



Contract No. FP6-2002-SSP-1/502481

**HEATCO**  
**Developing Harmonised European**  
**Approaches for**  
**Transport Costing and Project Assessment**

**Deliverable four**

**Economic values for key impacts valued in the**  
**Stated Preference surveys**

Lead contractor for this deliverable: SWECO Grøner - Norway  
European Commission EC-DG TREN

Submission date: 20 February 2006

Start date of project: 29 February 2004  
Duration: 27 months

# Economic values for key impacts valued in the Stated Preference surveys

Authors: Ståle Navrud, Yngve Trædal, Alistair Hunt, Alberto Longo, Alexander  
Greßmann, Carmelo Leon, Raquel Espino Espino,  
Rita Markovits-Somogyi and Ferenc Meszaros

## Table of contents:

<b>1.0 Policy makers summary .....</b>	<b>3</b>
1.1 Introduction.....	3
1.2 Aim and description of surveys .....	3
1.3 Road noise annoyance .....	4
1.4 Rail noise annoyance .....	5
1.5 Aircraft noise annoyance .....	6
1.6 Value of Travel Time Savings (VTTS).....	6
1.7 Conclusion .....	7
<b>2.0 Introduction .....</b>	<b>10</b>
<b>3.0 Selection of topics for valuation survey .....</b>	<b>11</b>
<b>4.0 Selection of Valuation Methods.....</b>	<b>13</b>
4.1 Damage Function Approach (DFA) applied to noise annoyance.....	14
<b>5.0 Construction of stated preference survey.....</b>	<b>15</b>
5.1 Focus groups .....	16
5.2 Pre-test of final questionnaire .....	19
5.3 Sampling procedure .....	20
5.4 Aircraft noise study.....	22
<b>6.0 Description of individual country samples .....</b>	<b>23</b>
<b>7.0 Results and discussion .....</b>	<b>25</b>
7.1 Econometric modelling of the WTP responses.....	25
7.2 Road noise .....	26
7.2.1 Descriptive statistics .....	26
7.2.2 Mean WTP for elimination of road noise annoyance from current levels .....	30
7.2.3 Components of WTP and internal validity of the responses .....	31
7.2.4 Pooled Analysis .....	34
7.2.5. Conclusions.....	36
7.3 Rail Noise .....	37
7.3.1 Descriptive statistics .....	37
7.3.2 Mean WTP for elimination of rail noise annoyance from current levels .....	40
7.3.3 Pooled Analysis .....	41
7.3.4 Conclusions.....	42
7.4 Value of Travel Time Savings (VTTS).....	43
7.4.1 Descriptive statistics .....	43
7.4.2 Pooled Analysis .....	46
7.4.3 Conclusions.....	47
7.5 Aircraft noise .....	48
7.5.1 Descriptive statistics .....	48
7.5.2 Statistical analysis.....	50
<b>8.0 Comparison with previous studies .....</b>	<b>53</b>
8.1 Road noise .....	53
8.2 Rail noise .....	53
8.3 Aircraft noise .....	54
8.4 Value of Travel Time Savings (VTTS).....	55
<b>9.0 Conclusions and recommendations.....</b>	<b>58</b>
<b>REFERENCES .....</b>	<b>60</b>

## **1.0 Policy makers summary**

### **1.1 Introduction**

Transport projects cause external costs and benefits in terms of changes in e.g. accident risks, travel time-savings, noise, vibration, and emissions to air. When national projects and international projects within the Trans-European transport network (TEN-T) are subjected to cost-benefit analysis (CBA), we need to establish a set of national and EU unit values for these external effects. CBA compares the social costs and benefits of projects by aggregating them on a common monetary scale (euros). Thus, we need, to the extent possible, to establish economic values for each type of costs and benefits. While market prices can be used to value impacts like fuel savings of road projects and construction and maintenance costs of new railways, the external effects often involve impacts on public goods, which are not traded in a market. Thus, these external effects lack market prices, and we need to use other techniques to find unit values for the effects.

There are two main types of techniques for valuing public goods: revealed preference (RP) and stated preference (SP) techniques. Both sets of techniques use individuals' willingness-to-pay (WTP) to estimate the economic value of public goods (and bads) like air quality and noise. SP techniques ask individuals directly for their WTP to get an improvement or avoid a decrement in the quality or quantity of the public good; e.g. asking for individuals' WTP to eliminate noise annoyance from road traffic in a Contingent Valuation (CV) survey, or asking individuals in a Choice Experiment (CE) to choose between different road options with different travel time, accident risk and costs.. RP techniques are based on individuals' actual, rather than hypothetical, behaviour; in a market related to the public good. This includes deriving their implicit WTP for all characteristics of a house, including public goods characteristics like noise level, by studying how house prices vary with levels of these characteristics in a Hedonic Price (HP) study. Even though, from HP studies, we can derive an actual rather than hypothetical value for e.g. road noise, in terms of the percentage increase in property value caused by a decreased decibel level, noise is very often an indicator for many external effects of roads in this measure. Thus, it is often very difficult in HP studies to isolate the value of noise from other external effects, and one runs the risk of double-counting in a CBA if e.g. the noise value is taken as an estimate of noise annoyance only.

### **1.2 Aim and description of surveys**

The main goal for the work of Work Package (WP) 5 of the HEATCO Project is to find new economic unit values for the external effects considered most important in CBAs of transport projects, and for which we currently lack reliable economic estimates. Such new unit values will increase the reliability of CBAs of transport projects. Based on a review of the existing literature on economic valuation of externalities from transport, inputs from other WPs in HEATCO and a list of criteria, we selected noise and travel time-savings as effects where improved economic unit values were needed.

Weighing up the strengths and weaknesses of SP and RP techniques, we proceeded to construct a CV survey for eliciting economic values for road and rail noise annoyance and the value of travel time savings (VTTS). The same survey was conducted

simultaneously in six countries, in order to reflect the diversity in income and culture in Europe. The six countries were: Germany, Hungary, Norway, Spain, Sweden and the UK..

During the last half of 2005 a total of about 5500 respondents in Germany, Hungary, Norway, Spain, Sweden and the UK were interviewed in-person about their annoyance from noise and their willingness-to-pay (WTP) to eliminate their noise annoyance from road and rail, and their WTP for travel time savings when commuting to work. Note that only road noise annoyance was valued in the Swedish survey, which was an add-on to this project. For Hungary, a similar CV study of aircraft noise was also performed.

The respondents asked to value road and rail annoyance were interviewed at home and were selected as far as possible on the basis of ambient noise levels at home, as described by noise databases and noise maps, whereas for the time valuation a random sample of respondents was added. For all externalities valued here, we omit protest zero WTP responses, since the respondents might have a positive WTP but state zero WTP in order to protest against the Contingent Valuation (CV) scenario. If we had included these responses, our WTP values would have been biased downwards. All values are expressed in 2005-euros (converted from other currencies using Purchase Power Parity (PPP) corrected exchange rates).

### **1.3 Road noise annoyance**

For both road and rail noise, we first ask how annoyed by noise the respondent is on a 5-level ISO standard scale from “not annoyed” to “extremely annoyed”. Then we ask for their personal WTP over the next five years to a special state fund earmarked for this purpose, to remove *their* annoyance when they are at home. In this way we try to get unit values for each annoyance level, which can be combined with predictions of the changing number of individuals annoyed at the different levels as a result of a given transport infrastructure project. This number must be estimated from exposure-response functions (ERFs) between changing noise levels resulting from the project and the ISO standard on noise annoyance. The main results from the pooled analysis of the 6-country survey in terms of WTP for road noise annoyance elimination are summarized in table 1.2.

Table 1.1 shows the pooled results for all six countries for each annoyance level and separate for urban and rural households. Here we see a clear pattern of increased WTP with increased annoyance level when moving from “not annoyed” to “slightly annoyed”, and on to “moderately annoyed”. However, for the overall sample there is no significant difference in WTP between the three highest annoyance levels (i.e. moderately, very and extremely annoyed). This could be explained by the fact that people with lower income, and thus lower ability to pay, often live in areas with high road traffic noise levels, since the houses in these areas are cheaper. Therefore, we suggest using the same value, i.e. 85 euros for the three highest noise annoyance levels. Note also that there is no significant difference in WTP to avoid noise annoyance in rural versus urban areas. Thus, the same values should be used when valuing reduced road noise annoyance in rural and urban areas.

**Table 1.1. Mean WTP per person per year to eliminate road noise annoyance at each noise annoyance level, and separate for urban and rural locations; pooled/averaged over all six countries.**

<b>Annoyance level</b>	<b>Mean WTP per person per year (PPP-converted 2005-euro)</b>
Not annoyed	8.12
Slightly annoyed	37.08
Moderately annoyed	84.93
Very annoyed	84.30
Extremely annoyed	80.51
<b>Urban-Rural</b>	
Urban – all annoyance levels	48.21
Rural – all annoyance levels	48.80
Total number of observations (excluding protest zero responses)	2709

### **1.4 Rail noise annoyance**

The pooled results from the 5-country survey (i.e. not performed in Sweden) in terms of WTP for rail noise annoyance elimination are summarized in table 1.2 for all countries, together.

**Table 1.2. Mean WTP per person per year to eliminate rail noise annoyance at each noise annoyance level, and separate for urban and rural areas; pooled/averaged over five countries**

<b>Annoyance level</b>	<b>Mean WTP per person per year (PPP-converted 2005-euro)</b>
Not annoyed	15.08
Slightly annoyed	38.20
Moderately annoyed	59.17
Very annoyed	49.58
Extremely annoyed	68.28
<b>Urban-Rural</b>	
Urban – all annoyance levels	46.35
Rural – all annoyance levels	32.01
Total number of observations (excluding protest zero responses)	1519

Tables 1.1 and 1.2 show that rail noise annoyance is valued lower than road noise, supporting existing results from the exposure-response functions (ERFs) for rail noise, which show the same proportion of annoyed persons as for road noise at a 5 dB higher level. Therefore, we often talk about the 5db premium for rail compared to road noise. Again we see that WTP increases with increasing annoyance level up until “moderately annoyed” Then there is a small drop in mean WTP for the second highest annoyance level, but then again higher for the extremely annoyed group. This could be due to the same type of income effect as described for road traffic noise. Thus, CBAs of TEN-T projects we suggest using the values in table 1.2 for not and slightly annoyed, and the same value for the three highest annoyance level, i.e. 60 euro per person per year. Although WTP to avoid noise annoyance in rural areas is lower than in urban areas, both overall and in each country (except Spain where the opposite is true), the difference is not

significantly different. Thus, in CBAs of TEN-T projects the midpoint of 39 euro per person per year should be used.

### **1.5 Aircraft noise annoyance**

For aircraft noise a CV survey was performed in Hungary. The results reported in table 1.3 show that WTP does not vary systematically with changes in annoyance level nor with whether it is an urban or rural locality. These inconsistent values are most probably due to the low number of observations in many of these sub-samples, especially the higher annoyance levels. It is also interesting to compare the results for noise annoyance from the road, rail and aircraft in Hungary. Comparing table 1.3 with the results for Hungary on road and rail noise in tables 1.1 and 1.2, respectively, shows that in Hungary elimination of noise annoyance is valued highest for rail, and then road. Aircraft noise annoyance is valued the lowest. This ranking holds both for urban and rural areas.

**Table 1.3. Mean WTP per person per year to eliminate aircraft noise annoyance for each noise annoyance level, and separate for urban and rural locations in Hungary**

Mean WTP	Noise annoyance level				
	Not annoyed	Slightly	Moderately	Very	Extremely
Rural	2.1	19.8	9.8	15.6	0
Urban	2.6	14.3	6.1	13.8	4.0

### **1.6 Value of Travel Time Savings (VTTs)**

As described in HEATCO Deliverable 2, State-of-the-art in project assessment (Laird et.al, 2005), it is established practice to include travel time savings within transport cost benefit analysis, and traditionally they have been the most important source of monetised benefit. Since time is a limited resource, individuals will have a willingness to pay to reduce time spent on travel in order, to transfer available time to other activities, for example leisure time. For the case of transferring travel time to leisure activities, the individual value of the time saving will depend on factors such as individual preferences, culture, and marginal utility of an additional unit income and journey purpose. The most common approach for assessing the individual utility of time savings is Choice Experiment methods, which includes Conjoint Analysis. In this method individuals are asked to choose repeatedly between two alternative factors relevant to the decision context – in this case the journey to work – as the characteristics of the alternatives (typically time and costs) are varied. In this way, individuals preferences can be derived statistically from the choices they make.

This survey uses the same method, Contingent Valuation, for assessing VTTs as used for noise annoyance in order to be able to implement similar valuation scenarios for noise and time and in order to limit the length of the questionnaire, since all valuation scenarios were presented in one questionnaire. Since this differs from normal practice, the VTTs survey should therefore be regarded as an experiment in applying Contingent Valuation for the value of time. Hence, new European values for time savings should be based on the meta-analysis conducted in other parts of the HEATCO project, rather than on the

new values from this large-scale pilot study focusing on the use of CV-methods in assessing European travel time savings.

The VTTS survey has generated values for 5 and 10 minutes time-savings of travelling to work. The results are presented for each of the five countries surveyed. Table 1.7 shows that time is valued the highest in Norway and Spain, then comes the UK closely followed by Hungary, and Germany last. Pooled/averaged results for all countries, again using the results corrected for protest zero responses, give a mean WTP of €0.15 and €0.24 for 5 and 10 minutes travel time-savings, respectively. Thus, there seem to be a decreasing marginal value of travel time-savings. If we assume each of these values to be constant, this corresponds to a value per hour of saved travel time going on a journey to work by car equal to €1,80 and €1.44, based on a 5 and 10 minutes time savings, respectively. These values are significantly lower than what is experienced in other surveys for valuing time and are probably explained by the use of a different methodological approach, rather than underlying changes in individual's preferences.

**Table 1.4. Mean WTP per person for a 5 and 10 minutes travel time savings for each trip to work, reported for each country**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
Mean WTP – 5 minutes time savings	0.14	0.25	0.13	0.04	0.23
Mean WTP – 10 minutes time savings	0.25	0.41	0.19	0.06	0.42

## **1.7 Conclusion**

The great advantage of using an identical Contingent Valuation (CV) survey simultaneously in many countries is that the observed differences in values between countries are not due to different methodological differences, but rather differences in preferences and the cultural/institutional settings.

However, there is always a trade-off between what is the best design of a CV survey for each country, versus finding a common design that works reasonably well in all countries. In this instance, the need for a common CV scenario used in all countries may have led to a higher proportion of people answering zero WTP, especially protest zero WTP than would otherwise be the case. In addition, the pattern of WTP over the range of annoyance levels does not strictly conform to what we might theoretically expect. This may be explained by respondents finding it difficult to distinguish well between the five different annoyance levels. Overall, however, this six-country Contingent Valuation (CV) survey seems to have performed well, and has created new economic values for the selected externalities; noise annoyance from road and rail (and aircraft noise in Hungary, representing the new EU Member countries), and for travel time-savings (going by car or public transport to work).

The results from the survey for road traffic noise annoyance did not show any significant differences between the most annoyed annoyance categories in the pooled national survey analysis; hence the recommended values are the same for the “highly annoyed” and “annoyed” categories. This result might be due to the low number of observations for

each of these sub-samples. The pooled samples confirm that WTP increases, as expected from theory, when going from “not annoyed” to “slightly annoyed” and on to “moderately annoyed”. There is however no significant difference in the WTP between the three highest annoyance levels (i.e. moderately, very and extremely annoyed). This could be explained by the fact that people with lower income, and thus lower ability to pay, often live in areas with high road traffic noise levels, since the houses in these areas are cheaper. As mentioned above, it may also be the result of respondents being unable to distinguish effectively between these different annoyance levels, as currently described. Therefore, we suggest using the same value for the three highest noise annoyance levels. These values from the pooled sample could be used for national valuation purposes by PPP-adjusting the Euro values.

The pooled sample for rail noise annoyance confirm that WTP increases, as we would expect from theory, when going from “not annoyed” to “slightly annoyed” and to “moderately annoyed”. However, as with road, there is no significant difference in WTP between the three highest annoyance levels (i.e. moderately, very and extremely annoyed) for rail noise annoyance. As for road noise annoyance, this could be explained by the fact that people with lower incomes often live in areas highly exposed to rail noise. Therefore, we suggest using the same value for the highest noise annoyance levels. These values should be used in national valuation by adjusting the euro values by PPP. There is no significant difference in WTP between rural and urban areas for either road or rail, hence the same values for both urban and rural, independent of annoyance level, can be used.

For the noise annoyance values to be used with the 4-level noise annoyance scale we have exposure-response functions (ERFs) for, we recommend that the average values of the two highest levels in the new 5-level annoyance scale (i.e. “Extremely” and “Very”) are merged to provide a value for the highest level in the 4-level scale (“Highly annoyed”). For the remaining three annoyance levels the values are assumed to be the same as for the 5 level annoyance categories. Moreover, we recommend not to apply amounts for people stating that they are “not annoyed” by noise for surveyed noise source. This means that we only recommend values for three categories, namely i) Highly annoyed ii) Annoyed and iii) Little annoyed.

Table 1.5 and 1.6 show the recommended values for the three categories for noise annoyance from rail and road.

**Table 1.5. Recommended values for annoyance categories for road (2005-€pr. annoyed person pr. year)**

<b>Annoyance category</b>	<b>European values (2005-€pr. annoyed person pr. year)</b>
Highly annoyed	85 €
Annoyed	85 €
Little annoyed	37 €
Not annoyed	0 €



**Table 1.6. Recommended values for annoyance categories for rail (2005-€pr. annoyed person pr. year)**

<b>Annoyance category</b>	<b>European values (2005-€pr. annoyed person pr. year)</b>
Highly annoyed	59 €
Annoyed	59 €
Little annoyed	38 €
Not annoyed	0 €

The value of travel time savings (VTTS) estimated is only for journeys going to work, and estimated by using the same valuation method as used for valuing noise annoyance from rail and road since all valuation scenarios were presented in one questionnaire. The VTTS practice should therefore be regarded as an experiment on applying Contingent Valuation for the value of time. Until this methodology is more throughout tested for other aspects of travel time savings, we recommend that new European values for time savings should be based on the meta-analysis conducted in other parts of the HEATCO project, rather than on the new values from this large-scale pilot study focusing on the use of CV-methods in assessing European travel time savings.

## 2.0 Introduction

The main goal for the work of Work Package (WP) 5 of the HEATCO Project is to estimate new unit values for the external effects considered most important, and which we currently lack reliable economic estimates for. These new unit values will reduce the uncertainty in cost-benefit analyses of transport projects.

To derive unit values that covers the East-West and North-South dimension in income inequality within the EU and cultural differences between countries, the surveys are carried out in six different countries; Germany, Hungary, Norway, Spain, Sweden and the UK. In order to reflect different traffic conditions, surveys are conducted in both urban and rural areas. Note that only the road traffic noise part of our main survey was carried out in Sweden<sup>1</sup>.

WP 5 developed and tested a survey instrument simultaneously in these selected countries in order to ensure full comparability of results. Focus groups were performed in all countries in order to develop a draft questionnaire that could be pre-tested in all countries in order to provide input to the final main survey instrument. The main survey used stratified random sampling to ensure representative samples of the relevant populations affected by the three external effects analyzed, i.e. i) noise annoyance from roads, ii) noise annoyance from railways, and iii) value of travel time savings (VTTS) going to work by car. Then, the questionnaire was adapted to aircraft noise, tested and a survey on aircraft noise conducted in Hungary. Econometric and statistical analyses have been conducted to generate unit values for these external effects. We have calculated both national values and a common EU value for each of the external effects considered. The national unit values should be used in CBAs of national transportation projects, while the EU unit values should be used for transportation projects within the trans-European transport network (TEN-T).

This report is organized as follows. Chapter 3 summarizes the criteria and arguments for choosing noise annoyance from road and rail and VTTS for the main survey; and a separate survey for aircraft noise in Hungary (as a representative of the new EU Member countries). Chapter 4 provides an overview of the valuation approach selected, while chapter 5 describes the process of constructing the main survey and the aircraft noise survey. Chapter 6 describes the country samples of the main survey, while chapter 7 reports and discusses the results of both the main survey and the aircraft noise survey. Chapter 8 compares our results with results from previous studies, and chapter 9 concludes with recommendations for individual country and EU values for these externalities for use in CBAs of national transportation and TEN-T projects, respectively.

---

<sup>1</sup> No survey was originally planned in Sweden, but the Swedish road authorities contacted us since they were about to do their own survey of road traffic noise. We invited them to join the project, and they participated in the development of the survey.

### 3.0 Selection of topics for valuation survey

There are many gaps to be covered in monetising external effects in cost-benefit analysis of transport projects.

To ensure high quality of the valuation study, the number of investigated external effects should be limited to one or a few. The consortium agreed upon five criteria for selecting the topics/external effects to be covered in a new Contingent Valuation (CV) study.

1. The effect should make up a significant part of the total externalities from transport.
2. There are few existing stated preference valuation studies of the externality, using state-of-the-art valuation methodology.
3. The valuation study should not replicate studies planned in other EU-projects.
4. The description of the external effect must be suitable for CV studies in the countries where the survey will be carried out, and for developing benefit transfer validity test of the results.
5. It must be possible to create comparable values across European Union countries.

Three main categories of externalities were identified. These were:

- i) Accident risk,
- ii) Value of Travel Time Savings (VTTS), and
- iii) Noise annoyance

The consortium decided to focus on VTTS and valuation of noise annoyance, based on the following arguments:

i) Accidents risks make up a large part of the total externalities, but new valuation studies (CV surveys) of mortality risks will be performed within other EU-projects (NEEDS-Stream 1b and VERHI-Children)

ii) Time savings makes up a significant part of the external costs in transport projects. A new study would not replicate studies planned in other EU-projects, and there is a need for updating and harmonising existing values. There are several original stated preference studies (i.e. Choice Experiments / Conjoint Analysis and Contingent Valuation studies) for VTTS available in the literature. The most comprehensive studies, based on state-of-the-art methods are however, concentrated around the Northern and Western regions of the EU. Similar studies are needed for other parts of the EU. However, since a full scale VTTS study of the same magnitude as the existing ones is too resource demanding to do for a 6-country survey given the survey budget in WP5, the consortium decided to focus on assessing one main VTTS for one transport purpose only. Hence, the survey elicits the VTTS for travelling to work by car or public transport. Insight gained from differences between countries for this transport task can be utilised in a benefit transfer exercise to generalize existing values for VTTS for different transport tasks.

iii) Noise annoyance is classified in five annoyance categories according to the ISO technical specification 15666. These categories are based on individuals' subjective

assessment of their noise annoyance. Since there is a lack of exposure-response functions for health impacts from noise, the survey assesses noise annoyances only. Thus, this study will provide a lower estimate of the external costs of transport noise, since the health impacts are omitted. There is currently a lack of stated preference studies assessing noise annoyance according to this new ISO classification. Transport modes selected for the survey are those that are considered most relevant for the TEN-T projects, and for which noise level data is available. Hence, the CV survey focuses on noise from rail and road traffic, in both urban and rural areas within the six countries where the survey is carried out (In Sweden only road traffic noise in urban and rural areas was considered). However, to be able to assess the social benefits of transferring transportation demand from air to e.g. rail, which is an essential objective of the TEN-T projects, annoyance from aircraft noise should also be valued. As there are stated preference studies available for aircraft noise annoyance from the north and the west of Europe, a stated preference survey on aircraft noise annoyance is carried out in Hungary. We use the same methodological approach as for rail and road traffic noise annoyance; i.e. only minor changes were made to the Contingent Valuation scenarios used to assess road and rail noise..

Based on the criteria mentioned above, and discussion in the consortium, the CV surveys assesses the following external effects in both urban and rural areas:

- Noise annoyance from rail and road traffic noise
- Value of Travel Time Savings (VTTS) for travel to work by car
- Noise annoyance from aircraft noise

## 4.0 Selection of Valuation Methods

Deliverable 1 of WP3 (pp. 9 – 10) lists the following definitions of different types of project analyses, where each analysis uses separate valuation methods to assess transport costs across Europe;

- i. *Cost Benefit Analysis (CBA)*: The effects are assigned a monetary value, and included in an overall economic appraisal of the total value of the project in monetary terms.
- ii. *Multi-Criteria Analysis (MCA)*: The effects are not assigned monetary value, but are included in an overall project appraisal by assigning non-monetary weights to the individual effects.
- iii. *Quantitative Measurements (QM)*: The effects are estimated in physical units of numbers (cardinal scale), but in contrast to MCA no specific weights are assigned to allow an aggregation of the effects to a single criterion.
- iv. *Qualitative Assessment (QA)*: The effects are classified into one of several ranked categories (ordinal scale) based on well-defined standard criteria for each of the categories, which are invariant from project to project.
- v. *Not covered and not relevant*

Due to this ranking, the surveys are focusing on state-of-the-art methods for creating monetary values for externalities to be used in Cost Benefit Analysis.

Environmental valuation methods, both stated preference (SP) and revealed preference (RP) methods, have been employed to estimate the economic value of changes in noise levels. Most studies have applied the RP approach of Hedonic Pricing (HP) to the housing market to analyze how differences in property prices reflect individuals' willingness-to-pay (WTP) for lower noise levels. More recently, there has been an increased interest in applying SP methods to value noise. Contingent Valuation (CV), Conjoint analysis (CA) and Choice Experiments (CE) have all been applied to value transportation noise. VTTS has in most cases been estimated from SP methods, especially CA and CE.

WP5 decided to use the SP method of Contingent Valuation for assessing both noise annoyance and VTTS, based on the outcomes from focus groups and pre-tests and the overall process of constructing a survey instrument to be used in all six countries.

## **4.1 Damage Function Approach (DFA) applied to noise annoyance**

To calculate the total welfare loss from increased noise, or total increase in welfare due to reduced noise, from new transportation projects a damage function approach (DFA) can be applied. The DFA is a bottom-up approach. Figure 4.1 shows the different steps of DFA applied to noise.

**Figure 4.1. Damage function approach (DFA) assessing noise annoyance**

1. INCREASE IN NOISE EMISSIONS due to a new transportation project, described in terms of change in time, location, frequency, level, and source of noise (and composition/contribution of noise sources if there are multiple sources).
2. NOISE DISPERSION MODELS are used to estimate the *changed exposures to noise* at different geographical locations; measured in dB(A) and noise indicator ( $L_{eq}$ ) (presented in noise maps and noise databases)
3. EXPOSURE-RESPONSE FUNCTIONS (ERFs), between decibel levels (measured by noise indicators like  $L_{den}$ ) and levels of annoyance, ischemic heart disease, subjective sleep quality and other impacts of noise. For annoyance, the endpoint of the ERF is the technical ISO specification 15666 for the five level annoyance scale (from “extremely annoyed” to “not annoyed”)
4. ERFs and information about the number of cases of each endpoint, e.g. the change in the total number of persons annoyed per year at each of the five noise annoyance levels, are used to calculate the *overall change in noise impact*.
5. ECONOMIC VALUATION TECHNIQUES are used to estimate an economic value for a “unit” of each endpoint of the ERFs , e.g. “euro per person extremely annoyed by noise per year” (and similar values for the other four noise annoyance levels). In HEATCO the valuation endpoint of the ERFs are valued by new, original CV studies

The external costs of changes in noise levels due to a transportation project are calculated by multiplying the economic value of each impacts in terms of the unit of the endpoint in step 5 (e.g. “euro per person extremely annoyed per year”), by the calculated, corresponding impact from step 4 (e.g. “change in number of persons extremely annoyed per year”). Then we do the same for all levels of noise annoyance to find the overall annoyance costs from noise. To find the total impact from noise, we need to do the same for health impacts and other impacts from noise where we have endpoints from ERFs and unit values for these endpoints. During the aggregation of these impacts, we should always check to avoid double counting impacts. For noise, however, we only have reliable ERFs for noise annoyance, and these are based on an extensive meta-analysis of ERFs for the previous 4-level noise annoyance scale (Miedema and Oudshoorn 2001). While we are waiting for a similar meta-analysis of ERFs for the new 5-level noise annoyance scale, we have to convert our survey results to fit the “old” scale in order to

apply the DFA. As an approximation<sup>2</sup> we suggest merging the two highest annoyance levels of the current 5-level scale (“Extremely” and “Very”) to represent the highest level of the old scale (“Highly” annoyed”). The other annoyance levels are assumed to be the same for the two scales.

## 5.0 Construction of stated preference survey

The first WP5 plenary meeting was organized in Oslo 14.10.2004 (see minutes from the meeting at <http://heatco.ier.uni-stuttgart.de>), where the aim was to construct a first draft outline of the noise and timesavings valuation questions that could be tested in focus groups in each country.

The description of noise annoyance categories is based on ISO 15666, Technical Specification. Its scope includes: questions to be asked, response scales, key aspects of conducting the survey, and reporting the results; all of which have been applied in the surveys. Questions recommended by ISO 15666 to be asked in surveys are provided in all language relevant for the national HEATCO surveys, except Swedish (which had to be constructed, and are very close to the Norwegian descriptions). Hence, the ISO wording is used for key-questions in the final questionnaire.

The final questionnaire (Annex 12) is based on assessing annoyance levels, rather than decibel exposure. That is, respondents are asked to state their subjective annoyance caused by relevant noise source (here; road traffic or rail noise)<sup>3</sup>. When asked this question respondents are shown a card with 5 different annoyance categories; i) Not at all, ii) Slightly iii) Moderately iv) Very and v) Extremely. Respondents were asked which category they felt best described their own situation. Noise exposure was identified at address-level, through noise databases and noise maps. Respondent’s subjective noise annoyance was therefore linked to the actual noise exposure, and makes review of current dose-response relationship between noise exposure and noise annoyance possible.

