Vulnerability to Local Environmental Conditions and Subjective Well-Being

Presentation by

Nick Johnstone, Jerome Silva and Zachary Brown (OECD)
with Femke de Keulenaer (Gallup)

Asia-Pacific Conference on Measuring Well-Being and Fostering the Progress of Societies

Tokyo - Dec. 5th-6th, 2011

Conceptual Framework (1)

1) Concentrations of Pollutants

2) => Perceptions of Air Quality

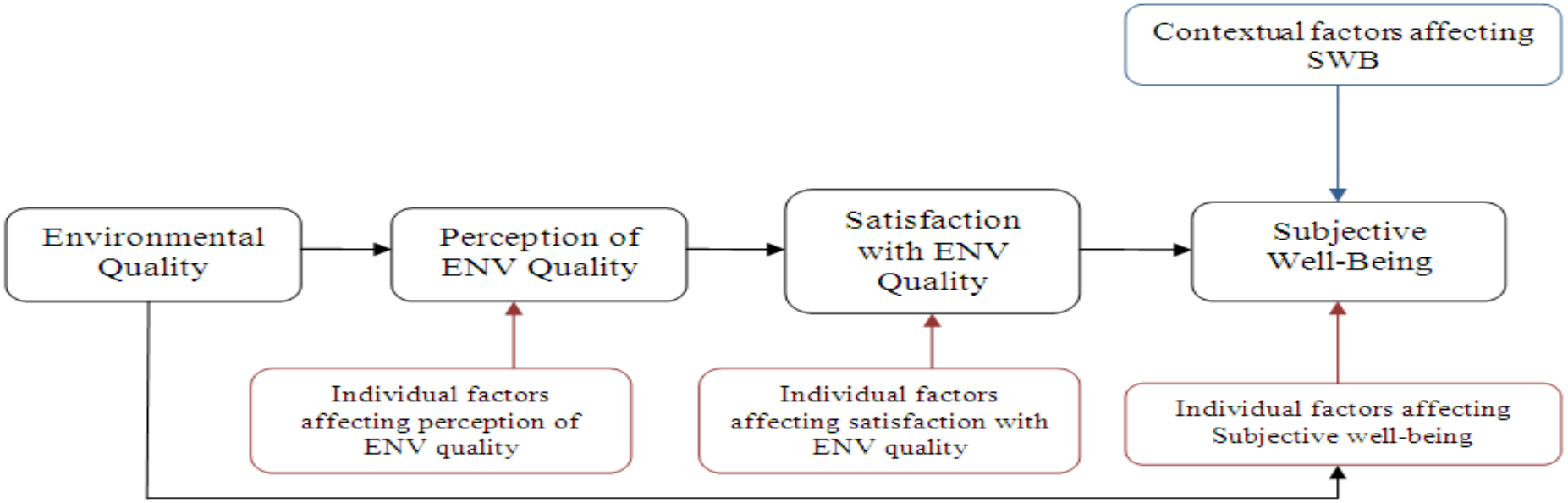
3) => Satisfaction with Air Quality

4A) => Importance of Air Quality (SWB)

4B) => Preferences for Air Quality (Utility)

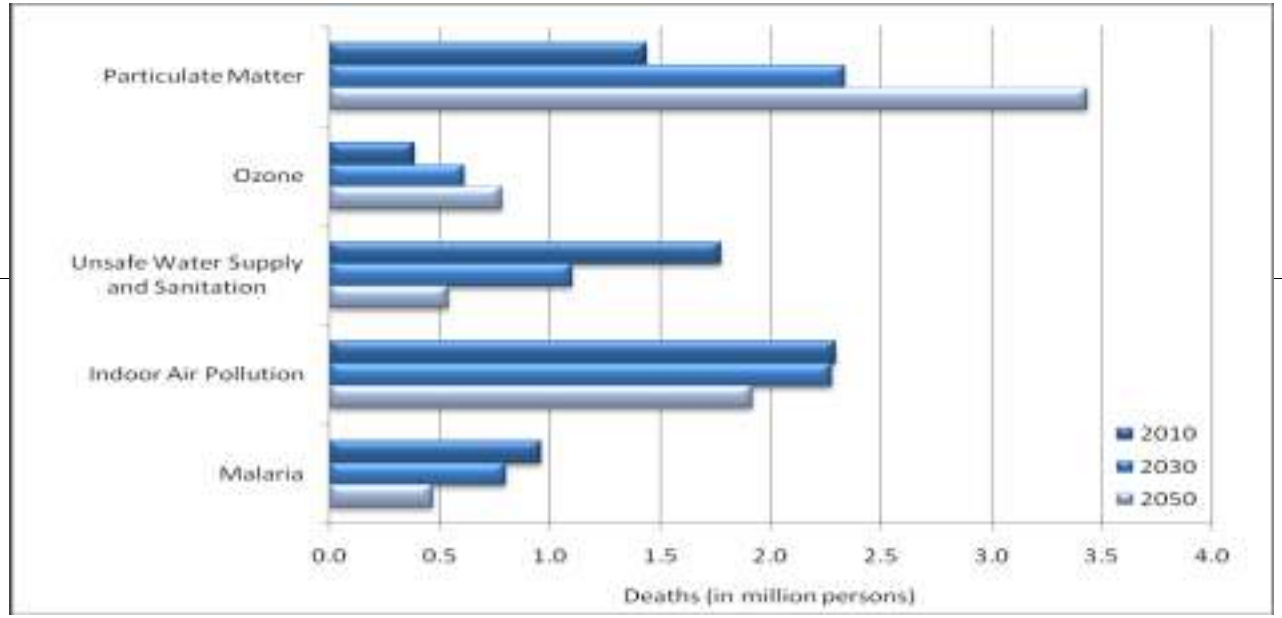
[ALL RELATIONSHIPS MEDIATED BY INDIVIDUAL CHARACTERISTICS]

