



**2008 OECD Household Survey on Environmental Attitudes
and Behaviour: Data Corroboration**

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1. Introduction

This document corroborates data from the 2008 OECD Household Survey on Environmental Attitudes and Behaviour. Firstly, socio-demographic data is compared with official sources to check that the sample is approximately representative and unbiased. Secondly, survey results are compared with other data sources across the five subject areas: waste, transport, energy, organic food and water. The survey contains a section related to environmental attitudes and asks what might motivate respondents to behave in a more environmentally friendly manner. Unfortunately this data is not easily comparable with other sources and consequently are not included. Nine research teams involved in the analysis of the survey have contributed to this corroboration paper, providing formal and informal statistical comparisons with other surveys and national statistics. Analysis taken directly from the research teams is presented in text boxes. See Appendix Seven for a list of the research teams with their country and area specialties.

The survey was carried out in January-February 2008 in ten OECD countries: Australia, Canada, Czech Republic, France, Italy, Korea, Mexico, Netherlands, Norway and Sweden. Approximately 1,000 households were interviewed in each country using an internet-based questionnaire resulting in a total sample of 10,000 households. Information was collected on household characteristics, environmental attitudes and household behaviours in five key areas: waste and recycling, transport, energy use, organic food expenditures and water consumption.

Companies providing internet surveys recruit people to become a member of their 'panels' who then become eligible to complete survey questionnaires. Usually, demographic information is collected on panel members and panel members are given rewards for taking part in surveys. The OECD chose the survey provider with care in order to minimise problems that can be associated with online surveys, such as biased samples, professional respondents and superficial responses. Thus, the survey provider's panel size, recruitment, management and representiveness were scrutinised.

The OECD chose Lightspeed research to carry out the survey. Lightspeed Research recruits respondents through hundreds of websites in each country and uses broad-reach portals with niche websites to reach rarer demographic targets. Potential panel members are contacted through newsletters and online advertising campaigns with partner sites. A respondent cannot choose to seek out the Lightspeed panel to join it; they can only become members via the methods above. Once recruited, chosen panel members are contacted by email and invited to respond to selected surveys. An algorithm conducted by MARSC¹ software is used to select respondents based on stratification variables and the panel management rules (for example taking into account maximum number of surveys a panellist can respond to each year).

To ensure data quality the chosen internet survey provider utilises techniques to ensure all people on their panels are real: IP addresses are checked to avoid those with past fraudulent behaviour, computers are tagged to ensure only one registrant per computer, email addresses verified and respondents postal addresses confirmed. New panel recruits must agree to country specific terms and conditions and successfully fill out a registration survey containing demographic and household

¹ <http://www.marisc.com/>

information which has internal data quality checks. Panel members and their responses can be removed if they do not respond to surveys satisfactory. For instance, the time taken to complete a questionnaire and certain questions is recorded and respondents are removed if their response times indicate that they are not responding properly. The survey provider offers a points system (redeemable for goods, gift certificates etc) or prize draws to motivate respondents.

To ensure a representative sample and avoid sample bias, the survey was stratified by income, age, gender and region in each of the ten countries. For the income variable, a different approach was adopted for each country due to differences in data collection practice and availability. The data was stratified by either two or three classes based on either household or personal income, and on gross or income net of taxes. However, within the questionnaire, respondents were requested to indicate household after-tax income which allows for a consistent treatment of the data. The stratification was adjusted based upon the distribution of responses to this question in a pilot study. Age was stratified using the following groups: 18-24, 25-34, 35-44, 45-54 and 55 years and over. Gender was approximately half male and half female, with slightly more females in all countries. Region was stratified by as few as four regions in Italy and as many as ten in Canada. See Table 7.1 in Appendix Seven.

Along with stratification, the size of the survey panel was considered key to ensuring that the sample was representative. A large panel was especially crucial in countries where internet penetration rates were low. For this reason, a smaller sample (approximately 700) was taken in the Czech Republic where internet penetration rates were low and the panel size relatively small, as the survey provider could not ensure that a larger sample would be representative. Internet penetration rates for the survey countries are high with the exception of Mexico and the Czech Republic, see Figure 7.1 Appendix Seven.

2. Summary

2.1 Socio-demographic

Area	Notes
Stratification variables: age, gender and region	<ul style="list-style-type: none"> • Age and gender comparisons are complicated by the selection criterion requiring respondents to have primary or shared responsibility for purchasing decision. Hence, the survey results for these variables will not necessarily mirror the population statistics. Nevertheless, age data is presented for Canada, Australia, and the Czech Republic. For gender, comparisons have been included by individual research teams and in addition, an overall table of the gender split is included in Appendix One. • Region data corroborates well for Mexico and the Czech Republic
Income, employment, occupation and education level	<ul style="list-style-type: none"> • Household net income comparisons are available for Australia, Canada, Mexico, Norway and Sweden. Note, with the exception of Mexico and Canada, the comparisons deal with average income, not the income distribution. Income bands by country are presented for the survey to show that the income variable is reasonably distributed. • Employment – Norway provides a full-time/part-time split, while data is also provided for Italy. • Education – data is presented for the Czech Republic, Mexico, Norway and limited comparison is available for France, Italy and Australia.
Household structure (single adult, multiple adult, number of adults/children)	<ul style="list-style-type: none"> • Household structure data is included for Sweden, Norway, Mexico, Australia, Italy and the Czech Republic.
House characteristics: ownership, residence type (e.g. apartment/house etc), size (m ²), size (number of rooms), location (e.g. urban/rural) and age of residence	<ul style="list-style-type: none"> • Ownership – data included for Sweden, Czech Republic, France, Mexico and Australia. • Residence type – Korea, Australia and the Czech Republic • House size – Czech Republic, France, Italy and Mexico • Location (urban/rural) – data presented for Czech Republic and Korea • Age of Residence – data presented for the Czech Republic

2.2 Survey areas

Topic	Notes
Waste	
Frequency and charging of mixed waste collection	<ul style="list-style-type: none"> Although the proportion of households who are charged for mixed waste is an important variable, unfortunately there is little corroboration of this variable. France provides an official figure of 0.5% having pay per throw compared to 0.9% (OECD 2008), this being comparable, but a tiny fraction of the population.
Availability and frequency of recycling services	<ul style="list-style-type: none"> Availability of recycling services is compared for Canada.
Amount recycled by material	<ul style="list-style-type: none"> Average recycling rates for glass, plastic, metal and paper are compared for France.
Transport	
Number of cars, detail of cars (fuel type, age, seating capacity, engine size)	<ul style="list-style-type: none"> Number of cars – the survey data is compared with International Road Federation data for all 10 countries. Canadian and Australian motor vehicle (owner, number per household) information corroborates well, however, car ownership is too high for Mexico. France 2007 per capita car figure is lower than the survey data.
Public transport accessibility, weekly distance driven by respondents, commuting times to work, commuting time for various activities, occurrence of various transport behaviours (i.e. car pooling, using recycled tires)	<ul style="list-style-type: none"> Canada provides length of commute to work (minutes) along with mode (specifically car and public transport).
Mode of transport for different activities	<ul style="list-style-type: none"> Australian data for mode of work commuting corroborates well.
Energy Use	
Energy Sources and whether households are charged by amount consumed	<ul style="list-style-type: none"> Czech Republic, Sweden and Australia
Renewable electricity (do you buy it, if not why not and willingness to pay)	<ul style="list-style-type: none"> Data provided on Sweden
Appliance ownership	<ul style="list-style-type: none"> Data presented for the Czech Republic, Mexico, France and Australia

Energy efficient appliance ownership	<ul style="list-style-type: none"> • Compact fluorescent lighting for Canada.
Organic	
Organic food expenditures (proportion of each food category that is organic) Food categories are fresh fruits and vegetables, dairy products, eggs, meat and poultry, and finally bread, pasta, rice and other cereals.	<ul style="list-style-type: none"> • Little data is available to corroborate this area. Data presented for Australia, France and Italy.
Motivations for consuming organic food (including, health versus environmental), willingness to pay, organic labelling.	
Water	
Price structure of water (free, metering, fixed charge etc)	<ul style="list-style-type: none"> • All countries.
Water consumption per year and water cost	<ul style="list-style-type: none"> • All countries for consumption. France and Mexico for water costs
Water saving appliances	<ul style="list-style-type: none"> • Canada and Australia (low flow shower heads and low volume/dual flush toilets)
Consumption of tap water for drinking, satisfaction with tap water and willingness to pay for improved tap water	<ul style="list-style-type: none"> • Data available for Korea and France

Part A - Socio-Demographic Corroboration

Socio-demographic data is collected in the survey on a wide range of characteristics. These include gender, age, household size, number of children in household, region, education level, employment status, occupation, household income, home ownership, residence type, number of rooms, size (m²), garden/terrace/balcony, residence location (rural/urban etc), age of residence and time lived in current residence. Data is collected for each household from an adult who has either primary or shared purchasing responsibility for the household with respect to such things as utility bills and grocery shopping. The socio-economic data mostly relates to the household as a whole, but such fields as gender, age, education, employment status, occupation are collected for the individual responding to the survey and as such, this complicates comparisons of these variables with population statistics.

In order to investigate the possible biases created by the respondent selection process, Table 1.1 in Appendix One shows the proportion of respondents who regard themselves as the primary income earner excluding single persons, single parents and those households where people are sharing accommodation with non-family members. It is quite likely that the primary income earner is likely to be better educated, on average older and more likely to be in full time employment than other members of the same household and this should be considered when comparing data specifically on individual respondents for countries with high or low primary earner proportions. The proportion of respondents who consider that they are the primary income earner is approximately 50% for most countries, the lowest proportion is found in Korea at 38% and the highest in France at 55%.

Before comparing data from the OECD Survey with other sources, we look at gender and income variables from the survey. Table 1.2 in the appendix shows the gender split by country. Overall 48% of respondents are male and 52% are female which appears sensible. The country with the smallest proportion of males is Sweden with 44% followed by Australia at 45%. Norway has the most males at 52%. The comparatively even gender split ensures the behavioural and motivational questions based on the individual are unlikely to be biased.

Net household income is a crucial variable and is significant for a number of econometric models built using this data. The service provider was only able to stratify by country-specific socio-economic classes. This complicated efforts to ensure that we had a representative distribution of income levels. Moreover, data on income is notoriously difficult to collect in a survey. As such, in order to ensure a reasonable response rates, respondents were asked to choose one of 12 income bands. The bands were adjusted for each country following the pre-test in order to ensure a reasonable distribution across the different bands. The distribution of responses by income band for each country is shown in Table 1.3 in the appendix.

For modelling purposes, these responses were converted into a continuous income variable, expressed in Euros. Midpoints were taken for 10 intermediate bands for each country, converted into Euros, and non-linear curves were fit for each country in order to generate the values for the lowest and highest income bands. This gives a total of 120 possible values. Using the converted data we can, for example, compare Australia's mean household income from the survey of approximately \$1,000 AUD a week with figures from the Australian Census 2006. The data compares well. Comparisons of the average income for other selected countries follow in the text.

Socio-demographic comparisons between the OECD survey and other data sources follow for Australia, Canada, Czech Republic, France, Italy, Korea, Mexico, Norway and Sweden. Tables 1.4,

1.5 and 1.6 in the appendix compare demographic results from the OECD survey with data from Statistics Canada. The corroboration suggesting that the survey respondents were slightly wealthier and better educated than the Canadian population. The income of OECD survey respondents appears to be higher than expected with just 28% of OECD respondents having an after tax household income of under \$35,000, compared to nearly 38% from Statistics Canada, see Table 1.4. Similarly the high income households are over represented with nearly 26% reporting income of over \$75,000 compared to 23% reported by Statistics Canada. Table 1.5 compares educational attainment with data from the Canadian Labour Force Survey. Just 6% of respondents of the OECD survey had no high school qualification compared to 20% found by the Labour Force Survey. Table 1.6 compares age groups for Canada, the survey data is similar to the population statistics provided by Statistics Canada with slight over-sampling of those under 44 and under-sampling of those 45 or over.

Table 1.7 in Appendix One compares the proportion of Korean households living in apartments and houses along with the proportion living in an urban area. The OECD 2008 survey data corroborates fairly well with other sources: the survey having 88% living in an urban area compared to 89.8% and 62% living in an apartment compared to 53% from other sources.

Table 1.8 and 1.9 compare selected Australian socio-demographic variables with the 2006 Australian Census. The Australian sample has too few one person households at 14% compared to 24% found by the census, see table 1.8. However, the average number of persons per household in the OECD survey (2.8) is only slightly higher than that found by the Australian census, 2.6, see table 1.9. The OECD survey average individual weekly income (\$465) and weekly median household income (\$998) compares well with the Australian census, \$466 and \$1027 respectively. The comparison for the highest level of education is mixed, but it does not indicate that the OECD sample is either more or less educated than the census. Nearly 65% of households in the Australian census own their dwelling, compared to 58% in the survey. In the OECD survey 77% of respondents live in a detached house compared to 75% in the Australian Census 2006 and 13% (OECD) live in an apartment compared to 14% in the Census.

Table 1.10 compares selected Italian socio-demographic characteristics with data from the 2001 Italian census. As is the case with other countries, the Italian sample has too few single adult households with just 12% compared to 25% found in the Italian 2001 census. In addition, the OECD sample has a higher proportion employed 64% compared to 46% in the Italian census. Some of this difference can be explained by the census counting adults over 15 while the OECD survey is restricted to those over 18. The numbers of unemployed are similar from both sources. The OECD sample is better educated than the Italian population with 30% having a bachelor degree or above compared to 10% in the census. Also, the size of residence appears to be larger with nearly 20% living in a residence of more than 105 m² compared to 10% in the census.

Comparisons for the Czech Republic, France, Mexico, Norway and Sweden are presented in boxes below. Czech Republic data is well corroborated. Similarly, the French comparison is favourable with the possible exception of an oversampling of families. Sweden also has too few single adult households along with Norway. In addition, the Norwegian sample has a higher income and is better educated than the general population. The samples do not appear too biased with the exception of Mexico who causes the most concern. In Mexico internet access is not widespread both geographically and socio-economically, and thus the OECD sample is younger, wealthier and better educated than expected.

Box 1.1 Czech Republic

The sources used to corroborate Czech Republic data comes from micro-censuses of Czech Statistical Office (SILC 2007, CSO 2007) that uses random sampling, and from the household budget survey (SRU 2006, SRU 2007) that uses quota sampling based on quota frame derived from micro-census. The results are displayed in the Table 1.11 in Appendix One. We have also tested differences

between sample and population mean using t-test at 95%-level.