Respondent’s willingness to pay is expressed as a per year amount for the next five years to a specific public fund, earmarked for a noise preventing purpose. The public fund will be used to implement measures that will remove *the respondent’s* potential road traffic/rail noise annoyance when they are at home. The respondents are told to keep in mind their budget restrictions (that costs must be taken from either savings or money spent on other things), when asked the willingness to pay question. The wording in the valuation questions is tested in all countries where the survey was carried out, in order to find an equal wtp-question to reduce the number of protest zero answers (e.g. people stating they have zero WTP even if they have utility from the removal of their noise annoyance, but they state zero WTP to protest one or more aspects of the CV scenario).

The time valuation questions and scenarios are constructed with help from Institute of Transport Studies, University of Leeds (J.J. Laird, P. J. Mackie and M. Wardman),

---

<sup>2</sup> Klæbo (2006) shows that this approximation will probably lead to a small overestimation of the number of people “Highly annoyed”.

<sup>3</sup> The exact question asked is “When you are here at your home, how much does noise from the road traffic/rail bother, disturb or annoy you?”

reviewing state-of-the-art-surveys for assessing value of travel timesavings (Wardman, 2001; Dillen and Algers, 1999; Gunn et al. 1999; Hague Consulting Group, 1990; Hague Consulting Group et al 1999, MVA et al., 1987. Persula and Kurri, 1996; Ramjerdi et al, 1997; Small et al. 1999).

### **5.1 Focus groups**

To test approaches for the questionnaire for the valuation questions, focus groups are used. A focus group is a group consisting of typically five to ten people where the intent is to promote self-disclosure among participants, relating the investigated topic. The participants are individuals representing different characteristics of the target group for the main survey. Through group discussion, led by a professional moderator, approaches and key questions relating the studied topic are explored to find out what people really feel and to reveal challenges and conflicts when making the questionnaire for the main survey.

Focus groups were conducted in all countries where the HEATCO-survey was carried out. The focus groups consisted of 5 – 10 people who discussed issues essential for the survey. The group participants were selected in order to reflect different interests and stands concerning the survey topic. The group discussion was lead by a professional chairperson (called “the moderator”), and followed a focus group guide developed by the WP5 consortium that was developed in English and translated into relevant languages (Annex 11). The participants in the focus group were recruited from noise databases or maps, showing exposure from road traffic or rail noise, where people exposed to high level of rail or road noise were selected. The moderator started the group conversation by asking general questions related to the topic, followed by more noise and time specific questions leading to the essential topics in the survey.

Six out of eight participants in the Hungarian focus group were very or extremely annoyed by noise. The noise absorbing road layer that was presented as the noise reducing mechanism for road was not well known among the respondents. Issues about its effectiveness and carcinogenicity where introduced, feedback which required more information and additional measures in the further noise reducing scenarios. Several questions where also raised related to the payment vehicle and how the stated willingness to pay for the noise reducing mechanism was collected. Some questioned if only people affected by noise would have to pay. If it the payment was elective, free riders could be a problem. Others thought the costs should be incorporated in other general taxes. When asked how much they were willing to pay to reduce noise annoyance, most people answered that they were not willing to pay anything at all. Some of the zero answers were reasoned in “protest behaviour”; that is people found it unfair to pay or were against more taxes, even if they had had economically possibilities and positive preferences for reduced noise exposure. Some of the participants stated that the reason that they did not want to pay was factors like, “not very much bothered by noise” or “cannot afford to pay”, which are answers regarded as “true” zero bids, since they are reasoned either by budget restrictions or by lack of need for reduction of noise exposure. Governmental mistrust was also expressed, and people were afraid that money collected could be used for other purposes. Experiences from the Hungarian survey showed that other measures



additional to the noise-reducing road layer should be included in the scenario. Alternative payment vehicles to taxes should also be considered.

The participants in the Spanish focus group found it very difficult to isolate valuations invoked by car traffic from the overall street noise. Most of them failed to focus on the valuation scenario since the rest of the noise sources remained. Another potential protest argument was the perception that the main source of car traffic noise was not heavy traffic but a “non-civic” driving behaviour. Hence, other actions like increase in the number of police officers in the streets to enforce civic behaviour would be more effective than the road layer. It was noted that the quality, and not only the quantity, of the activities that subjects carry out at home, could make a difference in the valuation results. That is, people who studied or worked at home seemed to complain far more than others. Participants showed relevant doubts about the current wording in the noise-reducing scenario. Two alternatives and more reliable wordings were therefore suggested and considered in the further work: i) It should be mentioned that the cover has been used successfully in Europe, and ii) Play traffic noise before and after the policy to convince individuals about the change in traffic noise due to the road layer. The participants did not fully trust a 100% noise annoyance reduction, and different levels of noise annoyance reduction to elicit a full annoyance valuation function should be considered. Moreover, participants did not find the motorbikes scenario credible. As for the Hungarian focus group, the Spanish participants did not accept an increase in the municipality fee to cover the policies because they did not believe in current politically management. An ad hoc Association that collected money and secured relevant use for reducing traffic noise was somewhat more credible to the participants.

In Germany, nine persons living in an area that is heavily trafficked in Bonn, attended the focus group meeting. When describing the area they lived in, noise annoyance was only sporadically mentioned, whilst positive characteristics, such as good traffic links, central location and shopping availabilities were frequently expressed. Thus, few people were very, or extremely, bothered by traffic noise. The scenario describing the noise absorbing road layer was familiar to most participants and no further explanations needed, as the measure was found credible. However, few participants were willing to pay for implementing this measure. Most participants found it most fair that the costs should be financed through private car or petrol taxes or road tolls. About half the group was sceptical towards the noise-dampening box on scooters, mopeds and motorcycles. However, they realised a need for restrictions introduced by the authorities. Noise reducing measures for railroad, such as new wheels and grinding of the rail were found credible. The noise preventing walls were however considered to reduce the quality of view of nature. The time saved in the travel time scenario was regarded to be too low, and 15 minutes was suggested as the minimum time saving that should be considered. This could however for many persons be an unrealistic time saving, due to short travel time or distance to work.

Eight persons from Stockholm, who lived in houses with between 60 – 70 dBA outdoor noise levels, attended the Swedish focus group. Most of them were not very or extremely annoyed by noise. In general the questions and scenarios were well understood and found

credible. However, Swedes tend to be negative to increased tax level, whatever purpose, which influences all WTP questions. The participants were against personal contributions to finance the noise reducing measures, since this was regarded to be a public task. Thus, many considered this to be unfair, since several people not bothered by noise, would be forced to contribute to implement the measures. Also, the households did not cause the noise. Moreover, due to the price level of noise-exposed houses; these “attracted” people with low income who could not afford to pay such a tax. A general opinion was that the ones producing the noise should pay. The noise reducing road layer, was not found fully effective and would not remove all noise annoyance. Other contaminants like aerial dust in particular, were also regarded a bigger problem than noise. Most attendants were, however, positive towards the rail noise reduction measures. The group was not able to value the travel timesavings, and asked for more contextual information about the journey.

The British focus group was conducted in Bath and had eight participants, selected from a range of urban, suburban and rural locations in order to reflect a range of ambient noise and noise annoyance levels. Noise was a characteristic frequently mentioned by the attendants while describing their neighbourhood, where seven out of eight experienced road traffic noise in their home. The noise reducing road layer was found credible, but some participants regarded other nuisances, such as fumes and safety issues more important. People were strongly against households paying for this new road layer, and generally not willing to pay a community charge. Road taxes were preferred as the fairest payment. The rail noise reducing scenario was regarded credible, but the users and rail companies should be responsible for financing the measures. For the time saving scenario, people highlighted the need for more information about the context of the journey.

Seven people with indoor noise levels measured to be above 40 dBA<sub>ekv</sub> participated the Norwegian focus group. Most of them were moderately to extremely annoyed by noise. However, the annoyance was worse in the summer than winter, due to higher frequency of open windows and outdoor activities. The group was sceptical towards the effectiveness of the noise absorbing road layer. Aerial dust was also regarded as a bigger problem. Government should bare the costs of implementing the measures, since the roads are publicly owned. A second best option was to make the car drivers pay. Car drivers, however, felt that they already were responsible for too many taxes and charges. The households were regarded as a victim, not the reason for the noise, and should not pay for the noise reducing measures. Noise from scooters, mopeds and motorbikes were not a real problem, but if noise-reducing measures should be implemented for these vehicles, the general opinion was that this should be charged to the customer at the time of purchase. The measures for reducing rail noise were considered to be effective, but again the Government should be responsible for the costs. Contextual information related to the time saving scenario should be better specified, to be able to assess the benefit of the time savings.

The results from the focus group were discussed in a work package meeting in Budapest 31 March – 1 April 2005. Results from the focus groups (see the minutes at

<http://heatco.ier.uni-stuttgart.de/>) indicated challenges in presenting a credible noise reducing measure for road traffic, while the noise reducing measures for rail seemed to be more credible. In the revision of the scenario, it was therefore pointed out that the road cover had been tested by experts and found to be effective. In addition, other measures than noise-absorbing road cover in roads and streets that absorb noise from tires, like “add-on engine noise dampening boxes for buses, heavy goods vehicles, private cars, scooters and motorbikes” should be mentioned.

The described tax used to collect the individual payment did also seem to create protest behaviour. There was a general feeling that it was unfair to make the households responsible for the costs of implementing the noise reducing measures. In the revision of the questionnaire, it was therefore highlighted that it was not the households’ responsibility alone, but that the Government, car owners (railway companies for the rail scenario), companies transporting goods and the households in the areas where the noise annoyance is removed should share the extra costs. Hence, this could be a potential source of a large proportion of zero answers in the final survey. Further development of the questionnaire was essential also to identify reasons for potential protest zero bids, due to the needed compromises taken to be able to construct a joint questionnaire for six countries.

## **5.2 Pre-test of final questionnaire**

The aim of the pre-test was to test the draft final questionnaire on a small sample using the same interview method and carried out as in the same way as the final survey. Due to results from the focus groups, two different versions of the questionnaire were developed. Version 1 used choice experiments to value travel timesavings for a travel to work, while the noise annoyance scenarios were constructed as CV-scenarios. Version 2 used CV-scenarios both for the VTTS questions and the noise annoyance scenarios.

The sample size varied from 20 to 50 respondents in the six countries. With the exception of Sweden (where only persons exposed to road noise were interviewed), versions 1 and 2 were asked respondents exposed either to rail or road noise. Most respondents were mainly exposed to road traffic noise, but about 1/4 of the sample were mainly exposed to rail noise. Based on the pre-test findings, the contingent valuation (CV) method was selected for valuation of both road and rail noise annoyance and for travel time savings.

The Hungarian pre-test showed that the WTP question for noise reduction could be too complicated, and the recommendation to shorten the CV scenario description as much as possible. The role of the Government being responsible for implementing the measures was ambivalent. Some did not believe that the package of noise reducing measures would ever be implemented if the Government were responsible, while others found it fairer that Government paid all costs. The survey should also highlight that the scenarios were hypothetical examples made to make the questions more realistic.

The Spanish pre-test was conducted about half a year later than in the other countries, and after the other final surveys were conducted. Hence, the aim of the pre-test was to improve the wording of the final Spanish questionnaire and to decrease interviewer bias.

During the pre-test; all the misunderstandings, doubts, and questions that were expressed by the respondents were collected and were used to define a common list of responses to all the interviewers. The Spanish pre-test showed that although there was a large proportion of zeros willingness-to-pay answers, the CV scenario for noise annoyance seemed to be well understood. The relationship between noise reduction and travel timesavings was, however, questioned as the respondents did not understand why they were asked questions about noise annoyance and travel timesaving in the same survey. Moreover, respondents found it difficult to understand how paying extra money can reduce traffic congestion and travel time.

In the German pre-test, six different locations were chosen according to noise level maps in Bonn, where three of them represented noise levels above 65 dBA<sub>ekv</sub> for road and the other three for rail noise level above 70 dBA<sub>ekv</sub>. Version 1 of the questionnaire was preferred, since it turned out to be easier for the participant to follow. The valuation question for noise was regarded as being too long and and complex.

Since only road traffic noise was assessed in the survey in Sweden, a short version of the questionnaire was tested. Feedback from the Swedish pre-test showed that the questionnaire worked rather well in its current form. No question had to be removed, but some were suggested reformulated or eliminated.

In the UK pre-test, people living close to a major railway or road, were interviewed. However, the interviewers found that respondents that lived close to railways were hardly affected by the noise compared to those that lived close to roads. Other comments from the pre-test were mainly related to reformulation of wording in the questionnaire.

For the Norwegian pre-test, it was noted strong resistance towards paying for reducing noise. The general opinion was that this was something the Government should finance, and many respondents expressed that they already paid enough taxes. Hence, political attitudes were often expressed. The scenarios for the valuation questions were however well understood, even though some respondents did not believe that the measures would be effective.

Based on the pre-test experiences, the questionnaire was simplified, both in length and the wording. Due to a long questionnaire, it turned out to be difficult to include enough choice experience questions in the value of time exercise, to provide a reliable statistical analysis. Hence, version 2 of the questionnaire, using a scenario description of value of time saving assessment was preferred for the final survey. In general, the pre-test findings indicated that, even though the respondents found the questionnaire understandable, several had the opinion that noise-reducing measures were a public matter, thus reported zero WTP for noise reducing efforts.

### **5.3 Sampling procedure**

To recruit respondents experiencing different noise annoyance levels, stratified sampling was used. The individual level of noise annoyance was assessed in question 3a and b in

the final questionnaire (Annex 12), and the distribution of answer from this question compared with the recruiting criteria.

To recruit individuals exposed to the effects that would be valued, the sample was divided into three groups:

- i. Respondents mainly exposed to road traffic noise
- ii. Respondents mainly exposed to noise from rail
- iii. Random sample

Each of these sub samples was equally split between respondents in urban and rural areas. Respondents in category i) and ii) were recruited from noise databases or noise maps. For areas where no road or rail noise data were identified, respondents who lived less than 50 meters from a National or European road, or major railroad were interviewed. Since people living in noise-exposed areas could have different characteristics compared to a national representative population, respondents in category iii) were selected as a control group. This was particularly important for the time valuation questions. Respondents in category iii) valued reduction of road traffic noise and timesavings.

All together more than 5500 respondents were interviewed (1000 respondents in all countries except Sweden who interviewed 520 persons). They were recruited according to the criteria in Table 5.1.

**Table 5.0-1. Recruiting criteria**

	Road traffic		Railroad		Random	
	Urban	Rural	Urban	Rural	Urban	Rural
Noise exposure outdoor <sup>4</sup>	Over 65 dbA (eq)	Over 65 dbA (eq)	Over 70 dbA (eq)	Over 70 dbA (eq)	Random	Random
Number of respondents	200	200	200	200	100	100
Distance from road/rail. ( Only used where no noise database / noise maps are available)	Less than 50 m from National or European Road		Less than 50 m from major railroad		Random	Random
Age	Respondents 18 – 70 years old					
Urban	Population above 20.000					
Rural	Population below 2.000					
Noise	Outdoor noise in decibel, measured in L(eq)					

To identify noise exposed individuals, noise databases and noise maps showing respondents exposed to noise from rail or road at different decibel level L(eq) were used in all countries. There were, however, not available input for noise exposure for all areas and transport modes in all countries. Table 5.2, where x is symbolising available noise data, shows areas where noise databases or noise maps were available and used for the

<sup>4</sup> These noise limits have been decided based on exposure-response functions between noise levels and level of annoyance, in order to create a sample with the same number of people in each annoyance level.

sampling. Lack of noise data was particularly a problem in many rural areas, and this category was therefore mainly identified by the distance the respondent lived from a National or European road or a major railroad.

**Table 5.0-2. Available noise data**

	Road		Rail	
	<i>Urban</i>	<i>Rural</i>	<i>Urban</i>	<i>Rural</i>
Spain	x			
Germany	x		x	
Sweden	x	x	x	
UK	x		x	
Hungary	x		x	
Norway	x	x	x	x

People were asked about their occupation and the mode of transportation they used going to work. Only full-and part-time occupied individuals, who used private or public transport to work, were asked the time valuation questions.

This main survey was developed, tested and carried out during the period from October 2004 to December 2005. The final survey was carried out in the UK, Norway and Sweden during June – July 2005, in Hungary from July - August 2005, in Germany from September – October 2005 and in Spain during November – December 2005.

### **5.4 Aircraft noise study**

One of the main aims for the aircraft noise study in Hungary was to use a CV survey instrument, which would make the results directly comparable to the main survey on road and rail noise annoyance. Only minor changes were made to the questionnaire, and mostly to adapt the CV scenario to aircraft noise (Annex 14), in terms of e.g. a list of measures capable of mitigating aircraft noise. As for road and rail, we wanted to compare the preferences of rural and urban respondents, and therefore the sample was stratified on these two groups of respondents. The survey was conducted in Budapest and surrounding villages in December 2005 and January 2006 with a sample size of 957 respondents; out of which 408 and 549 respondents were from rural and urban areas, respectively.

## 6.0 Description of individual country samples

In this section, we report on the results from the questionnaire that was applied in the six European countries: UK, Sweden, Norway, Germany, Hungary and Spain. The principal results are presented for the individual countries and for the econometric analysis where the data from individual countries are pooled together. Note that only the road survey was carried out in Sweden, since this country study was not carried out within the current EC research project (but added on a voluntary basis).

The structure of this section is to consider the results relating to the willingness to pay (WTP) to avoid different levels of noise annoyance from road followed by the equivalent WTP for rail noise. Finally, the results of the survey relating to the value of the Value of Travel Time Savings (VTTS) for 5 minute and 10 minutes work travel time savings are presented. In each case, aggregate responses to a number of key questions that help to explain individuals' preferences for these goods are presented before summarizing the WTP values for these goods. In the main text, we focus on the pooled analysis (i.e. data aggregated over all countries) but also highlight key inter-country differences since these are important in drawing conclusions about the potential for, and limitations of, value transfer of noise and time values in Europe. First, however, we show how the sampling frame used in the study, and described in the preceding section, was applied in practice.

Table 6.1 shows the numbers of observations recorded according to the different WTP scenarios presented in the survey instrument. The recruitment target was 1000 in each country. Note that Sweden implemented the road noise questionnaire only, and also had a target of 500 observations only. The survey recruitment protocol required forty percent of the total sample size to be asked the set of questions relating to road noise, forty percent to be asked the set of questions relating to rail noise, and the final twenty percent to be randomly recruited between the two. Within the road and rail samples the protocol required an equal split between urban and rural locations. The observations from the Hungarian survey exactly reflect the protocol requirements, whilst the other countries approximated the respective recruitment targets.

**Table 6.1: Observations recorded for the noise and travel time survey questions**

	UK		Sweden		Norway		Hungary		Germany		Spain	
	%	obs	%	obs	%	obs	%	obs	%	obs	%	obs
Road traffic noise – Urban	20.2	212	70.6	<b>368</b>	19.8	202	20	200	19.8	204	23.2	200
Road traffic noise – Rural	29.8	313	23.6	123	19.4	198	20	200	19.8	204	23.2	200
Railway noise – Urban	20.9	219			19.5	199	20	200	19.5	201	26.6	230
Railway Noise – Rural	13.4	141			19.3	197	20	200	19.9	205	14.1	122
Random Sample – Urban	8.2	86	3.3	17	6.4	65	10	100	11.0	113	9.0	78
Random Sample – Rural	7.4	78	2.5	13	15.8	161	10	100	9.9	102	3.9	34
total	100	1049	100	521	100	1022	100	1000	100.0	1029	100.01	864
Travel time		579				661		553		580		416

Table 6.2 presents a number of key descriptive statistics of the country samples, alongside the equivalent statistics for the national population, in bold. Comparison of the two can give a first indication as to whether the survey results can be seen to be representative of the country as a whole. The main limitation of this transferability is the

fact that in all countries, the survey was undertaken in a small number of localities e.g. capital cities. Nonetheless, the comparison in Table 6.2 shows that there are only a small number of marked country-specific differences between the two sets of statistics. Key differences include: a disproportionate low proportion of male respondents in UK and Hungary compared to the national gender mix; Hungary has a much higher proportion with higher education in the sample whereas the other countries have a slightly lower proportion with higher education; a higher mean age in the sample (reflecting the fact that the survey recruitment criteria specified respondents to be over the age of 18), and; a higher married % in the sample – Germany apart – for the same reason as above. One would not generally expect – a priori – that the age and marital status of the respondent to be major influences on the determination of WTP for noise annoyance reductions. This increases our confidence that the WTP results shown below may be taken as being representative of the national populations and so be justifiably used in project appraisals within these countries.

**Table 6.2 Descriptive Statistics of the Respondents (Income is converted to euro using Purchase Power Parity (PPP) –corrected exchange rates)**

Variable	UK	Sweden	Norway	Hungary	Germany	Spain
Male (%) - sample	32.5	49.7	51.8	39.5	49.9	49.8
Male (%) - national	49	49.6	49.6	48.4	48.9	49.4
Income (€ PPP) - sample	18,192	21,294	22,289	10308	14,560	14,619
Income (€ PPP) - national	14,511	17,740	21,471	4260	16,842	13,715
Age (mean) - sample	46	43	48	49	46	45
Age (mean) - national	39	40	38	38	45	39
% with univerversity degree - sample	13	14	13	12	8	17
% with university degree – national	16	28	24	3	12	19
Married (%) - sample	64	53	71	61	28	54
Married (%) - national	50	28	37	41	45	46



## 7.0 Results and discussion

### 7.1 Econometric modelling of the WTP responses

The payment card approach asks respondents to pick the *highest* amount they are almost certainly willing to pay. We can therefore assume that their true willingness to pay (WTP) must lie between this amount they chose and the next amount on the card .

Suppose there are  $k$  payments,  $t_1, \dots, t_k$  arranged in descending order so that  $t_k < t_{k+1}$ . When a respondent picks payment  $t_k$ , the probability that this respondent picks this payment is the probability that WTP lies between  $t_k$  and  $t_{k+1}$ :

$$(1) \quad \Pr(\text{choose } t_k) = \Pr(t_k \leq WTP < t_{k+1}).$$

Our questionnaire also allows respondents to state whether they hold a WTP equal to zero. We take the answers of this latter group of respondents at face value, that is these respondents should be ascribed zero WTP. This means that the appropriate statistical model is a discrete mixture with two components.

The first component is a degenerate distribution where WTP is equal to zero with probability one. We call the mixing probability (i.e., the percentage of the sample that comes from this population)  $q$ . The second component is a non-degenerate random variate defined on the positive semi-axis. The mixing probability for this component is  $(1-q)$ . Formally,

$$(2) \quad WTP^* = \begin{cases} 0 \text{ with probability } q & \text{mixing probability } q \\ WTP \sim f(WTP; \lambda) & \text{mixing probability } 1-q \end{cases}$$

Where  $f(\cdot)$  is the probability density function of WTP, and  $\lambda$  is its vector of parameters. Mean  $WTP^*$  is thus  $0 \cdot q + E(WTP) \cdot (1-q) = (1-q) \cdot E(WTP)$ , where  $E(WTP)$  is mean WTP. Median  $WTP^*$  is equal to median WTP if the proportion of zero voters is less than 50%, while is equal to 0 if the proportion of respondents stating a zero willingness to pay is equal or greater than 50%. In equation (2),  $WTP^*$  denotes WTP for the entire sample, while  $WTP$  denotes WTP for those persons in the sample who hold positive values for the program.

To estimate mean WTP for the latter, we fit an interval-data model of WTP, which allows us to estimate the parameters  $\lambda$  by the method of maximum likelihood. Formally, the log likelihood function is:

$$(3) \quad \sum_{i \in \mathcal{S}_{WTP>0}} \log[F(WTP_{k+1i}; \lambda) - F(WTP_{ki}; \lambda)],$$

where  $F(\cdot)$  is the cumulative probability distribution of WTP, and  $\mathfrak{S}_{WTP>0}$  is the set of respondents who picked a positive value on the WTP question.  $WTP_k$  and  $WTP_{k+1}$  are the lower and upper bound of the interval around these respondents' WTP.

After experimenting with different distributional assumptions  $F$  for WTP, we settled for a two-parameter Weibull distribution with scale  $\sigma$  and shape  $\theta$ .<sup>5</sup> The cdf of this variable is

$F(WTP) = 1 - \exp\left(-\left(\frac{WTP}{\sigma}\right)^\theta\right)$ , its mean is  $\sigma \cdot \Gamma(1/\theta + 1)$ , where  $\Gamma(\bullet)$  is the gamma function, and its median is  $\sigma \cdot [-\ln(0.5)]^{1/\theta}$ .

The results from this model are presented in Chapters 7.2.3 -7.2.5 and 7.3.3 – 7.3.5. In addition to this approach, we have also calculated the mean WTP as the arithmetic mean (mid-point) of the interval for each annoyance class for road and rail. This midpoint of the interval between the amount the respondent stated and the next amount on the payment card (with the exception of zero, which was counted as zero and the highest amount which was counted as this value), represents a very transparent approximation, i.e. used the midpoint. The results in terms of the arithmetic mean of this approach is presented in Chapters 7.2.2 and 7.3.2 for both rail and road noise annoyance, for each country and pooled, and for rural versus urban. These main results from the model are presented below.

## **7.2 Road noise**

### **7.2.1 Descriptive statistics**

The tables below present the results from a number of questions in the survey that gather information on the context in which the questionnaire respondent finds him/herself. A full summary of responses to each question can be found in Annex 2 of this report.

Table 7.1 summarises the respondents' distribution on different annoyance levels for road noise in each country. In each country, approximately half the sample was either slightly or not at all disturbed by road traffic noise. Overall, Germany and Hungary had the most even distribution across annoyance levels whilst the other four countries had significantly fewer respondents in the “extremely annoyed” category. The two Scandinavian countries had the lowest proportion in this category, perhaps reflecting the difficulty in finding locations where the level of noise protection is insufficient to dampen noise levels and minimise noise annoyance.

It is worth noting that when the respondents were asked how annoyed they were about other transport related hazards including dust and dirt, vibrations, accidents and air pollution, (see results in Annex 2, questions 3b-3e), the distribution over the annoyance

---

<sup>5</sup> Hence,  $\lambda$  is comprised of  $\sigma$  and  $\theta$ .

levels for each was not dramatically different. Only vibrations were seen as giving significantly less cause for annoyance than noise.

**Table 7.1. When you are here at your home, how much does noise from the road traffic bother, disturb or annoy you?**

Q3A	When you are here at your home, how much does noise from the road traffic bother, disturb or annoy you?					
	UK Percent	Sweden Percent	Norway Percent	Hungary Percent	Germany Percent	Spain Percent
Not at all	26.46	25.87	16.27	22.00	19.10	28.13
Slightly	26.32	31.77	32.22	17.00	20.22	29.69
Moderately	24.85	19.55	21.85	19.60	20.87	20.90
Very	11.99	14.05	22.81	22.40	19.90	11.13
Extremely	10.38	8.76	6.86	19.00	19.90	10.16

Table 7.2 below shows that the principle consequence of being slightly or more annoyed by traffic noise is that respondents do not open windows as often as they would otherwise do<sup>6</sup>. A more severe consequence, i.e. finding it hard to sleep, is also significant in all countries apart from Spain. One pattern that emerges from these results is that, apart from the sleep-related consequences, Sweden and Norway are least affected by these consequences.

**Table 7.2.. If noise from traffic bothers, disturbs or annoys you, could you say what the consequences are for you?**

	UK	Sweden	Norway	Hungary	Germany	Spain
	Percent	Percent	Percent	Percent	Percent	Percent
Find it hard to sleep	28.35	29.72	38.33	36.12	41.27	8.42
Sleep with earplugs	1.38	3.10	1.32	4.08	11.90	3.26
Do not open windows as often as I would if there were no noise	61.61	40.31	47.81	60.82	61.51	57.88
Hard to concentrate and disturbing when reading or working	13.58	6.98	6.64	23.06	26.59	25.27
Disturbing when watching TV or listening to the radio/music	24.80	12.18	14.42	46.94	31.94	38.86
Disturbing when talking in the telephone	10.83	2.33	8.34	28.78	12.50	8.42
Get headaches/migraine	4.53	1.03	3.98	13.67	11.31	4.35

<sup>6</sup> Note that the respondents are able to answer positively to more than one consequence, hence the column totals do not sum to 100.

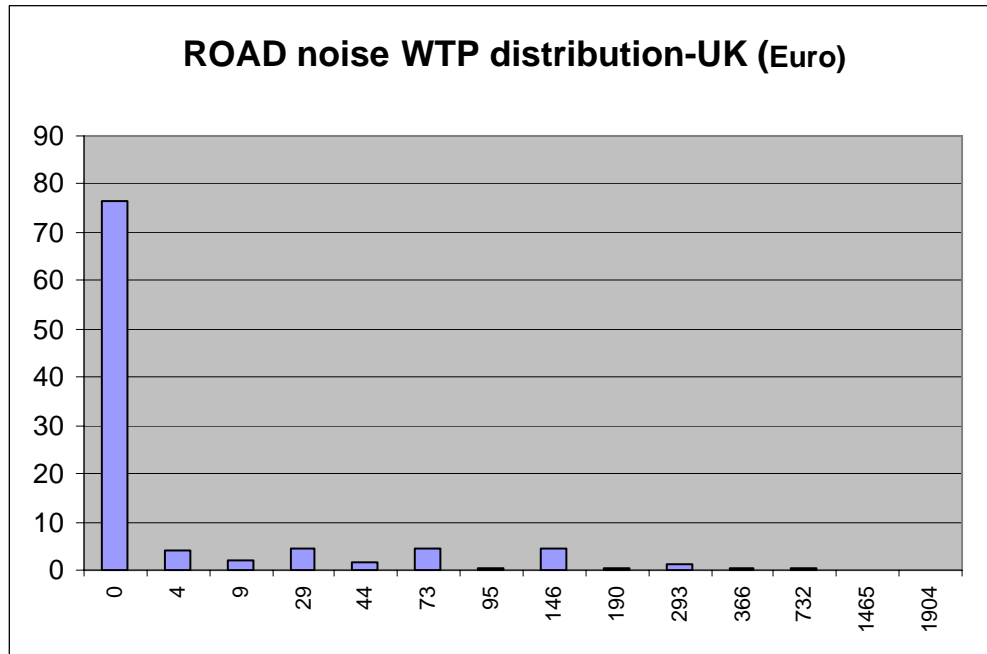
Related to the responses given in Table 7.2, it is likely to be the responses of a further question that asks about subjective sensitivity to noise. These are presented in Table 7.3. In the UK, Sweden, Germany and Norway, at least 80% of the respondents claimed to be either a little or not at all sensitive to noise. Hungary and Spain have a significantly higher percentage (34% and 32%) of respondents that state they are very sensitive to noise.