Conceptual Framework (2)



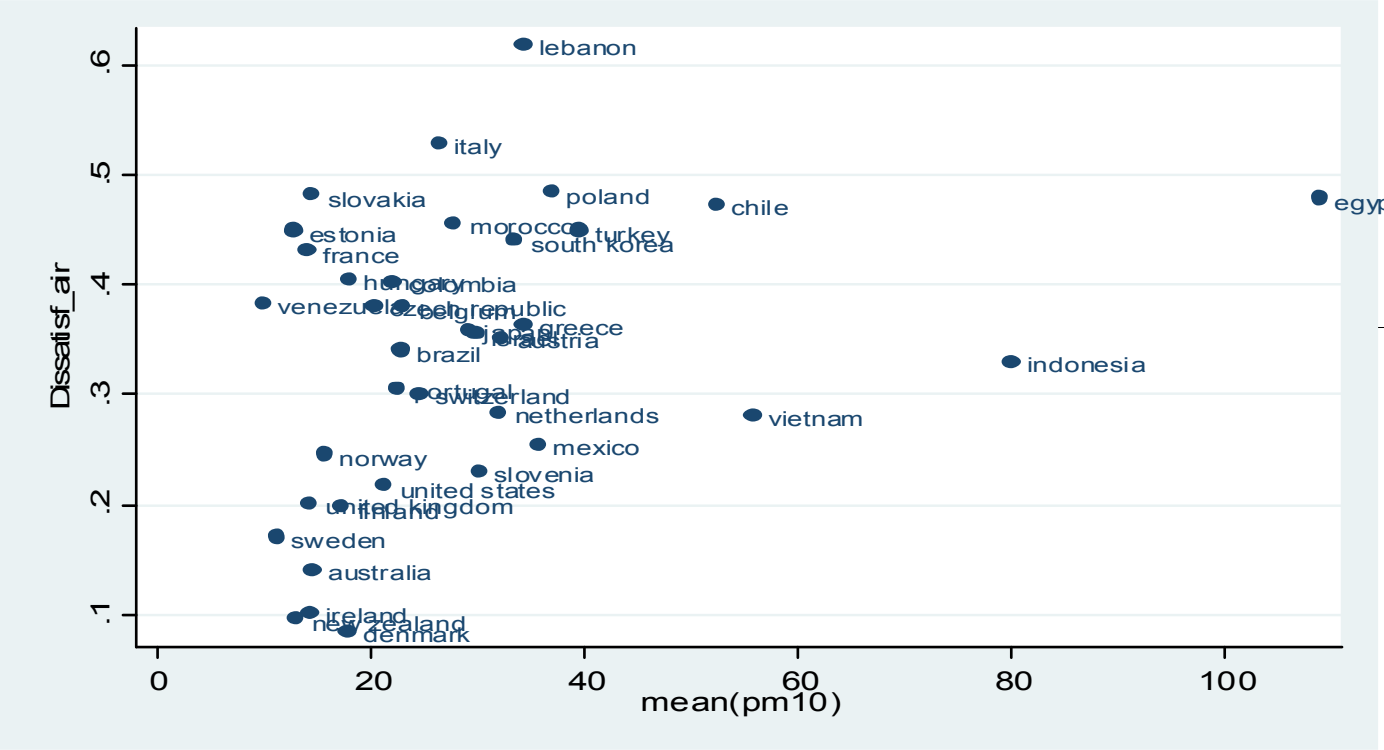
Context of the study

Global Premature Deaths from Selected Environmental Risks (2010 to 2050)