The Czech sample did not differ significantly from the population in terms of gender, age-groups, average number of adults in the household, number of children in the household and number of children less than 5 years in the household. Further, educational characteristics of the sample are not statistically different from those of the population either. Average income in the sample is somewhat higher from that of the population, but not significantly at 95% level. The sample is not different from the population also in proportion of flat-owners, proportion of people living in detached and semi-detached houses, or in terms of average number of rooms in flat that the household inhabits and area of the flat/ house. Further, the Czech sample is not different from the population in terms location of the household in the village or metropolitan areas. Also the time of construction of the flat/ house where the household lives is similar to that of the population.

As to the regional subpopulations, we have compared average age and proportion of males for the 8 regions, the result is displayed in Table 1.12 in Appendix One. We could see in the table that age characteristics of the sample for some regions are different from the population. Sample has significantly lower age for the Central Bohemia and Moravia, while it has higher age for SW Bohemia. The gender proportion is not significantly biased for the regions.

Box 1.2 France

We compare figures obtained from the national institute for statistical and economic studies (INSEE) with figures computed from the 2008 OECD survey. The main sources of socio-economic data are INSEE (2005, 2006, 2008), *Enquêtes annuelles de recensement* (2004, 2006), *Recensement de la population* (1999, 2004, 2005), *Enquêtes Emploi* (2007), *Enquêtes Logement* (2006) and DARES (2006).

Size of dwelling (number of rooms in the residence)

From the OECD survey, the average number of rooms in France is 4.75 and 50% of the French households have a residence with 5 rooms. In INSEE (2006), *Enquêtes Logement*, the number of rooms is a categorical variable. The national data indicate that in 2006, 48% of the properties had between 4 and 5 rooms.

Size residence (m²)

In the OECD survey, the average size of the residence is 95 m². Almost 50% of the households have a residence with a size between 51m² and 100m². In INSEE (2006), *Enquêtes Logement*, the average size of the residence is 91 m².

Status and tenure of residence

In the OECD survey, 58% of the households have ownership status, 42% live in an apartment and 59% in a house (detached or semi-detached). In INSEE (2005), the share of owners is 57%. 56% of household live in a detached or semi-detached house and 44% live in an apartment.

Household size

The OECD survey (2008) indicates an average household size of 3.57. In INSEE (2005), *Enquêtes annuelles de Recensement* (2004, 2006), *Recensement de la population*, the average household size

in France is 2.3. The discrepancy between these two figures may indicate that families have been oversampled in the OECD survey.

Education level

The comparison between the OECD survey and national surveys is not easy because the categories (in terms of level of education and age group) are different. However the comparison of two distinct categories corroborates reasonably. Firstly, 28.7% (INSEE) compared to 34.2% (OECD) did not graduate from High School. Secondly, 10.0% (INSEE) compared to 13.4% (OECD) had a post graduate degree.

Income

In the OECD survey (2008), the average income is 32,349 euros. In INSEE (2006), the mean disposable income was 32,551 euros.

Box 1.3 Mexico

A comparison is made between data obtained from the 2008 OECD Household Survey on Environmental Behaviour and data obtained from Mexican governmental sources, specifically, the last wave of the Household Income and Expenditure Survey (ENIGH) carried on in 2006. This Survey is a representative sample of Mexican households with respect to quarterly income and expenditures. This comparison reflects some differences between the latter with the former. This issue probably arises due to the web-based gathering of information that most likely affected the randomness of sample selection, causing that collected data from Mexico to be from households which share certain characteristics. In particular, it seems that the OECD sample contains younger and wealthier people, with a higher schooling level, more men, and a larger proportion of people who use and own a car compared with a representative sample of Mexican households. It is considered that this issue mainly affects the Mexican sample, being less important for other countries where Internet access is considerably larger.

Tenure of residence

The proportion of Mexican respondents who stated if any member of the family owned the primary residence is equal to 74.2%. From Mexican official sources this proportion is equal to 66.3%. A chi-squared test gives a statistic of 28.3 indicating that these proportions are significantly different. Observing these data it is possible that the respondents of the OECD Survey are wealthier than the whole Mexican population.

Size of dwelling

There is not an official indicator which measures the size of dwellings in Mexico. However, from the Mexican Housing Overview 2006² an estimate of the average size of Mexican dwellings can be obtained. With this data it is estimated that the average size of a Mexican dwelling is equal to 65.8 squared meters³ which contrasts deeply with the one obtained from the OECD Survey data, which is

² Published by Softec Corporation.

³ The cited publication actually shows an average size for five categories of dwellings in accordance to its price. Thus, the total average was obtained by estimating an average of the sizes of each category weighted by the contribution of

of 114.2 squared meters per dwelling.⁴ It is important to note that several assumptions were made to obtain these averages (which are detailed in footnotes); thus one should take with care any comparison between them. However, this difference is so large that it may be effectively indicating a bias for the Mexican sample. (Source: Mexican Housing Overview 2006)

Size of household

Household size was obtained from the OECD Survey by adding the number of household's members above 18 years old plus the number of children younger than 18 years old in household. By definition, the distribution of these data is truncated because respondents could not choose a number above five. For this reason, a household size variable from official Mexican sources was generated following the same procedure as in the OECD Survey.

A *t*-test and chi-square tests were carried on to compare means and proportions, respectively. Results indicate that there are not significant differences between these variables. A *t*-value of -1.62 was obtained when comparing the means and only one difference between proportions is found at a 95% level of confidence for households with four members. Nevertheless, it seems that both distributions are quite similar.

Schooling

Important differences between the Mexican sample and population parameters are found with respect to schooling. In table A below there are shown absolute and relative frequencies for each level of schooling. Strikingly, the largest proportion of Mexican people did not graduate from High School, which contrasts with the largest proportion observed in the OECD Survey that reflects that the majority of respondents had a Bachelor's Degree. To compare both data the Spanish version of the OECD questionnaire was consulted to determine the correct correspondence with official data. It is not likely that these differences come from an incorrect translation, as long as each level was defined with the right Spanish word. In contrast, this picture suggests that in fact the OECD Survey respondents had a very high level of schooling. However, these discrepancies are not so severe in the case of other variables; so, to give an unequivocal conclusion seems complicated.⁵

Table A. Schooling Level

Level	OECD Survey		ENIGH 2006	
	Frequency	%	Frequency* (millions of people)	%
Did not graduate from High School	2	0.2	27.8	42.2
High School Graduate	45	4.5	15.0	22.8
Some Post-Secondary Education	344	34.1	9.1	13.8
Bachelor's Degree (BA)	479	47.5	13.2	20.0
Post Graduate Degree (Master or PhD)	118	11.7	0.8	1.2
Prefer not to answer	21	2.1	n.a.	n.a.

each category to the total stock of dwellings. These weights were calculated by taking an average of the proportion of new dwellings from 1991 to 2005 for each category.

⁴ Since data from OECD Survey were taken from a frequency table, the average size of dwellings was calculated by taking the mid-point of each class. For the last class (residence size is more than 200 squared meters) it was assigned a value of 259.3 squared meters, which is the estimated average of the biggest residences as shown in the Mexican Housing Overview 2006.

⁵ In the developing of the work OECD (2009) several specifications were tested to determine the effect of the schooling level on transport decisions. However, in most of them there was not found a significant effect, which was probably due to these discrepancies.

Total	1009	100	65.8	100
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*The sample includes only people with an age of 18 years old or more.
n.a. not applicable

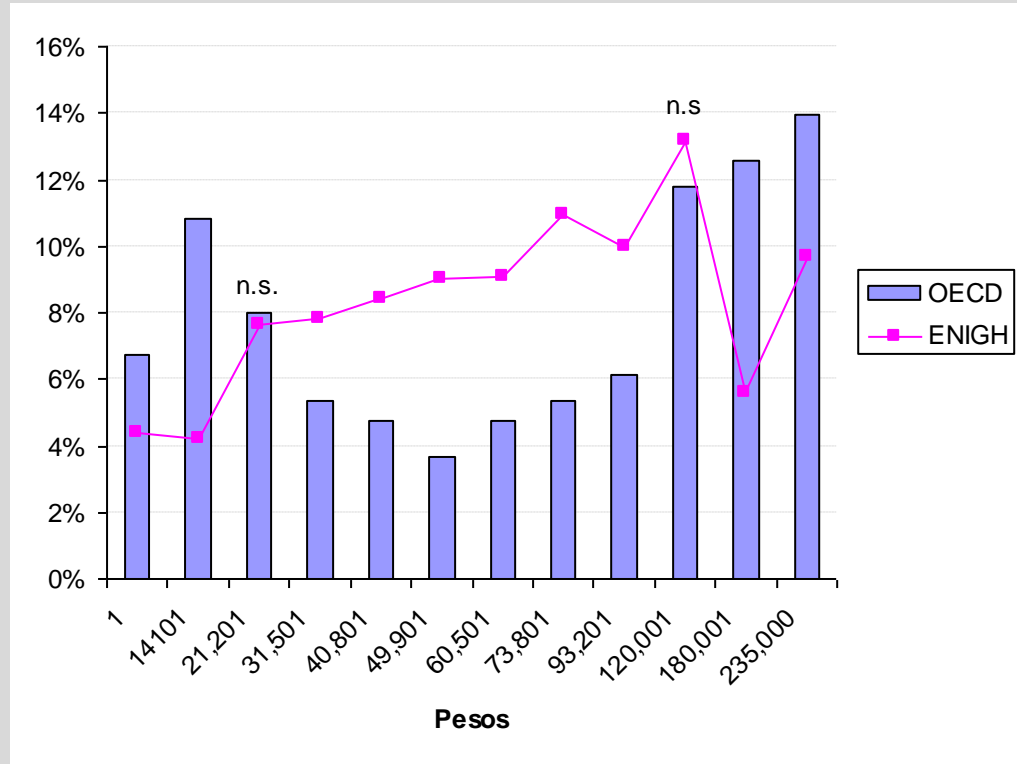
Stratification variables comparison

The OECD Survey was stratified by socio-economic status (income used as proxy), age, gender and region. To test if sample characteristics are affine with true Mexican data, a comparison is made for each one of these variables.

Income

In the OECD Survey income is represented by an integer which indicates that annual household income is between certain brackets. When proportions of observations in each of these brackets are compared independently with those obtained from the ENIGH it is observed that they are statistically different in ten of the twelve brackets. This is depicted in Graph A:

Graph A. Income differences



n.s. difference is not significant.

However, when the income variable is taken as a “continuous variable”⁶ the null-hypothesis of a t-test is not rejected, indicating that there is not a significant difference between the mean of both variables.

Age

A t-test for the case of the age variable indicates a significant difference between means, being

⁶ Refer to the methodological aspects of the Expert Meeting held in Paris, September 2008, where it was discussed the convenience to ‘transform’ this variable to a continuous taking on account mid-points of brackets.

the mean obtained from the ENIGH 2006 greater than the one from the OECD Survey. Three different measures of age from the ENIGH 2006 were taken on account: age of the head of household, age of all residents in households older than 18 years old, and age of all residents in households between 18 and 72 years old. This approach was taken to test if statistical differences in age were due to comparing different populations.

The OECD Survey respondents need not to be the head of their households, thus one can expect differences in the mean age of only those that are head of households and OECD Survey respondents. However, when comparing all kind of residents older than 18 years old there is also a significant difference between means. Finally, one can observe that the maximum age in the OECD sample is 72 and 97 in the case of the ENIGH 2006. Therefore, the difference could arise because of this. However, comparing the mean age only for those between 18 and 72 years old the statistical difference persists. It seems that the sample from the OECD Survey is younger, probably because younger people tend to use more Internet.

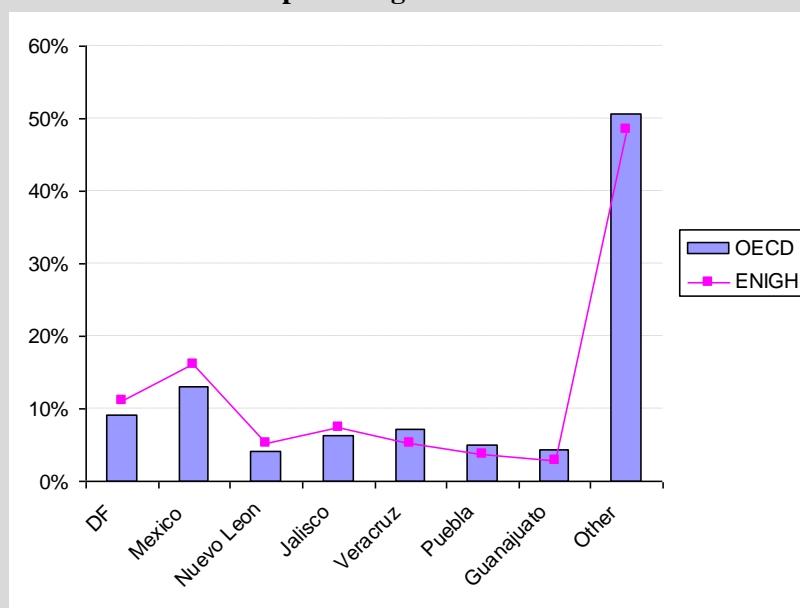
Gender

A slight difference is found with respect to gender. In the OECD sample 49% of respondents are women and 52% in the case of the ENIGH 2006 sample. A *chi-squared* proportion test indicates a statistical difference at the 10% level. The population that was the basis of comparison includes all residents in households. Clearly, it is not correct to compare only the proportion of women who are head of their households because in Mexico only one of each four women is the head of her household. In addition, when only the population above 18 years old is compared the statistical difference is larger. This result may reflect that men use Internet more extensively.