**Table 7.3. Do you think you are very, a little, or not at all sensitive to noise?**

	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Very sensitive	11.2	10.2	11.6	34.2	10.9	32.4
A little sensitive	46.7	63.4	56.1	44.7	45.4	46.3
Not at all sensitive	40.5	25.6	31.2	21.2	41.4	21.3
I don't know	1.6	0.8	1.1	0.0	2.3	0.0

In the light of the patterns of responses described in Tables 6.1 – 7.3 it is interesting to view the histograms in Annex 2 that show the percentage distribution of stated maximum WTP on the different amounts (or bids) listed on payments cards that were shown to the respondents. On the horizontal axis are the amounts (in their national currencies) on the payment cards (see annex 13). Note that the vertical axis shows the percentage of responses for each amount on the card respondents stated they were maximum WTP. However, their “true” WTP is an amount between the amount they stated and the next amount in the list of amounts shown at the payment card. The UK country values are presented in figure 7.1 below, and are broadly representative of the distribution on different amounts stated for elimination of road noise annoyance.

**Figure 7.1. Percentage of respondents stating different maximum WTP values (in Euro) to avoid road noise annoyance- UK results**



The graph shows zero WTP bids to comprise 77 percent in the UK. This compares with 49%, 83%, 68%, 86% and 77% for Sweden, Hungary, Norway, Germany and Spain, respectively. These high percentages could be explained by the fact that the majority of respondents in each country have either no or little sensitivity to noise.; see Table 7.3. It is perhaps therefore odd that the highest percentage of respondents that are very sensitive to noise, is found in the Hungarian sample, which has the highest percentage of zero WTP responses. Similarly, the Hungarian sample has a higher percentage of respondents that are extremely annoyed from road traffic noise (19%) compared to the other countries (<10%).

Respondents' explanations for the zero WTP bids are summarised in Table 7.4a. The specific reasons that respondents gave vary between countries to some degree. For example, whilst in Sweden the main reason is that the respondent was not disturbed by the road traffic noise, the UK respondents cite the fact that they feel they already pay enough taxes. This latter factor is important as an explanation in all six countries and, combined with the argument that respondents feel that the government should pay, suggest that there is a significant protest bid factor in existence (and, thus, these respondents state zero even if they have a positive WTP). The importance of this protest factor is explored further in the econometric results presented below.

**Table 7.4.a Why did you vote no, or did not answer the WTP question? Protest zero answers are marked in orange.**

Why did you vote no, or did not answer the wtp question?						
	UK	Sweden	Norway	Hungary	Germany	Spain
	Percent	Percent	Percent	Percent	Percent	Percent
I am not that bothered, disturbed or annoyed by the road traffic noise that I would pay	28.15	56.76	24.32	40.81	35.70	8.59
I cannot afford to pay	12.04	18.02	9.53	49.12	27.48	8.79
It is more important to reduce other nuisances from road traffic	3.04	19.82	3.02	18.14	3.93	1.37
The noise reducing measures cannot remove my annoyance from road traffic noise	2.32	6.79	1.74	6.55	3.18	0.59
If you live in a city there will be road traffic noise	2.90	25.22	3.33	17.13	8.04	1.95
I am going to move soon	2.46	4.95	2.28	4.79	6.73	1.17
I already pay enough charges and taxes	33.38	38.73	38.95	31.49	23.93	9.77
Government should pay	31.34	29.27	45.46	64.48	22.06	16.21
Those that cause the noise should pay for it	12.33	19.81	9.53	25.19	8.79	2.34
I do not want more roadwork in the street	1.74	3.60	1.43	4.28	2.99	1.17
The question about paying is too difficult to answer	2.17	2.70	1.90	2.02	1.31	0.20

## 7.2.2 Mean WTP for elimination of road noise annoyance from current levels

Table 7.4.b clearly shows that the estimates are based on a low number of observation, and are, thus, more uncertain, when we estimate WTP for each annoyance level in each country. Even though the limited number of observation could lead to inconsistencies in the estimated values, the results show that for the UK, Germany and Sweden there is an increasing WTP to eliminate road noise with increased annoyance level, whereas this pattern is not so clear for the other countries. However, these other countries (Norway, Hungary and Spain) have significant higher values for “not annoyed” versus the other, higher annoyance levels. Overall, Norway has the highest WTP, followed by Sweden, Spain, UK, Hungary and Germany. These results, but stated in national currencies instead of these PPP-adjusted 2005-euro values, should be used in CBAs of national and transportation projects

**Table 7.4.b: Mean willingness-to-pay (WTP) per person per year to eliminate road noise annoyance, estimated as the midpoint of the interval between the stated amount and the next amount on the payment card. (2005, PPP euro) . Protest zero answers , defined in table 7.4a are omitted (this sample is named “protest d(eleted)”); as opposed to the full sample where all zero WTP answers are included)**

	Protest d	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed	Urban	Rural
Pooled	48,48	8,12	37,08	84,93	84,3	80,51	48,21	48,8
Obs	2709	660	727	521	388	274	1477	1232
UK	42,46	7,58	31,75	53,31	64,77	173,34	28,42	57,05
Obs	469	143	137	108	41	35	239	230
Norway	144,69	12,37	93,37	315,69	213,7	143,05	180	116,53
Obs	416	88	147	83	75	22	182	234
Hungary	15,06	3,44	7,22	15,1	37,23	32,96	17,24	12,94
Obs	523	97	81	85	94	66	258	265
Germany	11,47	0,77	4,69	11,66	19,64	27,59	14,75	7,82
Obs	471	116	106	90	78	81	248	223
Spain	58,25	19,51	92,1	80,46	28,03	52,35	59,85	56,32
Obs	359	92	108	72	43	37	194	161
Sweden	80,57	22,3	53,43	119,91	157,8	272,09	66,46	122,3
Obs	471	124	146	83	57	31	352	119

For TEN-T and other international road projects in Europe, the results from the pooled sample of all countries in PPP-adjusted euros should be used. For the pooled sample (see first line in table 7.4b) WTP increases from not annoyed to slightly annoyed and on to moderately annoyed, but there is very little difference in WTP between the three highest annoyance levels (i.e. moderately, very and extremely annoyed). This could be explained by the fact that people with lower income, and thus lower ability to pay, often live in areas with high road traffic noise levels, since the houses in these areas are cheaper. Therefore, we suggest using the same value, i.e. 85 euros for the three highest noise annoyance levels.

To identify the values that different people attach to the program for noise annoyance reduction we can also partition our sample into sub-samples according to specific characteristics of respondents. For example, we can partition our sample into (i) persons that live in urban areas, and (ii) persons that live in rural areas. Note here that there is no significant difference in WTP to avoid noise annoyance in rural versus urban areas for the pooled sample. Thus, the same values should be used when valuing reduced road noise annoyance in rural and urban areas.

### **7.2.3 Components of WTP and internal validity of the responses**

In chapter 7.2.2 we have attempted to estimate values for a each annoyance level, but the relatively small sample size of the sub-samples has limited this investigation. To overcome the problem of small sample sizes when partitioning our initial sample into

sub-samples, we investigate internal validity of WTP by examining how mean and median WTP change when we add covariates to model (3).

Since WTP follows the Weibull distribution with scale  $\sigma$  and shape  $\theta$ , log WTP can be expressed as:

$$(4) \quad \log WTP = \ln \sigma + \varepsilon = \lambda + \varepsilon,$$

where  $\varepsilon$  follows the type I extreme value error distribution with scale  $\theta$ . To test the internal validity of the WTP responses, we allow  $\sigma$ , and hence  $\lambda$ , to vary across respondents. Specifically, we posit that  $\lambda_i = \mathbf{x}_i \boldsymbol{\beta}$ , where  $\mathbf{x}$  is a 1 x k vector of individual and site specific characteristics and  $\boldsymbol{\beta}$  is a k x 1 vector of unknown parameters.

For the noise annoyance WTP questions, individual characteristics comprise the level of annoyance that a person experiences, while site-specific characteristics include the noise levels.

The aggregate country results are presented in Table 7.5a. The results in these tables are in purchasing power parity (PPP) equivalent Euro. We report the mean WTP and standard error using a discrete mixture model that uses the Weibull distribution to model the positive WTP answers. We report the results for the full sample, including all the zero WTP bids, and a sub-sample which excludes observations with zero WTP on the basis that these do not have a genuine zero valuation of the noise annoyance reduction. They are protesting against some aspect of the annoyance reduction scenario. and are labelled “**protest d(eleted)**” in 7.5a (and other tables in the main report and in the appendices). This protest sub-sample is defined on the basis of their responses to question 10a of the survey as being those who gave one of the reasons for zero WTP highlighted in Table 7.4a, and none of the other reasons. Since the protest sub-sample omits some of the zero bids, the mean WTP results for this group are higher than for the full sample.

**Table 7.5.a Mean WTP/person/year for elimination of road noise annoyance from current levels (PPP-corrected 2005- €)**

Sample	mean (st. error)	mean (st. error)	mean (st. error)	mean (st. error)	mean (st. error)	mean (st. error)
full	27,52 (24.45)	80,38 (15.15)	11,97 (8.37)	8,46 (9.99)	42,16 (38.69)	71,78 (6.79)
protest d	40,44 (23.25)	119,15 (15.02)	13,73 (8.37)	11,19 (9.76)	60,63 (37.88)	86,38 (6.72)



**Table 7.5.b Mean WTP/person/year for elimination of road noise annoyance from current levels (PPP-corrected 2005- €)**

		UK	Norway	Hungary	Germany	Spain	Sweden
	Sample	mean	mean	mean	mean	mean	mean
Not Annoyed	full	15.02	27.52	6.15	8.46	42.16	33.52
	protest d	22.07	40.79	7.05	11.19	60.63	37.07
Slightly annoyed	full	21.95	62.82	6.15	8.46	42.16	43.06
	protest d	32.25	93.11	7.05	11.19	60.63	47.63
Moderately annoyed	full	23.79	114.50	6.15	8.46	42.16	75.24
	protest d	34.94	169.71	7.05	11.19	60.63	83.22
Very annoyed	full	32.64	83.34	16.36	8.46	42.16	90.93
	protest d	47.95	123.53	18.77	11.19	60.63	100.59
Extremely annoyed	full	53.26	77.70	18.21	8.46	42.16	163.53
	protest d	78.24	115.17	20.89	11.19	60.63	180.89

**Table 7.6. Sample Observations for road noise annoyance**

	UK obs	Norway obs	Hungary obs	Germany obs	Spain obs	Sweden obs
full sample	689	627	600	623	512	521
protest d	469	423	523	471	356	471

The following initial observations can be made on the basis of 7.5 b.

- the mean WTP for the two samples (full and excluding protest zeros) increases with the level of annoyance, as one would expect – ceteris paribus – for UK and Sweden. In Hungary the WTP for levels 1-3 is not significantly different from each other but then increases for levels 4 and 5. In Norway, however, the WTP increases over levels 1-3 before falling in levels 4 and 5. The WTP for annoyance levels in Germany and Spain are not significantly different from each other across all annoyance levels.
- Removing the zero WTP according to the Protest definition above leads to an increase of approximately 50% in UK, Norway, Germany and Spain. The difference is only about 10% in Hungary and Sweden.
- There is a large degree of variance between the mean WTP values across the six countries, and the results for Germany and Hungary are significantly lower than for the other countries.

Given the small sub-sample sizes it was not possible to calculate meaningful WTP values for each annoyance level by using the interval data model to analyse the positive responses to the willingness to pay question. Instead, in order to explore whether and what are the differences between urban and rural values, Table 7.7 pools the WTP bids across all annoyance levels according to whether they were taken from urban or rural households.

**Table 7.7. Mean WTP aggregated across all road noise annoyance levels: Urban and Rural locations (PPP € 2005)**

		UK	Norway	Hungary	Germany	Spain	Sweden
		mean	mean	mean	mean	mean	mean
Urban	full sample	20.85	80.38	11.97	9.36	71.96	57.73
	protest d	30.62	119.15	13.73	12.38	103.49	63.86
Rural	full sample	33.73	80.38	11.97	7.04	20.91	91.63
	protest d	49.56	119.15	13.73	9.31	30.07	101.36

Table 7.7 shows that there is no consistent pattern of difference between urban and rural WTP across the six countries. Whilst the UK and Sweden have higher rural WTP, Spain and Germany have higher urban WTP, whilst in Norway and Hungary there is no statistically significant difference between urban and rural WTP.

### 7.2.4 Pooled Analysis

To increase the number of observations and hence the efficiency of the estimates, as well as to be able to provide recommendation for noise annoyance values for policy purposes, we pooled the WTP data. The full sample size is now 3,575 observations. Regressions that check the internal validity of the responses and examine the effect of various factors on WTP have been made on the pooled data. The selection of explanatory variables in the regression analysis reported below was based on our a priori judgement as to which were likely to be most important in determining the WTP values. The results from our favoured interval model are shown in table 7.8<sup>7</sup>. The dependent variable is WTP, and the regression is based on the positive WTP responses only. Thus, the the model tries to explain the variation in WTP for those that had a positive WTP:

The results in table 7.8 show that, with the exception of the variable “slightly annoyed with air pollution”, other factors that might have been thought to confound the WTP results for noise were not significant. This suggests that respondents were able to clearly differentiate between other hazards related to transport and transport noise.

In these regressions, the UK is used as the reference country and dummy variables represent the other countries to take into account the panel characteristics of the data. The analysis shows that these dummies are proven to be statistically significant, so that other variables cannot fully explain the differences in country-specific values. The results confirm the pattern observed in Table 7.5b; that Hungary has the lowest aggregate WTP, followed by Germany, UK and Sweden. Norway has the highest WTP.

<sup>7</sup> The interval model used here uses only the responses from those who gave positive WTP values. To test whether excluding zero bids biased the results we tested the inverse-Mills ratio in a Probit model that used all observations. However, The ratio was not significant, confirming that no sample selection bias exists in the interval model.

**Table 7.8. Pooled regression results: road noise annoyance, interval data model.**

	coeff	t-stat
Intercept	2.6293	6.27
Germany	-0.3438	-1.81
Spain	0.3682	2.15
Norway	0.6461	4.58
Hungary	-0.5804	-3.24
Sweden	0.2223	1.65
slightly annoyed with noise	0.2622	1.74
moderately annoyed with noise	0.4069	2.48
very annoyed with noise	0.4227	2.31
extremely annoyed with noise	0.7837	3.69
Urban	-0.0084	-0.10
Personal Income	0.0091	2.84
Male	0.1178	1.45
Age	0.0168	0.97
Age-squared	-0.0002	-1.00
University	0.2442	2.91
Employed	0.1004	1.12
Own	0.4801	4.95
Room	0.1095	0.97
Bedroom	0.1554	1.82
Very sensitive	0.2164	1.88
Normal hearing	0.0566	0.54
Personally affected	0.1862	1.74
Noise redn measures in locale	0.0199	0.18
Noise worsened since moved in	0.0927	1.05
slightly annoyed with dust	-0.0453	-0.35
moderately annoyed with dust	-0.1000	-0.73
very annoyed with dust	0.1001	0.68
extremely annoyed with dust	-0.1590	-0.81
slightly annoyed with vibrations	0.1008	0.94
moderately annoyed with vibrations	0.0816	0.66
very annoyed with vibrations	-0.0302	-0.19
extremely annoyed with vibrations	-0.1288	-0.52
slightly annoyed with risk of accidents	-0.0505	-0.47
moderately annoyed with risk of accidents	-0.1826	-1.54
very annoyed with risk of accidents	0.1037	0.72
extremely annoyed with risk of accidents	0.0836	0.49
slightly annoyed with air pollution	0.3141	2.78
moderately annoyed with air pollution	-0.0318	-0.24
very annoyed with air pollution	0.1610	1.11
extremely annoyed with air pollution	0.1672	0.81
Weibull Shape	0.9207	
log likelihood function	-2049.80	
obs. > 0	884	

Ownership of the property, as well as income and having a university education, are also significant variables at the 5 % level, having a positive impact as one might expect. Gender is not significant. The fact that noise reducing measures have been adopted locally is, however, significant suggesting perhaps that the introduction of these measures has raised awareness of the noise issue in the neighbourhood, or – more likely - that the introduction of the measures had been as a consequence of a high awareness of noise in the area. As we might expect, where the respondent’s own bedroom is facing the road this has a significant positive influence on the WTP. Being very sensitive to noise positively affect willingness to pay, while having normal hearing seem to not influence our respondents’ value for the program.

WTP for the five different annoyance levels in the pooled analysis is found to behave as economic theory would predict (“not annoyed with road noise” is the reference value and has been excluded in the regression). It rises alongside the level of annoyance such that the highest WTP is found for the “extremely annoyed” annoyance level. The WTP for the five annoyance levels are given in Table 7.9.

**Table 7.9. WTP for road noise annoyance levels elimination and urban-rural locations (PPP € 2005)**

	mean wtp	mean wtp
	full sample	protest deleted
Obs	3575	2709
Urban	38.27	50.50
Rural	38.27	50.50
Annoyance 1	19.22	25.36
Annoyance 2	36.72	48.45
Annoyance 3	41.84	55.21
Annoyance 4	41.74	55.08
Annoyance 5	44.61	58.87

Confirmation of the findings presented in Table 7.7 regarding the lack of significant difference between the urban and rural noise WTP results is provided by the “urban” coefficient which is negative but not significant. As shown in Table 7.9 therefore, mean WTP for urban and rural locations are the same. Note also that the estimates in the tables in this chapter 7.2.3 are used to test the validity of the results we get, and that the WTP numbers comes from the arithmetic mean of the stated amount and the next amount on the payment card.

### **7.2.5. Conclusions**

The noise annoyance survey has generated new country-specific and EU values for WTP to eliminate noise annoyance at five distinct levels of noise annoyance. The regression models show that for some countries there is no significant difference between WTP for the different annoyance levels, which might be due to the low number of observations for each of these subsamples. For the pooled sample (see first line in table 7.4b), the results in table 7.9. confirm that WTP increase, as expected from theory, when going from “not annoyed” to “slightly annoyed” and on to “moderately annoyed”, but there is no significant difference in WTP between the three highest annoyance levels (i.e.

moderately, very and extremely annoyed). This could be explained by the fact that people with lower income, and thus lower ability to pay, often live in areas with high road traffic noise levels, since the houses in these areas are cheaper. Therefore, we suggest using the same value, i.e. 85 euros (see table 7.4b) for the three highest noise annoyance levels. For TEN-T and other international road projects in Europe, one should use these values from the pooled sample of all countries in PPP-adjusted euros. There is no significant difference in WTP between rural and urban areas, so we can use the same value for both urban and rural, i.e. 48 euros per annoyed person per year (independent of annoyance level); see table 7.4b.

## 7.3 Rail Noise

### 7.3.1 Descriptive statistics

Table 7.10 summarises the respondents' distribution on different annoyance levels for rail noise in each country.. It shows that Germany, Hungary and Spain have the most even distribution of respondents across annoyance levels, whilst UK and Norway have more than 70% in the “slightly” and “not at all” annoyed categories; and struggle to identify respondents in the “extremely annoyed” category.

**Table 7.10. Country-specific annoyance levels related to rail noise**

Q4A	When you are here at your home, how much does noise from the railway bother, disturb or annoy you?				
	UK	Norway	Hungary	Germany	Spain
	Percent	Percent	Percent	Percent	Percent
Not at all	41.23	28.04	19.50	19.70	18.47
Slightly	29.53	46.90	17.75	19.95	21.02
Moderately	15.60	12.16	12.00	20.69	20.45
Very	7.24	9.43	24.50	20.20	20.45
Extremely	6.41	3.47	15.25	19.46	19.60

Responses to questions 4b-4c show that other external effects risks associated with rail transport such as accidents and vibration, whilst causing some positive level of annoyance, are not regarded as significant as noise.

Table 7.11 shows that in the sub-sample in each country that claimed to be at least slightly annoyed by rail traffic noise, the effects of noise vary more between countries than in the road traffic noise sub-sample. Whilst in the UK the main consequence is that respondents do not open windows as often as they would otherwise choose to do, in Norway the main consequence is finding it hard to sleep, and in Hungary they are disturbed when watching TV or listening to the radio. The differences may perhaps be explained by different patterns of rail traffic over the 24-hour day. However, a further distinction is evident between the respondents from Hungary, who appear to suffer from a broader range of consequences from rail noise than those in the other countries. There is also a spread of consequences for Spain and respondents from that country are most affected by the most severe consequence: finding it hard to sleep. Note that the

respondents are able to answer positively to more than one consequence, hence the column totals do not sum to 100.

**Table 7.11 If noise from traffic bothers, disturbs or annoys you, could you say what the consequences are for you?**

Q5	If noise from traffic bothers, disturbs or annoys you, could you say what the consequences are for you?				
	UK Percent	Norway Percent	Hungary Percent	Germany Percent	Spain Percent
Find it hard to sleep	21.04	25.55	44.10	31.77	50.14
Sleep with earplugs	1.02	0.99	3.11	9.36	3.70
Do not open windows as often as I would if there were no noise	46.44	18.61	54.66	38.42	39.49
Hard to concentrate and disturbing when reading or working	10.01	7.94	24.84	18.97	23.93
Disturbing when watching TV or listening to the radio/music	18.43	19.60	69.57	30.30	48.72
Disturbing when talking in the telephone	7.98	16.87	47.20	15.02	23.36
Get headaches/migraine	3.34	1.24	10.25	6.40	0.00

As for road noise it is useful to look at respondents' sensitivity to rail noise levels. This evidence is shown in Table 7.12. In all countries the majority of respondents are "a little sensitive to noise". The percentages that are very sensitive to noise vary between countries but are highest in Hungary and Spain.

**Table 7.12 Do you think you are very, a little, or not at all sensitive to noise?**

	UK	Norway	Hungary	Germany	Spain
	Percent	Percent	Percent	Percent	Percent
Very sensitive	13.48	8.19	29.50	14.04	25.57
A little sensitive	45.31	53.35	52.50	42.61	61.08
Not at all sensitive	39.06	38.46	18.00	42.36	12.50
I don't know	2.15	0.00	0.00	0.99	0.85

The WTP results for rail noise are derived from the same econometric models as for road noise. The treatment of zero bids also follows the same system of categorisation. Annex 3 shows the distribution of WTP across the range of bid values. As with the bid distribution for road, the zero bids are very important in each country and are indeed higher in percentage terms than for road for each country apart from Hungary. They are: UK 83%; Norway 74%; Hungary 57%; Germany 83% and Spain 77%.

**Table 7.13.a Mean WTP for elimination of rail noise annoyance from current levels (PPP € 2005)**

	UK	Norway	Hungary	Germany	Spain
	mean	mean	mean	mean	mean
	(st. error)	(st. error)	(st. error)	(st. error)	(st. error)
full	15,87	37,47	39,10	22,79	46,34
	(17.21)	(11.98)	(8.91)	(26.69)	(29.68)
protest d	22,40	49,67	45,87	34,14	48,70
	(16.73)	(11.93)	(8.90)	(26.28)	(29.60)

**Table 7.13.b Mean WTP for elimination of rail noise annoyance from current levels (PPP € 2005)**

		UK	Norway	Hungary	Germany	Spain
		mean	mean	mean	Mean	mean
Not Annoyed	full sample	15.87	31.22	39.10	2.49	46.34
	protest d	22.40	41.39	45.87	3.73	48.70
Slightly annoyed	full sample	15.87	31.22	39.10	31.21	46.34
	protest d	22.40	41.39	45.87	46.76	48.70
Moderately annoyed	full sample	15.87	31.22	39.10	22.51	46.34
	protest d	22.40	41.39	45.87	33.72	48.70
Very annoyed	full sample	15.87	31.22	39.10	22.25	46.34
	protest d	22.40	41.39	45.87	33.33	48.70
Extremely annoyed	full sample	15.87	169.63	39.10	23.26	46.34
	protest d	22.40	224.87	45.87	34.85	48.70

Table 7.13b shows that WTP values cannot be differentiated on the basis of annoyance level in any of the five countries being considered. This may be due to the relatively small sample size for each annoyance level (see table 7.14), or because of a genuine lack of differentiation in preferences between levels. There are differences in the WTP between countries across annoyance levels, though they are perhaps not as great as those for road. For example, the range across countries for WTP to eliminate rail noise from a level of moderate annoyance is roughly €15 - €45 across the five countries, whilst the range for road is €6 - €115.

**Table 7.14. Sample sizes for rail noise annoyance level in five countries (PPP € 2005)**

	UK	Norway	Hungary	Germany	Spain
full sample	360	403	400	406	352
protest d	255	304	341	271	335

In order to explore whether and what are the differences in WTP between urban and rural areas, table 7.15a pools the WTP bids across all annoyance levels according to whether they were taken from urban or rural households. It shows that, as for road noise annoyance, there is no consistent pattern of difference between urban and rural WTP across the five countries. Whilst Spain has higher rural WTP, Norway and Germany have higher urban WTP, whilst in UK and Hungary there is no statistically significant difference between urban and rural WTP.

**Table 7.15a. Mean WTP aggregated across all rail noise annoyance levels: Urban and Rural locations (PPP € 2005)**

		UK	Norway	Hungary	Germany	Spain
		mean	mean	mean	mean	mean
Urban	full sample	15.87	44.02	39.10	32.89	26.22
	protest d	22.40	58.35	45.87	49.27	27.56
Rural	full sample	15.87	27.48	39.10	8.90	89.39
	protest d	22.40	36.43	45.87	13.34	93.92

### 7.3.2 Mean WTP for elimination of rail noise annoyance from current levels

The main results from the 5-country survey (i.e. not performed in Sweden) in terms of WTP for rail noise annoyance elimination are summarized in table 7.15b for each of the countries. Only Germany shows consistently increasing WTP with increasing noise annoyance level, but Norway and Hungary also show a similar pattern (only the value for “very annoyed” is somewhat lower than “moderately annoyed”). However, the low number of observations for the highest annoyance levels in each country could explain some of the observed inconsistency for these high annoyance levels.

**Table 7.15b: Mean willingness-to-pay (WTP) per person per year to eliminate rail noise annoyance**

	Protest d	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed	Urban	Rural
Pooled	39,93	15,08	38,2	59,17	49,58	68,28	46,35	32,01
Obs	1519	429	417	257	228	172	839	680
UK	23,22	5,21	19,96	89,75	15,23	9,78	27,96	14,53
Obs	255	109	79	38	16	12	165	90
Norway	52,89	14,69	51,47	99,98	69,46	483,92	76,22	28,95
Obs	304	105	146	28	19	6	154	150
Hungary	44,19	38,79	38,09	48,93	40,97	59,75	44,9	43,51
Obs	340	75	63	77	81	44	166	174
Germany	37,16	0,37	19,7	50,3	72,84	73,02	65,95	10,23
Obs	271	75	59	49	45	43	131	140
Spain	40,24	21,85	46,82	42,53	46,95	44,1	28,91	62,41
Obs	337	65	70	65	67	67	223	114

The results show that rail noise annoyance is valued lower than road noise, which was also expected based on the exposure-response functions (ERFs) for rail noise, which show the same proportion of annoyed persons as for road noise at a 5 dB lower level. Again we see that WTP increases with increasing annoyance level up until “moderately annoyed” Then there is a small drop in mean WTP for the second highest annoyance level, but then again higher for the extremely annoyed group. This could be due to the same type income effect as described for road traffic noise. Although WTP to avoid noise annoyance in rural areas is lower than in urban areas in each country (except Spain where the opposite is true), the difference is not significantly different.



### 7.3.3 Pooled Analysis

As for the road analysis above we pooled the WTP data for the five countries in order to generate WTP annoyance values for policy purposes. Regression analyses that check the internal validity of the responses and examine the effect of various factors on WTP have again been conducted on the pooled data. The results for an interval model are presented in 7.16a. Table 7.16.a shows that the country dummy variables (compared to the UK, which is the “hidden category”) are significant for Germany, Spain and Norway but not for Hungary. Other model runs have shown, as with the road sample, that the other hazards associated with rail transport, vibration and accidents, are not significant. This reiterates the fact that respondents are able to differentiate their WTP for noise annoyance alleviation from these other hazards. In a model not reported, income was found not to be significant. However, if the respondents judge themselves to be in a good financial situation (“money comfortable”) this has a significant, positive effect on WTP. Other possible proxies for income such as possessing a university degree and having employment are found to be significantly positive. Age is found to have an inverted U-shape in relation to WTP for elimination of noise annoyance. There is, however, no robust positive relationship between the levels of noise annoyance reductions and WTP that we might have hoped for. Finally, gender, (being male) has a positive effect on WTP.