Source: Environmental Outlook Baseline to 2050 (forthcoming)

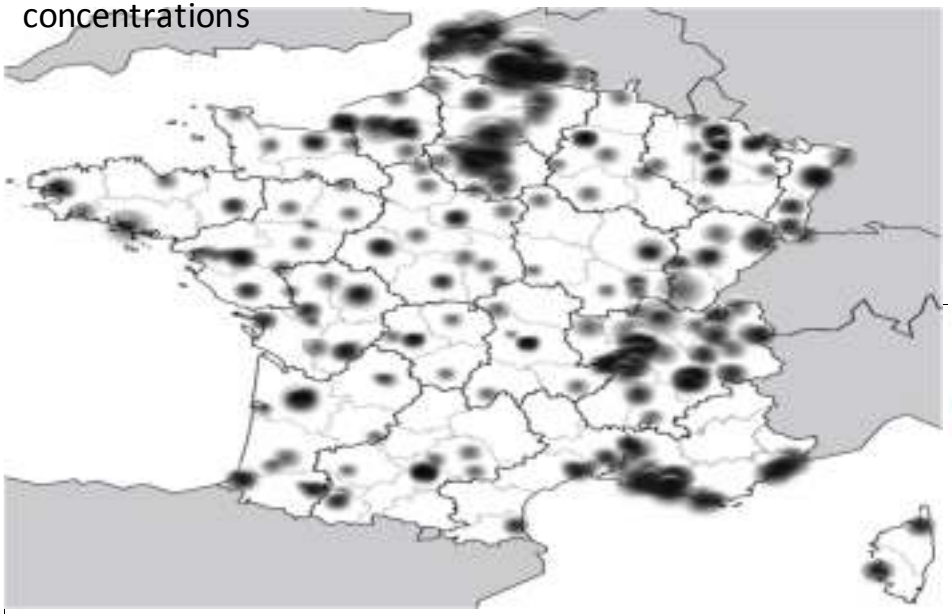
From Exposure to Perception to Satisfaction (The case of PM10)



Gallup data for measures of people's satisfaction w ith air quality (only for those living in a large city or in the suburbs of a large city) and World Bank data for PM_{10} concentrations (means of 100.000+ cities of the country)

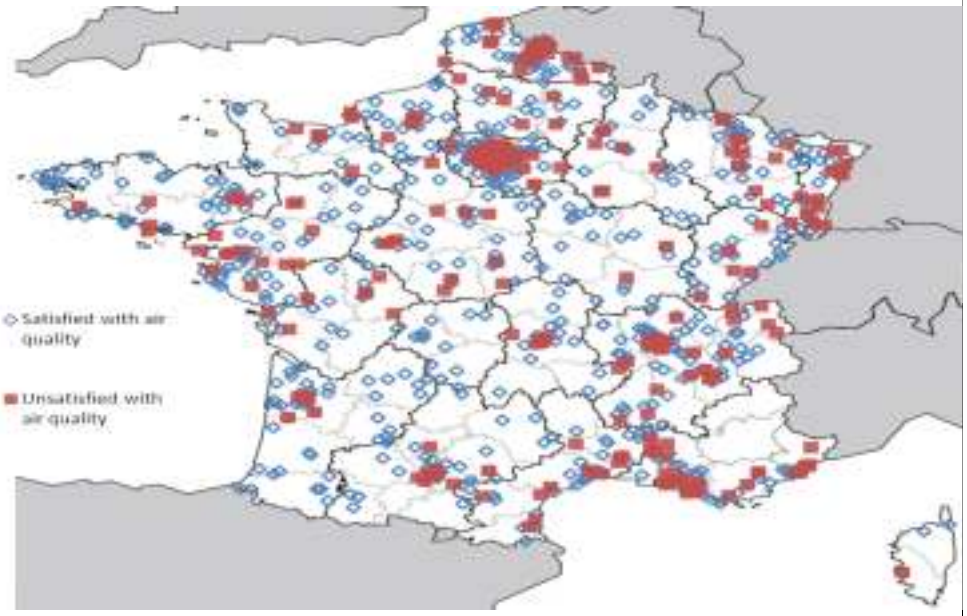
From Exposure to Perception to Satisfaction

Location of Air Quality Monitoring Stations in France
Bubble sizes indicate relative 2009 mean PM_{10} concentrations