Region

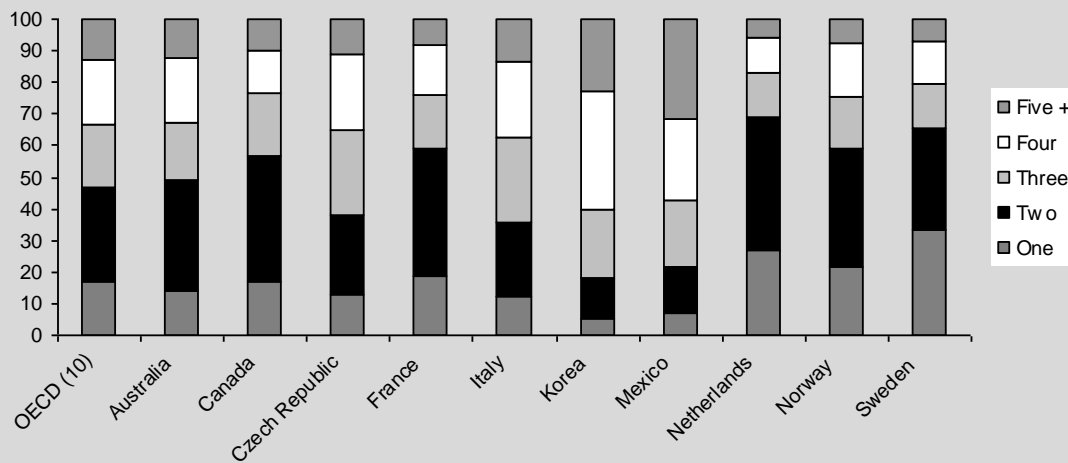
There are not found differences in the proportion of respondents regarding the region of Mexico where they have been living at the time when the Survey was carried on. In all eight regions the *chi-squared* test indicates that the geographical distribution of the OECD and the ENIGH 2006 samples are the same. (Source: ENIGH 2006)

Graph B. Region differences



Box 1.4 Norway

Figure A: Household size in the full sample and by country in the sample. N = 10 251

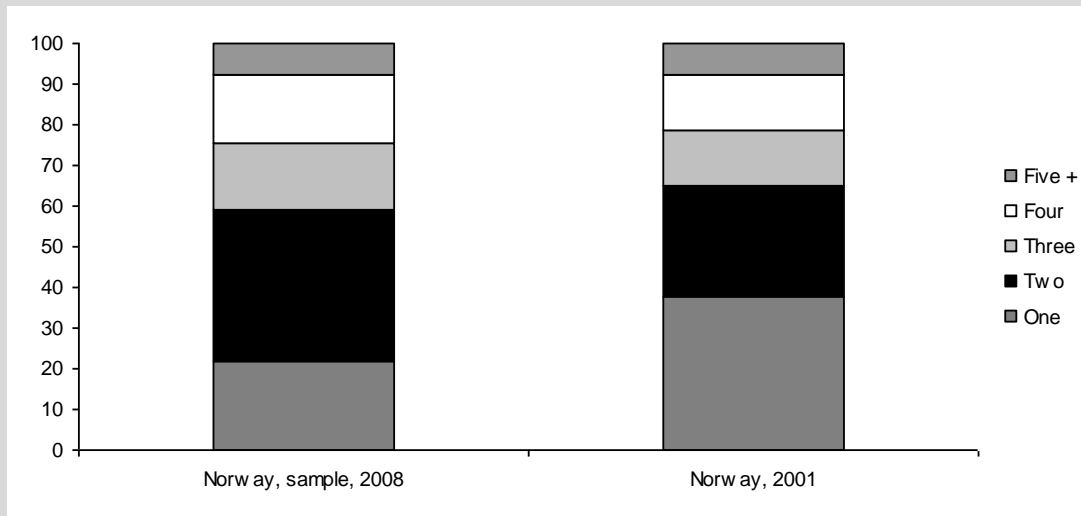


Source: OECD Survey on Household Environmental Behaviour 2008

Many of the variables used in the analysis are the result of the aggregate behaviour of all household members. It is thus important to see if the distribution in the sample with respect to family size is representative of the population. Figure A illustrates the distribution of households according to family size by country in the sample. We see that the household size varies considerably between countries with much larger households in e.g. Korea and Mexico than in e.g. Sweden and the Netherlands. This may be a result of differences in family structure across countries or because the sample is not representative with respect to household size. If we compare two countries in the sample which should be relatively similar, namely Norway and Sweden, we find that they differ quite much with respect to household size. This is an indication that some of these differences may be due to sampling problems.

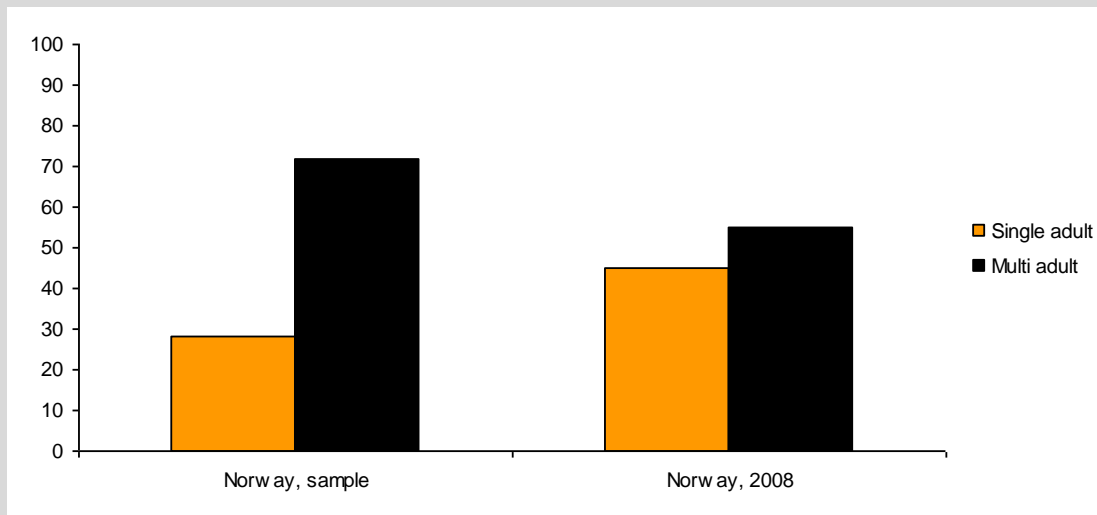
To test whether the Norwegian sub-sample is representative of the Norwegian population, Figure B compares the household size in the Norwegian sub-sample with the Norwegian population as given by the Norwegian Population and Housing Census 2001. We see that despite that Norway has one of the largest shares of one-person families in the sample; there are far too few one-person households in the sample compared to the Norwegian population. We cannot make any clear conclusions with respect to the other sub-samples, but it appears that the share of small households is too small.

Figure B: Household size in Norway, 2001, and in the Norwegian sample, 2008.



Source: Survey on Household Environmental Behaviour 2008 and Statistics Norway, Population and Housing Census 2001

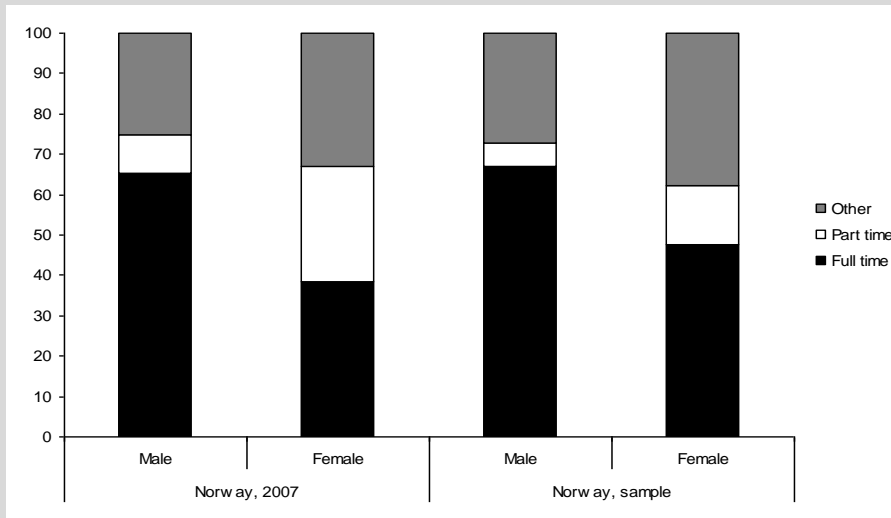
Figure C: Share of single- and multi-adult households in the Norwegian sample and in Norway population, 2008.



Source: OECD Survey on Household Environmental Behaviour 2008 and Statistics Norway 2008

Figure C shows that the share of households in Norway with more than one adult is much larger in the sample than in the Norwegian population. This means that single-adult households are much underrepresented in the Norwegian sub-sample. We also see that the distribution in the Swedish sub-sample more closely resembles the Norwegian population, which is an indication that this sub-sample has a better distribution with respect to single-adult households. Again, we cannot make any clear conclusions with respect to the other sub-samples, but it appears that the share of single-adult households is too small in most countries.

Figure D: Share of males and females with full and part time jobs in the Norwegian sample and in Norway, 2007



Source: OECD Survey on Household Environmental Behaviour 2008 and Statistics Norway 2007

This impression is enforced when we compare the share of males and females with full and part time jobs in the Norwegian sample with the official statistics for the population (see Figure D). We see that the participation in the work force is quite similar in the Norwegian sample as compared to the population, but the number of full time workers is too high, especially for females. Based on this, we would expect the income level in the Norwegian sub-sample to be higher than in the population (discussed in Figure E and F). It is, however, possible that some respondents working long part-time (90 - 95 %) will define themselves as full-time workers. If this is the case, the difference between the sample and the population diminishes.

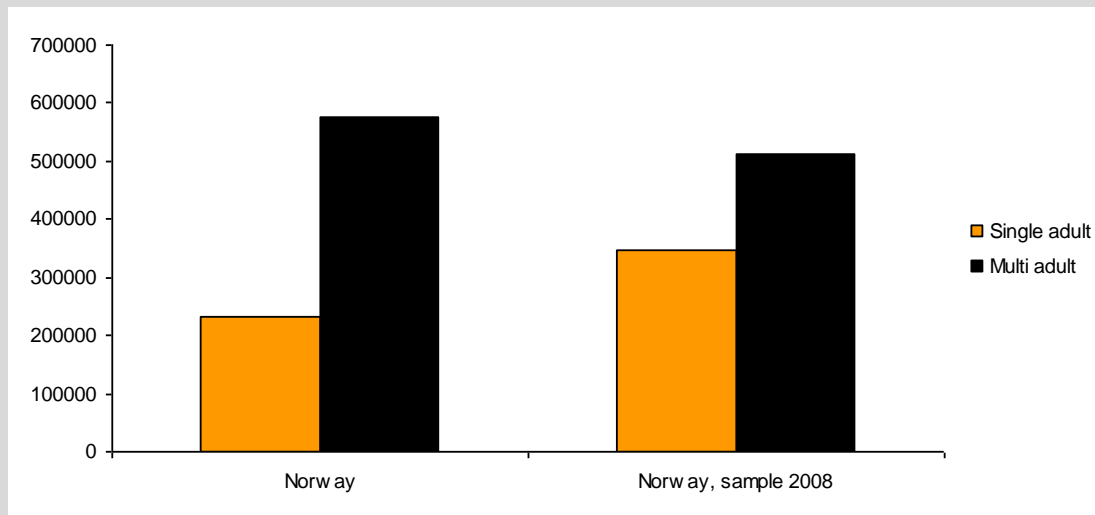
Since we have too few single adult households in the Norwegian sub-sample, we would expect to find that the reported mean household income is higher than in the population. This is indeed what we find. The Norwegian mean income in the full sample is € 58 627 (NOK 465 617). The mean income for all household types in the Norwegian population is € 52 604 (NOK 417 780). Even if the mean household income is higher in the Norwegian sub-sample as compared to the Norwegian population, the household income in the Norwegian population is still much higher than the mean household income in the Canadian sub-sample, which has the second highest income level in the sample with a mean at € 38 548. This, together with the fact that the difference between multi- and single-adult households is relatively small for many countries, is a clear indication that many respondents have interpreted the question as personal and not household income.

To see if the high income in the Norwegian sub-sample is due to too many large households in the sample, Figure F compare the mean income in single- and multi-adult households in the Norwegian sub-sample and in the Norwegian population.⁷ We see that the main difference in income between the Norwegian sub-sample and the population does not seem to stem from the lack of single adult households in the sample. The figure shows that the mean income in the single adult households is much higher in the sample than in the Norwegian population while the mean income in the multi adult households is higher in the population. One possible explanation for the last finding is that some Norwegian respondents have interpreted the question as personal and not household income. An explanation for the high mean income in single-adult households in the sample may be that the respondents in this group work more full-time than what we see in the

⁷ The income labelled Norway in the figure is based on the 2006-income in the Norwegian population with a 10 percent growth added to it, which was the average growth in income from 2006 to 2007.

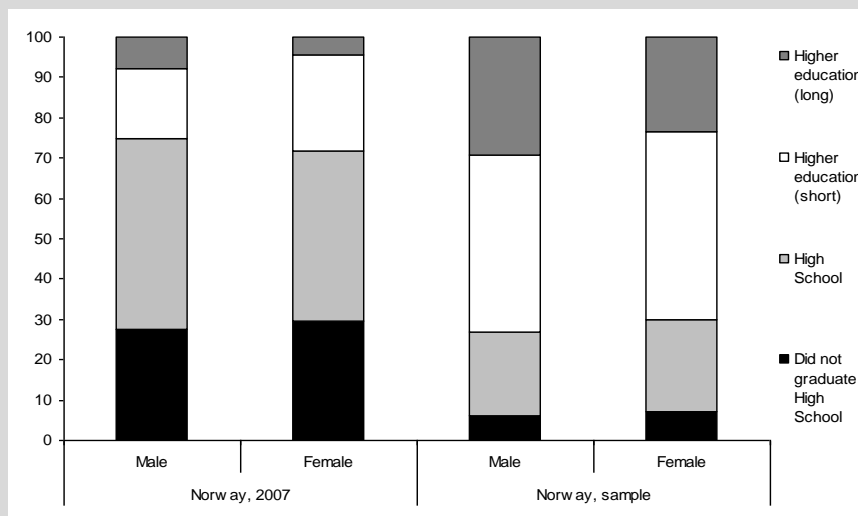
population (see the discussion of Figure D). Another explanation may be that the sample is more educated than the population, and thus earn more.

Figure E: Mean gross household income after taxes in single and multi adult households in Norway and in the Norwegian sample. NOK



Source: OECD Survey on Household Environmental Behaviour 2008 and Statistics Norway 2006

Figure F: Education level in Norway and in the Norwegian sample.