**Table 7.16.a Pooled regression results: rail noise annoyance, interval data model.**

	Coeff	t-stat
Intercept	2.7518	5.08
Germany	0.6323	2.60
Spain	0.8782	3.92
Norway	0.6116	2.99
Hungary	0.2001	1.03
slightly annoyed with noise	-0.2679	-0.18
moderately annoyed with noise	0.0754	0.35
very annoyed with noise	-0.2412	-1.10
extremely annoyed with noise	0.0308	0.13
urban	0.0005	0.00
moneycomfortable	0.6634	5.07
male	0.2174	1.85
age	0.0517	2.18
Age-squared	-0.0007	-2.33
university	0.2807	2.35
employed	0.3182	2.53
own	0.1846	1.17
Weibull Shape	0.8258	30.25
obs.	489	
Log Likelihood function	-1150.96	

**Table 7.16.b Mean WTP for rail noise annoyance levels elimination and urban-rural locations (PPP € 2005)**

	mean wtp	
	full sample	protest deleted
Obs	1936	1521
Urban	31.78	40.45
Rural	31.78	40.45
Annoyance 1	31.78	40.45
Annoyance 2	31.78	40.45
Annoyance 3	31.78	40.45
Annoyance 4	31.78	40.45
Annoyance 5	31.78	40.45

Table 7.16b shows that there is no significant difference between WTP for rail noise annoyance elimination in rural and urban areas in the pooled sample.

### 7.3.4 Conclusions

The noise annoyance survey has generated new country-specific and pooled values for WTP for rail noise. Though the regression analysis of the pooled sample has shown that the survey instrument has generated statistically robust WTP estimates, the results do not reflect differences in WTP between annoyance levels. To avoid making uncertain distributional assumptions, we decided to use the more transparent and reliable approach of the arithmetic mean for determining mean WTP. Thus, for TEN-T and international projects the values of the pooled

The results, presented in tables 7.15 a and b for all countries, and each of the countries, respectively, show that rail noise annoyance is valued lower than road noise. This was expected, based on the exposure-response functions (ERFs) for rail noise, which show the same proportion of annoyed persons as for road noise at a 5 dB lower level. Only Germany shows consistently increasing WTP with increasing noise annoyance level, but Norway and Hungary also show a similar type pattern. Although WTP to avoid noise annoyance in rural areas is lower than in urban areas in each country (except Spain where the opposite is true), the difference is not significantly different.

For the pooled sample (see first line in table 7.15b, the results confirm that WTP increase, as expected from theory, when going from “not annoyed” to “slightly annoyed” and on to “moderately annoyed”, but there is no significant difference in WTP between the three highest annoyance levels (i.e. moderately, very and extremely annoyed). This could be explained by the fact that people with lower income, and thus lower ability to pay, often live in areas with high rail traffic noise levels, since the houses in these areas are cheaper. Therefore, we suggest using the same value, i.e. 59 euros (see table 7.15b) for the three highest noise annoyance levels. For TEN-T and other international rail projects in Europe, one should use these values from the pooled sample of all countries in PPP-adjusted euros. There is no significant difference in WTP between rural and urban areas, so we can use the same value for both urban and rural, i.e. 39 euros per annoyed person

per year (independent of annoyance level); see table 7.15b (40 euros is the midpoint between 46 and 32 euros).

## 7.4 Value of Travel Time Savings (VTTS)

### 7.4.1 Descriptive statistics

The questionnaire also comprised a section where we collected information on the valuation of time to travel to work. This part of the questionnaire was administered to all respondents, except to the Swedish sample that did not have this section. Tables 7.17 – 7.22 report the answers that people who have a job have given in this section of the questionnaire.

The most common approach for assessing the individual utility of time savings is through Choice Experiments methods, which includes Conjoint Analysis. In this method individuals are asked to choose several times between two different alternatives. The characteristics of the alternatives (typically time and costs) are changed, and individuals preferences can therefore be statistically measured. However, our survey uses the same method, Contingent Valuation, for assessing VTTS as used for noise annoyance. The VTTS values derived from this part of the survey should therefore be regarded as an experiment on applying Contingent Valuation for the value of time.

Most respondents use their own car to travel to work, except in Hungary where the majority of people use public transportation. When we focus our attention on people that do not travel by bicycle, or walk, we see that on average our respondents take approximately 20-40 minutes to reach their working place, being Norway the country where commuting time is the shortest, and Spain where people spend on average more than 40 minutes to reach their work. In general, respondents deem that it is likely to expect a 5 minutes delay in their travel to work, except in Norway, where respondents seem more confident in not facing unexpected delays.

**Table 7.17. Thinking about the last journey you made to work, which of the following modes of transportation did you use?**

	UK Percent	Norway Percent	Hungary Percent	Germany Percent	Spain Percent
Driver of own or household's car	45	64	32	34	43
Passenger in car	4	3	2	9	4
Train	8	4	2	2	10
Tram	0	0	21	4	0
Metro	2	1	20	2	4
Bus	3	5	36	9	13
Bicycle	2	9	2	26	0
Walking	4	10	11	15	22
Other	3	6	4	2	4

**Table 7.18. Approximately how many minutes did your last journey to work take, one way?**

	UK	Norway	Hungary	Germany	Spain
obs	348	478	462	334	308
mean	28.57	20.78	40.83	25.07	46.88
median	22.50	15.00	92.13	20.00	20.00
st dev	23.14	28.15	30.00	26.70	343.18
min	1.00	2.00	0.00	1.00	0.00
max	180.00	360.00	999.00	450.00	6039.00

**Table 7.19 If you were to make the exact same journey to work next week, what do you think would be the chance of experiencing an unexpected delay of 5 minutes or more?**

	UK Percent	Norway Percent	Hungary Percent	Germany Percent	Spain Percent
Very likely	30	14	15	17	27
Quite likely	33	23	40	36	33
Quite unlikely	13	24	25	26	13
Very unlikely	17	37	10	18	18
I don't know	7	3	10	3	10

**Table 7.20 About how much did your journey to work cost you, one way?**

	UK	Norway	Hungary	Germany	Spain
Obs	274.00	443.00	395.00	334.00	114.00
Mean	3.90	30.46	310.83	3.63	1.69
Median	3.00	20.00	165.00	3.00	1.45
st dev	4.35	37.41	432.01	5.84	1.28
Min	0.00	0.00	0.00	1.00	0.00
Max	30.00	500.00	5000.00	120.00	7.00

The central part of the section of the question on travel time asked two contingent valuation questions. The first question asked the maximum amount respondents were willing to pay to decrease by 5 minutes their travel time to work, and the second question asked for a 10 minutes reduction in travel time to work.

The results to these questions for the individual countries are reported in Table 7.2.1 and Table 7.22. Again, we considered the answers of the whole sample of respondents who travel to work and then we deleted respondents that were deemed to be protest bids, in a similar way as we did for the noise valuation part of the questionnaire. Annex 3 presents the distribution of WTP. The graphs highlight that for these scenarios about 80% of the respondents in general reported a zero WTP for the time saving scenarios. The sample sizes are given in Table 7.23.

**Table 7.21.. WTP for a 5 minutes travel time reduction (PPP € 2005)**

	UK	Norway	Hungary	Germany	Spain
	mean	mean	mean	Mean	Mean
	(s.e)	(s.e)	(s.e)	(s.e)	(s.e)
full sample	0.13	0.24	0.11	0.03	0.21
	(8.21)	(0.85)	(0.16)	(3.11)	(6.37)
protest d	0.14	0.25	0.13	0.04	0.23
	(8.16)	(0.91)	(0.15)	(3.10)	(6.33)

**Table 7.22. WTP for a 10 minutes travel time reduction (PPP € 2005)**

	UK	Norway	Hungary	Germany	Spain
	mean	mean	Mean	mean	Mean
	(s.e)	(s.e)	(s.e)	(s.e)	(s.e)
full sample	0.23	0.39	0.15	0.05	0.37
	(10.38)	(0.91)	(0.14)	(3.40)	(7.04)
protest d	0.25	0.41	0.19	0.06	0.42
	(10.25)	(0.90)	(0.14)	(3.39)	(6.98)

**Table 7.23. Country-specific Travel Time sample sizes**

	UK	Norway	Hungary	Germany	Spain
full sample	312	424	400	275	278
protest d	278	405	325	231	249

Mean WTP varies between €0.03 (Germany) and €0.24 (Norway) for the 5 minutes reduction (full sample) and between €0.05 and €0.39 for the 10 minutes reduction, for the same two countries. The UK and Hungary are broadly similar, in the middle of this range, whilst Spain is perhaps surprisingly just below Norway WTPs. There is little difference between the full sample and protest deleted WTP. As one would expect, WTP increases with the reduction in travel time. However, the marginal value of time (i.e. value pr. minute) is decreasing with increasing magnitude of the travel timesavings; which refelects diminishing marginal utility of time.

Table 7.24 and Table 7.25 show how the values differ when the individual begins her journey to work in a rural or urban area with a 5 minute and 10 minute travel time reduction, respectively. They show that, apart from the UK, there is no statistically significant difference between the urban and rural WTP. For the UK, the pattern we might expect: rural WTP is higher than urban, perhaps reflecting a longer travel distance, and so more potential for disruption.

**Table 7.24. WTP for a 5 minutes travel time reduction – urban-rural differences**

		UK	Norway	Hungary	Germany	Spain
		Mean	mean	Mean	mean	mean
Urban	full sample	0.10	0.24	0.11	0.03	0.21
	protest d	0.11	0.25	0.13	0.04	0.23
Rural	full sample	0.18	0.24	0.11	0.03	0.21
	protest d	0.20	0.25	0.13	0.04	0.23

**Table 7.25. WTP for a 10 minutes travel time reduction – urban-rural differences**

		UK	Norway	Hungary	Germany	Spain
		mean	Mean	mean	mean	mean
Urban	full sample	0.19	0.45	0.15	0.05	0.37
	protest d	0.22	0.47	0.19	0.06	0.42
Rural	full sample	0.27	0.29	0.15	0.05	0.37
	protest d	0.30	0.30	0.19	0.06	0.42

## 7.4.2 Pooled Analysis

The data for the five countries was pooled into a single analysis. The mean WTP for 5 minutes and 10 minutes travel timesavings for the pooled sample are presented in Table 7.26 and Table 7.27. The tables show that WTP values for the 10 minutes travel time saving are 50% or more than the values for the 5 minute travel time saving, showing that the results pass the scope test, though the difference is not proportionate. There is no significant difference for the values for urban and rural locations.

**Table 7.26. WTP for 5 and 10 minute travel time savings – pooled data**

	5 minute time saving		10 minute time saving	
	full sample	protest d	full sample	protest d
obs	2143	1924	2143	1938
mean wtp	0.14	0.15	0.20	0.24
st error	13.73	13.65	4.50	14.98

**Table 7.27. Urban and rural WTP for travel time savings – pooled data**

	5 minute time saving		10 minute time saving	
	full sample	protest d	full sample	protest d
Obs	2143	1924	2143	1924
Urban	0.14	0.15	0.14	0.15
Rural	0.14	0.15	0.14	0.15

As with the pooled noise annoyance analysis, an interval model was used to investigate the possible determinants of WTP for work travel time reductions (for those that had positive WTP for travel time savings). The results are reported in Table 7.28. They show that only the dummy variables for Spain and Norway are significant, UK being used as the reference. Thus, Norway and Spain have significantly higher WTP than the UK, while the other countries have a WTP of similar magnitude as the UK. The length of travel time has a significant negative relationship with WTP, though diminishing in strength for the longer time saving. However, the cost of the journey has a significant positive relationship for both 5 and 10 minutes of timesavings, as does using a car (as opposed to public transport). These two results seem somewhat contradictory, though the journey cost may pick up an income effect, itself significant for the greater time saving. The need to be at work at a specific time is also significant perhaps reflecting the fact that some jobs carry financial penalties for “clocking in” late.

We have also run a Probit model regression to see what variables explains whether people have a positive WTP rather than a “true” zero WTP. Annex 8 shows that only Germany and Norway have a significantly lower and higher, respectively, probability of having a positive WTP compared to the UK. For the 10-minute travel timesavings there is also a significant higher probability of having a positive WTP with increased travel time to work, increased personal income, and if it is very likely that you have a delay when travelling to work (as opposed to not knowing whether this I likely or not). All of these effects seem plausible.

**Table 7.28. Pooled Analysis of travel time data: Interval model. Variables that have a significant impact (at the 10 % level) on willingness-to-pay (WTP) for travel time savings are shown in grey.**

	WTP for 5 minutes saving		WTP for 10 minutes saving	
	coeff	t-stat	coeff	t-stat
Intercept	-0.271	-0.79	-0.056	-0.22
Germany	0.300	1.01	0.206	0.74
Spain	0.602	2.06	0.378	1.39
Hungary	0.325	1.24	0.139	0.64
Norway	0.349	1.79	0.459	2.65
travel time (minutes)	-0.020	-4.93	-0.011	-3.00
travel cost (euro)	0.088	3.69	0.039	1.92
Car	0.046	0.26	0.449	2.81
Verylikelydelay	0.260	1.64	0.146	1.04
workatspecifictime	0.301	2.01	0.158	1.17
Male	0.011	0.07	-0.166	-1.26
Age	0.000	1.00	0.000	2.00
Income	0.006	1.14	0.003	0.77
Weibull Shape	1.1719		1.1242	
log likelihood	-456.71		-580.04	
Obs	183		226	

### 7.4.3 Conclusions

The VTTS survey has generated values for work travel time savings of 5 and 10 minutes for the five individual countries surveyed using the same method, Contingent Valuation, for assessing VTTS as used for assessing the value of reducing noise annoyance, instead of the more common method used to assess VTTS. The VTTS values should therefore be regarded as results of a methodological experiment of applying Contingent Valuation for the value of time. Hence, new European values for time savings should be based on the meta-analysis conducted in other parts of the HEATCO project, rather than on the new values from this large-scale pilot study focusing on the use of CV-methods in assessing European travel time savings.

Pooled results for these savings using the results corrected for protest zero responses, are €0.15 and €0.24, respectively. This corresponds to a value per hour equal to €1.80 and €1.44, respectively. The country-specific and pooled results may be used to complement existing values used in transport project appraisal. The pooled results are particularly valuable because they benefit from a large sample size that improves their statistical robustness. They are also unique in being generated from a common questionnaire over a number of countries, and so are likely to be particularly useful to TEN-T projects and other international transport infrastructure projects.

## **7.5 Aircraft noise**

### **7.5.1 Descriptive statistics**

Figure 7.2. shows that more than 60% of the respondents claim to be moderately, very or extremely annoyed by aircraft noise. When rural and urban respondents are examined separately<sup>8</sup> the distribution changes significantly: Figure 7.3 shows that the corresponding percentage for rural and urban respondents is 40 and 70 %, respectively. This indicates that we cannot assume that city dwellers have a higher sensitivity limit to noise; much to the contrary. This is also evident by comparing the proportions being “not at all annoyed”, which constitute more than 50 % of the rural respondents.

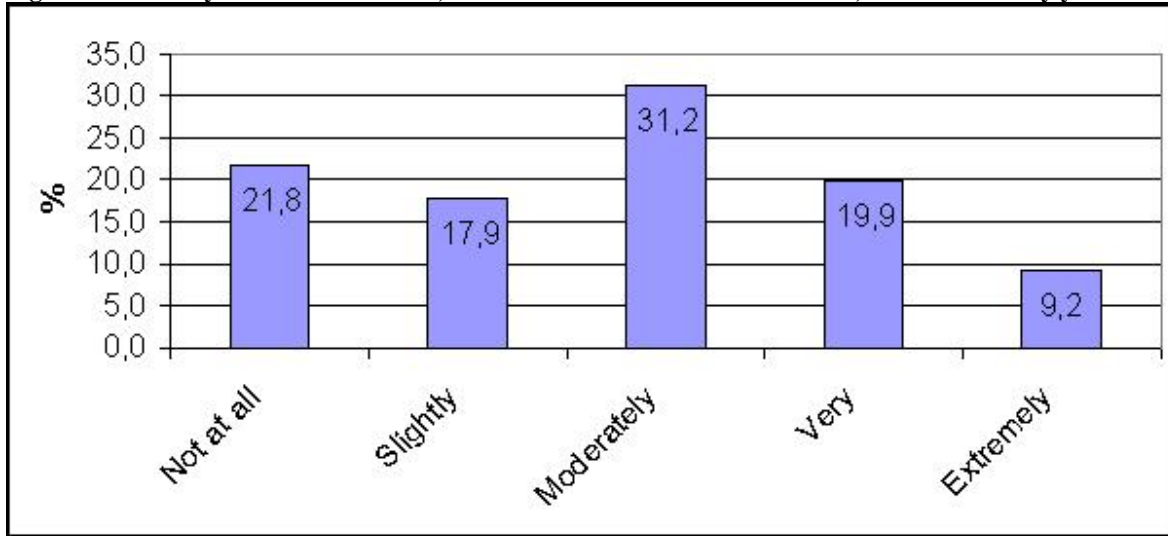
Regarding the reported consequences of aircraft noise, table 7.29 shows that the effect mentioned by most is that they find it disturbing when watching the TV or when listening to the radio. Not being able to open windows as often as they would compared to a situation with no noise annoyance comes only fourth, as opposed to rail and road noise when this was a more frequently reported problem. The effects most people mention in connection with aircraft noise includes that it is disturbing when watching TV, listening to the radio, and talking. Comfort (sleeping undisturbed, and being able to open the windows) comes only second. This may be due to the characteristics of a typical aircraft noise event. It is short in duration but has a high sound pressure level, and, thus, not so disturbing that people would close their windows so often, but it creates difficulties in hearing other people speak.

---

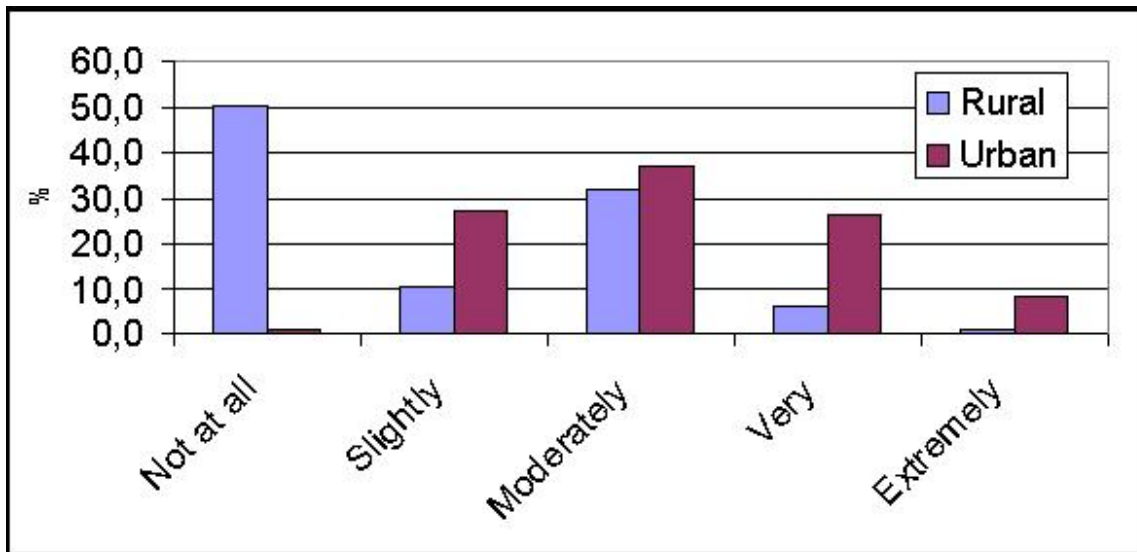
<sup>8</sup> Excluding the answers of the IPs who came from noise level category „7” (Q1A), that means that there is an equal share of rural and urban IPs in the sample (all below 65dB).



**Figure 7.2. When you are here at home, how much does aircraft noise bother, disturb or annoy you?**



**Figure 7.3. When you are here at home, how much does aircraft noise bother, disturb or annoy you? Answers split between the rural and the urban sample**



The respondents were also asked about their noise sensitivity (see Table 7.30). Slightly less people claimed to be very sensitive to noise compared to the Hungarian road and railway noise survey, but 24% is still more than double of the average value (11%) measured in the other countries.

**Table 7.29. What are the consequences of noise to you? <sup>9</sup>**

Consequences	Percent
Find it hard to sleep	33,0
Sleep with earplugs	2,4
Do not open windows as often...	30,2
Hard to concentrate	25,0
Disturbing when watching TV/listening to radio	63,9
Disturbing when talking	45,7
Get headaches/migraine	14,8
Palpitation	7,9
Other	22,1

**Table 7.30. Do you think you are very, a little or not at all sensitive to noise?**

	Road/railway noise	Aircraft noise
<b>Very</b>	34%	24%
<b>Slightly</b>	45%	52%
<b>Not at all</b>	21%	24%

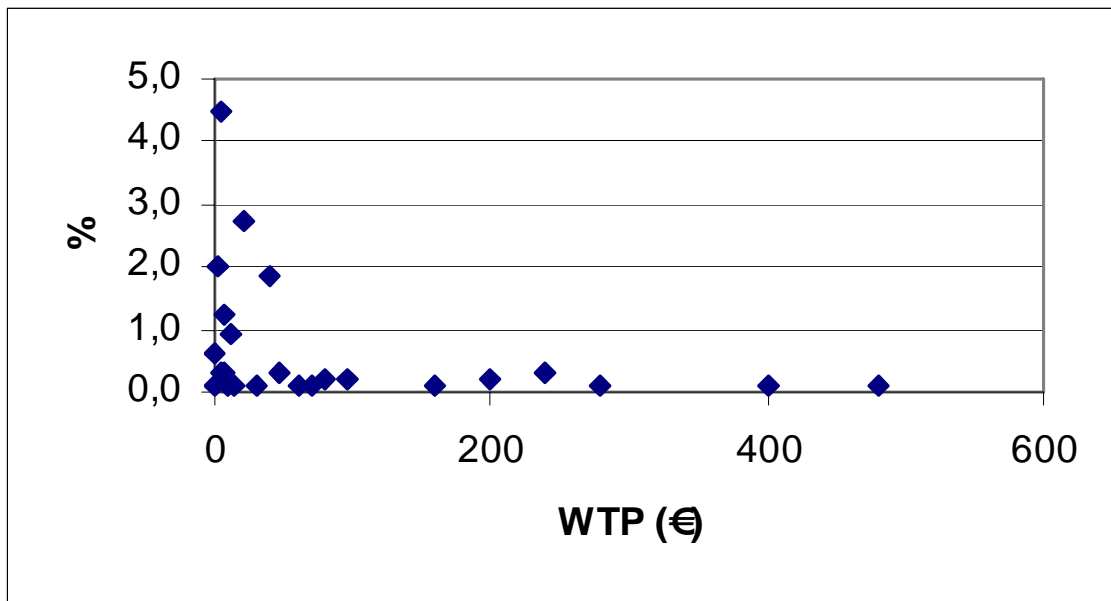
## 7.5.2 Statistical analysis

Figure 7.31 shows the distribution of the WTP values, excluding the zero WTPs (71.7%) and the “do not know/do not reply” (11.5%) answers. If the latter are included in the examination as zero WTPs (as it was done in the railway and road noise survey) the value becomes higher, 83.2 %.

---

<sup>9</sup> Respondents were allowed to state more than one consequence, so the answers do not add up to 100%.

Figure 7.31. WTP distribution, excluding the zero WTPs (71.7%) and the don't knows (11.5%)



In Table 7.32 the main reasons for zero WTP are listed. The main emphasis in this survey has shifted from the “government should pay” to “those who cause the noise should pay”. The reason for this might be that while the supply of road and railway infrastructure is seen as a task of the government, air traffic is regarded as the business of a privileged few. The second most important reason for zero WTP is that people cannot afford to pay; the argument about the government comes only third.

Table 7.32. Why did you vote no to pay, or why did you not answer the WTP question?<sup>10</sup> Protest zero WTP responses are marked in orange

Reasons for zero WTP	Percentage
I am not that bothered, disturbed or annoyed by noise that I would pay	27,9
I cannot afford to pay	38,3
It is more important to reduce other nuisances from aircraft traffic	5,9
<i>These measures cannot remove my annoyance from aircraft noise</i>	<i>7,1</i>
If you live in a city there will be noise	6,3
<i>I am going to move soon</i>	<i>2,7</i>
<i>I pay enough charges and taxes already</i>	<i>20,1</i>
<i>Government should pay</i>	<i>32,4</i>
<i>Those who cause the noise should pay</i>	<i>42,6</i>
<i>The question is too difficult to answer</i>	<i>6,6</i>
Other reasons	5,7

Table 7.33 shows the WTP for the rural sample, and the percentage of protest zeros. Table 7.34 contains the same values for the urban sample. As described earlier, the

<sup>10</sup> Respondents were allowed to state more than one reason. Thus, the answers do not add up to 100%.

protest group was created in order to be able to study the results in light of “true” zeros and “protest” zeros. Those answers were considered to be “true” zeros, where the reason for zero WTP was either that the respondent is not annoyed, bothered or disturbed by aircraft noise, or he/she cannot afford to pay, or he/she thinks it s more important to remove other nuisances, or he/she agreed that “if you live in a city there will be aircraft noise.” The mean WTP values are much lower than in the CV survey of rail and road noise in Hungary.

**Table 7.33. Results for each of the annoyance levels. Rural sample. WTP is expressed in PPP converted 2005-euros.**

	<b>Aircraft noise annoyance level - Rural</b>				
	Not annoyed	Slightly	Moderatly	Very	Extremely
Mean wtp (PPP-converted euro)	2.1 €	19.8 €	9.8 €	15.6 €	0 €
Median wtp (PPP-converted euro)	0 €	0 €	0 €	0 €	0 €
Mean wtp (original values)	304 Ft	2818 Ft	1391 Ft	2220 Ft	0 Ft
Median wtp (original values)	0 Ft	0 Ft	0 Ft	0 Ft	0 Ft
Real zero	77 %	64 %	56 %	20 %	33 %
Protest zero	13 %	7 %	24 %	40 %	67 %
WTP> 0 (n)	22	13	25	10	0
Total no of obs (N)	205	44	131	25	3

**Table 7.34 Results for each of the annoyance levels. Urban sample. WTP is expressed in PPP corrected 2005-euros.**

	<b>Aircraft noise annoyance level - Urban</b>				
	Not annoyed	Slightly	Moderatly	Very	Extremely
Mean wtp (PPP-converted euro)	2.6 €	14.3 €	6.1 €	13.8 €	4.0 €
Median wtp (PPP-converted euro)	1 €	0 €	0 €	0 €	0 €
Mean wtp (original values)	375 Ft	2039 Ft	869 Ft	1959 Ft	570 Ft
Median wtp (original values)	250 Ft	0 Ft	0 Ft	0 Ft	0 Ft
Real zero	50 %	63 %	55 %	52 %	47 %
Protest zero	0 %	22%	27 %	34 %	34 %
WTP> 0 (n)	2	19	31	23	16
Total no of obs. (N)	4	127	168	165	85

## 8.0 Comparison with previous studies

Our results can be compared with previous SP studies of transport noise and VTTS. For transport noise the dominant method has been Hedonic Pricing (HP), but in most cases it is impossible to disentangle the impact of noise on property prices from other external effects of the transport modes, like air pollution, barrier effect and soiling from road traffics; accident risk and vibration from rail; and accident risk of air traffic. Therefore, makes comparisons of HP studies with our SP study of noise only difficult. Thus, we will only consider previous SP studies in this comparative exercise. For VTTS, we will also only consider SP studies in order to minimize differences due to different valuation methodologies.

### 8.1 Road noise

Most environmental valuation studies of noise have used the Hedonic Price (HP) method. The advantage of HP is that it looks at real behaviour. However, very often it is difficult to disentangle the effect of noise on property prices from other impacts fro road, rail and aircraft transport. Navrud (2004) list the few Stated Preference studies that have been conducted for road traffic noise, but only a few of the value avoidance of noise annoyance. Many of them value a percentage reduction in noise level, which is very difficult for the respondent to relate to, and only two of them link WTP to the new scale of five annoyance levels; see table 8.1. Compared to our results, higher-income countries like Norway and Sweden produce estimates that are of the same magnitude as the French study. However, for all other countries the values are much lower than those shown in table 8.1, and also much closer (and not significant) between noise annoyance categories.

**Table 8.1. WTP to avoid road noise annoyance. Review of stated preference studies reoporting WTP for different annoyance levels according to the new 5-level scale.**

<b>Annoyance level</b>	<b>Lambert et al (2001) Rhones-Alpes Region, France 2001-euro</b>	<b>Bue-Bjorner et al (2003) Copenhagen Denmark 55-75 dbA 2003-euro</b>
Extremely	130	361
Very	101	257
Moderately	78	198
Slightly	61	85
Not at all annoyed	47	45

Source: Navrud (2004)

### 8.2 Rail noise

Only two original valuation studies on rail noise have been identified; both of them Hedonic Price (HP) studies. However, the CV scenario, annoyance level questions and noise exposure data of Navrud (2000) also include railway noise, but WTP is only expressed for the overall package of noise mitigating measures.

The two HP studies are:

- i) In the Gamlebyen region in Oslo (near the Oslo Central Railway Station) Strand and Vågnes (2001) used both HP and a Delphi study (using a Multi Criteria Analysis technique) of real estate brokers to value rail noise. Using distance to the rail tracks as a proxy for noise level the HP study found that a doubling of the distance to the tracks would mean a 10 % increase in property prices. In the Delphi study, a mean WTP of 2.000 1996 NOK per meter increased distance to the track. All results are for apartments. For single family and detached houses the impact is 20-27 % higher than for apartments.
- ii) A HP study on railway noise in Sydney, Australia (Holsman and Paparoulas 1982) found that the occurrence of railway noise in areas with no benefits from increased accessibility reduce property prices by 10 %.