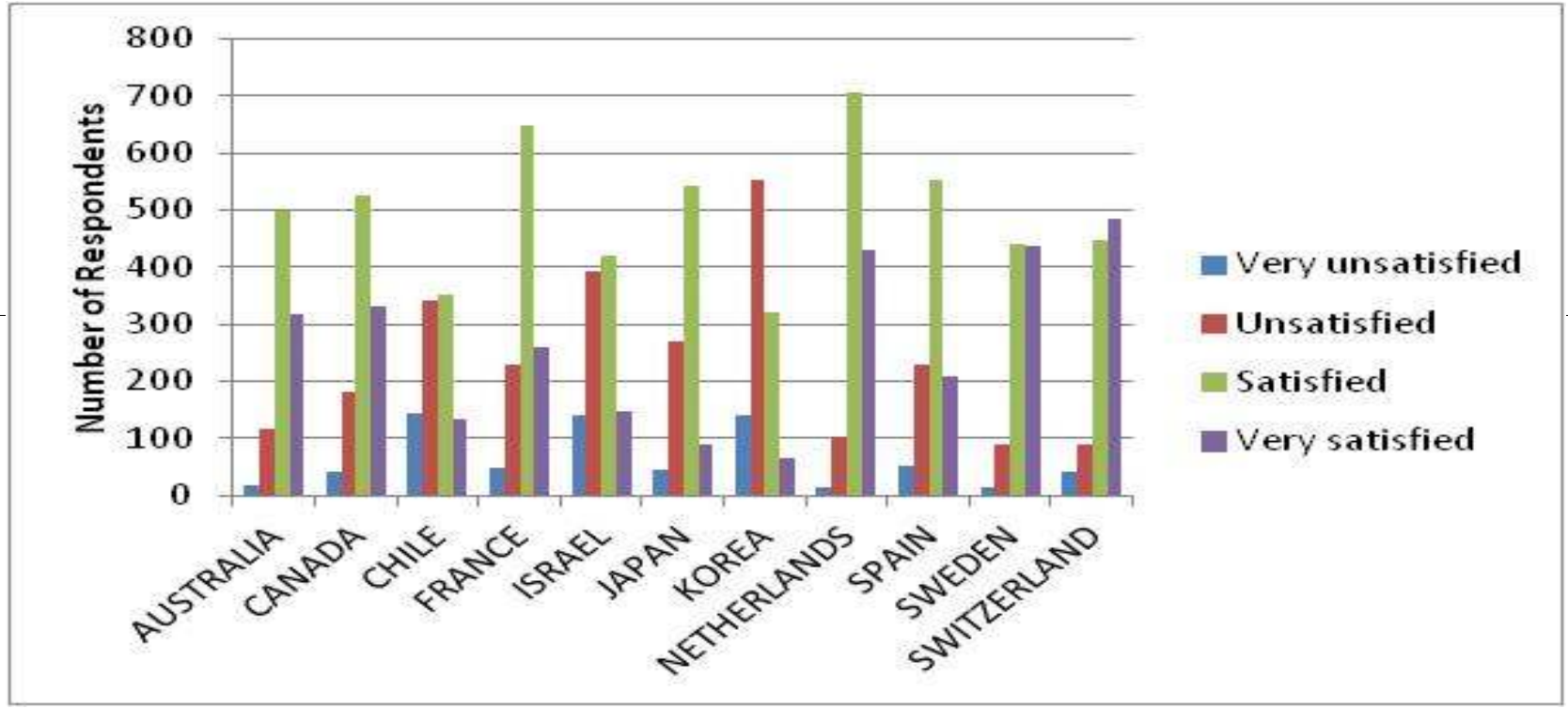
Source : Environmental European Agency

Location of Household Survey Respondents in France and their satisfaction with air quality



Source : Household Survey

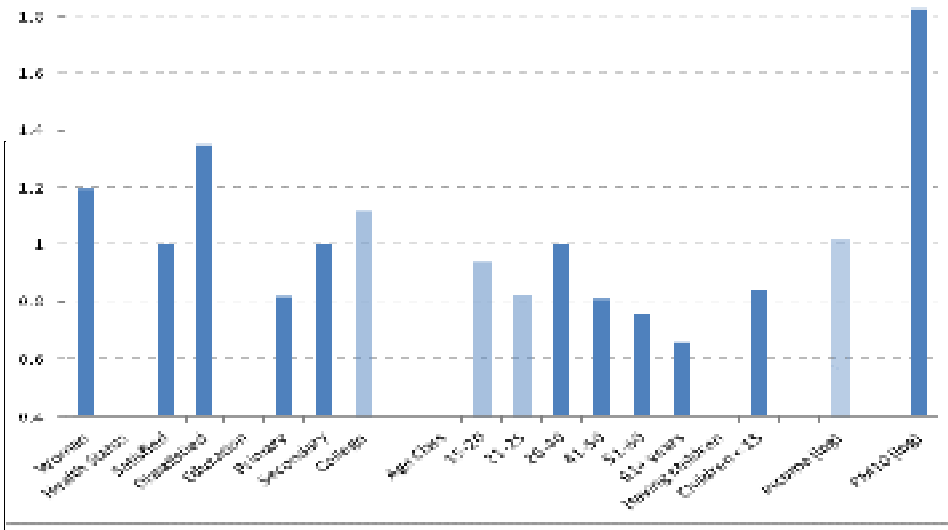
OECD Index of Satisfaction with Local Env'al Quality (Air, Water, Waste, Noise, Green Space, Litter)



