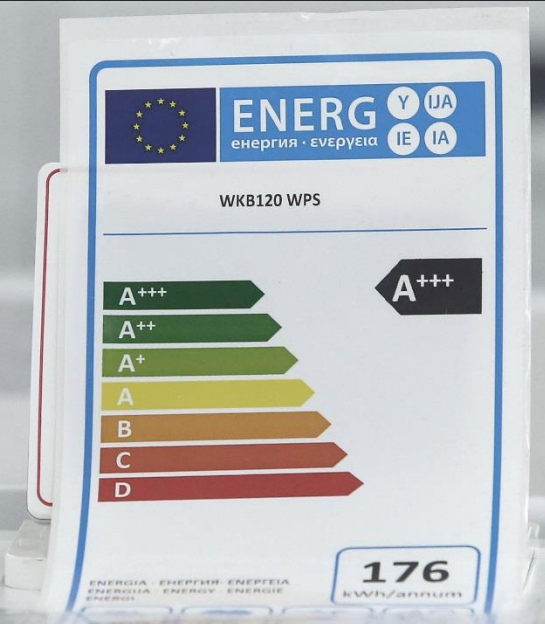
THE IMPACT OF ENERGY COST INFORMATION ON CONSUMER PREFERENCES FOR ENERGY EFFICIENT CARS



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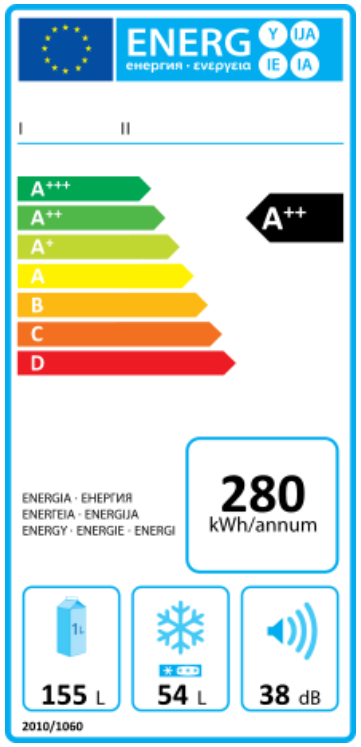
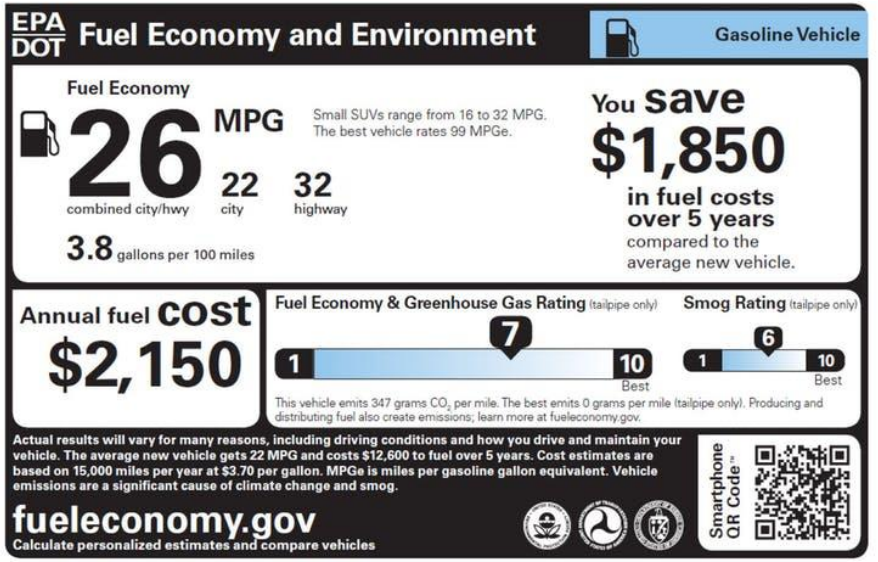
Introduction

- An examination of the role that energy labels can play in consumer choices
- Undertaken within the car sector in Norway in late 2017
- Examines how the reframing of fuel consumption information so as to provide it in the form of cost estimates, changes the valuation of willingness-to-pay for increased fuel efficiency
- Identify any information failures currently present within this sector
- Represents an application of behavioural economics to the energy sector

Energy Labels

- Required by legislation in a number of sectors and jurisdictions
- Designed to help individuals and businesses make better decisions
- Provision of information is seen as a means of encouraging the purchase of more energy efficient goods
- Designed to address an information gap
- Image trying to buy certain goods with them…