### **8.3 Aircraft noise**

Few SP studies have been conducted on aircraft noise, and to our knowledge none that present WTP in terms of annoyance levels. Pommerehne (1988) conducted parallel HP and CV studies on aircraft noise in Basel, Switzerland, and found a mean WTP per household per month of 22 and 32 CHF (1 euro = 1.47 CHF), respectively. Navrud (2000) conducted a CV survey of persons exposed to aircraft noise and other sources (i.e. road, train and rifle range) in the communities of Oslo and neighbouring Ullensaker (where the Oslo Airport is located). He found a mean WTP of about 1000 NOK per household per year (1 NOK = 0.12 euro) for a program of measures that would eliminate noise from all sources people were annoyed by. In the community of Ullensaker the combination aircraft and rifle range noise seems to give the highest WTP (1374 NOK/household/ year), while the combinations aircraft and road traffic noise and the addition of railroad noise gave the lowest WTP (about 685 NOK/household/year). Thune-Larsen (1995) performed in-person interviews of 473 respondents around the Oslo Airport Fornebu (now closed, and replaced by the new Oslo Airport Gardermoen) using both CV and CA techniques to value aircraft noise. Scenarios with percentage reductions in noise levels were used (i.e. scenarios with different percentage change in noise levels were used in the CA, whereas a 50 % reduction scenario was used in the CV question). Mean WTP per household per month of 91-460 NOK and 104-353 NOK were estimated from the CA and CV method, respectively.

Baarsma (2000) conducted a study of aircraft noise in 1998 around the Schiphol airport outside Amsterdam (The Netherlands) using CA and two other valuation methods named the welfare evaluation method and the well-being evaluation method. Baarsma op. cit concludes that the “well-being evaluation method”, based on the Cantril measure of well-being that uses respondents’ answers to a “ladder-of-life questions”, works the best in terms of significant relationships with the measure for noise nuisance used (i.e. Kosten units (Ku)<sup>11</sup>; an “objective” measure of aircraft noise nuisance developed in the 1960s for the Netherlands by the Kosten Committee, named after the chairman: late professor Kosten). The results are presented in terms of the compensation required per household

---

<sup>11</sup> The measure of noise nuisance levels from aircraft noise differs between countries, e.g. the US use Noise Exposure Forecast (NEF), the UK use Noise and Number Index (NNI), and the Netherlands use the Kosten unit (Ku).

per month if noise nuisance increase. For households with a net monthly income of 5000 DFL (1 euro = 2.20 NLG) living in a house with no noise insulation, a rise in noise level from 20 to 30 Ku would require a compensation of 215 NLG per month. The corresponding value based on information about living expenses (1,500 NLG/month) and asking price for the dwelling (400.000 NLG) instead of household income, is 357 NLG.

Faburel (2001) conducted a CV study of the benefits from eliminating aircraft noise annoyance around the Paris-Orly airport in France by a public program involving modification of flight paths. More than 600 residents were interviewed in 1999. In the most noise exposed areas ( $L_{Amax} > 80$  dBA), the annual, mean WTP per person was 83 euros while in the least exposed areas ( $L_{Amax}$  between 70 et 75 dBA), the WTP was 11 euros.  $L_{Amax}$  was used since this noise measure had the highest correlation with annoyance. Noise exposure, noise annoyance as well as non-acoustic variables as level of education and sensitivity to noise, had a significant effect on WTP.

When comparing the results from these studies in France, Holland, Norway and Switzerland with our results for Hungary, one should keep in mind the much lower income level in Hungary. Thus, one should expect the values from Hungary to be lower, which indeed also seem to be the case. However, we cannot make a close comparison since the results from the previous studies are not linked to a noise annoyance scale.

#### **8.4 Value of Travel Time Savings (VTTS)**

The value of time is one of the most significant values for Cost-Benefit Analysis (CBA) within the transport sector. Hence, it has for many years been a feature of transport research. The first development of theory started in the 1960s, and the first empirical studies were conducted in the United States (Warner, 1962; Lisco, 1967; Thomas, 1967) and in Great Britain (Beesley, 1965; Quarmby, 1967). During the last decades many empirical studies have been conducted, first by developments in disaggregated choice modelling and subsequently by experimentation with and acceptance of data sources other than those based on actual behaviour (Wardman, 2001). A wide range of other time related values such as time preferences (e.g. walking, access, waiting, delay, searching, interchange) have also been amassed, in addition to the in-vehicle time.

For passenger travel the following differentiation of the values of travel time should be made where the data permits:

- Travel purpose (business; commuting; leisure)
- Mode (car; bus; rail; air, inland waterways)
- Travel distance (urban/local; inter-urban/long distance)
- Travel condition (expected travel time; delay time; in-vehicle/walk/wait).

The UNITE (UNification of accounts and marginal costs for Transport Efficiency) project, which was a part of the European Union's Fifth RTD Framework Programme (1998-2002), had three core objectives: i) to develop pilot transport accounts for all modes, for the EU15 and additional countries (Estonia, Hungary and Switzerland). ii) to provide a comprehensive set of marginal cost estimates relevant to transport contexts

around Europe. and iii) deliver a framework for integration of accounts and marginal costs, consistent with public finance economics and the role of transport charging in the European economy. Based on a review of state-of-the-art studies the UNITE project suggested values for different travel modes and purposes. The reviewed state-of-the-art studies were the Dutch national value of time studies 1986 – 1995 (Hague Consulting Group 1998), the UK value of time study 1994 (Hague Consulting group 1996), and the Swedish national of time study (SNRA, 1996).

**Table 8.2. Values of one hour saved travel time**

Transport segment	Travel purpose	Values of one hour saved travel time from relevant Value of Time Studies <sup>12</sup>			
		HCG 1994 (Euro 1998)	HCG 1996 (Euro 1998)	SNRA 1997 (Euro 1998)	UNITE Values (Euro 1998)
<b>Car/motorcycle</b>	General value		6,7	9,31	
	Business	21,23	21,00	11,95	21,00
	<b>Commuting / private</b>	<b>5,53</b>	<b>6,37</b>	<b>3,91</b>	<b>6,00</b>
	Leisure / holiday	3,79	5,08	3,10	4,00
Coach (inter – urban)	Business	21,23			21,00
	Commuting / private	5,95		5,40	6,00
	Leisure / holiday	3,08		4,37	4,00
Urban bus / tramway	Business	21,23			21,00
	Commuting / private	5,95		4,94	6,00
	Leisure / holiday	3,08		3,22	3,20
Inter-urban rail	General value		4,97	8,50	
	Business		18,43	11,95	21,00
	Commuting / private		6,48	6,21	6,40
	Leisure / holiday		4,41	4,94	4,70
Air traffic	Business			16,20	28,50
	Commuting / private			10,11	10,00
	Leisure / holiday			10,11	10,00

Sources: Valuation Conventions for UNITE (Nellthorp, J.et al, 2001)

In table 8.2, the “Commuting/private car” travel values are those that are most comparable to the transport task we have looked at. The results from our pooled model of results from Germany, Hungary, Norway, Spain and the UK of €1.44 and €3.00, 2005-

<sup>12</sup> HGC1994, Hague Consulting Group (1994), *UK Value of Time Study*  
SNRA 1997, The Swedish national value of time study (1997)



euros per hour from the 5 and 10 minutes travel time savings CV scenarios, respectively, are significantly lower than the values in table 8.2. Note that the values in table 8.2 are in 1998-euros. Thus, if we had adjusted these to 2005-euros the difference would have been even greater. There could be several reasons for this divergence. Most of the studies underlying the values in table 8.2 are based on CE and CA, which very often produce higher estimates than the CV method that we used. There is also a larger degree of uncertainty in the values in table 8.2, since these are based on a benefit transfer / generalisation exercise based on an expert assessment of results from several studies undertaken at different points in time using different methodologies, whereas in HEATCO WP 5 we used the same methodology in all countries at the same point in time. The relative relationship between the values for different transport modes and tasks that can be calculated from table 8.2. (see e.g. Wardman (2001, table 2) for such calculations based on a meta analysis of UK VTTS studies) could serve as guide to construct new values based on the VTTS study we have performed here.

## 9.0 Conclusions and recommendations

This six-country Contingent Valuation (CV) survey seem to have performed well, and has created new economic values for the selected externalities; noise annoyance from road and rail (and to some extent also aircraft noise, but this was only valued in Hungary), and for travel timesavings (going by car or public transport to work). The study provide original new values for each country to be used in national cost-benefit analysis of transportation projects, whereas the pooled results for all countries could be used for TEN-T project and other international transportation projects in Europe.

The value of travel time savings (VTTS) estimated is only for journeys going to work, and estimated by using the same valuation method as used for valuing noise annoyance from rail and road since all valuation scenarios were presented in one questionnaire. The VTTS practice should therefore be regarded as an experiment on applying Contingent Valuation for the value of time. Until this methodology is more throughout tested for other aspects of travel time savings, we recommend that new European values for time savings should be based on the meta-analysis conducted in other parts of the HEATCO project, rather than on the new values from this large-scale pilot study focusing on the use of CV-methods in assessing European travel time savings.

The results from the survey for road traffic noise annoyance did not show any significant differences between the most annoyed annoyance categories for the national surveys; hence the recommended values are equal for the highly annoyed and annoyed categories. This result might be due to the low number of observations for each of these subsamples. The pooled sample confirm that WTP increases, as expected from theory, when going from “not annoyed” to “slightly annoyed” and on to “moderately annoyed”. There is however no significant difference in the WTP between the three highest annoyance levels (i.e. moderately, very and extremely annoyed). This could be explained by the fact that people with lower income, and thus lower ability to pay, often live in areas with high road traffic noise levels, since the houses in these areas are cheaper. Therefore, we suggest using the same value, for the highest noise annoyance levels. These values from the pooled sample could be used for national values by PPP-adjusting the Euro values.

The pooled sample for rail noise annoyance confirm that WTP increase, as expected from theory, when going from “not annoyed” to “slightly annoyed” and on to “moderately annoyed”. However, neither for rail noise annoyance is there significant difference in WTP between the three highest annoyance levels (i.e. moderately, very and extremely annoyed). This could, similarly as for the case of road noise annoyance, be explained by the fact that people with lower income often live in areas highly exposed to rail noise. Therefore, we suggest using the same value for the highest noise annoyance levels. These values should be used as national values by adjusting the euro values by PPP. There is no significant difference in WTP between rural and urban areas for neither road nor rail, hence the same values for both urban and rural, independent of annoyance level, can be used.

For the noise annoyance values to be used with the 4-level noise annoyance scale we have exposure-response functions (ERFs) for, we recommend that the average value of the two highest levels in the new 5-level annoyance scale (i.e. “Extremely” and “Very”) are merged to provide a value for the highest level in the 4-level scale (“Highly annoyed”). For the remaining three annoyance levels the values are assumed to be the same as for the 5 level annoyance categories. Moreover, we recommend not to apply amounts for people stating that they are “not annoyed” by noise for surveyed noise source. This means that we only recommend values for three categories, namely i) Highly annoyed ii) Annoyed and iii) Little annoyed.

Table 9.1 and 9.2 show the recommended values for the three categories for noise annoyance from rail and road.

**Table 9.1. Recommended values for annoyance categories for road (2005-€pr. annoyed person pr. year)**

<b>Annoyance category</b>	<b>European values (2005-€pr. annoyed person pr. year)</b>
Highly annoyed	85 €
Annoyed	85 €
Little annoyed	37 €
Not annoyed	0 €

**Table 9.2. Recommended values for annoyance categories for rail (2005-€pr. annoyed person pr. year)**

<b>Annoyance category</b>	<b>European values (2005-€pr. annoyed person pr. year)</b>
Highly annoyed	59 €
Annoyed	59 €
Little annoyed	38 €
Not annoyed	0 €

## REFERENCES

- Baarsma, B. 2000: Monetary Valuation of Environmental Goods: Alternatives to Contingent Valuation. Ph.D. thesis University of Amsterdam, The Netherlands. Tinbergen Institute Research Series no. 220. 302 pp.
- Beesley, M. E., 1965. The Value of time spent in travelling: some new evidence. *Economica* 32, 174 – 185.
- Bue-Bjørner, T., T. Lundhede and J. Kronbak 2003: Valuation of Noise Reduction – Comparing results from hedonic pricing and contingent valuation. AKF Forlaget, October 2003, Copenhagen, Denmark, 148 pp.
- de Jong. (1996), *Freight and Coach VOT Studies*. Paper presented at the PTRC Seminar on the Value of Time, Wokingham, UK.
- Dillen, J.L, Algers,S., 1999. Further research on the national Swedish value of time study. In: Meersman, H., Van de Voorde, E., Winkelmann, W. Eds), Proceedings of the Eight World Conference on Transport Research, vol 3. Transport Modelling/Assessment. Pergamon Press, Amsterdam, pp. 125- 148
- Faburel, G. 2001: Le bruit des avions - Evaluation du coût social. Presses Ponts et Chaussées (in French) University of Paris 12, France.
- Gunn, H.F., Tuinenga, J.G., Cheung, Y.H.F., Kleijn, H.J., 1999. Value of Dutch travel time savings in 1997. In: Meersman, H., Van de Voorde,E., Winkelmann, W. Eds), Proceedings of the Eight World Conference on Transport Research, vol 3. transport Modelling/Assessment. Pergamon Press, Amsterdam, pp. 163 - 189
- Hague Consulting Group, 1999, Accent Marketing and Research and Department of the Environment, Transport and the Regions, 1999. The Value of Travel on UK Roads. The Hague, Netherlands.
- Hague Consulting Group, 1996. *The 1985-1996 Dutch VOT Studies*. Paper presented at the PTRC Seminar on the Value of Time, Wokingham, UK.
- Hague Consulting Group, 1994, *UK Value of Time Study*.
- Hague Consulting Group, 1990. The Netherland's value of time study: final report. Report to Dienst Verkeerskunde, Rijkswaterstaat, The Hague.
- Laird, J.J., Nellthorpe, J., Mackie, P.J., HEATCO Deliverable 2, State-of-the-art in project assessment.
- ISO, 2001. Draft Technical specification 15666. ISO/TC 43/SC

- Klæbo, R. 2006: Applying ordinal logit models to environmental exposure and comparing results. Note. Institute of Transport Economics, Oslo.
- Lambert, J. 2000: Using Monetary Values of Noise for Transport Policy Decisions: Current Practice and Future Developments in France. INRETS-LTE, France. Paper in *Internoise 2000 Proceedings*, Vol. 5 pp. 3413-3418, Nice, August 27-30, 2000.
- Lisco, T. E., 1967. The value of commuters travel time: a study in urban transportation. Ph.D Thesis, Department of Economics, University of Chicago.
- Miedema, H.M.E. and C.G.M. Oudshoorn, 2001. Annoyance from Transportation Noise: Relationships with Exposure Metrics DNL and DENL and Their Confidence Intervals. *Environ Health Perspect* 109:409-416 (TNO-PG, Leiden, The Netherlands).
- MVA Consultancy, ITS University of Leeds, TSU University of Oxford, 1987. Value of travel time savings. Policy Journals, Newbury, Berks.
- Navrud, S. 2004: Current Practice and Future Perspectives of the Economic Valuation of Transportation Noise within the EU. Invited paper for the Acoustica 2004 conference, Guimaraes, Portugal.
- Navrud, S. 2000: Economic benefits of a program to reduce transportation and community noise – A contingent valuation survey. In *Proceedings of Internoise 2000*, Nice, France.
- Nellthorp, J.; Sansom, T.; Bickel, P.; Doll, C.; Lindberg, G. 2001. Valuation Conventions for UNITE (Unification of accounts and marginal costs for Transport Efficiency) of Competitive and sustainable growth programme, contract: 199-AM.11157, funded by the European Commission.
- Pommerehne, W.W. 1988. *Measuring Environmental Benefits: A Comparison of Hedonic Technique and Contingent Valuation* in by Dieter Bos, D. M. Rose and C. Seidl (eds.): *Welfare and Efficiency in Public Economics*, Springer; Berlin, Heidelberg, New York:
- Persula, M., Kurri, J., 1996. Value of time research in Finland. In: Paper presented at PTRC International Conference on Value of Time, Wokingham, Berkshire.
- Quarmby, D. A., 1967. Choice of travel mode for the journey to work. *Journal of Transport Economics and Policy* 1, 273 – 317.
- Ramjerdi, Farideh; Lars Rand, Inger-Anne F. Sætermo, Kjartan Sælensminde 1997: The Norwegian Value of Time Study .Report Insitute of Transport Economics (TØI), Oslo ISBN 82-480-0035-4.

SIKA, 1999. *Översyn av samhällsekonomiska kalkylprinciper och kalkylvärden på transportområdet. ASEK. Redovisning av regeringsuppdrag, juni 1999.* (In Swedish), Report 1999:6, Statens Institut för kommunikationsAnalys (SIKA ), Stockholm,

Small, K. A., Noland, R., Chu, X., Lewis, D. 1999: Valuation of travel-time savings and predictability in congested conditions for highway user-cost estimation. National Cooperative Highway Research Program. Report 432, Transportation Research Board, Washington DC

Thomas, T.C., 1967. The Value of Time for Passenger cars: A theoretical Analysis and Description of Preliminary Experiments. Stanford Research Institute.

Thune-Larsen, H. 1995: Flystøyavgifter basert på betalingsvillighet. (In Norwegian) TØI-report 289/1995. Institute for Transport Economics (TØI), Oslo. 86 pp.

UNITE (UNification of accounts and marginal costs for Transport Efficiency). The European Union's Fifth RTD Framework Programme (1998-2002).  
<http://www.its.leeds.ac.uk/projects/unite/>

Warner, S. L., 1962 Stochastic Choice of Mode in Urban Travel: A Study in Binary Choice. North Western University, Illinois.

Wardman, M., 2001: A review of British evidence on time and service quality valuations. Transportation Research Part E37. p 107 – 128.

**Internet pages:**

<http://heatco.ier.uni-stuttgart.de/>

<http://www.its.leeds.ac.uk/projects/unite/>

# Annexes

## Table of contents:

<b>Annex 1: Socio-economic data for survey countries and regional locations .....</b>	<b>64</b>
<b>Annex 2: Survey Responses.....</b>	<b>71</b>
<b>Annex 3: Road and rail noise maximum WTP-distribution.....</b>	<b>99</b>
<b>Annex 4: WTP for elimination of road and rail noise annoyance at the mid point interval calculated in local currencies.....</b>	<b>104</b>
<b>Annex 5: WTP from mid point estimate for road divided into urban and rural for annoyance levels – values in Euro (PPP – 2005) and national currencies .....</b>	<b>105</b>
<b>Annex 6: WTP from mid point estimate for rail divided into urban and rural for annoyance levels – values in Euro (PPP – 2005) .....</b>	<b>107</b>
<b>Annex 7: Value of time scenario: Travel to work – original currencies.....</b>	<b>109</b>
<b>Annex 8: Road regression analysis – Model results.....</b>	<b>114</b>
<b>Annex 9: Rail regression analysis – Model results.....</b>	<b>116</b>
<b>Annex 10: Pooled analysis – Probit Model – for time savings WTP .....</b>	<b>117</b>
<b>Annex 11: Focus group guide.....</b>	<b>118</b>
<b>Annex 12: Questionnaire – final version.....</b>	<b>125</b>
<b>Annex 13: Payment Cards.....</b>	<b>145</b>
<b>Annex 14: Questionnaire aircraft noise annoyance survey – Hungary .....</b>	<b>158</b>

## Annex 1: Socio-economic data for survey countries and regional locations

Table A1-1: Socio-economic data for survey countries and regional locations - Germany

Germany					
Country average			County of Nordrhein-Westfalen Rural sample (5) is taken from that county		
Average tax rate	-		-		
Personal net income (2003)	16,842 Euro		17,747 Euro		
Number of inhabitants (31.12.04)	82,500,849		18,075,352		
Gender (31.12.04)	Male: 48.91 %	Female: 51.09 %	Male: 48.70 %	Female: 51.30 %	
% University degree (incl. Fachhochschule = university of applied science degree) (March 2004)	12.12 %		9.52 %		
Unemployment rate	11.1 % (31.12.2005)		11.2 % (2004)		
Age	45.4 (31.12.2003)		46.0 (31.12.2004, calc. on 5-year group means)		
Marital status, % married (31.12.2004)	All: 44.84 %		Males: 46.7 %	Females: 44.6 %	All: 45.6 %



**Table A1-2: Socio-economic data for survey countries and regional locations - Hungary**

<b>Hungary</b>						
<b>Hungary (country average):</b>			<b>Urban (Budapest)</b>		<b>Urban (Kisköre)</b>	
Personal net income (2003)	4.260 Euro		4.512 Euro		2.104 Euro	
Number of inhabitants (2003)	10.117.000		1.705.309		3.070	
Gender (2003)	Male: 48,4 %	Female: 51,6 %	Male: 45,9 %	Female: 54,1 %	Male: 49,5 %	Female: 50,5 %
% University degree (2003)	2,96%		-		-	
Unemployment rate (2003)	11,2 %		4,0 %		32,0 %	
Age (2003)	38.4		41,5		43,8	
Marital status, % married (2002)	41.3 %		44,0 %		45,2 %	
			<b>Rural (central)</b>		<b>Rural (northern)</b>	
Personal net income (2003)			3.288 Euro		2.134 Euro	
Number of inhabitants (2003)			2.795.000		1.265.000	
Gender (2003)			Male: 47,1 %	Female: 52,9%	Male: 49 %	Female: 51 %
% University degree (2003)			-		-	
Unemployment rate (2003)			4,1 %		19,7 %	
Age (2003)			39,5		45,8	
Marital status, % married (2002)			39,8%		45,1%	

**Table A1-3: Socio-economic data for survey countries and regional locations - Norway**

Norway												
	Urban				Rural							
	Oslo		Bergen		Vennesla (south)		Siljan (east)		Sunndal (west)		Harstad (north)	
Average tax rate (2004)	24,6 (national average)		24,6 (national average)		24,6 (national average)		24,6 (national average)		24,6 (national average)		24,6 (national average)	
Personal gross income (2004) (persons more than 17 years old) <sup>13</sup>	458.300 NOK / 57.287 Euro		356.600 NOK / 44.575 Euro		330.800 NOK / 41.350 Euro		289.200 NOK / 36.150 Euro		299.400 NOK / 37.425 Euro		323.100 NOK / 40.387Euro	
Number of inhabitants (2005)	521 886		237 430		12 356		2 349		7 409		23 163	
Gender (2005)	Male: 48,6 %	Female: 51,4 %	Male: 49,1 %	Female: 50,9 %	Male: 49,4 %	Female: 50,6 %	Male: 50,3 %	Female: 49,7 %	Male: 50,3 %	Female: 49,7 %	Male: 49,4 %	Female: 50,6 %
% University degree (2004)	38,8 %		30,7 %		12,1 %		18,1 %		17,1 %		22,9 %	
Unemployment rate (2005)	4,3 %		3,7 %		3,5 %		1,8 %		2,7 %		4,0 %	
Age (2005) <sup>14</sup>	38		38		37		38		40		39	
Marital status, % married (2001)	Male: 31,3 %	Female: 29,5 %	Male: 35,9 %	Female: 34,6 %	Male: 42,9 %	Female: 42,0 %	Male: 44,9 %	Female: 42,0 %	Male: 37,0 %	Female: 37,5 %	Male: 35,9 %	Female: 35,1 %

<sup>13</sup> Calculated on county level

<sup>14</sup> Calculated on group means

**Table A1-4: Socio-economic data for survey countries and regional locations - Norway**

Norway (country average):		
Average tax rate (2004)	24,6	
Personal gross income (2004)	280 500 NOK/ 35 062,5 Euro (persons more than 17 years old)	
Number of inhabitants (2005)	4 606 363	
Gender (2005)	Male: 49,6 %	Female: 50,4%
% University degree (2004)	24,0 %	
Unemployment rate (2005)	3,4 %	
Age (2005)	38	
Marital status, % married (2001)	36,6 %	

**Table A1-5: Socio-economic data for survey countries and regional locations - Spain**

Spain						
	Spain (country average):		Community of Madrid		Community of Canarias	
Average tax rate	-		-		-	
Personal net income (2003)	10.200-12.100 Euro		12.700-13.500 Euro		10.200-11.300 Euro	
Number of inhabitants (2005)	44.108.530		5.964.143		1.915.540	
Gender (2005)	Male: 49,4 %	Female: 50,6%	Male: 48 %	Female: 52%	Male: 50 %	Female: 50%
% University degree (2003)	18,5 %		-		-	
Unemployment rate (2003)	11,1 %		11,6 %		7%	
Age (2002)	39,7		38,9		36,5	
Marital status, % married (2002)	46,5 %		44,6%		40,4%	

Table A1-6: Socio-economic data for survey countries and regional locations - UK

UK								
	Urban				Rural		Country average	
	London		Birmingham		West Mids (18 villages)			
Average tax rate (2004)	21.3 (national average)		21.3 (national average)		21.3 (national average)		21,3 (national average)	
Personal gross income (2004) (persons more than 17 years old) <sup>15</sup>	38,686		21,360				Euro 24,165	
Number of inhabitants (2005)	7,172,091		977,087		5,267,308		59,835,000	
Gender (2005)	Male: 49.4 %	Female: 50.6 %	Male: 49.2 %	Male: 50,8 %	Male: 49,2 %	Female: 50.8 %	Male: 49,0 %	Female: 51,0 %
% University degree (2004)	15.8 %		15.8 %		15.8 %		15,8 %	
Unemployment rate (2005)	7 %		5.4 %		5.4 %		4,7 %	
Age (2005) <sup>16</sup>	39		36		36		38, 6	
Marital status, % married (2001)	Male: 51.0 %	Female: 49,0 %	Male: 51.0 %	Male: 51.0 %	Female: 49,0 %	Female: 49,0 %		

<sup>15</sup> Calculated on county level

**Table A1-7: Socio-economic data for survey countries and regional locations – Sweden**

Sweden		
	Country average	Stockholm
Disposal income – 20 – 64 years old (2003)	162800 SEK / 17740 Euro	
Personal gross income (2004)	285.000 SEK 31190 Euro	277000 – 322000 SEK 30340 – 35200 Euro
Number of inhabitants (2005)	9 039 143	1 885 734
Gender (2005)	Male 49,6 % Female 50,4 %	
% University degree (2004)	28 %	49 %
Unemployment rate (2005)	5,3 %	
Age (2005)	40,3 years old	

---

<sup>16</sup> Calculated on group means

## Annex 2: Survey Responses

### QUESTIONNAIRE RESPONSES: ROAD

Q1A

	<b>Enter which sample the IP was recruited for:</b> (Random sample are asked the road noise valuation question and we don't have info on road noise levels (decibels) for random sample)					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Road traffic noise – Urban	20.21	70.63	19.77	20.00	19.83	23.15
Road traffic noise – Rural	29.84	23.61	19.37	20.00	19.83	23.15
Railway noise – Urban	20.88		19.47	20.00	19.53	26.62
Railway Noise – Rural	13.44		19.28	20.00	19.92	14.12
Random Sample – Urban	8.20	3.26	6.36	10.00	10.98	9.03
Random Sample – Rural	7.44	2.50	15.75	10.00	9.91	3.94
total	100.00	100.00	100.00	100.00	100.00	100.01

	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	obs	Obs	obs	obs	obs	obs
Road traffic noise – Urban	212	368	202	200	204	200
Road traffic noise – Rural	313	123	198	200	204	200
Railway noise – Urban	219		199	200	201	230
Railway Noise – Rural	141		197	200	205	122
Random Sample – Urban	86	17	65	100	113	78
Random Sample – Rural	78	13	161	100	102	34
total	1049	521	1022	1000	1029	864

Q1B **How many IPs did you have to contact between last successful interview and this IP?** (not counting this IP)

<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
mean	Mean	mean	mean	mean	mean
3.76	2.39	3.15	1.59	2.75	1.59

Q)2

<b>How many years have you lived in your present home?</b>					
<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
mean	Mean	mean	mean	mean	mean
13.10	8.00	16.34	21.99	14.27	16.06

Q)3A

	<b>When you are here at your home, how much does noise from the road traffic bother, disturb or annoy you?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Not at all	26.46	25.87	16.27	22.00	19.10	28.13
Slightly	26.32	31.77	32.22	17.00	20.22	29.69
Moderately	24.85	19.55	21.85	19.60	20.87	20.90
Very	11.99	14.05	22.81	22.40	19.90	11.13
Extremely	10.38	8.76	6.86	19.00	19.90	10.16

Q)3B

	<b>How much does dust and dirt from road traffic bother, disturb or annoy you here at home?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Not at all	36.28	27.84	23.32	15.00	29.05	22.55
Slightly	23.45	25.91	27.96	10.80	28.41	25.69
Moderately	18.88	20.34	18.21	18.80	21.67	28.82
Very	13.72	16.27	21.25	31.60	14.45	13.92
Extremely	7.67	9.64	9.27	23.80	6.42	9.02

Q)3C

	<b>How much do vibrations from road traffic bother, disturb or annoy you here at home?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Not at all	42.92	50.96	44.80	27.40	40.13	41.75
Slightly	23.89	22.27	30.88	17.80	28.89	22.07
Moderately	15.19	14.99	13.12	21.00	18.14	21.07
Very	10.62	9.64	8.32	16.80	8.19	9.34
Extremely	7.37	2.14	2.88	17.00	4.65	5.77



**Q3D**

**How much does the risk of road traffic accidents in your neighbourhood bother, disturb or annoy you?**

	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Not at all	29.79	43.47	32.36	20.60	42.22	19.53
Slightly	22.42	26.98	31.23	20.60	20.50	30.27
Moderately	16.37	14.35	16.83	27.80	16.05	27.15
Very	15.93	10.06	11.97	17.20	6.74	14.65
Extremely	15.49	5.14	7.61	13.80	4.49	8.40

**Q3E**

**How much does air pollution and obnoxious smells from road traffic bother, disturb or annoy you here at home?**

	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Not at all	34.51	35.55	38.78	14.40	30.82	20.36
Slightly	23.30	31.91	32.69	9.80	25.52	23.72
Moderately	21.39	15.63	14.26	17.20	20.87	23.02
Very	12.54	11.13	10.42	30.00	15.89	12.04
Extremely	8.26	5.78	3.85	28.60	6.90	10.87