OECD EPIC Survey. N > 12,000

Determinants of Satisfaction with Air Quality* (Gallup World Poll Data)

Results of the City level model
- 4609 individual in 58 cities
- PM10 2008 data



Women are more often dissatisfied with air quality
Personal health problems are correlated with dissatisfaction of air quality
The more educated are respondents the more likely they are to be dissatisfied with the quality of air in their city
youngest and oldest people are more likely to be satisfied with air quality than respondents aged 25-40 years
Income has no effect on the satisfaction with air pollution
very local character of air pollution
An increase of 100 µg/m3 of the country average PM10 concentration would approximately increase the probability to be dissatisfied by the quality of air by 2
people living in cities in excess of the WHO standard are 2.6 times more likely to report dissatisfaction

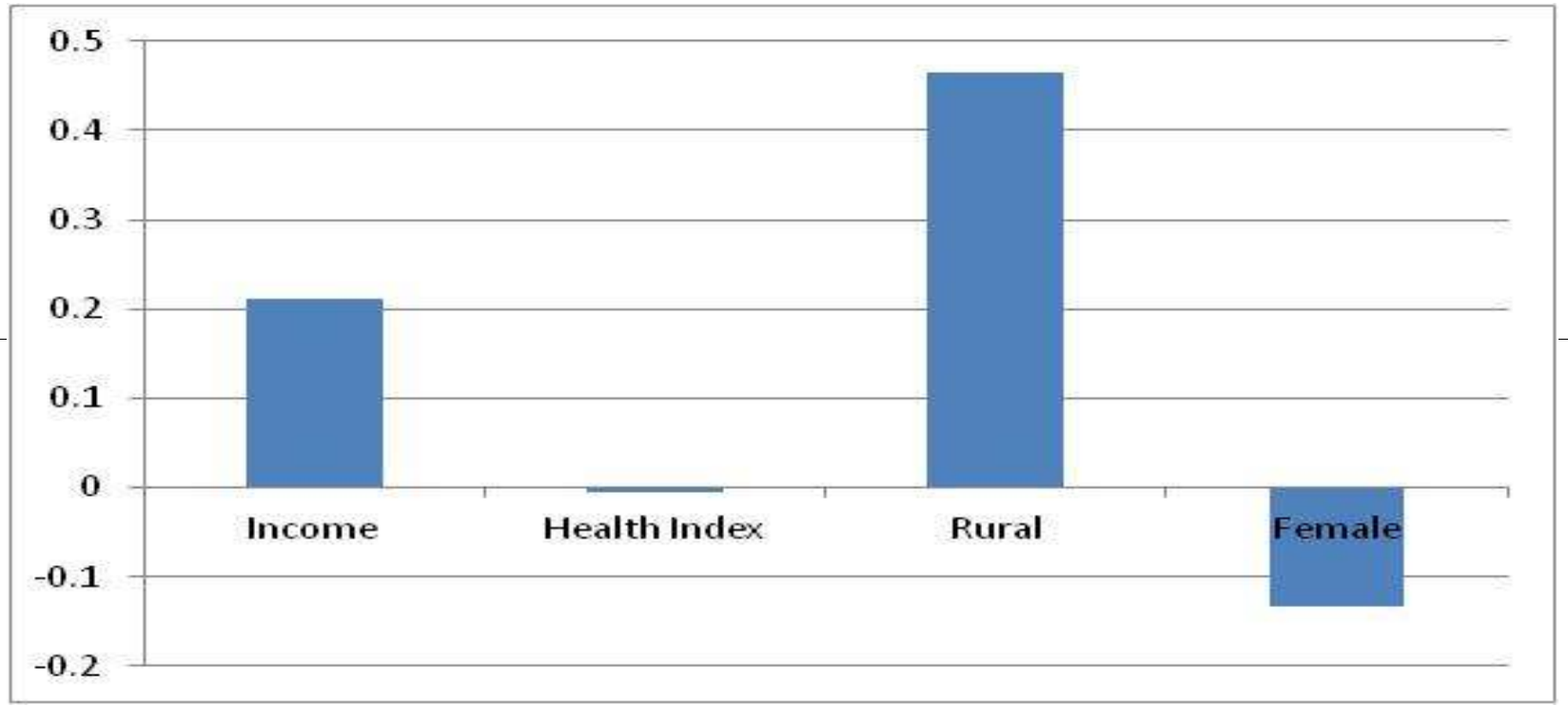
*Estimated odds ratios. Light shading indicates > 5% level significance