Source: OECD Survey on Household Environmental Behaviour 2008 and Statistics Norway 2007

To see if the high income in the Norwegian sub-sample may be due to a too high education level, Figure F shows the education level in the Norwegian population compared to in the Norwegian sub-sample by gender. The classification used for different education levels in the questionnaire is not directly comparable to the Norwegian statistics in that area, but by combining two middle categories in the questionnaire (“Some Post-Secondary Education” and “Bachelor’s Degree”) into the category “Higher education (short)” we get an illustration of the education level. We see from the figure that there are very small gender differences in both the Norwegian population and sub-sample, although males have a tendency to have a longer education. The most striking difference in the figure is that the education level in the Norwegian sub-sample is much higher than what we see in the Norwegian population. There are too few in the two lowest education categories, and too

many in the two highest categories for both genders. This means that even if Norway is a highly educated country, the sampling procedure used have favoured respondents with high education.

Box 1.5 Sweden

Because of the particular manner in which the sample has been collected, it will be useful to obtain some idea about “representativeness”. Let us begin, therefore, by considering if the websample obtained is a representative sample from the population. I cannot provide a thorough analysis of this issue here, even though it is crucial for mapping any of our conclusions to the main population.

Some of the analysis below is redundant, in the sense that the sampling process itself is designed to secure certain properties of the sample. Nevertheless, it is useful to re-check some of the numbers. Beginning with the first question (Q1), there are 55% in the Swedish sample that describes themselves as “Married or living as a couple”. A comparable number from official statistics is 43%.⁸ Those who claim to “live alone” are 30% of the Swedish sample, while a comparable number from the official statistics gives about 47%.⁹ A 2005 EU-survey shows that Sweden has the highest percentage of single households in the union.¹⁰ This is also true for the households in this survey. Note that the survey also includes the option “living as a single parent” (about 10% of the Swedish sample). Briefly, there seems to be slightly more married/couples in the survey relative to the general Swedish population. This hypothesis can certainly be tested formally, but, again, the comparison here is informal.

Turning to Q3 (sex), the official statistics for Swedes aged 16-74 has 50.5% men and 49.5% women, the survey has 44% and 56%, respectively. A cursory look at the demographics data suggests that the demographics of the sample are similar to the Swedish population (in the relevant cohorts).¹¹ 49% (51%) in the sample owns (does not own) their residence (according to Q13)). Official statistics suggests that owners might be a larger proportion (about 60%), although the comparison is not straightforward to carry out.¹² I further note that 7% of the respondents described themselves as unemployed, which is not too distant from the official numbers. Income is notoriously difficult to measure in any survey, not the least because of a potential reluctance to state it, but also because of the subtle concept itself. At any rate, net household income in the data is on average 28743 EUR. These numbers are based on the secretariat’s transformation of the original data. Official statistics from 2006 gives the mean Swedish net household income at 230400 SEK.¹³ It appears as if mean net household income in the sample may be slightly higher than the Swedish average.

To summarize: an informal review of some of the characteristics that describe the sample suggests that there are, indeed, certain differences compared to the Swedish population as a whole. Yet, I do not find very significant concerns and the data is certainly useful for further analysis.

⁸ http://www.scb.se/templates/tableOrChart____163554.asp

⁹ http://www.scb.se/templates/tableOrChart____163554.asp

¹⁰ The survey suggests 47%, <http://svt.se/svt/jsp/Crosslink.jsp?d=22620&a=392402>.

¹¹ SCB, “Population:Befolkning 2007, 16-74 år” (Swedish statistics bureau, “population 2007, 16-74 years old”).

¹² http://www.scb.se/templates/tableOrChart____147042.asp suggests that 64.2% of the population either lives in a small house or an owned apartment. Whether or not the owner lives in his on residence is not shown. Therefore, the statistics are not directly comparable.

¹³ http://www.scb.se/templates/tableOrChart____163552.asp

Part B - Waste and Recycling Corroboration

The OECD survey looks at areas of waste generation and recycling with questions that relate to frequency and charging of mixed waste collection, recycling availability, amounts recycled, recycling behaviours and motivations along with willingness to pay for a waste collection and separation service. The main areas to be corroborated are the structure of mixed waste collection (charging and frequency), availability of recycling and the amount recycled. We are unable to corroborate the amount of mixed waste generated per household as the survey question is based on how many bags are put out for collection each week, the bag size being indicated pictorially, and is not able to be usefully compared with official mixed waste figures.

Table 2.1, 2.2 and 2.3 in Appendix Two shows access to, and use of recycling programs in Canada by province, comparing the Canadian Household and Environment Survey 2006 with the OECD survey data. Overall, the OECD survey has higher access rates at 99% compared to 93% found by Statistics Canada, and lower use of services 89% of those who have access compared to 97%. Bearing in mind that the two surveys are conducted in different years the results are not too dissimilar. Looking specifically at glass, Table 2.2, the OECD survey has higher access rates, 95% compared to 88% from the Canadian source, but identical use of glass recycling services, 94%. A similar pattern is observed for plastic recycling, see Table 2.3.

Box 2.1 France

We compare figures obtained from the French environment and energy management agency (ADEME) and figures computed from the 2008 OECD survey.

Mean recycling rate:

1. Glass bottles/containers: 71% (Ademe, 2005), 65%¹⁴ (OECD, 2008)
2. Plastic bottles/containers: 19% (Ademe, 2005), 67% (OECD, 2008)
3. Aluminium, tin and steel cans: 60% (Beverage Can Makers Europe, 2008), 47% (OECD, 2008)
4. Paper/Cardboard: 55% (Ademe, 2005), 66% (OECD, 2008)

Considering the inexact method used to derive the OECD survey's recycling rates, the figures are approximately similar for glass, metal and paper. However the figures for plastic are quite different.

% of household pay-per-throw: <0.5% (Ademe), 0.9% (OECD, 2008)

¹⁴ The OECD survey collected the approximate amount of each type of recyclable waste that households recycled, with the possible responses of nothing (0%), 25%, 50%, 75% and 100%. The mean recycling rate averages these percentages for France.

Part C - Transport Corroboration

The transport section includes questions on the number of cars and motorbikes owned or used regularly by the household, car specifications (age, capacity, fuel type etc), driving distances, and public transport access and use. The key areas corroborated are car ownership and transport mode used for commuting to work.

Table 3.1 in Appendix 3 compares the number of cars per capita by country using data from the International Road Federation. The number of per capita cars found by the OECD survey is higher than those supplied by the International Road Federation. This is particularly notable for Mexico and Korea. Note that as much of the IRF data is old it is expected to show lower rates of car ownership.

Table 3.2 in the appendix provides Canadian figures showing the number of cars per household. The comparison is very favourable with the OECD having 86% of households owning at least one car compared to 83% from Canadian Household and Environment Survey 2006. The figures for the number of cars per household are very close, with 47% of Canadian households having one car as compared to 49% from the Canadian 2006 survey. The figures for 2 car households are 40% (OECD) compared to 39% (Canadian Survey) and for 3+ car households, 14% (OECD Survey) compared to 12% (Canadian survey).

Similarly, Table 3.3 shows that the number of cars per household from the OECD survey corroborates well for Australia with data from the 2006 census. The OECD survey finds 7.1% of Australian households without a car compared to 9.8% from the 2006 Australian census, 40.8% (OECD) compared to 37.8% (ABS) for one car households, 39.6% (OECD) compared to 36.8% (ABS) for two car households, 8.5% (OECD) compared to 10.7% (ABS) for three car households and finally, 4.2% (OECD) compared to 4.8% (ABS) for households with four or more cars.

Table 3.4 in the appendix compares the mode of transportation used to commute to work and the length of commute in Canada. The OECD survey has higher usage of public transport and lower use of cars for commuting to work in Canada, but the results are similar enough and the commuting times almost identical. Table 3.5 shows the mode of commuting to work for Australians who only used one method of transport, the data corroborates very well.

The boxes below provide comparisons for France and Mexico.

Box 3.1 France

We compare figures obtained from the national institute for statistical and economic studies (INSEE) and the French environment and energy management agency (ADEME), with figures computed from the 2008 OECD survey.

Car ownership: 0.59/capita (Ademe, 2007), 0.76 (OECD).

% commuting to work by transport mode (INSEE, 1998):

Walking: 8%, 31% (OECD)

Car/ motorcycle: 73%, 52% (OECD)

Public transport: 6%, 15% (OECD)

Bicycle: 4%, 1% (OECD)

Here the OECD survey results and the national data do not really match, maybe because the urban households have been oversampled in the OECD survey.

Box 3.2 Mexico

Car ownership

Official data regarding to car ownership is very different to data from the OECD Survey. The median from Mexican official sources is equal to zero cars. In contrast, the median from OECD Survey data is one car. As can be seen in the next table the distribution of different levels of car ownership is very different when comparing both sources of data:

Table A. Car ownership

Number of cars in household	OECD Survey		ENIGH* 2006	
	Frequency	%	Frequency (thousands of households)	%
0	124	12.3	15,485	58.3
1	407	40.4	8,017	30.2
2	330	32.7	2,322	8.8
3	93	9.2	544	2.0
4	44	4.4	130	0.5
5 or more cars	11	1.0	44	0.2
Total	1009	100	26,541	100

*ENIGH (Encuesta Nacional de Ingresos y Gastos de los Hogares) National Survey of Household Income and Expenditure

These data give more evidence to consider that the households from the OECD sample are wealthier than the whole Mexican population.

Part D - Energy Use Corroboration

The energy section includes questions on type of energy source, whether charges depend on units consumed, renewable electricity usage and willingness to pay, household appliance ownership, energy conservation, energy efficient appliances and possible motivations for reducing energy consumption.

The type of energy source used in dwellings corroborates well for Australian data, see Table 4.1 in Appendix Four. The table compares OECD survey data with Australian data from 2005-06 and although the categories are not identical, the results are very similar, for example, 98.7% of households (OECD) use electricity compared to 99.9% (Australian comparison), 12.0% (OECD) use wood compared to 13.5% (Australian comparison) and 9.1% (OECD) of dwellings have a source of renewable energy (wind or solar) compared to 7.1% using solar energy as an energy source (Australian comparison) Table 4.2 corroborates OECD survey data for Australian appliance ownership with Australian Bureau of Statistics data. Again the proportions are very similar, for example, 44.4% (OECD) of households have a dishwasher compared to 45.1 (ABS), 56.5% (OECD) have a clothes dryer compared to 55.6% (ABS), 66.9% (OECD) have air conditioners compared to 66.8% (ABS) and 93.4% (OECD) have a microwave oven compared to 91.7% (ABS).

Table 4.3 in the appendix compares low-energy light bulbs (compact fluorescent) in Canada. The OECD survey found a significantly greater number of households with low-energy light bulbs at 84% than the Canadian survey at 56%.

The boxes below provide comparisons for the Czech Republic, Sweden, France and Mexico. For appliance ownership, the rates are too high for the Czech Republic and for Mexico, but the corroboration is favourable for France. Renewable electricity is investigated in the Swedish section.

Box 4.1 Czech Republic

Table 4.4 in Appendix 4 compares data from the OECD survey with SRU 2007 (Household Budget Survey). We observe some differences between the sample and the population in characteristics of energy consumption. Our sample is different in that significantly lower number of people reports to have electricity, and more often to have gas, and oil. The sample differs also in that significantly more people have washers, washing machines, freezers, microwaves, TV-sets, and PC's.

Box 4.2 Sweden

A basic feature of the Swedish residential energy market is the dominance of district heating; it is a dominating heating source in multi-unit dwellings. Official statistics shows that 77% of the heated area in multi-dwelling buildings was heated by district heating in 2006.¹⁵ In the Swedish sample, 598 respondents live in apartments and 249 of those (or about 42%) subscribe to district heating services. This is a surprisingly low proportion. I will return to a possible explanation of this fact, when we analyze energy usage via Q64 (*“Which of the following sources of energy do you use in your primary residence?”*).

As background information for the empirical analysis, an attempt was made to quantify “green” electricity demanded in Sweden. According to Kågeson (2002), about 5% of total production of electricity in Sweden year 2000 was certified “green” by the Nature Conservancy (an NGO in Sweden).¹⁶ Sundqvist (undated, p.5) suggests that this figure increased to 9% in 2001 (to a level of about 14 TWh). Ek & Söderholm (2008) puts the figure at about 8% in 2002; most of this being consumed by state-owned companies (e.g. the railway service). The review by Bird et al (2002) estimates that the share of residential customers is highest in the Netherlands (13%), followed by Sweden (they put the estimate at 6%), Switzerland at 2% and the remaining countries in their global survey has 1% or lower “green power” share. Definitions vary across countries, so the numbers are difficult to compare. I will return to these numbers below.

Additional information can be gleaned from the current Swedish electricity certificate system (installed May 2003). The system aims to increase annual production of electricity from renewable sources by 17 TWh relative to its production in 2002 (a year in which 70,3 TWh of electricity came for renewable energy sources, dominated by large scale hydro power). Certified producers delivered 12,7 TWh in 2007 (or about 8% of the total electricity generated).¹⁷ The certificate system distinguishes between e.g. small and large-scale hydropower, so that there are competing definitions. There thus is a subtle, but important distinction between “electricity generated by renewables”, “certified electricity” and “green” electricity. According to one survey, ¼ of Swedish households have chosen certified electricity, while ¾ either makes no choice or is ignorant.¹⁸

In this light, we consider the responses to three questions on residential energy use (Q64, Q67 and Q68). We first use Q64 to find that 773 (out of 1006) Swedish households uses electricity as one energy source. This is clearly too low, but more on this later. These 773 respondents subsequently answered Q67 (*“Does your household take special measures to buy renewable energy from your electricity provider?”*) and 125 Swedes claimed to be active. Out of the 439 Swedes who answered Q68 (*“Please state why you do not buy renewable energy”*), 24 (or about 5%) stated that the energy already comes from renewables. The subtlety of defining renewable electricity, combined with a possible misunderstanding of Q64, suggests caution in interpreting these facts. Yet, the received numbers do not look manifestly absurd.

15 “Energistatistik för flerbostadshus 2006: Energy statistics for multi-dwelling buildings in 2006”, EN 16 SM 0702, Statistics Sweden, 2007. Out of 2431000 apartments, 1869000 were heated solely by district heating in 2006.

16 Kågeson, P. (2002) ”Samhällsekonomiska kalkylvärden för elektricitet som används inom transportsektorn samt frågan om hur effekterna av järnvägens elförbrukning bör internaliseras”, Nature Associates, Stockholm, 2002-03-20.

17 Swedish Energy Agency (2008) “The electricity certificate system, 2008”, Eskilstuna, Sweden.

18 Salo, M (2008) “Vindkraft i topp när svenskarna väljer el” Miljöaktuellt, 2008-03-27, <http://dagensmiljo.idg.se/2.1845/1.152551>.