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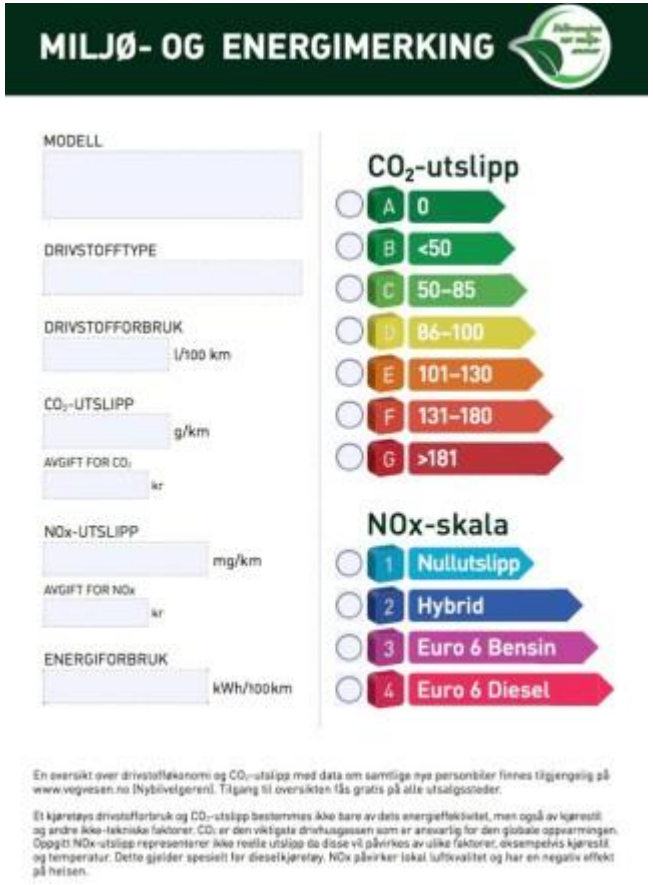
Car Sales in Norway

- Current labelling required for new car sales in Norway
- Contains carbon dioxide and nitrogen oxide emissions information
- Similar colour coding and alphabetical classification to other labels used across a number of sectors to provide some form of context
- Emissions information in grams of CO2 per kilometre
- Norway is an atypical car market
- Large amount of electric car and hybrid adoption



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Theoretical Model

- When do people buy more energy efficient goods
- Based on Allcott and Greenstone, 2012
- p=price of unit energy, e=energy intensity of the alternatives, m= agent specific quantity of energy services, r=risk adjusted discount rate
- γ is an investment inefficiencies parameter $(0 < \gamma < 1)$, want to get this closer to 1

$$\frac{\gamma\ p\, m_i\, (e_0 - e_1)}{(1+r)} - \sigma > I$$

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Research Objectives

- To examine the role that re-framing fuel/energy consumption information can have on consumers' willingness to pay for energy efficiency
- How does the addition of monetary estimates increase the valuation of energy efficiency?
- Research focuses on new car sales within Norway
- Field trials also currently underway in a number of VW car dealerships to provide validation

Choice Modelling

- Research adopted a discrete choice experiment designed to, in part, replicate the conditions of a real world purchase
- Alternatives (cars) represented as a function of its component attributes/factors
- Probability of a given alternative being selected will be a function of the underlying utility derived from the levels of the product attributes and the estimated model parameters
- We examined the role of attribute framing in consumer choices-underlying values of attributes were common across designs
- This should be considered primarily an **information framing experiment** due to limited number of attributes considered

Experimental Design

- Split sample design
- Half of participants assigned to control group (just fuel consumption information)
- Half assigned to the treatment group (+ monetary information)
- Four attributes selected to add realism to the experiment
- Attributes identified from focus groups from a previous stage of the project

Cost (NOK)	Fuel Consumption	Safety	Capacity
500K	0.8	90	700
450K	0.7	80	600
400K	0.6	70	500
350K	0.5		400
	0.4		

Survey Description

- Survey distributed to ~1000 individuals in late 2017
- Formed part of a larger Norwegian study examining the importance of energy labelling and the desire for more energy efficient products
- Sample provided by a third party survey collection specialist organisation
- Respondents must have bought a **new car** in the last 5 years or are currently intending to do so
- Representative of the car buying population, not the general Norwegian population