Self-Reported Satisfaction with OECD Index of Environmental Quality (Air, Water, Waste, Noise, Green Space, Litter)

	Coefficient	P>|t|
Rural	**0.1828**	0.0000
Age	-0.0001	0.9850
Age Sqr	0.0000	0.6540
Income (EUR2007)	**0.0000**	0.0000
Unemployed	-0.0615	0.1160
HH Size	-0.0018	0.8490
Children	0.0173	0.4460
Post-Sec. Education	-0.0003	0.9310
Female	-0.0521	0.0100
Health_INDX	**-0.0169**	0.0000
Country (Australia is Reference)		
Canada	**-0.1033**	0.0050
Chile	**-0.6269**	0.0000
France	**-0.3167**	0.0000
Japan	**-0.5823**	0.0000
Netherlands	0.0600	0.1300
Spain	**-0.3038**	0.0000
Sweden	**0.0877**	0.0250
Switzerland	-0.0339	0.5280
_cons	0.4138	0.0000

N = 6227, Adjusted R-Square = 0.1392

OECD Index of Self-Reported Satisfaction with Env'al Quality (Estimated Elasticities*)

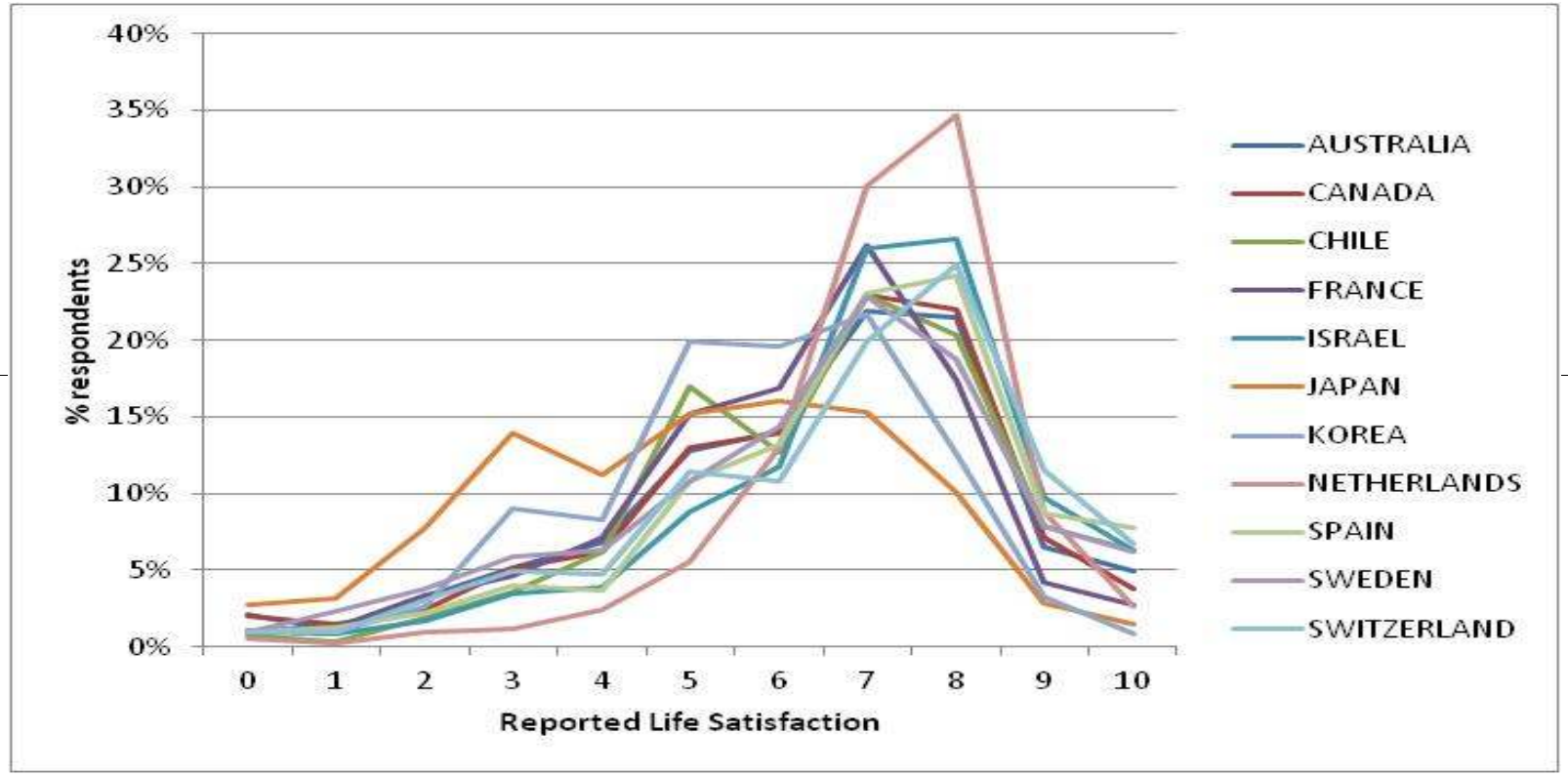


* Marginal effects for discrete variables (gender & rural)