Box 4.3 France

In what follows, we compare figures obtained from various French sources including surveys, the national institute for statistical and economic studies (INSEE), the French institute for the Environment (IFEN), the French environment and energy management agency (ADEME), and figures computed from the 2008 OECD survey.

Appliance ownership:

1. Dishwashers: 47% (INSEE, 2007), 59% (OECD)
2. Clothes washers / clothes washer-dryers: 94% (INSEE, 2007), 89% (OECD)
3. Clothes dryers: 36% (INSEE, 2007), 38% (OECD)
4. Fridges / fridge-freezers: 100% (INSEE, 2007), 98% (OECD)
5. Separate freezers: 84% (INSEE, 2007), 54% (OECD)
6. Ovens: 95% (INSEE, 2007), 88% (OECD)
7. Microwave ovens: 81% (INSEE, 2007), 92% (OECD)
8. Electric water heating boilers: n.a., 44% (OECD)
9. Televisions: 95% (INSEE, 2007), 96% (OECD)
10. Set-top boxes: 42% (INSEE, 2007), 51% (OECD)
11. Computers: 54% (INSEE, 2006), 97% (OECD)
12. Air conditioners: n.a., 8.84% (OECD)

Except for computers (obviously related to the mode of implementation of the survey), the figures seem to match.

Box 4.4 Mexico

Regarding appliance ownership several discrepancies are found. In all comparisons there is found a significant difference between both sources of information. As expected, the OECD sample reflects larger proportions of households that own certain appliances. These are shown in the next table:

Table A. Appliance ownership

Appliance	OECD Survey	ENIGH 2006	
	% of households that own the appliance	% of households that own the appliance	
Dishwasher	4	n.a.	
Clothes washer	85	65	***
Clothes dryer	23	n.a.	
Fridge	99	80	***
Separate freezer	3	n.a.	
Oven	34	n.a.*	
Microwave oven	83	43	***
Electric hot water tank	10	n.a.	
Television	99	94	***
Set-top boxes	17	21	***
Computer	89	20	***
Air conditioner	28	11	***

n.a. not available

* 89% of Mexican households own a stove; however, this percentage includes gas stoves (which regularly have an oven embedded) and electric stoves (which do not have an oven embedded). Moreover, it is possible that some households own a gas stove yet without an oven embedded.

*** There is a significant difference at the 1% level of confidence between the OECD Survey and data from official Mexican sources.

Part E - Organic Food Corroboration

The organic food section collects organic expenditure estimates by asking average weekly expenditures in the following categories (fresh fruits and vegetables, dairy products, eggs, meat and poultry, and finally bread, pasta, rice and other cereals). Other questions relate to reasons for consuming organic food (including health versus environmental motivations), willingness to pay, motivating factors for consuming or encouraging more organic consumption and organic labelling.

The Australian Bureau of Statistics (ABS) reports in *Environmental Issues: Peoples views and practices (2003)* that 42% of respondents had used organically grown fruit and vegetables. This figure is comparable with the OECD 2008 survey where 46% of Australian respondents report purchasing at least some organic fruits and vegetables.

Table 5.1 in Appendix Five compares four food categories for Italy: fruit and vegetables corroborates well with 26% of expenditure organic (OECD) compared to 20% (Italian source). Similarly, dairy expenditure corroborate well with both sources reporting that 20% of expenditure in this category is organic. However, the egg and cereal categories do not corroborate well, with OECD rates approximately 3 times higher than the Italian source.

Box 5.1 France

Statistics from a CSA survey on a representative sample of 1050 individuals show that 39% bought an organic product in the 4 weeks preceding the survey (37% in 2007). This compares well with 42% of households purchasing (at least some) organic food found in the OECD survey.

[Reference: Baromètre de consommation et de perception des produits biologiques en France, Agence française pour le développement et la promotion de l'agriculture biologique, Report n° 0800929, 2008.]

Part F - Water Corroboration

The final subject area in this paper is water consumption and use. This section includes the price structure of water, annual cost of water per year, volume of water consumed per year, water saving activities such as turning off the water while brushing teeth, use of water efficient appliances/devices (such, as low volume or dual flush toilets), motivations for reducing water consumption, whether people drink tap water and if they are satisfied with tap water for drinking and finally a willingness to pay for improved tap water.

Table 6.1 in Appendix Six shows compares the survey results on water saving devices for Canada, specifically low flow shower heads and low volume or dual flush toilets with the Canadian Household and the Environment Survey 2006 data. The results are similar, with the OECD survey finding 56% of Canadian households have low flow shower heads compared to 54% in the Canadian survey and 40% (OECD) compared to 34% (Statistics Canada) for low volume or dual flush toilets.

In 2007, 39% of Canadian households report having a low-volume toilet, whereas the corresponding figure is 40% in the OECD survey (Statistics Canada, 2009). In the same year, 54% of Canadian households reported having a low flow shower head (56% in the OECD sample, which also includes water flow restrictor taps). In Australia, the statistics from 2004 (Australian Bureau of Statistics, 2006) indicate that 73% of households used a dual flush toilet (75% in the 2008 OECD survey), and that 44% used a reduced flow shower head (the corresponding figure in the OECD survey is 63% but it also includes water flow restrictors in general).¹⁹

Korea provides data from the National Survey on Public Awareness for Environmental Conservation in Korea to corroborate the data with regard to satisfaction with tap water. In 2008, 36.5% of Koreans were satisfied with tap water compared to 30% in the OECD survey. In both surveys 11% were dissatisfied due to taste.²⁰

Quentin Grafton, Box 6.1 finds that respondents provided reasonable estimates of their water consumption by comparing per capital residential water consumption from other sources. He also compares the burden of water charges as a percentage of total expenditure or household income and finds similar results for most countries, with the exceptions of Canada and Sweden. The proportion of single household dwellings with water meters is comparable with other surveys, with the exception of Sweden. In addition, the calculated price inelasticities of demand for water are all comparable with other studies for all countries. Box 6.2 looks at data for France and finds that the water price and average water consumption are very close to other estimates. OECD survey results regarding satisfaction with tap water for drinking and reasons for dissatisfaction (taste or health) are comparable to other sources. Box 6.3 looks at annual water costs for Mexico and finds the OECD survey results higher than other sources, however,

¹⁹ Australian Bureau of Statistics, 2006. What do Australians think about protecting the environment?, Paper prepared for the 2006 Australian State of the Environment Committee, Department of the Environment and Heritage, Canberra.

Statistics Canada, 2009. Households and the Environment 2007. Catalogue no. 11-526-X.

²⁰ National Survey on Public Awareness for Environmental Conservation in Korea conducted in June and July 2008 by World Research Company for The Ministry of Environment of Korea. The survey was conducted on 2000 people (above 15 years) and also 215 environmental experts.

when taking into account that the Mexican sample is suspected to be oversampled in large urban areas, the average water charge figure looks comparable.

Box 6.1 All countries

Table 6.2 in Appendix 6 provides various estimates of per capita residential water consumption in liters per day for the ten OECD countries included in the survey. A comparison between the values from previously published sources and those from the OECD (10) survey indicates the median survey responses are similar to that reported in the literature. This suggests, as whole, respondents provided reasonable estimates of their water consumption.

Table 6.3 in Appendix 6 compares calculated water prices from the survey (estimated annual expenditure on water divided by estimated water consumption) to water prices reported from other sources. The survey responses were first converted to Euros and then converted to US dollars as previous estimates of water prices by country are quoted in US dollars. The table compares water prices from two different sources – the OECD’s Water Report forthcoming in late 2009 and the International Water Association (2008) – to the calculated average water price from the survey. The OECD survey results are reasonably close those found in the OECD’s Water pricing report for the Czech Republic, Italy and the Netherlands. For Australia, Canada, France and Korea the results are quite dissimilar. The differences between the sources may have several causes. First, the three water prices may be measuring different prices. In the survey, the calculated price includes a fixed cost and variable cost component. If the OECD and IWA prices fail to include a fixed component and also report the average volumetric price, their prices will be less than the actual average price. Second, it is possible that some respondents in the survey overestimated their water charges. This is because in some OECD countries the water and sewage bill come together and, thus, it is possible that the annual cost estimated by households includes a sewage cost component which would inflate their estimated annual water bill. Third, conversions of domestic currencies into Euros from the survey and then into US\$ are likely to make comparisons difficult over time with reported water prices that were converted from domestic currencies into US\$ at different rates and time periods. In particular, exchange rate fluctuations and conversion difficulties mean that price comparisons across surveys should be used only as an approximate verification.²¹

Another way to compare the results from the survey to previous studies is to use the burden of water charges as a percentage of income or household expenditures. Unlike cross-country comparisons using water prices, there is no need to make conversions into a common currency as the water burdens are directly comparable because they are measured as percentages. A comparison from two published data sources of the average burden (OECD 1999a and 2003) to those calculated from the survey is provided in Table 6.4 Appendix 6. With the exception of the water burden for Canada and Sweden, the ratios calculated from the survey are very similar to those reported earlier by the OECD.

To corroborate the findings in the OECD survey with other data sources it is also helpful to compare the proportion of households with water meters in the survey and in the population as a

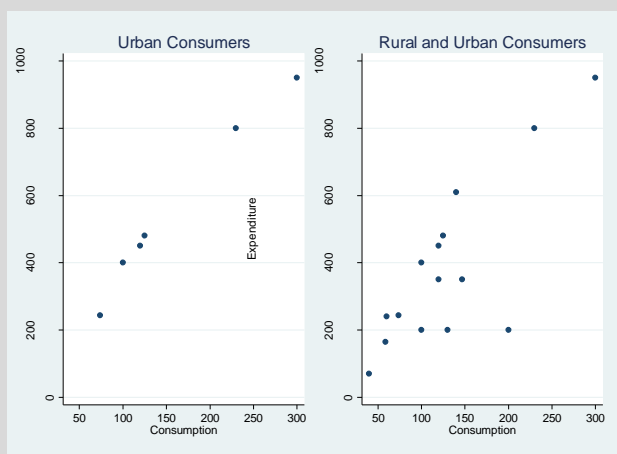
²¹ For example, the OECD’s Australian water price is given as 0.71USD/kL. However if this figure was recalculated using October 2009 exchange rates for illustration purposes, the figure would be 0.98 USD/kL. As the time periods and conversions differ between the difference sources, this factor causes variability and limits the usefulness of such comparisons.

whole. The proportion of households with water meters in existing data sources is generally only provided in terms of single-household dwellings. Consequently the comparison between the findings in the OECD survey and previously published sources is restricted to households in single-household dwellings. Table 6.5 Appendix 6 shows that, with the exception of Sweden, the proportion of households with water meters in single-household dwellings in the OECD survey is similar to that reported in published studies.

The calculated price elasticities of demand can also be used for comparative purposes. For all ten countries there is an inelastic price elasticity of demand that ranges from a low of -0.33 for Norway to a high of -0.88 for Italy (see Figure 6.1 in Appendix 6). The average price elasticity across the entire sample is -0.56. These price elasticities are well within the range of residential demand elasticities calculated in previous studies. For instance, they all lie well within one standard deviation of the mean price elasticity of -0.41 from a meta-study derived from 64 previous studies containing 296 price elasticity estimates (Dalhuisen et al. 2003). The overall income elasticity of demand of 0.10 is also within the range of previously reported elasticity estimates with a mean value of 0.43 and a standard deviation of 0.79 that was obtained from 162 income elasticity estimates of residential water demand (Dalhuisen et al. 2003). Overall, the survey data appear to be corroborated by previous studies of water consumption, especially in terms of the calculated burden of water charges by households, the proportion of households with water meters, and estimated price and income elasticities.

Finally, another method of data corroboration is to check for internal consistency in the data. The left panel of Figure A is a scatter plot of reported water expenditures and household water consumption for urban households in the Picardy region of France using the OECD data. It shows a clear pattern that is consistent with accurate reporting of water consumption and expenditure data by households. The right panel in Figure 1 shows the same points in the left panel, but with the inclusion of reported data from rural households from the same region. In the right panel of Figure 1, the previous signal is obscured because of multiple water suppliers and pricing structures. Scatter plots for households in most of the regions in the OECD (10) provide a similar pattern with a strong signal/curve consistent with accurate reporting of water consumption and expenditure data, but tempered by multiple pricing and noise.

Figure A: Household water expenditures plotted against household water consumption for Picardy, France



Box 6.2 France

The average water price in France, for utilities providing both water and sanitation services, was estimated at 3.01 euros per cubic meter in 2004 (Institut Français de l'Environnement, 2007). This figure is close to the average price obtained from the OECD survey: 3.14 euros.

The average water consumption, as given by the French Center for Information on Water (Centre d'Information sur l'Eau), is 137 litres per capita per day, which is again quite close to the average computed from the OECD survey: 142 litres per capita per day.

In the French sample from the OECD survey, 77% of households indicate being charged for water and metered, 10% indicate being charged for water but non-metered and 13% mention no charge for water at all. In France, by law, the water bill has to be based on the measured water use (charging a fixed fee, which would not depend on water use, is forbidden). But, not all French households are individually metered. We do not have any national figure for metering. In France, 100% of single-dwelling houses are metered. In collective housing, there are different situations. In some cases, apartments are individually metered. But it can also be the case that there is a single meter for a group of apartments and the total bill is (in general) shared among the different apartments based on their size. The way the water bill is shared among different households varies from one collective house to another. For example, the cost of water can be included in the rent (in this case, it will appear as fixed over some period of time).

Regarding French households' opinion about water quality: 81% of households surveyed by the French Center for Information on Water in 2008 think that tap water is safe. 75% of the surveyed households are satisfied with water quality. Those who are unsatisfied mostly criticize the "bad" taste of tap water. In the OECD survey, 70% of respondents declared to be satisfied with their tap water (which is close to the figure above). In this survey, there is a higher share of dissatisfied respondents having taste concerns than dissatisfied respondents having health concerns (which seems to be consistent with the national survey)..

Box 6.3 Mexico

An interesting pattern is observed with respect to water consumption. When comparing the mean expenditures on water consumption from the OECD Survey with official sources there is found a significant difference at the 1% level of confidence. However, when only municipalities with more than 150,000 inhabitants are considered, the mean expenditures are identical, being of 1,699 pesos for the OECD Survey and of 1,700 pesos for the ENIGH 2006. As a reference, when taking the whole Mexican population the mean expenditure is of 1,350 pesos. Therefore, it seems that the Mexican sample probably is representing only urban municipalities, where Internet access is widespread.