**Q5**

**If noise from traffic bothers, disturbs or annoys you, could you say what the consequences are for you?**

	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Find it hard to sleep	28.35	29.72	38.33	36.12	41.27	8.42
Sleep with earplugs	1.38	3.10	1.32	4.08	11.90	3.26
Do not open windows as often as I would if there were no noise	61.61	40.31	47.81	60.82	61.51	57.88
Hard to concentrate and disturbing when reading or working	13.58	6.98	6.64	23.06	26.59	25.27
Disturbing when watching TV or listening to the radio/music	24.80	12.18	14.42	46.94	31.94	38.86
Disturbing when talking in the telephone	10.83	2.33	8.34	28.78	12.50	8.42
Get headaches/migraine	4.53	1.03	3.98	13.67	11.31	4.35

**Q6**

**When you are here at your home, which *other* noise sources bother, disturb or annoy you?**

<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
-----------	---------------	---------------	----------------	----------------	--------------

	Percent	Percent	Percent	Percent	Percent	Percent
No other noise source bother, disturb or annoy me	36.87	48.63	59.45	23.50	58.43	22.29
Road traffic	26.71	4.69	19.87	39.67	23.60	8.56
Aeroplanes	7.26	6.84	3.49	9.50	0.32	1.85
Businesses, e.g. cafes, shops or workshops	3.92	2.54	2.38	11.83	8.03	1.97
Neighbours	12.05	22.85	4.45	15.50	19.74	4.28
Railway traffic	1.16	2.54	3.49	8.00	1.93	0.00
Tram or Metro	0.29	4.70	2.38	11.50	1.28	0.00

**Q7B**

<b>Interviewer had to say: "government will also have to pay their share of the costs"</b>					
<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
Percent	Percent	Percent	Percent	Percent	Percent
27.87	15.27	36.88	56.80	6.10	16.21

**Q8B**

<b>I don't know/I don't want to answer the WTP question</b>					
<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
Percent	Percent	Percent	Percent	Percent	Percent
7.11	1.23	4.29	3.80	0.32	0.00

Q9

**People have different reasons for their willingness to pay to avoid noise annoyance. Please look at the statements on the card, and tell me which ones best describe your view** (asked only to those who have a positive WTP)

	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
I am bothered, disturbed or annoyed by noise from road traffic	72.50	70.89	81.68	82.52	94.31	15.83
Others in my household are bothered, disturbed or annoyed by noise from traffic	35.00	32.46	56.93	38.83	14.77	16.67
I would like to reduce the noise annoyance for the other people in the street	25.00	45.89	33.16	40.77	10.22	15.83
Other reasons	3.75	13.43	12.37	7.76	0.00	0.00

Q)10A

People have different reasons for saying they are *not* willing to pay anything to avoid noise annoyance from road traffic, or for saying they do not know or can't answer this question. Look at the statements on the card, and tell me which ones best describe your views. (asked only to those who did not answer the WTP question or answered 0)

	UK	Sweden	Norway	Hungary	Germany	Spain
	Percent	Percent	Percent	Percent	Percent	Percent
I am not that bothered, disturbed or annoyed by the road traffic noise that I would pay	28.15	56.76	24.32	40.81	35.70	11.22
I cannot afford to pay	12.04	18.02	9.53	49.12	27.48	11.47
It is more important to reduce other nuisances from road traffic	3.04	19.82	3.02	18.14	3.93	1.78
The noise reducing measures cannot remove my annoyance from road traffic noise	2.32	6.79	1.74	6.55	3.18	0.76
If you live in a city there will be road traffic noise	2.90	25.22	3.33	17.13	8.04	2.55
I am going to move soon	2.46	4.95	2.28	4.79	6.73	1.27
I already pay enough charges and taxes	33.38	38.73	38.95	31.49	23.93	12.50
Government should pay	31.34	29.27	45.46	64.48	22.06	20.66
Those that cause the noise should pay for it	12.33	19.81	9.53	25.19	8.79	2.80
I do not want more roadwork in the street	1.74	3.60	1.43	4.28	2.99	1.53
The question about paying is too difficult to answer	2.17	2.70	1.90	2.02	1.31	0.25

**Q10B**

	<b>Have any measures been taken in your neighbourhood recently to reduce road traffic noise?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
yes	10.15	21.68	16.29	4.20	6.42	4.60
no	74.78	50.31	81.47	67.40	74.80	81.45
don't know	15.07	28.02	2.24	28.40	18.78	13.87

**Q15A**

	<b>Do you stay at home in the daytime on workdays, i.e. not weekends?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Yes, most workdays	49.93	26.35	40.67	50.83	46.87	43.95
Yes, some workdays	31.73	22.12	22.97	20.50	14.93	22.07
No, never or seldom	17.90	51.15	33.36	28.67	38.20	33.79
I don't know	0.44	0.38	0.00	0.00	0.00	0.20

**Q15B**

	<b>Does your spouse (co-habitant) stay at home in the daytime on workdays, i.e. not weekends?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Yes, most workdays	21.62	11.32	23.91	29.33	33.23	21.48
Yes, some workdays	22.35	12.48	16.64	11.67	13.16	12.70
No, never or seldom	29.85	32.44	35.54	29.00	31.94	36.33
I don't know	25.88	0.00	23.91	0.00	0.64	26.56
not relevant	0.29	43.76	0.00	30.00	21.03	2.93

**Q16**

	<b>Do you think you are very, a little, or not at all sensitive to noise?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Very sensitive	11.22	10.21	11.62	34.17	10.91	32.42
A little sensitive	46.65	63.39	56.05	44.67	45.43	46.29
Not at all sensitive	40.52	25.63	31.21	21.17	41.41	21.29
I don't know	1.60	0.77	1.11	0.00	2.25	0.00

**Q17**

	<b>Do you have any hearing problems?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Yes, very reduced hearing	1.16	0.96	1.14	2.17	2.41	2.15
Yes, slightly reduced hearing	7.99	10.40	16.40	11.33	19.74	7.23
Yes, tinnitus (buzzing in your ears)	1.60	5.20	3.41	2.33	4.17	0.78
No, normal hearing	88.08	83.24	78.57	84.00	72.23	89.65
I don't know	1.16	0.19	0.49	0.17	1.44	0.20

**Q18**

	<b>Does any bedroom face the main source of Road traffic noise/Railway noise?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Yes	81.10	47.22	62.82	62.17	38.52	63.87
No	18.90	52.78	37.02	37.83	61.32	34.96
Don't Know	0.00	0.00	0.16	0.00	0.16	1.17

**Q19**

	<b>Do other rooms that are used during the daytime face the main source of Road traffic noise / Railway noise?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Yes	81.51	79.65	89.67	68.83	62.44	64.65
No	18.49	20.35	9.86	31.17	37.40	34.38
Don't Know	0.00	0.00	0.48	0.00	0.16	0.98

**Q20**

	<b>How bothering, disturbing or annoying was the Road traffic noise/ Railway noise when you moved in here compared to what you expected?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Less bothering, disturbing or annoying than expected	32.45	16.54	15.32	24.33	17.98	34.64
More bothering, disturbing or annoying than expected	22.57	26.73	31.94	32.50	36.44	22.50
Just as bothering, disturbing or annoying as expected	34.96	43.65	45.32	35.15	34.99	25.05
Don't know	10.03	13.08	7.42	8.02	10.59	17.81

**Q)21**

	<b>How bothering, annoying or disturbing is the Road traffic noise / Railway noise now compared to when you moved in here?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
The noise is better now compared to when I moved in.	7.91	12.69	7.54	5.43	7.06	9.74
The noise is the same now as when I moved in.	43.92	60.00	35.79	32.79	49.28	38.95
The noise is worse now compared to when I moved in	44.07	23.46	53.13	61.59	39.33	48.93
Don't know	4.10	3.85	3.53	0.18	4.33	2.38

**Q)22**

	<b>Do your household own or rent your present home?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Own	72.67	51.25	89.14	83.83	24.40	75.00
Rent	27.03	48.56	10.86	16.17	75.60	21.68
Don't Know	0.29	0.19	0.00	0.00	0.00	3.32

**Q)23**

	<b>Would you characterise yourself as (This question was not asked in the Swedish questionnaire)</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Always on time for work and appointments	58.28	66.50	59.50	58.27	50.00
Mostly on time	29.73	29.08	29.17	34.03	32.03
Sometimes I am on time and sometimes I am too late	7.25	3.59	7.67	4.98	9.57
Mostly coming too late	1.18	0.16	1.17	0.64	3.32
Always coming too late	0.74	0.00	0.33	0.00	0.20
I don't know	2.81	0.65	2.17	2.09	4.88

**Q)24**

	<b>What would you describe as your occupational situation?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Self-employed	8.27	9.40	6.06	13.83	2.57	11.52
Employed full-time	25.83	55.47	45.14	35.83	42.86	29.49
Employed part-time	20.90	5.76	11.64	4.83	11.72	4.88
Student	2.90	7.68	3.99	2.50	8.19	7.62
Unemployed	3.05	4.80	2.23	2.67	3.21	11.13
Looking after the home full-time	15.38	0.38	4.63	1.33	1.28	15.63
Retired	20.61	13.44	15.47	32.33	28.25	16.60
Unable to work due to sickness or disability	1.74	2.11	6.22	1.17	0.48	1.95
Parental leave	0.29	2.11	0.64	3.50	0.64	0.00
Other (please specify)	0.73	1.54	1.75	2.00	0.80	1.17

**Q)38**

	<b>Gender</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
male	32.51	49.71	51.83	39.50	49.90	49.80

**Q)39**

	<b>Age</b>				
	mean	median	min	max	st dev
UK	46.28	44.00	18.00	93.00	15.81
Sweden	42.94	39.00	18.00	91.00	15.36
Norway	48.03	48.00	18.00	99.00	14.33
Hungary	49.32	53.00	18.00	70.00	14.75
Germany	46.42	43.00	18.00	88.00	18.08
Spain	45.36	44.00	18.00	92.00	17.24

**Q)40**

	<b>How many persons are there in your household, including yourself? (Only count those who live permanently in your home)</b>				
	mean	median	min	max	st dev
UK	2.87	3.00	1.00	12.00	1.42
Sweden	2.05	2.00	1.00	7.00	1.17
Norway	2.83	2.00	1.00	10.00	2.83
Hungary	2.53	2.00	1.00	13.00	1.30
Germany	2.24	2.00	1.00	8.00	0.94
Spain	3.07	3.00	1.00	10.00	1.47



**Q41**

	<b>Of these, how many are 15 years of age or younger?</b>				
	mean	median	min	max	st dev
UK	0.68	0.00	0.00	7.00	1.06
Sweden	0.39	0.00	0.00	4.00	0.76
Norway	0.73	0.00	0.00	6.00	1.10
Hungary	0.30	0.00	0.00	6.00	0.69
Germany	0.27	0.00	0.00	3.00	0.57
Spain	0.65	0.00	0.00	8.00	0.88

**Q42**

	<b>What is your highest completed educational qualification?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Primary School	22.34	6.92	17.07	10.33	17.17	40.82
Secondary School theoretical	29.20	27.88	18.36	20.83	27.77	33.01
Secondary School - practical education, including trade and office	14.10	8.46	34.14	32.67	46.87	8.20
College or University	34.45	56.73	30.43	32.17	8.19	16.80

**Q43**

	<b>What is your marital status?</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent	Percent
Single	19.19	36.92	15.76	16.67	17.17	29.88
Married/living with someone	64.24	52.50	71.06	61.33	27.77	54.30
Divorced/separated	10.47	8.08	6.43	9.83	46.87	6.64
Widowed	6.10	2.50	6.75	12.17	8.19	8.98

<b>Income of respondent (personal income)</b>						
	mean	median	min	max	st dev	obs
UK	12,063.00	10,000.00	0.00	65,000.00	12,369.00	613
Sweden	215,553.00	200,000.00	0.00	825,000.00	116,369.00	500
Norway	215,381.00	200,000.00	0.00	1,000,000.00	124,810.00	597
Hungary	127,891.00	100,000.00	0.00	650,000.00	96,277.00	504
Germany	14,721.00	15,000.00	5,000.00	55,000.00	8,131.00	623
Spain	11,858.00	7,000.00	240.00	95,000.00	10,752.00	404

<b>Income of respondent converted in Euros (personal income)</b>						
	mean	median	min	max	st dev	obs
UK	17,817.30	14,770.21	0.00	96,006.34	18,269.27	613
Sweden	21,860.22	20,282.92	0.00	83,667.03	11,801.51	500
Norway	21,866.57	20,305.01	0.00	101,525.05	12,671.34	597
Hungary	938.54	733.86	0.00	4,770.08	706.54	504
Germany	14,721.00	15,000.00	5,000.00	55,000.00	8,131.00	623
Spain	14,580.02	8,606.86	295.09	116,807.39	13,220.14	404

<b>Q47</b>	<b>Decibel</b>					
	<b>UK</b>	<b>Sweden</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
obs		521	138	600	623	
mean		64.53	62.68	65	70.33	
median		64	62	65	69.8572	
st dev		4.23	6.23	1.86	6.27245911	
min		73	48	65	58.5206	
max		52	81	70	79.8572	

## **RAIL**

<b>Q1B</b>	<b>How many IPs did you have to contact between last successful interview and this IP (not counting this IP)</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	mean	mean	mean	mean	mean
	4.15	2.01	1.38	2.61	4.52

<b>Q2</b>	<b>How many years have you lived in your present home?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	mean	mean	mean	mean	mean
	12.66	14.68	21.22	13.39	14.32

<b>Q4A</b>	<b>When you are here at your home, how much does noise from the railway bother, disturb or annoy you?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Not at all	41.23	28.04	19.50	19.70	18.47
Slightly	29.53	46.90	17.75	19.95	21.02
Moderately	15.60	12.16	12.00	20.69	20.45
Very	7.24	9.43	24.50	20.20	20.45
Extremely	6.41	3.47	15.25	19.46	19.60

Q4B	<b>How much does the risk of railway accidents in your neighbourhood bother, disturb or annoy you?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Not at all	65.52	61.79	41.50	53.20	22.64
Slightly	19.54	21.59	18.50	22.66	22.35
Moderately	6.32	5.96	14.00	8.62	27.79
Very	5.17	5.96	20.25	7.64	22.06
Extremely	3.45	4.71	5.75	7.88	5.16

Q4C	<b>When you are here at your home, how much does vibrations from the railway bother, disturb or annoy you?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Not at all	47.41	47.38	23.75	38.42	34.19
Slightly	27.87	30.17	17.75	20.44	27.35
Moderately	12.64	12.72	16.50	18.47	15.67
Very	5.17	7.23	27.50	11.08	13.64
Extremely	6.90	2.49	14.50	11.58	9.12

Q5	<b>If noise from traffic bothers, disturbs or annoys you, could you say what the consequences are for you?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Find it hard to sleep	21.04	25.55	44.10	31.77	50.14
Sleep with earplugs	1.02	0.99	3.11	9.36	3.70
Do not open windows as often as I would if there were no noise	46.44	18.61	54.66	38.42	39.49
Hard to concentrate and disturbing when reading or working	10.01	7.94	24.84	18.97	23.93
Disturbing when watching TV or listening to the radio/music	18.43	19.60	69.57	30.30	48.72
Disturbing when talking in the telephone	7.98	16.87	47.20	15.02	23.36
Get headaches/migraine	3.34	1.24	10.25	6.40	0.00

Q6

<b>When you are here at your home, which <i>other</i> noise sources bother, disturb or annoy you?</b>					
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
No other noise source bother, disturb or annoy me	39.38	40.94	17.00	59.85	56.41
Road traffic	20.08	45.90	45.50	7.39	21.02
Aeroplanes	9.55	1.98	20.75	0.74	4.56
Businesses, e.g. cafes, shops or workshops	3.90	3.97	7.25	2.96	4.84
Neighbours	15.20	1.73	13.50	13.05	10.51
Railway traffic	8.38	3.47	47.50	22.17	0.00
Tram or Metro	0.19	0.24	2.50	1.48	0.00

Q11B

<b>Interviewer had to say: "government will also have to pay their share of costs"</b>					
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
	27.17	38.70	36.75	3.20	16.81

Q12B

<b>I don't know/I don't want to answer the WTP question</b>					
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
	5.56	5.21	0.25	0.00	8.83

**Q13**

**People have different reasons for their willingness to pay to avoid noise annoyance. Please look at the statements on the card, and tell me which ones best describe your view (asked only to those who have a positive WTP)**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
I am bothered, disturbed or annoyed by noise from railways	63.49	66.01	68.21	88.57	19.75
Others in my household are bothered, disturbed or annoyed by noise from railways	15.87	46.60	45.66	21.42	29.26
I would like to reduce the noise annoyance for the other people along the railway here	28.57	46.60	49.71	15.71	51.85
Other reasons	3.17	14.56	8.09	0.00	0.00

**Q14A**

**People have different reasons for saying they are not willing to pay anything to avoid noise annoyance, or for saying they don't know or can't answer this question. Look at the statements on the card, and tell me which ones best describe your views(asked only to those who did not answer the WTP question or answered 0)**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
I am not that bothered, disturbed or annoyed by the road traffic noise that I would pay	49.15	52.00	36.56	37.80	3.33
I cannot afford to pay	10.77	14.00	39.65	18.45	81.85
It is more important to reduce other nuisances from road traffic	3.70	3.66	11.01	2.38	1.48
The noise reducing measures cannot remove my annoyance from road traffic noise	5.38	3.00	8.81	5.65	0.74
If you live in a city there will be road traffic noise	4.71	4.66	7.93	5.06	0.74
I am going to move soon	1.01	4.33	3.08	7.14	3.33

I already pay enough charges and taxes	25.35	36.33	26.43	19.94	18.88
Government should pay	31.64	56.66	47.58	18.75	13.70
Those that cause the noises should pay for it	12.79	41.33	39.21	16.37	8.88
I do not want more roadwork in the street	2.02	1.00	4.85	0.00	0.00
The question about paying is too difficult to answer	0.33	0.66	3.96	1.19	0.00

**Q14B**

	<b>Have any measures been taken in your neighbourhood recently to reduce railway noise?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
yes	4.27	11.44	11.00	9.36	3.13
no	68.66	75.37	66.75	75.37	82.95
don't know	20.07	13.18	22.25	15.27	13.92

**Q15A**

	<b>Do you stay at home in the daytime on workdays i.e. not weekends?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Yes, most workdays	44.92	46.75	47.75	46.31	44.03
Yes, some workdays	32.23	21.00	24.50	17.49	24.72
No, never or seldom	22.46	32.25	27.75	36.21	31.25
I don't know	0.39	0.00	0.00	0.00	0.00

**Q15B**

	<b>Does your spouse (co-habitant) stay at home in the daytime on workdays, i.e. not weekends?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Yes, most workdays	24.79	31.20	28.75	32.27	48.86
Yes, some workdays	22.82	17.90	18.25	14.04	21.59
No, never or seldom	26.48	33.25	26.50	33.00	27.84
I don't know	25.92	17.65	0.00	0.00	1.70
not relevant	0.00	0.00	26.50	20.69	0.00

**Q16**

	<b>Do you think you are very, a little, or not at all sensitive to noise?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Very sensitive	13.48	8.19	29.50	14.04	25.57
A little sensitive	45.31	53.35	52.50	42.61	61.08
Not at all sensitive	39.06	38.46	18.00	42.36	12.50
I don't know	2.15	0.00	0.00	0.99	0.85

**Q17**

	<b>Do you have any hearing problems?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Yes, very reduced hearing	2.15	1.00	2.00	2.46	2.27
Yes, slightly reduced hearing	6.07	13.25	15.50	20.20	4.55
Yes, tinnitus (buzzing in your ears)	1.76	2.50	3.25	3.20	92.33
No, normal hearing	88.85	83.00	79.25	73.15	0.85
I don't know	1.17	0.25	0.00	0.99	

**Q18**

	<b>Does any bedroom face the main source of Road traffic noise/ Railway noise?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Yes	76.08	59.95	59.50	40.89	81.82
No	23.92	40.05	40.50	59.11	18.18
Don't Know	0.00	0.00	0.00	0.00	0.00

**Q19**

	<b>Do other rooms that are used during the daytime face the main source of Road traffic noise / Railway noise?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Yes	73.18	88.34	63.25	56.65	69.32
No	26.54	11.66	36.75	43.10	30.68
Don't Know	0.28	0.00	0.00	0.25	0.00

**Q)20**

**How bothering, disturbing or annoying was the Road traffic noise/ Railway noise when you moved in here compared to what you expected?**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Less bothering, disturbing or annoying than expected	35.21	24.13	14.25	15.76	33.52
More bothering, disturbing or annoying than expected	18.31	26.12	41.50	39.66	22.73
Just as bothering, disturbing or annoying as expected	36.90	44.53	29.75	37.19	25.28
Don't know	9.58	5.22	14.50	7.39	18.47

**Q)21**

**How bothering, annoying or disturbing is the Road traffic noise/Railway noise now compared to when you moved in here?**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
The noise is better now compared to when I moved in.	13.60	33.75	15.50	12.32	13.24
The noise is the same now as when I moved in.	58.64	49.13	43.86	47.78	62.72
The noise is worse now compared to when I moved in	22.95	13.65	39.18	35.22	23.00
Don't know	4.82	3.47	1.46	4.68	1.05

**Q)22**

**Do your household own or rent your present home?**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Own	71.85	87.66	91.00	24.14	80.68
Rent	27.56	12.34	9.00	74.88	15.91
Don't Know	0.59	0.00	0.00	0.99	3.41



**Q)23**

	<b>Would you characterise yourself as:</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Always on time for work and appointments	54.47	71.00	62.00	60.84	51.42
Mostly on time	26.54	22.25	31.00	33.25	38.07
Sometimes I am on time and sometimes I am too late	14.25	5.00	4.25	4.93	6.82
Mostly coming too late	1.96	0.75	1.75	0.49	0.85
Always coming too late	0.28	0.25	0.50	0.00	0.00
I don't know	2.51	0.75	0.50	0.49	2.84

**Q)24**

	<b>What would you describe as your occupational situation?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Self-employed	8.89	7.44	13.00	3.20	6.25
Employed full-time	27.78	43.92	39.50	42.86	37.22
Employed part-time	18.33	9.93	4.00	9.11	7.95
Student	3.89	5.21	4.00	7.39	7.10
Unemployed	4.72	3.72	3.25	3.45	5.40
Looking after the home full-time	13.06	4.47	1.75	2.22	18.47
Retired	18.89	14.14	29.25	27.59	16.76
Unable to work due to sickness or disability	2.22	4.96	0.50	0.49	0.85
Parental leave	1.67	1.99	4.50	2.22	0.00
Other (please specify)	0.56	2.98	0.25	1.48	0.00

**Q)38**

	<b>Gender</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
male	33.53	50.62	36.75	47.29	44.88

**Q)39**

	<b>Age</b>				
	mean	median	min	max	st dev
UK	45.63	44	18	93	15.2
Norway	45.73	45	19	74	14.53
Hungary	48.18	49	18	70	15.07
Germany	46.76	45	18	84	17.85
Spain	45.12	42	18	86	16.41

**Q)40**

**How many persons are there in your household, including yourself?** (Only count those who live permanently in your home)

	mean	median	min	max	st dev
UK	2.83	3.00	1.00	9.00	1.31
Norway	2.80	2.00	1.00	7.00	1.31
Hungary	2.75	3.00	1.00	8.00	1.18
Germany	2.36	2.00	1.00	6.00	1.01
Spain	3.25	3.00	1.00	7.00	1.16

**Q)41**

**Of these, how many are 15 years of age or younger?**

	mean	median	min	max	st dev
UK	0.74	0.00	0.00	5.00	1.04
Norway	0.65	0.00	0.00	4.00	0.96
Hungary	0.39	0.00	0.00	4.00	0.72
Germany	0.36	0.00	0.00	4.00	0.36
Spain	0.45	0.00	0.00	3.00	0.76

**Q)42**

**What is your highest completed educational qualification?**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Primary School	19.22	17.75	12.00	17.00	35.80
Secondary School theoretical	30.00	16.00	18.75	27.34	23.86
Secondary School - practical education, including trade and office	13.14	34.00	44.50	45.81	11.36
College or University	37.65	32.25	24.75	9.85	28.69

**Q)43**

**What is your marital status?**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Single	20.66	12.94	16.75	14.78	24.15
Married/living with someone	60.62	74.63	64.00	73.65	69.89
Divorced/separated	12.87	7.71	7.00	3.69	1.70
Widowed	5.85	4.73	12.25	7.88	3.98

<b>Income of respondent (personal income)</b>						
	mean	median	min	max	st dev	obs
UK	12,812.00	10,000.00	0.00	65,000.00	12,582.00	315.00
Norway	225,895.00	200,000.00	0.00	1,900,000.00	154,872.00	391.00
Hungary	101,265.00	80,000.00	0.00	450,000.00	67,466.00	347.00
Germany	14,312.00	15,000.00	1,000.00	85,000.00	9,040.00	406.00
Spain	11,956.61	10,000.00	1,666.67	50,000.00	9,146.36	198.00

<b>Income of respondent converted in Euros (personal income)</b>						
	mean	median	min	max	st dev	obs
UK	18,923.59	14,770.21	0.00	96,006.34	18,583.87	315
Norway	22,934.00	20,305.01	0.00	192,897.60	15,723.39	391
Hungary	743.14	587.09	0.00	3,302.36	495.10	347
Germany	14,312.00	15,000.00	1,000.00	85,000.00	9,040.00	406
Spain	14,701.27	12,295.51	2,049.26	61,477.57	11,245.92	198

**Q)47**

	<b>Decibel</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
obs		310		406	
mean		58.78	70	70.6689	
median		58.91	70	69.8572	
st dev		5.22	0	6.2853	
min		33.74	70	59.8572	
max		71.94	70	79.8572	

## TRAVEL TIME SAVINGS

Q)23

	<b>Would you characterise yourself as: (only answers from self employed and employed)</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Always on time for work and appointments	56.96	68.28	60.50	59.28	50.58
Mostly on time	28.63	26.38	29.90	33.72	34.49
Sometimes I am on time and sometimes I am too late	9.67	4.15	6.30	4.96	8.45
Mostly coming too late	1.45	0.40	1.40	0.58	2.31
Always coming too late	0.58	0.10	0.40	0.00	0.12
I don't know	2.71	0.69	1.50	1.46	4.05

Q)25

	<b>Thinking about the last journey you made to work, which of the following modes of transportation did you use?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Driver of own or household's car	0.45	0.64	0.32	0.34	42.79
Passenger in car	0.04	0.03	0.02	0.09	3.61
Train	0.08	0.04	0.02	0.02	9.86
Tram	0.00	0.00	0.21	0.04	0.00
Metro	0.02	0.01	0.20	0.02	4.33
Bus	0.03	0.05	0.36	0.09	12.50
Bicycle	0.02	0.09	0.02	0.26	0.00
Walking	0.04	0.10	0.11	0.15	21.63
Other,	0.03	0.06	0.04	0.02	4.33

Q)26

	<b>Approximately how many minutes did your last journey to work take, one way?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
obs	348	478	462	334	308
mean	28.57	20.78	40.83	25.07	46.88
median	22.50	15.00	92.13	20.00	20.00
st dev	23.14	28.15	30.00	26.70	343.18
min	1.00	2.00	0.00	1.00	0.00
max	180.00	360.00	999.00	450.00	6039.00

**Q)27**

**If you were to make the exact same journey to work next week, what do you think would be the chance of experiencing an unexpected delay of 5 minutes or more?**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Very likely	29.72	13.68	15.15	17.37	26.28
Quite likely	33.06	22.53	40.04	35.63	32.69
Quite unlikely	13.06	24.42	24.89	26.35	13.46
Very unlikely	16.94	36.63	9.53	17.66	17.95
I don't know	7.22	2.74	10.39	2.99	9.62
total	100.00	100.00	100.00	100.00	100.00

**Q)28**

**About how much did your journey to work cost you, one way?**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
obs	274.00	443.00	395.00	334.00	114.00
mean	3.90	30.46	310.83	3.63	1.69
median	3.00	20.00	165.00	3.00	1.45
st dev	4.35	37.41	432.01	5.84	1.28
min	0.00	0.00	0.00	1.00	0.00
max	30.00	500.00	5000.00	120.00	7.00

**Q)29**

**Who paid for the costs of the journey?**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
All paid by myself	87.68	88.52	86.58	82.34	92.95
All paid by other traveller(s) in the vehicle	1.12	0.63	0.87	2.40	1.28
Shared with other traveller(s) in the vehicle	0.56	1.04	0.65	6.89	0.00
A colleague, partner, family member, etc paid all costs	1.12	0.21	1.08	5.69	0.00
My employer paid all costs	7.56	6.26	8.87	2.10	5.77
I don't know	0.56	0.00	0.43	0.60	0.00
Other, please specify:	1.40	3.34	1.52	0.00	0.00
total	100.00	100.00	100.00	100.02	100.00

<b>Journey to work</b>					
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
time	28.57	20.78	40.83	25.07	46.88
cost (Euro)	5.71	3.78	1.25	3.63	1.69
distance (km)	13.94	20.11	11.63	13.47	6.64
All paid by myself	87.68	88.52	86.58	82.34	92.95

<b>Q30</b>	<b>About how many kilometres is it from your home to work, one way?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
obs	309.00	478.00	401.00	334.00	308.00
mean	13.94	20.11	11.63	13.47	6.64
median	10.00	10.00	10.00	10.00	2.00
st dev	17.75	13.83	10.02	12.74	10.67
min	1.00	0.00	1.00	1.00	0.00
max	160.00	1000.00	80.00	150.00	50.00

<b>Q31</b>	<b>Do you have to reach work by a specific time, or do you have flexible working hours?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
A specific time	67.41	65.69	63.42	75.75	71.71
Flexible working hours	32.03	34.31	36.58	24.25	23.36
I don't know	0.56	0.00	0.00	0.00	4.93