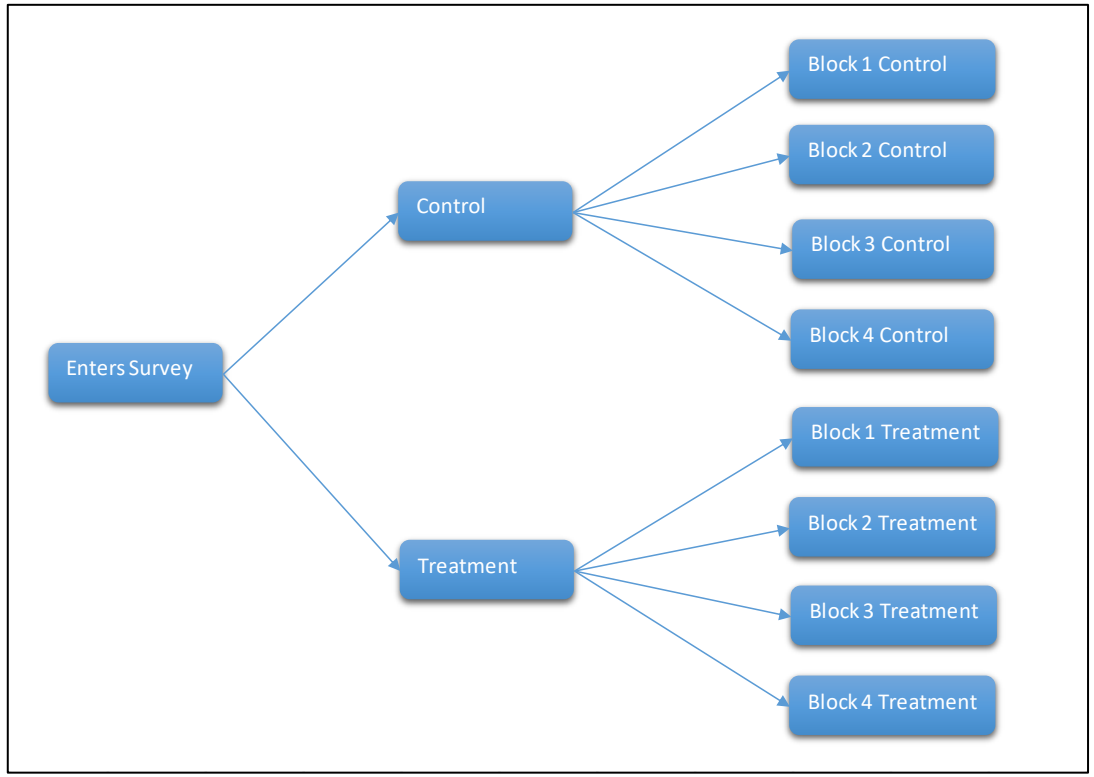
Sample

- Representative sample of the Norwegian car buying population in terms of
  - Age
  - Gender
  - Geographic representation
  - Socio-economic divisions/education

	Control		Treatment	
Mean Age	48.4		49.16	
	Male	Female	Male	Female
Gender Ratio	281	274	266	272

Respondent Assignment

- 32 choice scenarios
- Split between 4 blocks of 8 choices
- Replicated for both control and treatment options
- Respondent was either assigned to a control or a treatment block