Conclusions

This document compares data from the OECD 2008 Household Survey on Environmental Attitudes and Behaviour with other surveys and official statistics. There were 10 countries in the survey, thus comparisons were made at the country level. Although the corroboration is not exhaustive, a wide range of data has been compared: the robustness of the sample has been investigated by numerous socio-demographic comparisons and various key variables from the five subject areas have been corroborated.

Although there are differences between the socio-demographic characteristics of the sample and the general population the data corroborates well, with the exception of Mexico. The respondents are generally wealthier, younger, better educated but as the data is being analysed using econometric models that take many of these characteristics into account, the representativeness of the sample can be considered sufficient. We believe the biases occurring in the Mexican sample are related to the survey being conducted on the internet. Fortunately, these problems do not affect the Czech Republic sample, the country with the second lowest internet penetration rates. As the results suggest that single adult households are underrepresented for several countries, this variable could be a good stratification characteristic for future surveys.

For waste the three areas requiring corroboration are mixed waste charging and frequency of collection, availability of recycling, and the amount recycled. Figures for Canada corroborate well for the availability of recycling and there is evidence from France to support the amount of each waste material recycled. However mixed waste collection structures across countries need further comparisons.

The crucial variables for transport included car ownership and transport behaviour (i.e. transportation mode for various activities). Recent comparisons of car ownership for Canadian and Australian data are favourable; however the figures for Mexico are too high. The mode used to commute to work corroborated well for Australian data.

Energy sources and appliances are the main corroboration areas. The proportion of households using various energy sources (e.g. electricity, gas and wood) corroborates well for Australian data, as do appliance ownership rates for Australia. However, appliance ownership rates are found to be high in Mexico and the Czech Republic and it is relevant to note that these two countries have the lowest internet penetration rates. For France the appliance ownership rates corroborate well.

There is insufficient data available to corroborate the organic food findings from the survey.

Water use corroborates well for consumption amount, water burden, price inelasticities and metering, though information is limited for the latter. Korea, where quality of tap water is of particular interest, satisfaction with tap water is well corroborated. Similarly, results for France on satisfaction with tap water are close to results from other sources. Canada provided information on water saving devices which also corroborated well with the survey data, specifically low flow shower heads and low volume or dual flush toilets.

The purpose of the survey was to improve knowledge on household environmental behaviour to aid policy development in the areas of household waste generation and recycling, transport choice, energy use, organic food consumption and water use. The wide scope of the survey provides a unique opportunity to

investigate multiple environmental concerns and their interrelationships across multiple household types and countries. The data has been analysed by specialist research teams using econometric models to explore residential behaviours, attitudes, response to environmental policy instruments (such as, taxes, pricing structures, regulation, labelling schemes and availability of environment related services) and any interrelationships at the household level. Given these aims, the data is sufficiently robust; however, special care needs to be taken with results from Mexico.

Appendices

APPENDIX ONE – SOCIO DEMOGRAPHIC VARIABLES

Table 1.1 Percentage of respondents who were the primary income earner in the household (excluding single adult, single parent and households with non-family members sharing accommodation)

	Yes	No	Don't know
Korea	38%	60%	2%
Australia	40%	57%	3%
Czech Republic	42%	54%	4%
Canada	44%	54%	2%
Mexico	46%	52%	2%
Sweden	49%	47%	4%
Italy	50%	48%	3%
Norway	51%	47%	2%
Netherlands	53%	46%	2%
France	55%	43%	1%
OECD(10)	47%	51%	2%

Table 1.2 Gender of respondents in OECD Survey 2008 (in percentages)

	Male	Female
Canada	49%	51%
Netherlands	47%	53%
France	50%	50%
Mexico	51%	49%
Italy	48%	52%
Czech Republic	49%	51%
Sweden	44%	56%
Norway	52%	48%
Australia	45%	55%
Korea	50%	51%
OECD(10)	48%	52%

Table 1.3 Income bands by country in percentages

Income band	AUS	CAN	CZR	FRA	ITA	KOR	MEX	NLD	NOR	SWE	OECD(10)
1	5%	6%	9%	7%	3%	8%	7%	17%	7%	13%	8%
2	8%	8%	4%	4%	8%	9%	11%	1%	8%	8%	7%
3	8%	8%	14%	10%	3%	7%	9%	19%	10%	14%	10%
4	8%	7%	10%	9%	6%	6%	6%	15%	12%	10%	9%
5	9%	10%	8%	9%	9%	7%	5%	16%	9%	14%	10%
6	6%	8%	10%	7%	10%	8%	4%	15%	9%	7%	8%
7	10%	8%	8%	9%	12%	6%	5%	6%	7%	4%	8%
8	10%	10%	8%	14%	10%	9%	6%	4%	5%	6%	8%
9	9%	10%	7%	12%	12%	9%	7%	3%	9%	6%	8%
10	9%	8%	12%	10%	13%	10%	13%	3%	7%	5%	9%
11	11%	11%	8%	9%	11%	12%	13%	2%	13%	8%	10%
12	7%	7%	3%	2%	4%	9%	15%	1%	4%	6%	6%

Table 1.4 Annual After-Tax Family Income in Canada (in percentages)

	OECD Survey ¹	Statistics Canada ²
Income Group 1	5.7	10.9
Income Group 2	22.3	27.0
Income Group 3	25.8	23.6
Income Group 4	20.3	16.0
Income Group 5	7.8	8.1
Income Group 6	18.1	14.6

Notes:

Group 1: (0 – 14800); Group 2: (14801 – 35200); Group 3: (35201 – 54700); Group 4: (54701 – 73500); Group 5: (73501 – 91700); Group 6: (more than 91700).

Group 1: (0 – 14999); Group 2: (15000 – 34999); Group 3: (35000 – 54999); Group 4: (55000 – 74999); Group 5: (75000 – 89999); Group 6: (90000 and over). Percentages computed based on figures in 2006 constant dollars.

Statistics Canada Source: CANSIM TABLE 2020601 – Distribution of after-tax income, by economic family type, 2006 constant dollars.

Group 1 – v1549271 and v1549272.

Group 2 – v1549273, v1549274, v1549275, and v1549276.

Group 3 – v1549277, v1549278, v1549279, v1549280.

Group 4 – v1549281, v1549282, v1549283, and v1549284.

Group 5 – v1549285, v1549286, and v1549287

Table 1.5 Educational Attainment by Gender in Canada (in percentages)

Level	OECD Survey		Statistics Canada	
	Female ¹	Male ²	Female ^{3,5}	Male ^{4,5}
a – No High School	5.74	5.76	19.40 (21.95)	19.07 (22.49)
b – High School Graduate	22.57	21.19	20.17 (20.12)	18.56 (19.31)
c – Post-Secondary Education	44.95	38.27	38.92 (38.65)	39.63 (38.63)
d – Bachelor's Degree	22.57	26.34	15.59 (14.16)	14.74 (12.85)

e – Above Bachelor's Degree	4.16	8.44	5.92 (5.11)	8.00 (6.72)
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Notes:

1. As a percentage of Canadian female respondents (February 2008).
2. As a percentage of Canadian male respondents (February 2008).
3. As a percentage of the female population (January 2007).
4. As a percentage of the male population (January 2007).
5. The first figure includes persons 15 years old and over; the second figure in brackets includes persons 25 years old and over.

Statistics Canada Source: CANSIM TABLE 2820004 – Labour force survey estimates (LFS), by educational attainment, sex and age groups.

- a – v2584192 (v2584012) and v2584193 (v2584013); v2583382 (v2583202) and v2583383 (v2583203).
b – v2584194 (v2584014); v2583384 (v2583204).
c – v2584195 (v2584015) and v2584196 (v2584016); v2583385 (v2583205) and v2583386 (v2583206).
d – v2584198 (v2584018); v2583388 (v2583208).
e – v2584199 (v2584019); v2583389 (v2583209)

Table 1.6 Age in Canada (in percentages)

Source – Variable	OECD Survey ¹	Statistics Canada ²		Statistics Canada ³	
		2007	2008	2007	2008
a – Age 18-24	12.96	9.59	9.63	12.16	12.16
b – Age 25-34	19.34	13.42	13.52	17.02	17.07
c – Age 35-44	22.53	15.07	14.63	19.11	18.48
d – Age 45-54	17.55	15.68	15.84	19.89	20.00
e – Age 55+	27.62	25.09	25.58	31.82	32.30

Notes:

1. As a percentage of Canadian households covered in the survey (2008 figures).
2. As a percentage of the population.
3. As a percentage of the population 18 and over.

Statistics Canada Source: CANSIM II.

- a – T510001-V466668/V466677/V466980
b – T510001-V466668/V466677/V466776/V466797
c – T510001-V466668/V466677/V466815/V466836
d – T510001-V466668/V466677/V466857/V466875
e – T510001-V466668/V466677/V466980/V466776/V466797/V466815/V466836/V466857/V466875

Note: The employment the categories are not exhaustive and the percentages have been adjusted so that a comparison can be made between the two sources.

Table 1.7 Household characteristics in Korea

	Korea	OECD survey –Korea
House type (total)	12,494,827(100%)	
- living in a apartment	6,626,957(53.04%)	62%
- Living in a house	5,867,870(46.96%)	38%
Living in a urban area		
Total Population (persons)	47,278,951	
Living in a urban area (persons)	42,458,580 (89.8%)	88%

Source: Korean Ministry of Environment, Volume-based waste fee system yearbook, 2007.

Table 1.8 Number of people per household in Australia (in percentages)

	OECD Survey	Australian Census 2006
One	14%	24%
Two	35%	34%
Three	19%	16%
Four	20%	16%
Five	8%	7%
Six or more	4%	3%

Table 1.9 Selected socio-economic comparisons for Australia – income, education, home ownership and type of dwelling

	OECD survey	ABS
Average household size (persons)	2.8	2.6
Average individual income (\$/weekly)	465	466
Median household income (\$/weekly)	998	1027
Percentage of highest level of education (%)		
Postgraduate degree	7	5
Bachelor degree	18	22
High school graduate	24	12
Post-secondary qualification	37	32
Percentage of owned dwelling (%)	58	65*
Percentage of type of dwelling (%)**		
Separate house	77	75
Semi-detached, row or terrace house, townhouse etc	5	9
Flat, unit or apartment	13	14
Other dwellings	6	2

Note: * Includes 33% who fully own dwellings and 32% currently being purchased.

** The OECD Survey's categories differ slightly, and use the following categories: an apartment building with less than 12 apartments in total, an apartment in a building with more than 12 apartments, a detached house, a semi-detached/terraced house and other. The census categories are shown in the table – the slight differences between the categories may account for some of the differences.

Sources: ABS – Australian Bureau of Statistic, 2006
OECD – This OECD survey

Table 1.10 Selected socio-economic data from Italy – number of people per household, education, employment and dwelling size

	OECD Survey	Italian Census 2001
Number of people per household %		
One	12	25
Two	23	27
Three	27	22
Four	24	19
Five	9	6
Six or more	5	2
Employment status		
Employed	64	46
Unemployed	2	3
Not in labour force	33	51
Highest educational level %		
Bachelor degree or higher %	30	10
Size of dwelling %		
Less than 50 m ²	7	7
50 m ² to 100 m ²	41	53
101 m ² to 150 m ²	33	29
More than 150 m ²	19	10

Table 1.11 Characteristics of the Czech sample and population

Variable	N	Mean	Std Dev	CSO 2007	SILC_2006	SRU_2007	Notes
Sociodemographics							
Male	701	0.491	0.500	0.484			
Age	701	39.506	13.349	40.3			
Age 18-24		0.170		0.113			to date 31 Dec 2007
Age 25-34		0.234		0.204			to date 31 Dec 2007
Age 35-44		0.176		0.171			to date 31 Dec 2007
Age 45-55		0.285		0.163			to date 31 Dec 2007
Age 55+		0.136		0.348			to date 31 Dec 2007
Adults	701	2.295	1.027		1.94	1.72	
Children	701	1.728	0.920		0.40-0.58	0.36-0.58	up to 15 - up to 25 dependent
Children 5	701	0.688	0.851		0.140	0.14	
Elementary	701	0.332	0.471		0.642		
Highschool (A)	701	0.472			0.256		
College	701	0.054			0.018		
Bachelor	701	0.030	0.171				
Master	701	0.097	0.296				
University	701	0.127	0.333		0.100		
Income, mil.CZK	636	0.303	0.162		0.277	0.29	
Characteristics of place							
Flatowner	701	0.658	0.475		0.587	0.62	
Detached + terraced	701	0.434			0.431	0.45	
Terraced	701	0.074	0.262				
Rooms	701	4.003	1.803			3.10	
1		0.034			0.084		
2		0.137			0.280		
3		0.277			0.370		
4		0.263			0.163		
5+		0.290			0.103		
Areaflat	669					52.70	
Up 50m2		0.166			0.086		
50 to 100 m2		0.544			0.710		
Above 100m2		0.290			0.204		
Hamlet	701	0.010	0.099			0.32*	villages
Village	701	0.248	0.432				
Suburb	701	0.245	0.431			0.68*	towns+cities
City	701	0.496	0.500				
Built_5	701	0.049	0.215		0.172	0.02*	SILC 2006: less than 7years; note SRU 2006-micro: less than 6 years
Built 5_15	701	0.078	0.269		0.230	0.09*	note SILC 2006: 8 to 17 years; note SRU 2006-micro: 7 to 16 years
Built 16_30	701	0.325	0.469		0.203	0.16*	note SILC 2006: 18 to 27 years; note SRU 2006-micro: 17 to 26 years
Built 31_50	701	0.210	0.407		0.294	0.40*	note SILC 2006: 28 to 47 years; note SRU 2006-micro: 27 to 46 years
Built 51_80	701	0.153	0.360				
Built 80_	701	0.161	0.368		0.101	0.34*	more than 48 years; note SRU 2006: more than 47 ys

Note: * Based on micro data of SRU 2006 (Household Budget Survey)

Table 1.12 Age and gender in Czech regions – sample and population

	N	Rel. size		Average age		Males	
		OECD survey	Popul_CS0	Age_OECD	Age_CS0	Male_OECD	Male_CS0
CZ	701			39.5	40.3	49%	48%
Prague	81	12%	12%	42.8	41.7	52%	48%
Central	82	12%	12%	35.6	40.0**	48%	49%
SW	78	11%	12%	45.8	40.5**	58%	49%
NW	80	11%	11%	40.9	39.5	41%	49%
NE	107	15%	14%	42.4	40.3	49%	48%
SE	53	8%	16%	40.9	40.4	51%	48%
Moravia	131	19%	12%	31.3	40.3**	43%	48%
Mor-Silezia	89	13%	12%	41.0	39.9	56%	48%

APPENDIX TWO - WASTE

Table 2.1: Access to and Use of Recycling Programs in Canada by Province (in percentages)

Province	OECD Survey		Statistics Canada	
	Access ^{1,3}	Use ⁴	Access ^{2,3}	Use ⁴
Alberta	98	95	89	96
British Columbia	100	98	94	99
Manitoba	92	97	90	88
New Brunswick	100	91	86	96
Newfoundland	100	91	87	94
Nova Scotia	100	97	97	99
Ontario	99	98	95	98
Prince Edward Island	100	75	99	99
Quebec	99	98	91	95
Saskatchewan	100	97	91	96
Canada	99	89	93	97

Notes:

1. As a percentage of Canadian households covered in the survey (2008 figures).
2. As a percentage of all households (2006 figures).
3. Includes any recycling program (glass, paper, plastics, and metal cans for Statistics Canada survey or aluminium for OECD survey).
4. As a percentage of households reporting having access to any recycling program (glass, paper, plastics, and metal cans or aluminium).

