Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

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Energy efficiency in the Swiss rental sector

Adan L. Martinez-Cruz

Presented at the workshop on
Unlocking the energy efficiency potential in the rental and multifamily sectors
Institute for Energy and Transport,
Brussels, January 20th 2016

Plan

- Stated preference methodology
- Tenant's WTP for attributes related with energy efficiency
- Owner's WTI on energy efficient renovation of multi-family buildings
- What we are still need to learn

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Stated preference approach

- People choose among hypothetical scenarios
- Scenarios present alternatives described in terms of attributes
- Essence of the method: levels of attributes vary in such a way that WTP can be inferred by using statistical tools
- This topics would be more desirable to study with **revealed preferences** but not data available.

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Attributes related to energy efficiency

Attribute	Levels for new buildings
Window	• Standard insulation (coated, rubber) • enhanced insulation
Facade	• Standard insulation • enhanced insulation
Ventilation	• Present • Not present
Rental price	5 levels (-15%, -7.5%, 0%, +7.5%, +15%) as referred to the actual price

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Example of choice task

Your present residential situation (your present apartment)	
Window	Double glazing, with sealing rubber
Facade	Old Facade
Ventilation	Not present
Rent	1'500 CHF/Month

Do you prefer rather your present residential situation or rather the following alternative:

Altenative 1	
Window	Double glazing, without sealing rubber
Facade	Old Facade
Ventilation	Yes, present
Rent	1'350 CHF/Month

⇨

❒ I refer my present residential situation

❒ I refer alternative 1

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WTP

Attribute	Rental flats WTP (Sig.)	Rental flats Cost per flat of 100m^2 HFA dr=3%	Rental flats Cost per flat of 100m^2 HFA dr=6%	Single family houses WTP (Sig.)	Single family houses Investment
Enhanced insulated window (as compared to standard insulated w.)	*1% (n.s.)*	1%	2%	*1% (n.s.)*	1.7%
Enhance facade insulation (As compared to standard insulation)	3% (*)	1%	1%	2% (*)	1.2%
Housing ventilation system	8% (***)	3%	4%	9% (***)	1.9%
Housing ventilation system	8% (***)	7%	8%	*2% (n.s.)*	2.5%
New windows (as compared to medium old ones)	13% (***)	3%	4% (+)	10% (***)	2.1% (+)
Standard facade insulation (as compared to facade painting)	6% (**)	3%	4%	5% (**)	3.6%
facade painting (as compared to old unpained facade)	*3% (n.s.)*	1%	1%	*2% (n.s.)*	0.9%

Sig. = Significance level: (***)= 0.1% level, (**) =1%-level, (*) = 10% level, n.s. = not significantly different from 0 on the 10%-level
BT: Building type, N = New Buildings, E = Existing Buildings HFA: Heated Floor Area dr: discount rate
1) source: Banfi et al 2005 2) source: calculated with data from Jakob et al. 2002, see also Jakob et al. 2004
+) If a window is replaced at the end of its lifetime, the costs for the new windows are covered by the actual (normal) rent which was assumed to be the reference level for the willingness to pay estimation (i.e. no surcosts). Here we assume an ahead of time replacement of the old window and assume sunk cost of 50% of the window replacement cost

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Attributes under owners decision (1|2)

Attribute (Variable)	Values (Levels)
Prefabricated Modules	Yes No
Energy savings (in % of the status-quo energy use)	In 5 different factors multiplied by the expected energy savings (%) in the category (1-162). Typical factors: .5, .85, 1, 1.15, 1.4 Adjustments: - Replace 1 with overhaul option provided this option is available - Replace 1.15 and 1.4 with 1.1 and 1.3 respectively, if 30%<energy-saving≤50% - Replace 1.15 and 1.4 with 1.05 and 1.2 respectively, if energy-saving>50%
Attic/Roof Extension	Yes No
Ventilation	Yes No

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Attributes under owners decision (2|2)

Construction Time (months or weeks depending on the renovation group)	In 4 different levels (generic values 3,5, 7, 10): For CS1-3: 3, 5, 7, 10 weeks For CS4: 1, 2, 3, 4 months For CS5: 2, 3, 4, 6 months
Ventilation	Yes No
Total Cost per Apartment (CHF)	In 4 different levels (generic factors 1, 2, 3, 4), obtained from the expected costs estimated in the category (1-162): 1: LB-δ; 2: LB+δ; 3: UB-δ; 4: UB+δ LB and UB are lower and upper bound estimate in the category (1-162) and δ =(UB-LB)/4
Price Risk	Fixed price Possibility of excess cost up to 10%

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Owner's WTI (1|2)

Table 3-12. Willingness to Invest measured as additional investment costs (%)

	High		Low	
Attribute	Mean	Std. Err.	Mean	Std. Err.
Five Percentage Points Increase in Annual Energy savings:				
From 10% to 15%	27.7*	7.1	13.9*	2.64
From 20% to 25%	17.1*	3.88	8.55*	1.16
From 40% to 45%	9.34*	2.05	4.68*	0.56
From 60% to 65%	6.66*	1.46	3.33*	0.40
Overhaul Option	37.8*	17.7	18.95*	7.79

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Owner's WTI (2|2)

Construction Time (1 week shorter):				
Base Group	-0.22	1.53	-0.11	0.77
Conscious Group	8.22*	3.84	4.11*	1.70
Life Time (1 year longer)				
Base Group	0.564	0.57	0.28	0.28
Conscious Group	3.68*	0.96	1.85*	0.30
Prefabricated Modules				
Base Group	24.7*	10.88	12.4*	4.66
Conscious Group	-14.4	14.60	-7.22	7.22
Ventilation				
Base Group	-38.5	25.88	-19.3	11.3
Conscious Group	-196.4*	70.8	-98.3*	27.9

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Energy consultants

- Owners rely on opinions from architects, consultants, etc.
- We searched for the possible impact on a related study.
- Not great news.
- What else then?
- Subsidies to certificated renovations to avoid just ovehaul.

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What we would like to learn now (1/2)

- Ventilation and insulation systems provide benefits in terms of noise reduction, indoor air quality and comfort.
- *Green Housing* design includes these elements.
- We want to learn WTP for green housing using a *field experiment*
- i.e. closest we can get to **revealed preferences**

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What we would like to learn now (2/2)

- Field experiment would require
  - Coordinated work with construction companies to design homes that vary attributes related with comfortability and health.
  - Offer people the opportunity of experiencing the green house for a couple of days
  - Carry out a in-depth survey on stated and revealed preferences for green house attributes.

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Thanks

Adan L. Martinez-Cruz

madan@ethz.ch

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Example of choice task

Variante B | Wärmedämmung Dach und Fassade	
Jährliche Energieeinsparung	25 %
Bauzeit	4 Monate
Kosten pro Wohnung	20000 Fr.
Mögliche Kostenüberschreitung	Nein
Lebensdauer	30 Jahre
Art der Renovation	Konventionelle Anfertigung und Montage
Aufstockung	Nein
Würden Sie diese Variante in Betracht ziehen?	(•) ja ( ) nein

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