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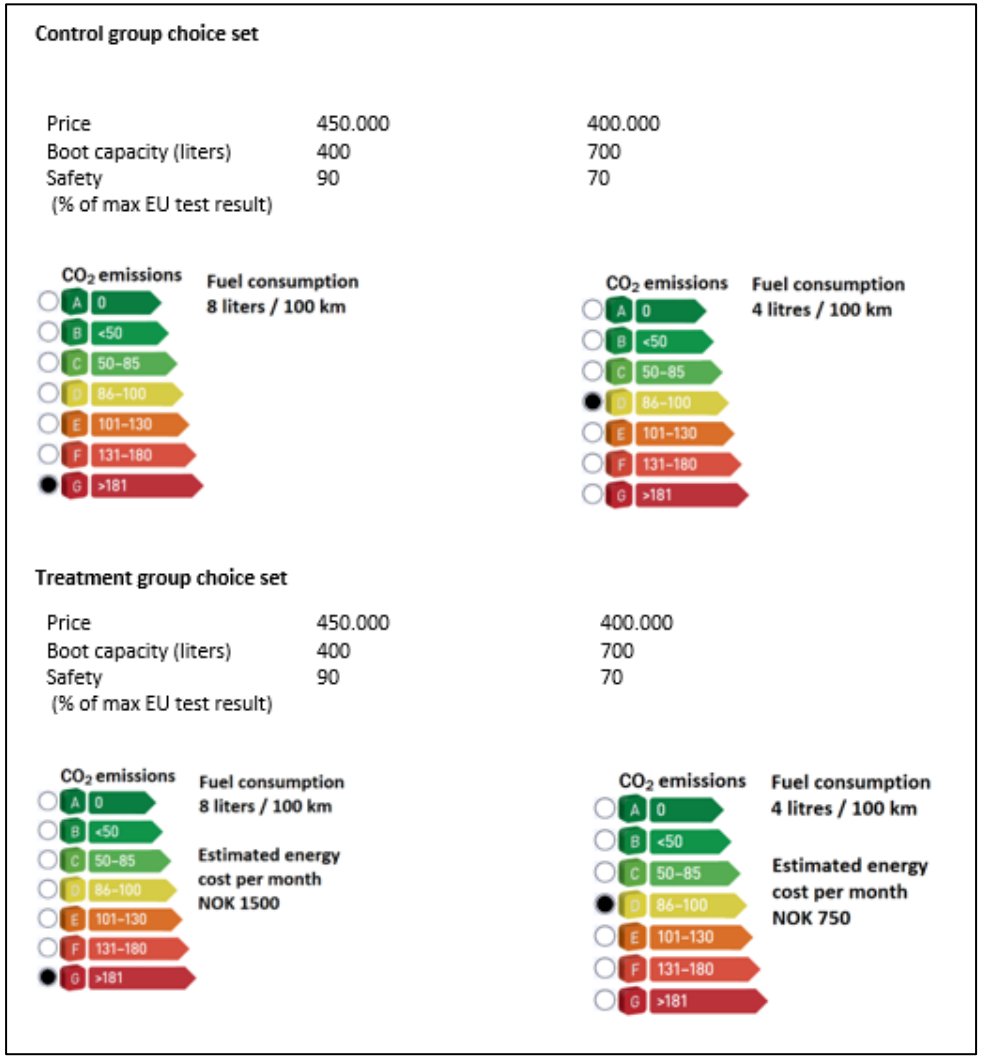
Car Labels: Norway

- Same scenarios presented in different formats
- Addition of estimated energy cost per month is the only difference
- Energy information is quite prominent in both designs
- Salience common for both designs



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Modelling

- MNL Model with a linear utility equation
- “No choice” represented by constant in utility equation
- Priors specified in attribute level design
- Demographic and attitudinal variables were included in models, however these emerged as non-significant so are not included
- Split sample approach: Two separate models estimated for control and treatment
- All variables significant at $p<0.01$

Results

	Control	Treatment
Observations	4352	4368
Cost	-.65*10-05	-0.50*10-5
Energy	-0.52	-0.57
Capacity 1	0.33	0.33
Capacity 2	0.62	0.58
Capacity 3	0.63	0.56
Safety 1	0.39	0.23
Safety 2	0.79	0.55
Log Likelihood	-4158.50	-4226.21

Model	Willingness to Pay
Control	80102 NOK
Treatment	113579 NOK

Limitations

- New car sales are a complex and nuanced area that is hard to accurately replicate in a simple experiment such as this
- A number of important attributes had to be excluded such as: Brand, model type, additional features, warranty etc.
- However, the purposes wasn't to create totally accurate WTP estimates for fuel efficiency
- It was to examine relative differences arising from different framing effects
- This was found to be up to 41%

Implications

- Results indicate that the provision of monetary estimates enables consumers to make better and more informed decisions
- Any cost figure will be an estimate-but we are already providing estimates with such labels
- This approach enables consumers to better factor estimated running costs into comparison with upfront purchase costs
- Can compare with other monetary costs such as : road tax, insurance, purchase price, estimated resale value etc.
- Highlights the information failure present in current labelling approaches
- Appears to be an “easy win”, of value to society and the consumer

Other CONSEED Research

- Examining the role of energy labels in:
- Housing in Ireland and Slovenia
- Appliances in Greece and Spain
- Cars in Norway
- Use of other DCEs and field trials (currently undergoing)

Thank You

- Questions?
- http://www.conseedproject.eu/

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