<b>Q32</b>	<b>How would you rate the overall level of traffic congestion during your last journey to work?</b>				
	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Extremely congested most of the journey	7.56	5.83	17.32	5.39	24.36
Moderate congestion, with occasional periods of heavy congestion	21.85	12.50	19.05	15.87	22.44
Moderate congestion	20.17	11.67	28.35	31.14	25.00
Little congestion, with occasional periods of moderate congestion	21.85	17.71	9.73	26.35	10.90
No or very little congestion	24.37	51.67	24.03	17.07	9.62
I don't know	4.20	0.62	1.52	4.19	7.69
total	100.00	100.00	100.00	100.01	100.01

<b>Q)34B</b>	<b>I don't know/I don't want to answer the WTP question for 5 mins</b>				
<b>5 minutes time of travel reduction</b>	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	6.73	8.49	0.25	0.00	11.36

<b>Q)35</b>	<b>People have different reasons for saying they are not willing to pay anything to reduce their travel time, or for saying they do not know or can't answer this question. (asked only to those who did not answer the WTP question or answered 0)</b>				
<b>5 minutes time of travel reduction</b>	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
I cannot afford to pay more than I do today	0.13	0.05	0.23	0.23	12.98
The prices for public transportation are high enough already	0.18	0.15	0.49	0.22	12.21
Petrol is already too expensive	0.37	0.19	0.33	0.37	20.61
The authorities should build better roads and public transportation	0.13	0.12	0.29	0.03	6.11
It is not possible to save 5 minutes on my travel to work	0.15	0.46	0.28	0.09	7.63
It does not matter if I come 5 minutes earlier to work	0.33	0.50	0.37	0.24	31.30
Other reasons	0.08	0.06	0.08	0.00	0.76

<b>Q)36B</b>	<b>I don't know/I don't want to answer the WTP question for 10 mins</b>				
<b>10 minutes time of travel reduction</b>	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	4.92	11.36	2.00	0.00	6.83

**Q37**

**10 minutes time of travel reduction**

**People have different reasons for saying they are not willing to pay anything to reduce their travel time, or for saying they do not know or can't answer this question.** (asked only to those who did not answer the WTP question or answered 0)

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
I cannot afford to pay more than I do today	0.15	0.05	0.24	0.27	8.97
The prices for public transportation are high enough already	0.19	0.12	0.49	0.20	14.48
Petrol is already too expensive	0.35	0.17	0.34	0.33	20.00
The authorities should build better roads and public transportation	0.10	0.13	0.30	0.05	4.14
It is not possible to save 5 minutes on my travel to work	0.18	0.53	0.26	0.13	4.14
It does not matter if I come 5 minutes earlier to work	0.30	0.41	0.35	0.22	24.83
Other reasons	0.05	0.04	0.10	0.00	8.28

**Q38**

**Gender**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	percent	Percent
male	32.50	49.12	38.40	48.88	45.02

**Q39**

**Age**

	mean	median	min	max	st dev
UK	46.13	44.00	18.00	93.00	15.56
Norway	47.12	47.00	18.00	99.00	14.46
Hungary	48.86	52.00	18.00	70.00	14.88
Germany	46.55	44.00	18.00	88.00	17.98
Spain					



**Q)40**

**How many persons are there in your household, including yourself?** (Only count those who live permanently in your home)

	mean	median	min	max	st dev
UK	2.86	3.00	1.00	12.00	1.38
Norway	2.82	2.00	1.00	10.00	1.43
Hungary	2.61	2.00	1.00	13.00	1.26
Germany	2.29	2.00	1.00	8.00	0.97
Spain	1.35	3.00	1.00	10.00	0.68

**Q)41**

**Of these, how many are 15 years of age or younger?**

	mean	median	min	max	st dev
UK	0.70	0.00	0.00	7.00	1.05
Norway	0.70	0.00	0.00	6.00	1.05
Hungary	0.34	0.00	0.00	6.00	0.70
Germany	0.31	0.00	0.00	4.00	0.61
Spain	0.55	0.00	0.00	8.00	0.83

**Q)42**

**What is your highest completed educational qualification?**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Primary School	21.46	17.34	11.00	17.10	38.77
Secondary School theoretical	29.31	17.43	20.00	27.60	29.28
Secondary School - practical education, including trade and office	13.41	34.08	37.40	46.45	9.49
College or University	35.82	31.15	31.60	8.84	22.45

**Q)43**

**What is your marital status?**

	<b>UK</b>	<b>Norway</b>	<b>Hungary</b>	<b>Germany</b>	<b>Spain</b>
	Percent	Percent	Percent	Percent	Percent
Single	19.75	14.65	16.70	15.94	27.61
Married/living with someone	62.88	72.46	62.40	71.82	60.79
Divorced/separated	11.16	6.93	8.70	3.50	4.64
Widowed	6.20	5.96	12.20	8.75	6.96

<b>Income of respondent (personal income)</b>						
	mean	median	min	max	st dev	obs
<b>UK</b>	12,317.00	10,000.00	0.00	65,000.00	12,440.00	928
<b>Norway</b>	219,542.00	200,000.00	0.00	1,900,000.00	137,516.00	988
<b>Hungary</b>	117,034.00	91,000.00	0.00	650,000.00	86,657.00	1000
<b>Germany</b>	14,559.96	15,000.00	1,000.00	85,000.00	8,499.23	1029
<b>Spain</b>	11,890.00	7,500.00	240.00	95,000.00	10,244.00	602

<b>Income of respondent converted in Euros (personal income)</b>						
	mean	median	min	max	st dev	obs
UK	18,192.46	14,770.21	0.00	96,006.34	18,374.14	928
Norway	22,289.01	20,305.01	0.00	192,897.60	13,961.32	988
Hungary	858.86	667.81	0.00	4,770.08	635.94	1000
Germany	14,559.96	15,000.00	1,000.00	85,000.00	8,499.23	1029
Spain	14,619.37	9,221.64	295.09	116,807.39	12,595.53	602

## Annex 3: Road and rail noise maximum WTP-distribution

Table A3-1: Uk road noise WTP-distribution

Uk road noise WTP-distribution			
Q08A (GBP)	Q08A (Euro)	Frequency	Percent
£0	€0	515	76,3
£3	€4	27	4
£6	€9	13	1,93
£20	€29	30	4,44
£30	€44	11	1,63
£50	€73	30	4,44
£65	€95	3	0,44
£100	€146	30	4,44
£130	€190	2	0,3
£200	€293	7	1,04
£250	€366	3	0,44
£500	€732	2	0,3
£1 000	€1 465	1	0,15
£1 300	€1 904	1	0,15

Table A3-2: UK rail noise WTP- distribution

UK rail noise WTP- distribution			
Q08A (GBP)	Q08A (Euro)	Frequency	Percent
0	€0	278	81,52
3	€4	9	2,64
6	€9	7	2,05
20	€29	15	4,4
30	€44	7	2,05
50	€73	10	2,93
65	€95	3	0,88
100	€146	8	2,35
130	€190	2	0,59
500	€732	2	0,59

**Table A3-3: Norway road noise WTP- distribution**

Norway road noise WTP- distribution			
Q08A (NOK)	Q08A (Euro)	Frequency	Percent
kr 0	€0	400	66,45
kr 50	€6	10	1,66
kr 100	€12	18	2,99
kr 300	€37	12	1,99
kr 500	€62	34	5,65
kr 800	€99	6	1
kr 1 000	€124	46	7,64
kr 1 500	€186	10	1,66
kr 2 000	€248	20	3,32
kr 3 000	€373	13	2,16
kr 4 000	€497	8	1,33
kr 6 000	€745	8	1,33
kr 8 000	€994	2	0,33
kr 10 000	€1 242	9	1,5
kr 15 000	€1 863	2	0,33
kr 20 000	€2 484	4	0,66

**Table A3-4: Norway rail noise WTP- distribution**

Norway rail noise WTP- distribution			
Q12A (NOK)	Q08A (Euro)	Frequency	Percent
kr 0	€0	279	73,04
kr 50	€6	8	2,09
kr 100	€12	13	3,40
kr 300	€37	19	4,97
kr 500	€62	21	5,50
kr 800	€99	3	0,79
kr 1 000	€124	15	3,93
kr 1 500	€186	4	1,05
kr 2 000	€248	8	2,09
kr 3 000	€373	3	0,79
kr 4 000	€497	4	1,05
kr 6 000	€745	3	0,79
kr 8 000	€994	1	0,26
kr 20 000	€2 484	1	0,26

**Table A3-5: Hungary road noise WTP- distribution**

<b>Hungary road noise WTP- distribution</b>			
Q08A (HUF)	Q08A (Euro)	Frequency	Percent
0 Ft	€0	378	78,59
500 Ft	€2	21	4,37
1 000 Ft	€4	33	6,86
4 000 Ft	€16	16	3,33
6 000 Ft	€24	6	1,25
10 000 Ft	€40	11	2,29
15 000 Ft	€60	1	0,21
20 000 Ft	€80	5	1,04
25 000 Ft	€100	4	0,83
50 000 Ft	€201	5	1,04
100 000 Ft	€402	1	0,21

**Table A3-6: Hungary rail noise WTP- distribution**

<b>Hungary rail noise WTP- distribution</b>			
Q08A (HUF)	Q08A (Euro)	Frequency	Percent
0 Ft	€0	226	56,78
500 Ft	€2	34	8,54
1 000 Ft	€4	35	8,79
4 000 Ft	€16	27	6,78
6 000 Ft	€24	19	4,77
10 000 Ft	€40	24	6,03
15 000 Ft	€60	8	2,01
20 000 Ft	€80	8	2,01
25 000 Ft	€100	7	1,76
40 000 Ft	€161	4	1,01
50 000 Ft	€201	3	0,75
100 000 Ft	€402	2	0,5
150 000 Ft	€602	1	0,25

**Table A3-7: Germany road noise WTP- distribution**

<b>Germany road noise WTP- distribution</b>		
Q08A (Euro)	Frequency	Percent
0 €	533	85,83
5 €	14	2,25
10 €	16	2,58
30 €	18	2,9
50 €	22	3,54
80 €	2	0,32
100 €	11	1,77
150 €	1	0,16
200 €	3	0,48
300 €	1	0,16

**Table A3-8: Germany rail noise WTP- distribution**

<b>Germany rail noise WTP- distribution</b>		
Q12A (Euro)	Frequency	Percent
0 €	336	82,76
5 €	11	2,71
10 €	12	2,96
30 €	4	0,99
50 €	19	4,68
80 €	2	0,49
100 €	9	2,22
150 €	4	0,99
200 €	2	0,49
300 €	2	0,49
600 €	2	0,49
1 000 €	3	0,74

**Table A3-9: Spain road noise WTP- distribution**

<b>Spain road noise WTP- distribution</b>		
Q8A (Euro)	Frequency	Percent
0 €	392	76,56
5 €	15	2,93
10 €	17	3,32
15 €	2	0,39
30 €	20	3,91
50 €	20	3,91
80 €	9	1,76
100 €	24	4,69
200 €	8	1,56
600 €	1	0,20
3 000 €	4	0,78

**Table A3-10: Spain rail noise WTP- distribution**

<b>Spain rail noise WTP- distribution</b>		
Q12A (Euro)	Frequency	Percent
0 €	239	74,45
5 €	5	1,56
10 €	9	2,8
30 €	16	4,98
50 €	18	5,61
80 €	5	1,56
100 €	11	3,43
200 €	11,00	3,43
400 €	3,00	0,93
600 €	3,00	0,93
3 000 €	1,00	0,31

**Table A3-11: Sweden road noise WTP- distribution**

<b>Sweden road noise WTP- distribution</b>			
Q08A (SEK)	Q08A (Euro)	Frequency	Percent
kr 0	€0	217	44,74
kr 50	€5	14	2,89
kr 100	€11	50	10,31
kr 200	€21	6	1,24
kr 240	€26	1	0,21
kr 300	€32	35	7,22
kr 400	€43	1	0,21
kr 500	€54	55	11,34
kr 700	€75	1	0,21
kr 800	€86	11	2,27
kr 1 000	€107	35	7,22
kr 1 200	€129	8	1,65
kr 1 500	€161	12	2,47
kr 2 000	€214	15	3,09
kr 2 500	€268	1	0,21
kr 3 000	€322	6	1,24
kr 4 000	€429	5	1,03
kr 5 000	€536	3	0,62
kr 6 000	€643	4	0,82
kr 10 000	€1 072	3	0,62
kr 20 000	€2 144	2	0,41

## Annex 4: WTP for elimination of road and rail noise annoyance at the mid point interval calculated in local currencies

**Table A4-1: Road noise annoyance local currency**

	Protest d	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed	Urban	Rural
UK	28.75	5.13	21.50	36.09	43.85	117.36	19.24	38.63
Obs	469	143	137	108	41	35	239	230
Norway	1425.17	121.84	919.67	3109.48	2104.90	1409.01	1772.96	1147.80
Obs	416	88	147	83	75	22	182	234
Hungary	2052.17	468.76	983.84	2057.62	5073.19	4491.33	2349.23	1763.28
Obs	523	97	81	85	94	66	258	265
Germany	11.47	0.77	4.69	11.66	19.64	27.59	14.75	7.82
Obs	471	116	106	90	78	81	248	223
Spain	47.38	15.87	74.91	65.44	22.80	42.58	48.68	45.81
Obs	359	92	108	72	43	37	194	161
Sweden	794.46	219.89	526.85	1182.37	1555.99	2682.95	655.33	1205.94
Obs	471	124	146	83	57	31	352	119

**Table A4-2: Rail noise annoyance local currency**

	Protest d	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed	Urban	Rural
UK	15.72	3.53	13.51	60.76	10.31	6.62	18.93	9.84
Obs	255	109	79	38	16	12	165	90
Norway	520.96	144.69	506.97	984.78	684.17	4766.51	750.75	285.15
Obs	304	105	146	28	19	6	154	150
Hungary	6021.60	5285.76	5190.38	6667.50	5582.82	8141.90	6118.35	5928.94
Obs	340	75	63	77	81	44	166	174
Germany	37.16	0.37	19.7	50.3	72.84	73.02	65.95	10.23
Obs	271	75	59	49	45	43	131	140
Spain	32.73	17.77	38.08	34.59	38.18	35.87	23.51	50.76
Obs	337	65	70	65	67	67	223	114



## Annex 5: WTP from mid point estimate for road divided into urban and rural for annoyance levels – values in Euro (PPP – 2005) and national currencies

**Table A5-1: Road noise annoyance – Urban (Values in Euro PPP (2005) – Germany is taken as benchmark)**

	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed
UK	9,35	30,69	58,21	12,38	47,26
Obs	78	70	52	22	13
Norway	15,48	100,14	523,17	215,58	198,36
Obs	40	66	31	32	13
Hungary	6,37	2,09	18,79	47,63	27,45
Obs	42	43	37	54	30
Germany	18,69	16,82	14,09	13,9	10,75
Obs	191	191	196	204	210
Spain	30,60	134,48	33,82	18,13	12,78
Obs	42	60	44	29	19
Sweden	19,51	40,99	131,64	152,46	84,46
Obs	99	106	58	50	22

**Table A5-2: Road noise annoyance – Urban (Values in national currencies (2005))**

	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed
UK	6.33	20.78	39.41	8.38	32.00
Obs	78	70	52	22	13
Norway	152.47	986.36	5153.11	2123.42	1953.80
Obs	40	66	31	32	13
Hungary	868.02	284.80	2560.44	6490.35	3740.50
Obs	42	43	37	54	30
Germany	18.69	16.82	14.09	13.9	10.75
Obs	191	191	196	204	210
Spain	24.89	109.37	27.51	14.75	10.39
Obs	42	60	44	29	19
Sweden	192.38	404.18	1298.04	1503.33	832.82
Obs	99	106	58	50	22

**Table A5-3: Road noise annoyance – Rural (Values in Euro PPP (2005) – Germany is taken as benchmark)**

	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed
UK	5,45	32,86	48,77	125,43	247,85
Obs	65	67	56	19	22
Norway	9,78	87,87	192,01	212,31	63,17
Obs	48	81	52	43	9
Hungary	1,20	13,03	12,26	23,20	37,55
Obs	55	38	48	40	36
Germany	10,64	9,74	8,61	5,47	5,07
Obs	164	174	185	189	180
Spain	10,21	39,14	153,75	48,54	94,13
Obs	50	48	28	14	18
Sweden	33,36	86,38	92,68	195,93	730,71
Obs	25	40	25	7	9

**Table A5-4: Road noise annoyance – Rural (Values in national currencies (2005))**

	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed
UK	3.69	22.25	33.02	84.92	167.80
Obs	65	67	56	19	22
Norway	96.33	865.50	1891.26	2091.21	622.21
Obs	48	81	52	43	9
Hungary	163.52	1775.55	1670.62	3161.37	5116.79
Obs	55	38	48	40	36
Germany	10.64	9.74	8.61	5.47	5.07
Obs	164	174	185	189	180
Spain	8.30	31.83	125.05	39.48	76.56
Obs	50	48	28	14	18
Sweden	328.95	851.75	913.87	1931.97	7205.18
Obs	25	40	25	7	9

## Annex 6: WTP from mid point estimate for rail divided into urban and rural for annoyance levels – values in Euro (PPP – 2005)

**Table A6-1: Rail noise annoyance – Urban (Values in Euro PPP (2005) – Germany is taken as benchmark)**

	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed
UK	6,80	16,23	113,68	15,23	13,04
Obs	57	56	26	16	9
Norway	28,13	67,67	84,43	104,29	697,96
Obs	47	77	15	11	4
Hungary	57,15	24,15	21,45	52,11	84,01
Obs	46	30	39	32	19
Germany	0,72	38,5	99,34	128,93	129,73
Obs	38	30	23	21	19
Spain	18,45	36,90	28,36	25,07	34,06
Obs	41	44	40	45	53

**Table A6-2: Rail noise annoyance – Urban (Values in national currencies (2005))**

	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed
UK	4.60	10.99	76.97	10.31	8.83
Obs	57	56	26	16	9
Norway	277.07	666.53	831.62	1027.23	6874.76
Obs	47	77	15	11	4
Hungary	7787.61	3290.83	2922.91	7100.83	11447.71
Obs	46	30	39	32	19
Germany	0.72	38.5	99.34	128.93	129.73
Obs	38	30	23	21	19
Spain	15.01	30.01	23.07	20.39	27.70
Obs	41	44	40	45	53

**Table A6-3: Rail noise annoyance – Rural (Values in Euro PPP (2005) – Germany is taken as benchmark)**

	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed
UK	3,55	29,06	37,91	.	0,00
Obs	52	23	12	0	3
Norway	3,80	33,40	117,92	21,57	55,83
Obs	58	69	13	8	2
Hungary	9,68	50,75	77,15	33,69	41,31
Obs	29	33	38	49	25
Germany	0	0,25	6,92	23,75	28,125
Obs	37	29	26	24	24
Spain	27,67	63,62	65,19	91,69	82,14
Obs	24	26	25	22	14

**Table A6-4: Rail noise annoyance – Rural (national values (2005))**

	Not Annoyed	Slightly annoyed	Moderately annoyed	Very annoyed	Extremely annoyed
UK	2.40	19.67	25.67	.	0.00
Obs	52	23	12	0	3
Norway	37.43	328.98	1161.49	212.46	549.91
Obs	58	69	13	8	2
Hungary	1319.06	6915.50	10512.93	4590.80	5629.15
Obs	29	33	38	49	25
Germany	0	0.25	6.92	23.75	28.125
Obs	37	29	26	24	24
Spain	22.50	51.74	53.02	74.57	66.80
Obs	24	26	25	22	14

# Annex 7: Value of time scenario: Travel to work – original currencies

Figure A7-1: Travel time maximum willingness to pay for a 5 minutes reduction – UK (percentages)

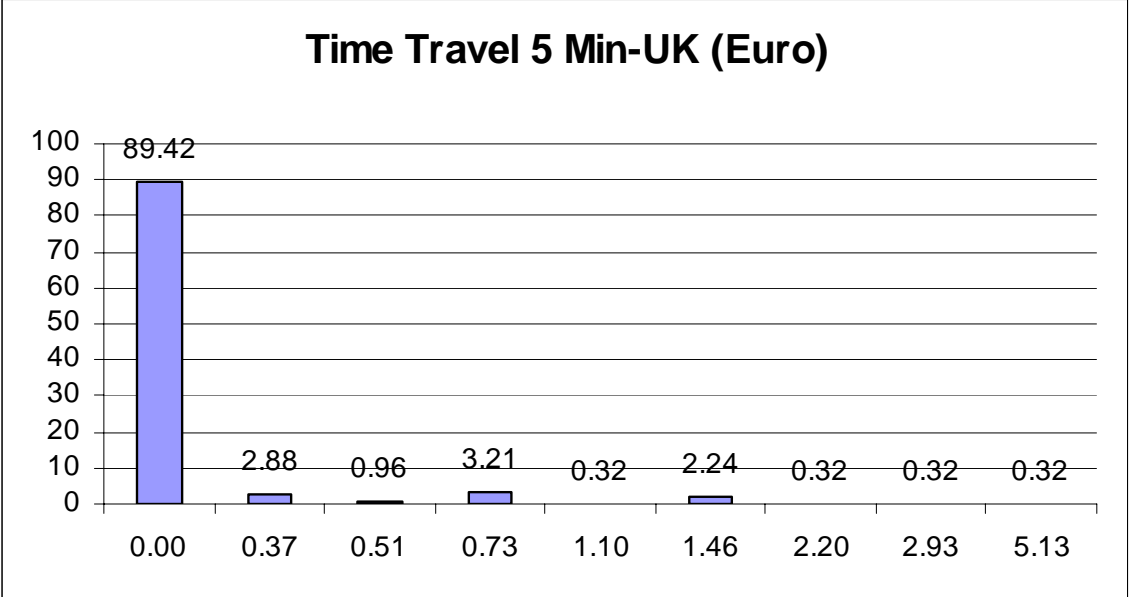


Figure A7-2: Travel time maximum willingness to pay for a 10 minutes reduction – UK (percentages)

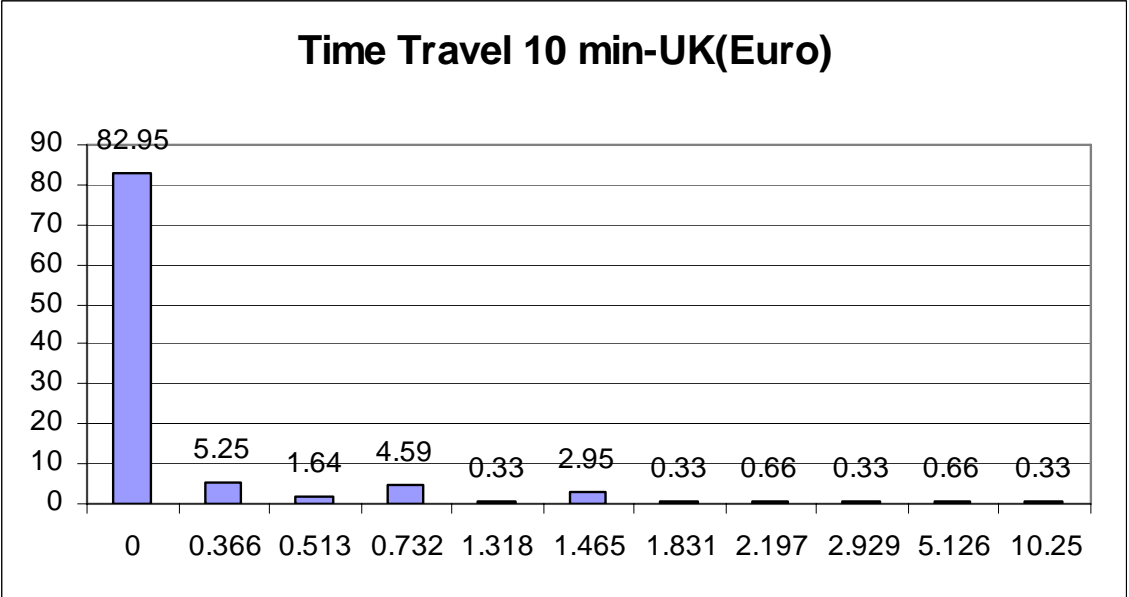


Figure A7-3: Travel time maximum willingness to pay for a 5 minutes reduction – Norway (percentages)

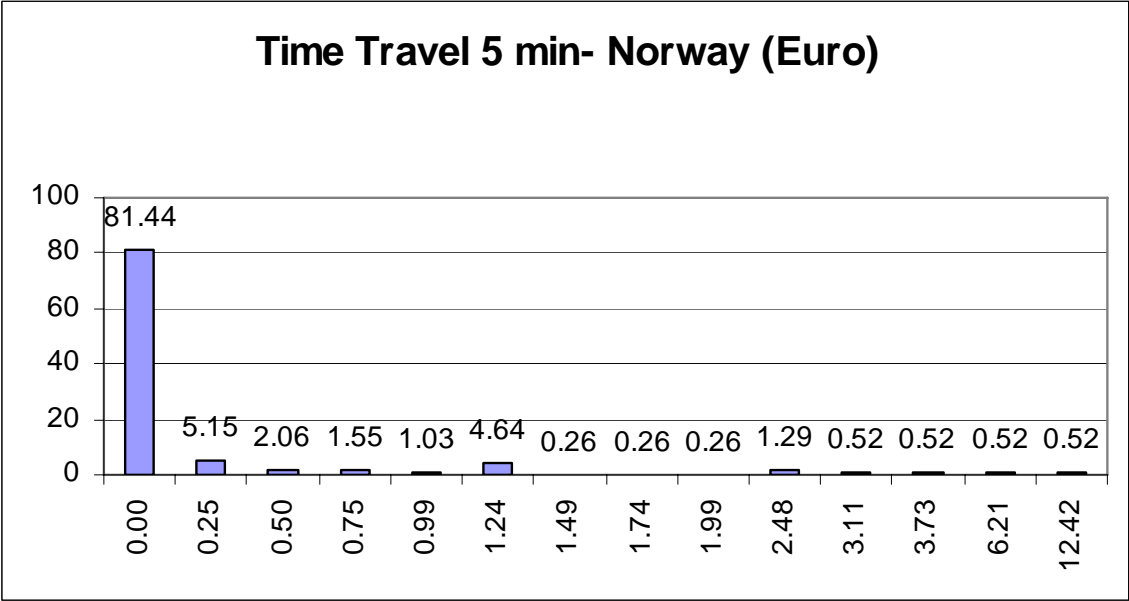


Figure A7-4: Travel time maximum willingness to pay for a 10 minutes reduction – Norway (percentages)

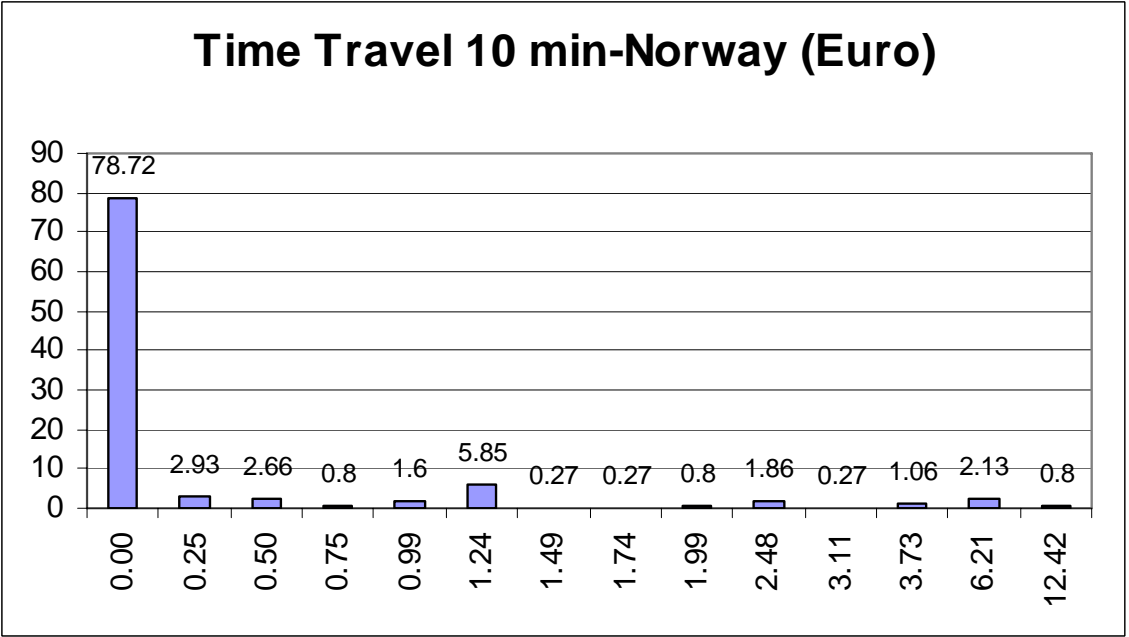


Figure A7-5: Travel time maximum willingness to pay for a 5 minutes reduction – Hungary (percentages)