From Satisfaction to Well-Being

- Analysis based on OECD Survey of over 6,000 households in 9 OECD countries
- Web-based survey implemented in February-March 2011
- (Very) preliminary results based on index of self-reported life satisfaction (Likert – 1 to 10)

From Satisfaction to Well-Being

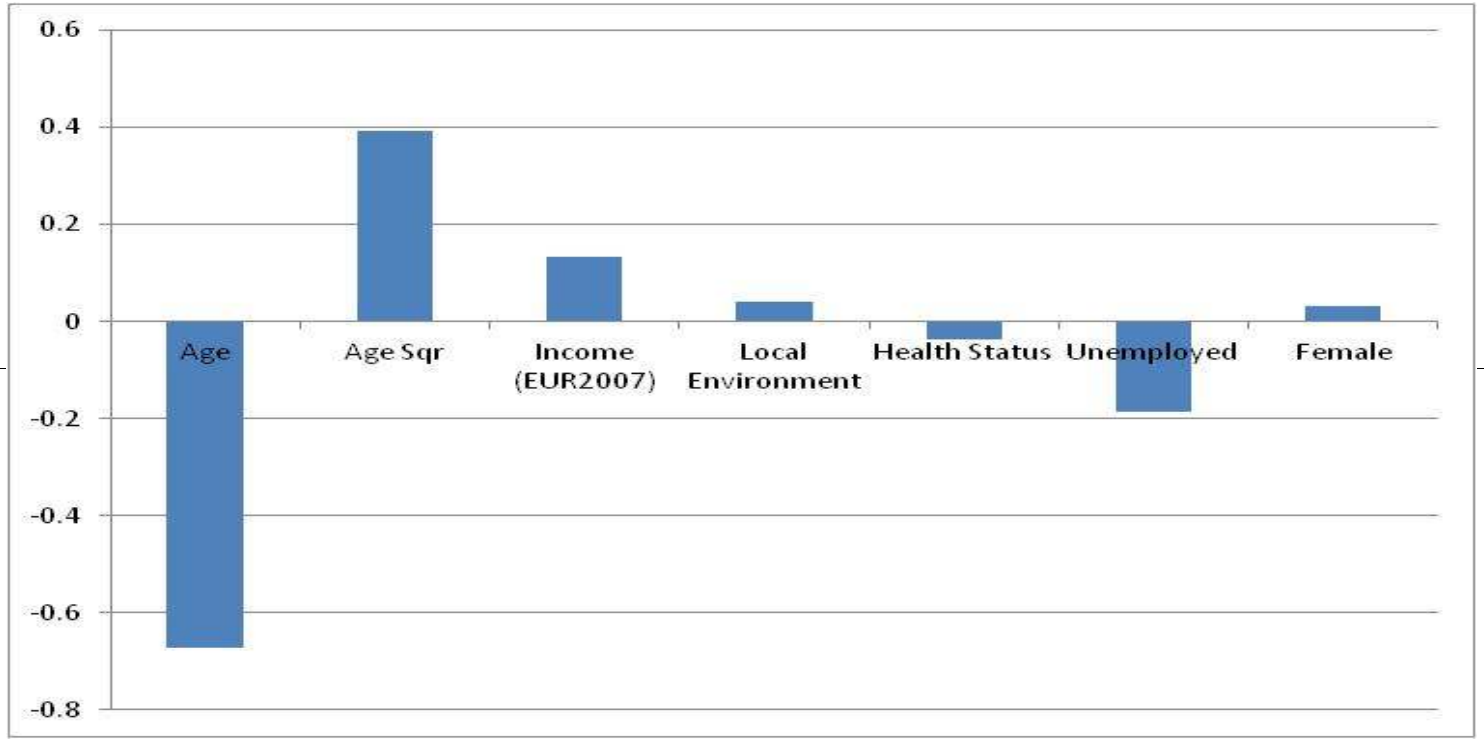


Determinants of Subjective Well-Being

Age	**-0.097**	0.000
Age Sqr	**0.001**	0.000
Income (EUR2007)	**0.000**	0.000
Unemployed	**-1.161**	0.000
HH Size	0.008	0.798
Children	0.045	0.239
Post-Sec. Education	0.011	0.178
Gender	**0.190**	0.000
Local Environment	**0.435**	0.000
Health Status	**-0.050**	0.000
COUNTRY (Australia is reference)		
Canada	0.162	0.071
Chile	**1.931**	0.000
France	0.123	0.172
Japan	**-1.320**	0.000
Netherlands	**0.820**	0.000
Spain	**1.198**	0.000
Sweden	0.074	0.436
Switzerland	-0.210	0.104
_cons	6.857	0.000