Statistics Canada Source: Households and the Environment Survey, 2006.

Table 2.2: Access to and Use of Recycling Programs in Canada for GLASS by Province (in percentages)

Province ⁴	OECD Survey		Statistics Canada	
	Access ¹	Use ³	Access ²	Use ³
Alberta (91)	95	92	84	92
British Columbia (132)	97	95	89	96
Manitoba (37)	92	97	85	84
New Brunswick (24)	79	89	69	92
Newfoundland (11)	100	82	75	92
Nova Scotia (31)	97	93	94	97
Ontario (398)	95	95	93	97
Prince Edward Island (4)	100	75	96	98
Quebec (241)	97	94	86	93
Saskatchewan (34)	94	94	81	92
Canada (1003)	95	94	88	94

Notes:

1. As a percentage of Canadian households covered in the survey (2008 figures).
2. As a percentage of all households (2006 figures).

3. As a percentage of households reporting having access to a recycling program.

4. Number of households covered by the OECD survey is given in brackets.

Statistics Canada Source: Households and the Environment Survey, 2006.

Table 2.3: Access to and Use of Recycling Programs in Canada for PLASTICS by Province (in percentages)

Province ⁴	OECD Survey		Statistics Canada	
	Access ¹	Use ³	Access ²	Use ³
Alberta (91)	93	86	77	89
British Columbia (132)	97	98	88	96
Manitoba (37)	92	91	84	86
New Brunswick (24)	92	91	69	93
Newfoundland (11)	100	82	72	92
Nova Scotia (31)	94	100	93	98
Ontario (398)	94	95	92	97
Prince Edward Island (4)	75	67	99	99
Quebec (241)	95	97	87	94
Saskatchewan (34)	91	97	77	91
Canada (1003)	95	95	87	95

Notes:

1. As a percentage of Canadian households covered in the survey (2008 figures).

2. As a percentage of all households (2006 figures).

3. As a percentage of households reporting having access to a recycling program.

4. Number of households covered by the OECD survey is given in brackets.

Statistics Canada Source: Households and the Environment Survey, 2006.

APPENDIX THREE - TRANSPORT

Table 3.1 Mean number of cars per household member

Country	Mean per capita OECD Survey	St. Dev.	Observations	IRF Passenger cars per capita
Australia	0.731	0.264	986	0.542 (2005)
Canada	0.711	0.267	984	0.561 (2003)
Czech Rep	0.598	0.264	694	0.358 (2002)
France	0.756	0.278	1055	0.494 (2005)
Italy	0.715	0.249	1397	0.595 (2005)
Korea	0.489	0.2	963	0.230 (2005)
Mexico	0.59	0.303	969	0.137 (2005)
Netherlands	0.656	0.265	1010	0.424 (2002)
Norway	0.733	0.304	985	0.439 (2005)
Sweden	0.654	0.308	987	0.460 (2005)

Source of data: IRF World road Statistics 2007 Database

Table 3.2 Motor Vehicles in Canada by Province (in percentages)

Province	OECD Survey			Statistics Canada				
	Owner ¹	Number of Motor Vehicles ³			Owner ²	Number of Motor Vehicles ⁴		
		1	2	3 or more		1	2	3 or more
Alberta	92	46	35	19	87	41	42	18
British Columbia	87	46	37	17	83	48	38	14
Manitoba	95	43	40	17	81	46	39	15
New Brunswick	88	43	33	24	85	53	37	10
Newfoundland	91	50	40	10	82	59	35	6
Nova Scotia	90	57	32	11	83	54	36	10
Ontario	84	43	44	14	82	48	41	12
Prince Edward Island	100	75	25	0	89	46	40	14
Quebec	83	56	38	7	81	57	36	8
Saskatchewan	94	25	56	19	87	40	42	18
Canada	86	47	40	14	83	49	39	12

Notes:

1. Households with at least one motor vehicle as a percentage of households covered in the survey (2008 figures).
2. Households with at least one motor vehicle per personal use as a percentage of all households (2006 figures).
3. As a percentage of households with at least one motor vehicle.
4. As a percentage of households with at least one motor vehicle per personal use.

Statistics Canada Source: Households and the Environment Survey, 2006.

Table 3.3 Number of motor vehicles (excluding motorcycles/scooters) per dwelling for Australia (in percentages)

	OECD Survey	ABS 2006 Census
None	7.1%	9.8%
1 motor vehicle	40.8%	37.8%
2 motor vehicles	39.6%	36.8%
3 motor vehicles	8.5%	10.7%
4 or more motor vehicles	4.2%	4.8%

Notes:

1. Australian Bureau of Statistics 2006 Census of Population and housing

Table 3.4 Mode of Transportation to Commute to Work and Length of Commute in Canada by Province (in percentages)

Province	OECD Survey				Statistics Canada			
	Car		Public Transit		Car		Public Transit	
	Use ¹	Time ³	Use ²	Time ⁴	Use ¹	Time ⁵	Use ²	Time ⁶
Alberta	82	25	14	78	79	23	10	59
British Columbia	73	21	20	53	75	25	10	67
Manitoba	73	26	19	40	78	18	9	53
New Brunswick	80	8	20	0	87	11	N/A	N/A
Newfoundland	57	0	0	0	84	14	N/A	N/A
Nova Scotia	71	13	24	60	83	16	5	58
Ontario	73	27	20	56	76	27	13	66
Prince Edward Island	100	0	0	0	88	17	N/A	N/A
Quebec	67	30	26	71	76	22	11	63
Saskatchewan	96	4	4	0	81	13	2	N/A
Canada	73	24	20	60	77	24	11	64

Notes:

1. Persons who travelled to work by car as a percentage of all persons who commuted to and from work.
2. Persons who travelled to work by public transit as a percentage of all persons who commuted to and from work.
3. Persons for whom it took more than 30 minutes to get to work (one way) as a percentage of all persons who travelled by car.
4. Persons for whom it took more than 30 minutes to get to work (one way) as a percentage of all persons who travelled by public transit.
5. Persons for whom it took 30 minutes or more to get to work (one way) as a percentage of all persons who travelled by car.
6. Persons for whom it took 30 minutes or more to get to work (one way) as a percentage of all persons who travelled by public transit.

Statistics Canada Source: Households and the Environment Survey, 2006.

Table 3.5 Commuting to work in Australia (for respondents using only one mode of transport) (in percentages)

	OECD Survey	ABS 2006 Census
Walking	6.9%	5.1%
Car	80.3%	81.9%
Public Transport	11.0%	8.6%
Bike	1.0%	1.2%
Motorcycle	0.9%	0.8%

Notes:

1. Australian Bureau of Statistics 2006 Census of Population and housing

2. In the OECD survey 70% of respondents used one method to get to work compared to 80% in the Australian Census. The Australian census data covers employed persons 15 years and over, while the OECD data contains unemployed people and does not include those under 18.

APPENDIX FOUR - ENERGY

Table 4.1 Sources of energy in dwellings in Australia (proportion of households %)

	OECD Survey	Australian comparison ¹
Mains electricity	98.7	99.9
Mains gas	50.3 ²	47.4
LPG/bottled gas	-	13.5
Wood	12.0	13.5
Solar	9.1 ³	7.6
Oil	1.1	0.7
Other	-	0.2

- Notes:
1. ABARE (2008) Energy in Australia 2008. Australian energy consumption by fuel, 2005 - 06
 2. The OECD 2008 survey collected the proportion of households with natural gas, whereas the Australian comparison data collected mains gas and LPG/bottled gas separately.
 3. The OECD 2008 did not include solar energy in the question 64 which collected sources of energy in dwellings, however it did ask in question 73 whether respondents already had or had installed renewable energy (e.g. solar panels and wind turbines) in the last 10 years. Thus the OECD solar figure will include some households who have wind turbines.

Table 4.2 Proportion of households with appliances in Australia (in percentages)

	OECD Survey	Australian Bureau of Statistics
dishwasher	44.4	45.1
clothes washers / clothes dryers	90.0	96.7
clothes dryers	56.5	55.6
fridges/fridge-freezers	98.9	99.8
separate freezers	43.1	36.9
ovens	94.3	
microwaves	93.4	91.7
electric water heating boiler	51.3	
TV	98.6	99.2
set top boxes	39.1	
computers	96.9	
air conditioners	66.9	66.8

- Notes:
1. Source – Australian Bureau of Statistics (2008) Environmental Issues: Energy use and conservation, Mar 2008.
 2. The ABS data collects desk top computers and lap top computer separately, with 59.7% and 38.1% of households having these appliances respectively.

Table 4.3 Energy-Saving Devices in Canada by Province (in percentages)

	OECD Survey	Statistics Canada
	Light Bulbs ^{1,3}	Light Bulbs ^{2,3}
Alberta	79	56
British Columbia	79	63
Manitoba	84	48
New Brunswick	88	57
Newfoundland	91	51
Nova Scotia	90	59
Ontario	86	60
Prince Edward Island	100	59
Quebec	83	46
Saskatchewan	79	50
Canada	84	56

Notes:

1. As a percentage of Canadian households covered in the survey (2008 figures).
2. As a percentage of all households (2006 figures).
3. Compact fluorescent light bulbs.

Statistics Canada Source: Households and the Environment Survey, 2006.

Table 4.4 Energy characteristics of the Czech sample and population

Variable	N	Mean	Std Dev	SILC_2006	SRU_2007	Notes
Energies						
En_electricity	701	0.944	0.229		0.987** 0.693**	
En_gas	701	0.623	0.485		0.700** (06)	natural gas supply facility
En_oil	701	0.010	0.099		0.035**	
En_wood	701	0.238	0.426			
En_coal	701	0.137	0.344		0.267 (06)	
En_central	701	0.437	0.496		0.43 0.422 (06)	
En_other	701	0.010	0.099			
Combinations of energy						
Gas		0.270	0.444		0.3586** (06)	
Electra		0.083	0.278		0.0403* (06)*	
Central		0.118	0.327		0.1022** (06)	
Blockflats		0.237	0.438		0.2974* (06)*	
Appliances						
Washer	701	0.281	0.450		0.198**	
Washingm	701	0.967	0.178	0.955	0.934**	
Dryer	701	0.029	0.167		0.02	
Fridge	701	0.990	0.099		1.06	
Freezer	701	0.311	0.463		0.965**	
Oven	701	0.763	0.425			
Microwave	701	0.880	0.325		0.756**	
Heater	701	0.445	0.497			
TV	701	0.969	0.174	0.976**	1.295**	
_count		1.800		1.281		
Settop	701	0.241	0.428		0.22	cable TV
PC	701	0.964	0.186	0.465**	0.556**	
AC	701	0.026	0.158			

Note: (06) based on micro data SRU 2006.

APPENDIX FIVE – ORGANIC FOOD

Table 5.1 Domestic consumption of organic food (2008): % on total value of organic food for Italy

	OECD Survey	Italian 2008
Dairy products	20%	20%
Fresh fruit and veg	26%	20%
Bread, pasta and rice	22%	8%
Eggs	29%	8%

Note: For the OECD survey, respondents were asked to estimate their average weekly spend on *Fresh fruit and vegetables, Milk and other dairy products, Eggs, Meat and poultry, and Bread, pasta, rice and cereal*. For each of these food groups, they were then asked what proportion of expenditure that they spent on organic produce: 0%, 1-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-99%, 100%, *Consume organic products but % unknown, Don't know if consume organic products or not*. The mid points have been taken for each of these organic proportions and then averaged. Households unsure if they consume organic products or unsure of the amount have been removed from the calculation.

Source for the Italian data comes from ISMEA/Nielsen panel, 9000 households, domestic consumption, non-specialized distribution (organic shops excluded).

APPENDIX SIX - WATER

Table 6.1 Water-Saving in Canada by Province (in percentages)

	OECD Survey		Statistics Canada	
	Shower ^{1,3}	Toilet ^{1,4}	Shower ^{2,3}	Toilet ^{2,4}
Alberta	48	36	48	39
British Columbia	52	31	51	33
Manitoba	49	43	46	34
New Brunswick	67	46	53	28
Newfoundland	45	27	56	27
Nova Scotia	65	39	53	30
Ontario	57	45	57	40
Prince Edward Island	50	75	54	26
Quebec	63	37	56	27
Saskatchewan	29	29	35	32
Canada	56	40	54	34

Notes:

1. As a percentage of Canadian households covered in the survey (2008 figures).
2. As a percentage of all households (2006 figures).
3. Low flow shower heads.
4. Low volume or dual flush toilets.

Statistics Canada Source: Households and the Environment Survey, 2006.

Table 6.2 Comparison of average water consumption per head per day

Estimate of per capita household water consumption
Litres per head per day (lhd)

	1975	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	2004	2008	OECD 2008
														Median
AUS	256	285								268		236 ^a	230 ^b	192
CAN	255				350					326				263
CZR	138	157	165			137			121		113			103
FRA											137			110
ITA		211					251		249		213		195 ^b	205
KOR	62	69	103		160	164	169	181	175	181	183			186
MEX														182
NLD			122	130	128	129	125	128	129	130			130 ^b	137
NOR		154	175								140		190 ^b	151
SWE	207	196	195	197	195	201	203	199	191				180 ^b	137

Source:

Data 1970 - 1997: The Price of Water - Trends in OECD Countries, OECD (1999b), p.19;

Data 2004, 2006: Calculated from International Statistics for Water Services, IWA (2008), p.10 and Productivity Commission 2008 (p. 23, using data for Sydney and assuming 4 person household);

OECD 2008 is from this survey.

Table 6.3 Comparison of average water prices (US\$/kL)

Country	OECD Estimates (2009) ¹		IWA (2008)	OECD 2008 survey
	Year measure	US\$/kL	US\$/kL	US\$/kL
Australia	2007 WAV(250)	1.15	1.15	0.709
Canada	2004 WAV(300):70%	0.52		1.199
Czech Republic	2007 AV	1.31		1.580
France	2005 WAV(120)	1.86	1.90	3.735
Italy	2007 (a)	0.82		0.922
Korea	2006 AV	0.61		0.320
Mexico				0.422
Netherlands	2007WAV(55%)	2.29	1.65	2.064
Norway			1.00	2.241
Sweden			1.00	2.736

Notes:

1. Source: OECD's Water Pricing Report forthcoming in late 2009 NOT TO BE QUOTED. Based on official OECD USD exchange rates with reference to the year of the data point. The exchange rates applied to each source will differ and this will affect comparisons.
2. Notes for OECD estimates measure:
 - a. (a) not specified,
 - b. AV Average price of water across all utilities and households = Total revenue from household/Total m3 sold
 - c. WAV(x):P Weighted averages of volumetric rates, with an assumed average household consumption of x m3/year. And (where available) utilities in the sample covering P% of the population.
3. IWA (2008, p. 9) represents average specific water consumption of considered main cities in the specified country in 2007.
4. Blank cells indicate data not available from the given source.

Table 6.3 Comparison of average water prices (US\$/kL)

Country				
	Data from OECD (1999b) ¹		IWA (2008)	OECD 2008 survey
	year	US\$/kL	US\$/kL	US\$/kL
Australia	1997	0.756 *	1.15	0.709
Canada	1994	n.a.		1.199
Czech Republic	1997	0.384		1.580
France	1996	1.584	1.90	3.735
Italy	1996	0.502		0.922
Korea	1996	0.235		0.320
Mexico				0.422
Netherlands	1998	1.41	1.65	2.064
Norway			1.00	2.241
Sweden	1998	1.043	1.00	2.736

Notes:

5. In OECD (1999b, p. 79) data, the prices we use for comparison is in the *PWS* (Public Water Supply) column. Although not clearly stated the prices appear to include a fixed element and, thus, are treated as the equivalent volumetric price (per kL) of water consumption for all households facing water charges (not only the set of households facing unit charges).
6. The prices in OECD (1999b) data are measured in US\$ of the year of study, so to calculate the change in water price, we change the unit of our results above into US\$/kL (using IMF exchange rate 16 Jan 2008: 1.4792 US\$ = 1 EURO, *source: imf.org*).
7. Explanation of the calculation for OECD (1999b): In case of Australia, water price per kL = 0.95 A\$, sewage treatment cost per kL = 1.11 A\$, so the total cost per kL of water consumption is 2.06 A\$, which is equivalent to 1.64 US\$. Thus, the price per kL of household water consumption (without sewage treatment cost) in US\$ is: $(0.95 / 2.06) * 1.64 = 0.756$ (US\$/kL).
8. IWA (2008, p. 9) represents average specific water consumption of considered main cities in the specified country in 2007.
9. Blank cells indicate data not available from the given source.

Table 6.4 Comparison of the burden of water charges as a percentage of income or expenditures

Country	OECD (^a = 1999a; ^b = 2003)			Productivity Commission (2008, p. 21) ¹	OECD 2008 survey
	year	denominator	%	%	%
	Australia	1996	income	0.79 ^a	0.65
Canada	1996	income	1.05 ^a		0.74
Czech Republic	1996	income	2.2 ^a		1.91
France	1995	income	0.9 ^b		1.01
Italy	1997	expenditures	0.7 ^b		0.90
Korea	1997-98	expenditures	0.6 ^b		0.46
Mexico	2000	income	1.3 ^b		1.42
Netherlands	1999	income	0.6 ^b		0.75
Norway	1996	income	0.45 ^a		0.50
Sweden	1996	income	0.59 ^a		0.98

Notes:

1. Based on New South Wales and as a percentage of total expenditure on goods and services in 2003-2004.
2. OECD (1999a) data refers public water supply and is obtained from Table 22.
3. OECD (2003) data refers to public water supply and is obtained from Table 2.2.
4. Blank cells indicate data not available.

Table 6.5 Comparison of the proportion of single dwelling houses with water meters

	OECD 2008 survey	Other surveys	
	Having water meters (% of h/holds in single dwellings)	Having water meters (% of total population)	Year
OECD (10)	66.74	-	-
Australia	84.67	95-100	1998 ^a
Canada	50.65	55	2006 ^b
Czech Republic	79.59	100	1998 ^a
France	96.03	100	2006 ^b
Italy	92.29	90-100	2006 ^b
Korea	83.38	100	1998 ^a
Mexico	77.45	58 ¹	2005 ^b
Netherlands	92.29	93	1997 ^a
Norway	21.10	10-15 ²	1998 ^a
Sweden	64.95	100	2006 ^b

Notes:

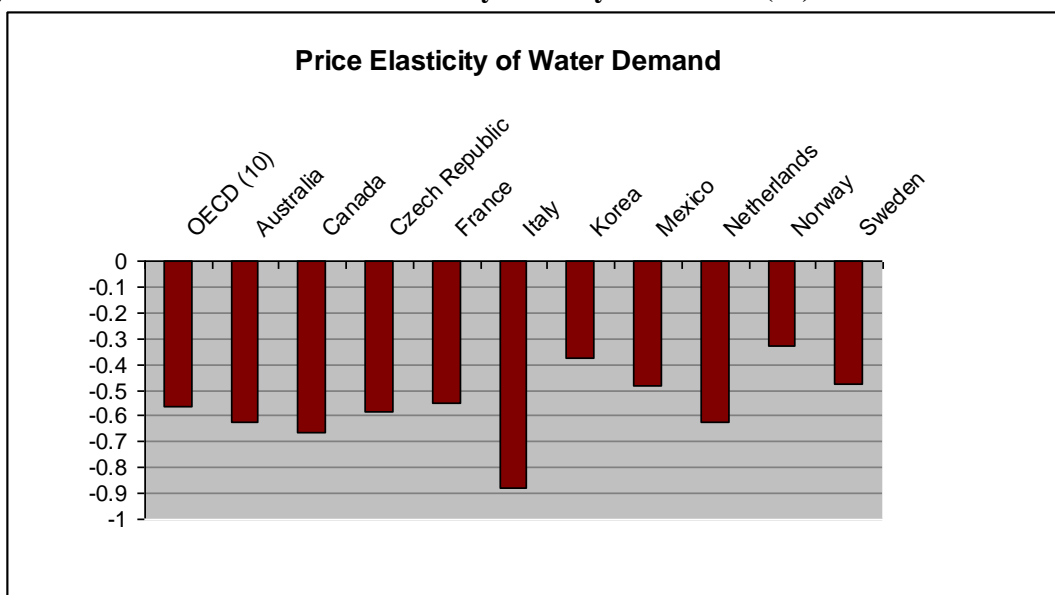
^a OECD (1999b).

^b ABS Energy Research (2006). World Water Meter Report, Volume 5. ABS Energy Research, London.

1. There were 58 per cent of Mexican households were connected to water meters in 2005. The remainder or 42% of households either do not have a piped service or are on fixed rates.

2. There was 'low' percentage of single family houses had water meters. Overall, 10-15 percent of Norway households were connected to water meters in 1998.

Figure 6.1- Price Elasticities of Demand by Country and OECD (10)



APPENDIX SEVEN – MISCELLANEOUS

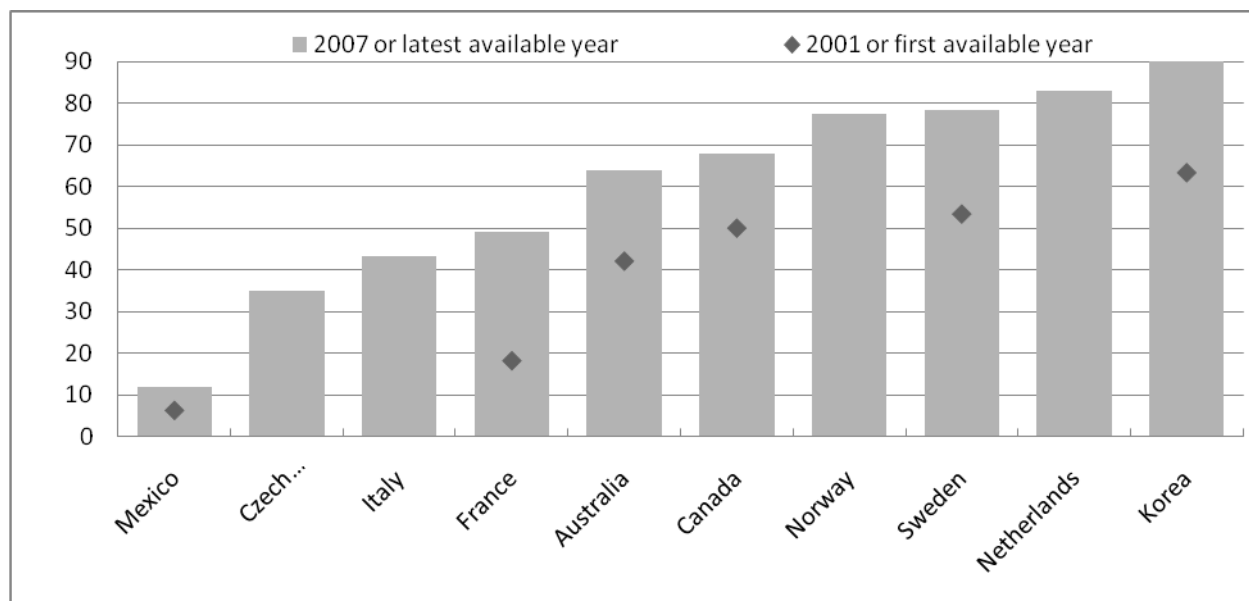
Table 7.1 Survey Regions by country

Australia	Mexico	Korea	Czech Republic	Netherlands
ACT	Distrito Federal	Seoul	Severozápadní Čechy	Drie grote steden en bijbehorende agglomeraties (Rotterdam, Amsterdam en Den Haag) Rest West Nederland (Z-Holland, N-Holland en Utrecht) Noord Nederland (Friesland, Drenthe, Groningen) Oost Nederland (Overijssel, Gelderland, Flevoland) Zuid Nederland (N-Brabant, Z-Limburg, Zeeland)
NSW	México	Gyeonggi	Praha	
NT	Nuevo León	Gangwon	Střední Čechy	
QLD	Jalisco	Chungcheong	Jihozápadní Čechy	
SA	Veracruz	Gyeongsang	Severovýchodní Čechy	
TAS	Puebla	Jeonra	Jihovýchodní Čechy	
VIC	Guanajuato	Jeju	Morava	
WA	Otros		Moravsko-Slezsko	

Canada	Italy	Sweden	France	Norway
Alberta	Abruzzo	Blekinge	Alsace	Oslo og Akershus
British Columbia	Basilicata	Dalarna	Aquitaine	Hedmark og Oppland
Manitoba	Calabria	Gävleborg	Auvergne	Sør-Østlandet
New Brunswick	Campania	Gotland	Basse-Normandie	Agder og Rogaland
Newfoundland	Emilia Romagna	Halland	Bourgogne	Vestlandet
Nova Scotia	Friuli Venezia Giulia	Jämtland	Bretagne	Trøndelag
Ontario	Lazio	Jönköping	Centre	Nord-Norge
Prince Edward Island	Liguria	Kalmar	Champagne-Ardenne	
Quebec	Lombardia	Kronoberg	Corse	
Saskatchewan	Marche	Norrbotten	Franche-Comté	
	Molise	Örebro	Haute-Normandie	
	Piemonte	Östergötland	Île-de-France	
	Puglia	Skåne	Languedoc-Roussillon	
	Sardegna	Södermanland	Limousin	
	Sicilia	Stockholm	Lorraine	
	Toscana	Uppsala	Midi-Pyrénées	
	Trentino Alto Adige	Värmland	Nord-Pas-de-Calais	
	Umbria	Västerbotten	Pays de la Loire	
	Valle d'Aosta	Västernorrland	Picardie	
	Veneto	Västmanland	Poitou-Charentes	
		Västra Götaland	Provence-Alpes-Côte d'Azur	
			Rhône-Alpes	

Note: For Canada, Australia, the Netherlands, Mexico, Korea, Norway and the Czech Republic the sample stratification used the same regions as that collected in the survey. For France, Italy and Sweden fewer regions are used to stratify the sample than found in survey. For France the stratification regions used were Ile de France, North East, North West, Centre and South. For Italy the four stratification regions were North-West, North-East, Centre and South. For Sweden there were six stratification regions: North, Middle, East, West, South-East and South.

Figure 7.1 Households with access to the internet (as a percentage of all households)



Source: OECD Science and technology - Information and Communications Technology (ICT) - Computer and internet access by households

Box 7.1 Research Teams

The project is coordinated by the OECD Environment Directorate, with research teams with extensive experience based in selected participating countries. These include:

- **Catholic University, Piacenza – Italy:**
Stefano BOCCALETTI (research team leader) – *Organic Food*
- **Charles University in Prague – Czech Republic:**
Milan SCASNÝ (research team leader) – *Energy Efficiency*
- **Korean Environment Institute (KEI) – Korea:**
Kwang-yim KIM (research team leader) – *Waste Generation*
- **SLU University – Sweden:**
Bengt KRISTRÖM (research team leader) – *Renewable Energy*
- **Statistics Norway - Norway:**
Bente HALVORSEN (research team leader) – *Gender Issues*
- **The Australian National University – Australia:**
Quentin GRAFTON (research team leader) – *Water Consumption*
- **Universidad Iberoamericana – Mexico:**
Alejandro GUEVARA-SANGINES (research team leader) - *Transport*

• **University Panthéon-Sorbonne and INRA – France:**
Katrin MILLOCK and Céline NAUGES (research team leaders) – *Water Conservation and Water Quality*

• **York University – Canada:**
Ida FERRARA (research team leader) – *Waste Recycling and Waste Prevention*