N = 6227; Adj's R-Square = 0.2045; Robust Standard Errors

Determinants of Subjective Well-Being (Elasticities)*



* Marginal effects for discrete variables (gender & unemployed)

Policy Applications

- Implications of SWB for environmental economics :
  - Potentially a complementary tool for orthodox valuation techniques
  - Advantages : - less strategic bias (contingent valuation/choice experiments)
    - no assumption of perfect markets (hedonics and other revealed preference)
  - But – does not allow for formal valuation (and thus cost-benefit analysis), except under strong assumptions
  - In any event can be a useful input into policy-making with respect to 'perceptible' and 'tangible' environmental conditions

ANNEX – Satisfaction with Specific Environmental Factors (Water Quality)

	France	Korea	Japan
Demographics and socioeconomics			
Gender (1=Female, 0=Male)	**-0.2050*** **	**-0.1300***	**0.1430***
Age (years)	0.0105	-0.0138	-0.0187
Age squared	-0.0001	0.0002	0.0001
Number of household members	-0.0475	0.0300	-0.0340
Number of children under 5 in household	0.0826	0.0624	0.00166
log(Household income in 2007 €)	**0.2040** **	**-0.1650** **	**0.1550** **
Number of years in current home	-0.0003	-0.0057	0.00360
Own primary residence? (1=Yes, 0=No)	-0.1190	**-0.163** **	-0.0219
Years of post-secondary education	0.0052	0.0113	-0.0086
Household Location			
Suburb	0.084	0.114	-0.005
Small town or village	**0.2240** **	**0.462*** **	0.0448
Isolated dwelling	**0.6720*** **	-0.067	**0.610***
Volunteer or donate to environmental organization?	-0.075	-0.004	**-0.499** **
Observations	1,022	1,048	930

ANNEX – Satisfaction with Specific Environmental Factors (Air Quality)

	France	Korea	Japan
Demographics and socioeconomics			
Gender (1=Female, 0=Male)	**-0.1450****	**-0.1260***	0.1260
Age (years)	0.0152	**-0.0472****	-0.0074
Age squared	-0.0001	**0.0005***	0.0005
Number of household members	-0.0625	0.0264	-0.0408
Number of children under 5 in household	0.0262	0.0884	0.0589
log(Household income in 2007 €)	**0.2220****	**-0.1340***	**0.1670****
Number of years in current home	**-0.0071****	-0.0003	0.0040
Own primary residence? (1=Yes, 0=No)	**-0.1880****	**-0.1710****	-0.0264
Years of post-secondary education	-0.0190	**-0.0302***	-0.0109
Household Location			
Suburb	0.1460	0.1380	**0.1850****
Small town or village	**0.6410*****	**0.6400*****	**0.3530*****
Isolated dwelling	**1.4040*****	-0.3580	**1.3010*****
Volunteerism			
Volunteer or donate to environmental organization?	-0.1390	-0.0962	**-0.438****
Observations	1,022	1,048	930

ANNEX – Satisfaction with Specific Environmental Factors (Access to Green Space)

Demographics and socioeconomics	France	Korea	Japan
Gender (1=Female, 0=Male)	**-0.154****	-0.1100	**0.148***
Age (years)	-0.0070	-0.0320	-0.0176
Age squared	0.0001	0.0004	0.0002
Number of household members	0.0138	0.0004	-0.0185
Number of children under 5 in household	-0.0340	-0.0693	0.0309
log(Household income in 2007 €)	0.1080	-0.0608	**0.112***
Number of years in current home	-0.0040	-0.0029	0.0007
Own primary residence? (1=Yes, 0=No)	-0.0753	**-0.153***	-0.0703
~~Years of post-secondary education~~	~~-0.0038~~	~~-0.0007~~	~~-0.0063~~
Household Location			
Suburb	0.151	0.124	0.012
Small town or village	**0.483*****	**0.512*****	-0.092
Isolated dwelling	**0.764*****	0.392	**0.884****
Volunteerism			
Volunteer or donate to environmental organization?	-0.066	-0.233	**-0.397****
Observations	1,022	1048	930