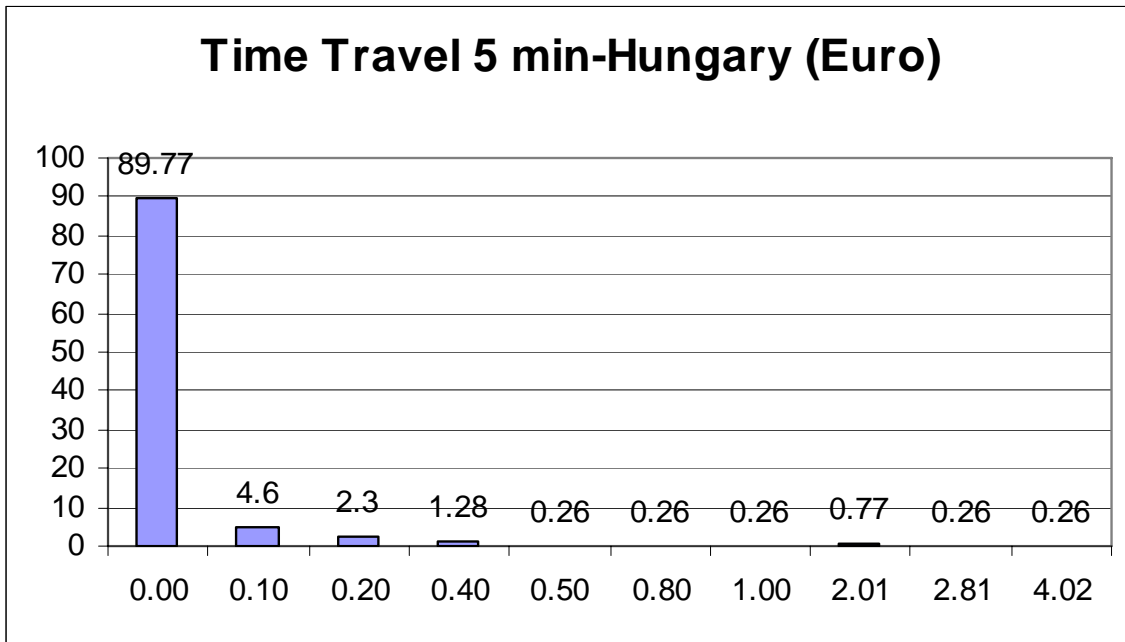
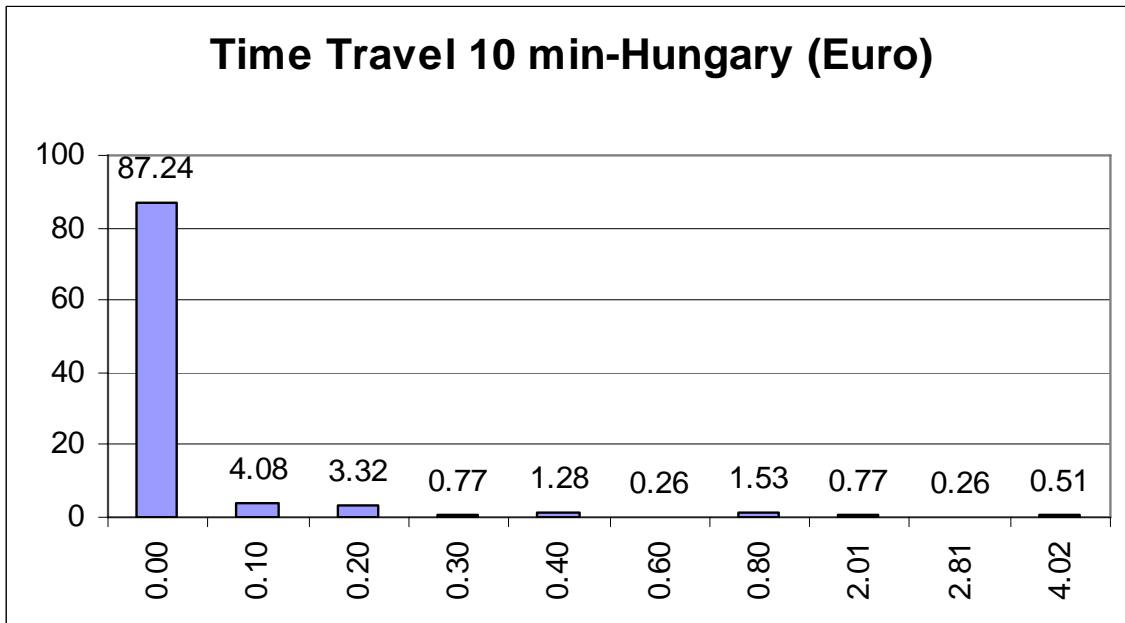
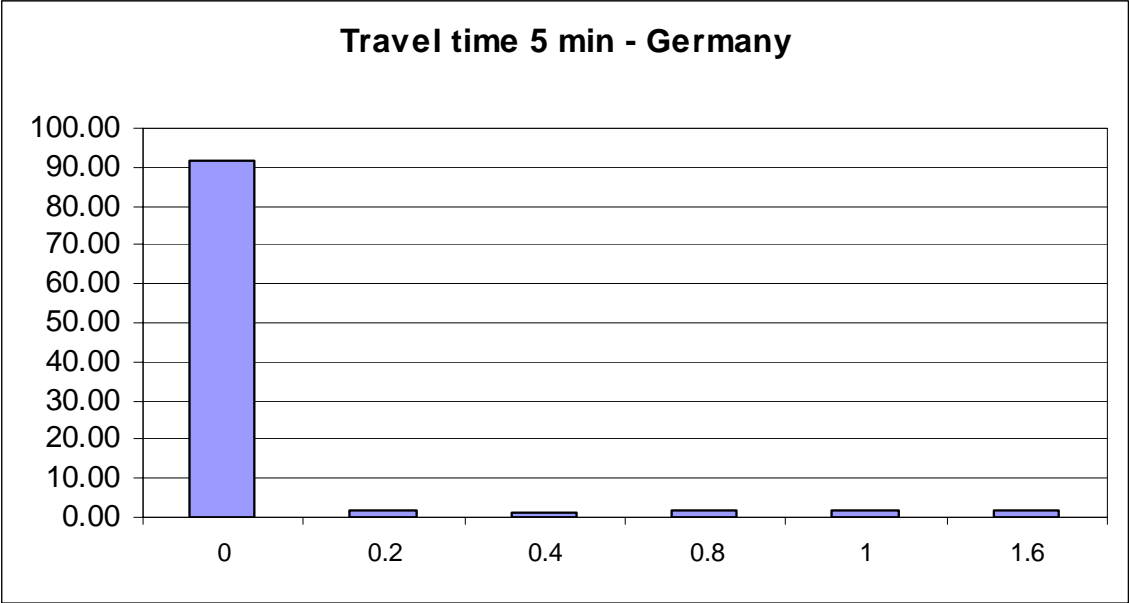


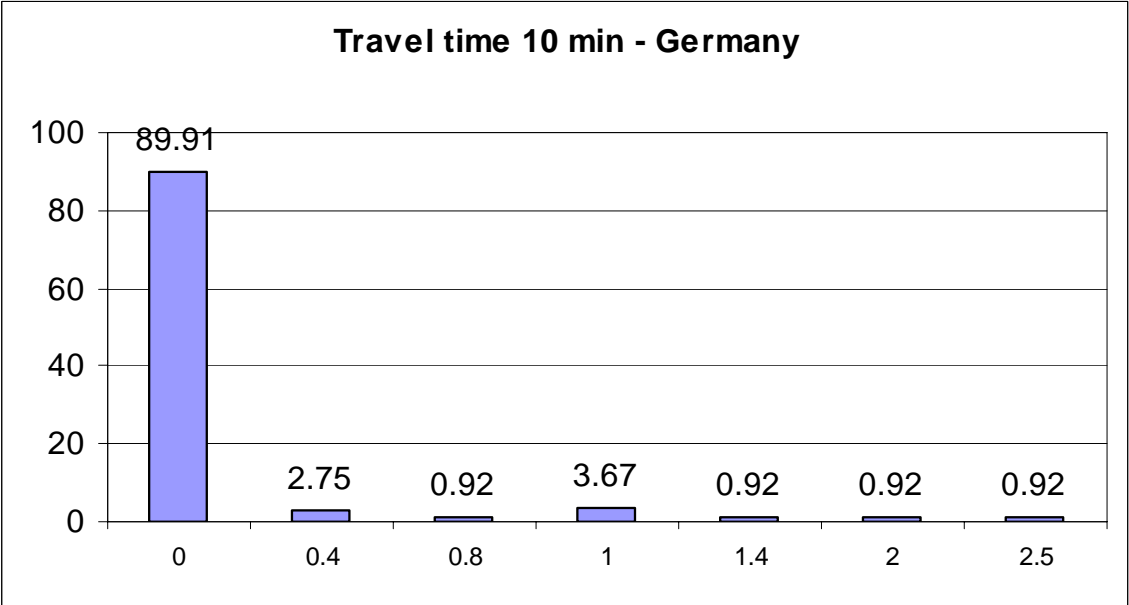
Figure A7-6: Travel time maximum willingness to pay for a 10 minutes reduction – Hungary (percentages)



**Figure A7-7: Travel time maximum willingness to pay for a 5 minutes reduction – Germany (percentages)**

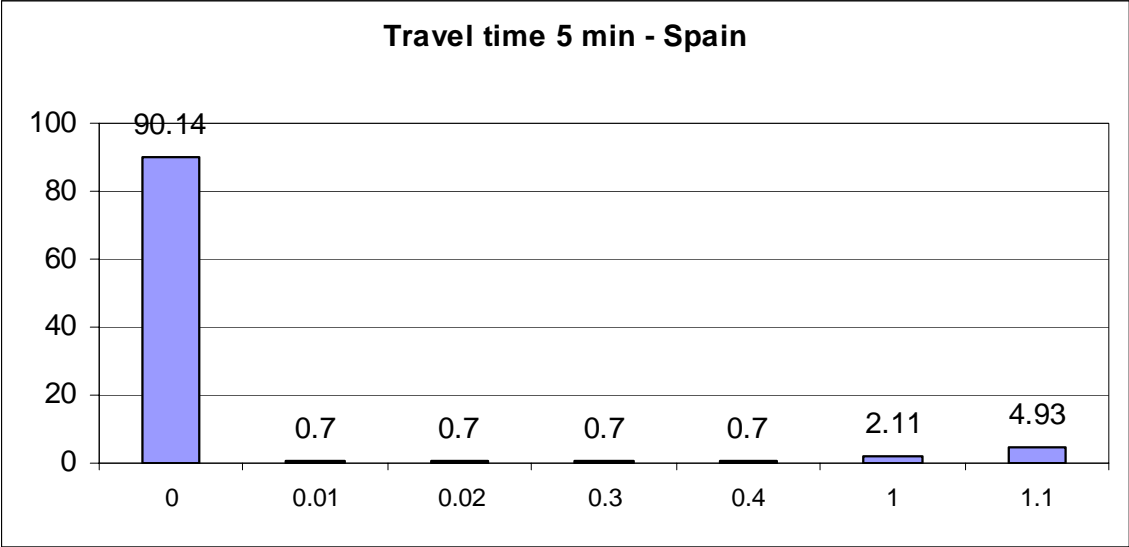


**Figure A7-8: Travel time maximum willingness to pay for a 10 minutes reduction – Germany (percentages)**

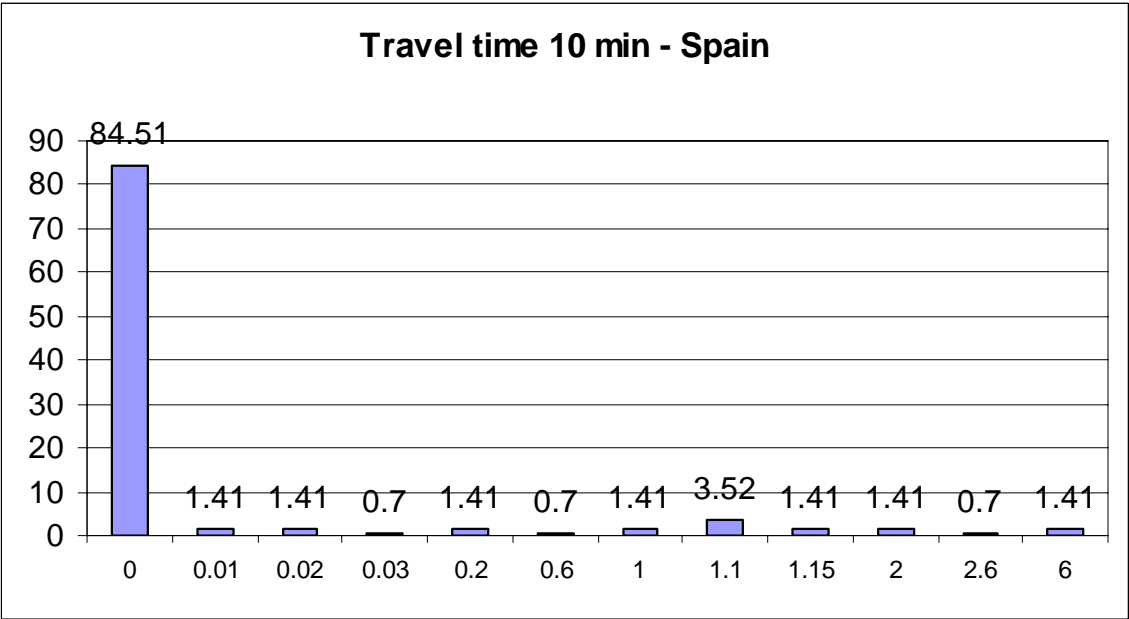




**Figure A7-9: Travel time maximum willingness to pay for a 5 minutes reduction – Spain (percentages)**



**Figure A7-10: Travel time maximum willingness to pay for a 10 minutes reduction – Spain (percentages)**



## Annex 8: Road regression analysis – Model results

Table A8-1: Road regression analysis – Modell 1

MODEL 1			
Probit model	dep variable is a dummy=1 if WTP>0; 0 otherwise		
	coeff	t-stat	
Intercept	-0.7200	-9.6904	
germany	-0.3856	-4.4018	
spain	0.0814	0.8848	
norway	0.2076	2.5630	
hungary	-0.1281	-1.3456	
sweden	0.7426	9.0782	
notannoy	-0.6038	-7.9447	
notpollution	-0.1547	-2.4478	
persin1000	0.0081	4.2073	
noisemeasures	0.1674	2.1544	
moreexpected	0.0796	1.4446	
no_otherbother	-0.0403	-0.7222	
obs.	3240		
likelihood ratio	378.8968		

Table A8-2: Road regression analysis – Modell 2

Only zeros	Probit model		
explain the protesters	dep. Variable is PROTEST2=1; else=0		
	Coeff	t-stat	
Intercept	-1.8123	-5.9970	
germany	-0.4763	-4.5233	
spain	-0.1497	-1.2517	
norway	0.0939	0.9641	
hungary	-0.8533	-7.2932	
sweden	-0.5223	-4.1387	
slightannoy	0.3791	4.1386	
modannoy	0.9211	9.6349	
veryannoy	1.0893	10.5043	
extannoy	1.1818	10.1704	
urban	-0.2385	-3.8221	
no_otherbother	-0.0952	-1.4146	
noisemeasures	0.1268	1.2287	
own	0.0800	1.0471	
worsenoise	0.1019	1.4985	
stayhome	-0.0077	-0.1027	
employed	0.1751	2.2363	
age	0.0289	2.5130	
age*age	-0.0003	-2.2523	
university	0.0204	0.2746	
persin1000	0.0040	1.4194	
male	0.0547	0.8766	

bedroom	-0.0673	-0.9956	
room	0.1368	1.7606	
child	0.0241	0.7774	
verysensitive	-0.0222	-0.2561	
obs.	2260		
likelihood ratio	483.7934		

## Annex 9: Rail regression analysis – Model results

Table A9-1: Rail regression analysis – Model 1

<b>Only zeros</b>	<b>Probit model</b>		
<b>explain the protesters</b>		<b>dep. Variable is PROTEST2=1; else=0</b>	
	Coeff	t-stat	
Intercept	-1.0558	-5.6672	
Germany	-0.3046	-2.1804	
spain	-1.4810	-8.0445	
norway	-0.1653	-1.3288	
hungary	-0.8258	-4.9777	
slightannoy	0.6158	5.2768	
modannoy	1.2944	9.5387	
veryannoy	1.3744	9.7337	
extannoy	1.5085	9.9048	
urban	-0.0441	-0.5213	
noisemeasures	0.2034	1.3809	
own	-0.0368	-0.3472	
stayhome	-0.0813	-0.8138	
employed	0.2446	2.3251	
university	0.1555	1.4909	
persin1000	-0.0007	-0.1922	
male	0.2026	2.3586	
bedroom	-0.1228	-1.3584	
obs.	1225		
likelihood ratio (chi-square)	261.5383		

## Annex 10: Pooled analysis – Probit Model – for time savings WTP

Table A10-1 Pooled analysis – Probit Model – for time savings WTP

Probit model	dep variable is a dummy=1 if WTP>0; 0 otherwise			
	WTP for 5 minutes saving		WTP for 10 minutes saving	
	Coeff	t-stat	Coeff	t-stat
Intercept	-1.4238	-5.94	-1.4244	-6.18
germany	-0.5100	-3.00	-0.6215	-3.87
spain	0.1074	0.56	0.0100	0.05
norway	0.3915	2.91	0.3153	2.49
hungary	0.0268	0.16	0.0225	0.14
travel time (minutes)	0.0018	0.71	0.0046	1.94
travel cost (euro)	0.0019	0.15	0.0013	0.11
car	-0.0315	-0.30	-0.0613	-0.61
veryunlikelydelay	-0.1396	-0.67	-0.0590	-0.29
quiteunlikelydelay	-0.0129	-0.06	0.0078	0.04
quitelikelydelay	0.0816	0.42	0.2066	1.10
verylikelydelay	0.2769	1.39	0.4499	2.33
male	0.0738	0.83	0.0027	0.03
age	0.0000	-0.15	0.0000	0.17
persin1000	0.0022	0.67	0.0053	1.75
log likelihood	56.80		87.56	
obs	1547		1547	

# Annex 11: Focus group guide

## Focus group guide

Final 22.01.2005

### Note:

**Spoken text is in italics with questions in bold. Instructions (to moderator unless otherwise indicated) in frames.**

### Set Up Prior to Commencement

- Tables and chairs arranged as inward facing horseshoe.
- Projector screen.
- Computer projector.
- Tape recorder, tape and microphone(s).
- Name cards completed with first names for team, and placed where they will be sitting.
- Blank name cards available for participants.
- Flipchart.
- Marker pens.

X = Moderator, Y = Note-taker, Z = Assistant

### Opening and Rules:

*Good evening/morning/afternoon. My name is X and {this is Y} {these are Y and Z}. We work for the (name of company) where we are undertaking research on people's attitudes and beliefs about certain issues facing the country. We are designing a survey to get a better idea of how the general public feels about these issues and are conducting discussion groups like this to help us ask the right questions.*

*Thank you for volunteering to come here to help with this. As you know, you will each receive € X.*

*Before we begin, let me make the following clear.*

- *This is strictly a research project and we are not here to sell you anything.*
- *Please feel free to contribute to discussions, we need to hear from everyone, and if anything is unclear please don't hesitate to say so.*
- *We are interested in hearing your opinions and views – there are no right or wrong answers, just what you think.*
- *What you say will remain confidential and your names cannot be associated with the tape recording that we are making. This recording is being done purely because we don't want to miss any of your comments. Y will also take notes in case anything does not come out on the tape.*
- *To make sure the recording is as clear as possible, please speak up and avoid speaking while someone else is.*
- *We will use first names, and please complete the cards in front of you like this [point to own name card].*
- *There will later on be a national survey related to this research project and identical surveys will be undertaken in Hungary, Spain, Germany, Norway and the UK.*

*This session will last about two hours. Let's begin.*

*First I'd like you to introduce yourself, where you live and how long you have lived there. We could perhaps begin from the right starting with you?*

**Introductory:**

**These are general questions related to the topic in order to start the group conversation.**

*We're today going to talk about the area which you live in.*

*Thinking back to the time when you first moved to the place where you now live. Can you describe your first impression of the neighbourhood?*

*Have there been any changes in your neighbourhood lately? If so, which?*

**Transitional questions:**

**Ask more noise specific questions leading to the essential topics in the survey.**

*We'd now like you to try to mention some characteristics in your neighbourhood which you appreciate. Think about the area you're living in and its characteristics. **What do you appreciate the most in the area you live?** Please take a few moments reflecting on the characteristics before writing them down on the paper in front of you.*

**Let the focus group have some minutes thinking about and writing down the characteristics they like the most about their neighbourhood.**

*We'd now like you to take a few moments thinking of the characteristics you like the least in your neighbourhood. Please also write them down on the paper in front of you.*

**Wait for the group to write down the negative characteristics**

*We'll now all share these aspects with each other. **Starting from the right again, could you please tell us the positive and negative characteristics on your list?***

**Key questions:**

*You're now going to test the essential questions used in the questionnaire made for this survey. Precise lead in will depend on whether noise from road traffic or railway is mentioned above, and in what context. If it is, you can say we'll focus on that. Here it's assumed that there has been no mention.*

*I'd now like you to think about a particular feature from your neighbourhood: Disturbance, bothering or annoyance from noise. I'd like you to think about the present noise level in your residence due to road traffic or railway. In which way do you experience noise from road traffic or railway in your house today?*

*Thinking about the last twelve months or so, when you are at your home, how much does noise from road traffic or railway bother, disturb or annoy you? Let us read through the alternatives on this card together and everyone will choose the alternative which best suits your situation.*

**Show card 1 with the 5 level noise annoyance scale and read it for the group. Start from the right and ask each participant about his or her level of annoyance.**

*Starting from the right. Thinking about the last twelve months or so, when you are at your home, how much does noise from road traffic or railway, bother, disturb or annoy you? If you are exposed to noise from only road traffic, railway or neither of them please specify so. If you are exposed to noise from both road and railway, please consider both sources separately*

Card 1 with the following alternatives will be shown		
Not at all .....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>

*Thanks.*

*Could you tell more about how you thought when you determined your level of annoyance from noise?*

*Which noise source do you think people find most annoying if they are exposed to noise from both railway and road traffic, and why?*

*Overall, which noise source do you think people find most annoying?*

*Thanks. Let us now focus on how noise can be reduced in areas like yours.*



**You will now test the scenario description on the group. Be sure to read the exact wording in the text.**

*The authorities are considering laying a noise absorbing road cover in roads and streets. This road cover will absorb noise from both tires and engines. It will reduce the degree of indoor noise to a level which is not annoying to people who are currently bothered, disturbed or annoyed by noise from road traffic. Other conditions such as traffic safety, exhaust fumes, dust and dirt from road traffic will stay the same. It is only the noise that is reduced. The new road cover will cost more to lay and maintain than the road covers used today.*

***What would you like to know in order to be convinced that the new road cover would effectively reduce noise to a level that is not annoying to those living near the road?***

***Could you think of any reason for the noise absorbing road layer NOT to be effective in avoiding all noise annoyance?***

***Do you think there will be any positive or negative side effects from the new road layer? If so, which?***

***What other ways of reducing annoyance from road traffic noise can you think of?***

***Would this/these ways to reduce noise annoyance be more effective?***

***Who do you think should pay the extra costs of this new road layer?***

***If households had to pay, how do you think they should pay?***

*One option is to collect money from households currently annoyed by noise from road traffic, as an extra annual community charge.*

***Do you find this a fair and realistic way of paying for the noise absorbing road cover? Why? Why not?***

***What other ways could people pay for this?***

*I will now describe one way households annoyed by noise could pay. The new road cover will cost more to lay and maintain than the road covers used today. Part of this extra cost would have to be paid by the households where the annoyance from noise is eliminated. Please imagine that a noise absorbing road cover can be laid in the street where you live. **What is the most your household is willing to pay annually as an extra community charge to remove the noise annoyance from road traffic where you live? Remember, this means that every year you will have less money at your disposal to buy other things.***

***Do you find this a fair and realistic way of paying for the noise absorbing road cover? Why? Why not?***

***If people refuse to pay for the new noise absorbing road cover when they hear this question, what do you think could be the reason?***

*Some of the noise from road traffic could come from scooters, mopeds and motorbikes. The authorities are considering making a new legislation that will order an extra exhaust box on these vehicles. Do you think the new exhaust box will be effective in reducing noise from light motor vehicles?*

*What do you think of this new legislation?*

*What other ways of reducing noise from scooters, mopeds and motorbikes can you think of?*

*Who should pay for the exhaust box?*

*How should this be paid?*

*Thanks! We are now going to talk about noise from rail.*

*The authorities are considering using noise reducing wheels, grinding the railroads and building noise preventing walls to reduce the noise from rail. These actions will decrease the level of noise to a level which indoors is not annoying to people today bothered, disturbed or annoyed by noise from rail. Other conditions like risk for traffic hazards and vibrations will stay the same. It is only the noise that is reduced. The implementation of noise reducing wheel, grinding of the railroads and noise preventing walls will come as an additional cost to the existing rail expenses.*

*Do you think noise reducing wheel, grinding of the railroads and noise preventing walls will be effective in eliminating annoyance from noise from rail? Why/Why not?*

*Do you think there will be any positive or negative side effects from the noise reducing wheels, grinding of the railroads and the noise preventing walls? If so, which?*

*Who do you think should pay for the noise reducing wheels, the grinding of the railroads and the noise preventing walls?*

*We are now going to talk about a different topic; time spent on travels.*

## **Show card 2**

*The travel we are going to consider is a trip between two cities in (respective country). You are going to be the driver of the car you are using. You will travel between two cities on a weekday with good driving conditions. The distance of you travel is 40 kilometres. There are two road options. Let us call them road A and road B. Road A is a recently built highway and in choosing this way, you will spend 30 minutes on the trip. Road B is an old road and by choosing this alternative, you will spend 45 minutes on the trip. Due to the higher construction costs on building road A, the road toll is € 2 for this route. Driving Road B is free of charge. The risks of accidents are the same on both roads and it is only the time saving and the road toll that are different. All other factors stay the same.*

*Which road will you choose to drive?*

**Show card 2 to the focus group**

	<b>Road A</b>	<b>Road B</b>
<b>Road toll</b>	<b>2 euro</b>	<b>0 euro</b>
<b>Travel time</b>	<b>30 minutes</b>	<b>45 minutes</b>

*What is the reason for your answer?*

*What kind of information do you need in order to decide between these two alternatives?*

*What difference, if any, would it make for your decision travelling during work time versus leisure time?*

*What difference, if any, would it make being the passenger instead of the driver of the car?*

**Closing questions**

*Suppose you had one minute to talk to the governor about the topic noise annoyance from road traffic or railway in your neighbourhood. **What would you say?***

*That is as much as we need to cover in this session. Thank you very much for your participation. Your input has been very useful.*

*Just before we close I would like to ask Y to briefly summarise the discussions.*

**Note-taker gives summary plus seeks clarification of any points or asks follow up questions.**

*Do you think this is a proper summary?*

*Do you think we missed any important elements in the previous discussion?*

*Thank you. Goodbye.*

**Card 1:**

Not at all
Slightly
Moderately
Very
Extremely

**Card 2:**

	<b>Road A</b>	<b>Road B</b>
<b>Road toll</b>	<i>2 euro</i>	<i>0 euro</i>
<b>Travel time</b>	<i>30 minutes</i>	<i>45 minutes</i>

# Annex 12: Questionnaire – final version

!!! Numbers are to be written like this!!!

1	2	3	4	5	6	7	8	9	0
---	---	---	---	---	---	---	---	---	---

1 a) Enter which sample the IP was recruited for

*Please circle  
only one  
number*

- Road traffic noise – Urban ..... 1
- Road traffic noise – Rural ..... 2
- Railway noise – Urban ..... 3
- Railway Noise – Rural ..... 4
- Random Sample – Urban ..... 5
- Random Sample – Rural ..... 6

1 b) How many IPs did you have to contact between last successful interview and this IP (not counting this IP)

\_\_\_\_\_

1 c) Enter Start Time of Interview: \_\_\_\_\_

## Introduction

Hello, my name is ..... from .....(SURVEY FIRM). We are conducting a survey on local living conditions and would like to ask you some questions. This survey is part of a European-wide research project on people's living conditions and your attitudes on the topic. The interview will take between 15 and 20 minutes.

When you answer the questions, remember that it is your opinions we are interested in, and there are no right or wrong answers. All answers will be treated confidentially and will be used solely for research purposes.

## Description of the area

2. How many years have you lived in your present home?

\_\_\_\_\_ years

TO THE INTERVIEWER:

IF IP IS RECRUITED FOR ROAD TRAFFIC NOISE (URBAN OR RURAL) **OR** RANDOM SAMPLE (URBAN OR RURAL) -> GO TO QUESTION 3 (**ROAD TRAFFIC**)

IF IP IS RECRUITED FOR RAILWAY NOISE (URBAN OR RURAL)  
-> GO TO QUESTION 4 (**RAILWAY**)

3. (**ROAD TRAFFIC**) Considering the last 12 months, how much do these things about road traffic bother, disturb or annoy you when you are here at home? Please look at the alternatives on this card.

TO THE INTERVIEWER: SHOW **CARD 1** TO THE IP. THEN READ a) AND THE ALTERNATIVES; AND PUT A CROSS NEXT TO IP'S PREFERRED ALTERNATIVE. DO THE SAME FOR b), c), d) and e).

a) When you are here at your home, how much does noise from the road traffic bother, disturb or annoy you?

*Please mark only one box*

Not at all .....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>

**b) How much does dust and dirt from road traffic bother, disturb or annoy you here at home?**

*Please mark only one box*

Not at all .....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>

**c) How much do vibrations from road traffic bother, disturb or annoy you here at home?**

*Please mark only one box*

Not at all .....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>

**d) How much does the risk of road traffic accidents in your neighborhood bother, disturb or annoy you?**

*Please mark only one box*

Not at all .....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>

**e) How much does air pollution and obnoxious smells from road traffic bother, disturb or annoy you here at home?**

*Please mark only one box*

Not at all .....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>

TO INTERVIEWER: JUMP TO QUESTION 5

**4. (RAILWAY) Considering the last 12 months, how much do these things about the railway bother, disturb or annoy you when you are here at home? Please look at the alternatives on this card.**

TO THE INTERVIEWER: SHOW **CARD 1** TO THE IP. THEN READ a) AND THE ALTERNATIVES; AND PUT A CROSS NEXT TO IP'S PREFERRED ALTERNATIVE. DO THE SAME FOR b) and c)

**a) When you are here at your home, how much does noise from the railway bother, disturb or annoy you?**

*Please mark only one box*

Not at all .....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>

Extremely ..... 5

**b) How much does the risk of railway accidents in your neighbourhood bother, disturb or annoy you?**

*Please mark only one box*

Not at all ..... 1

Slightly ..... 2

Moderately ..... 3

Very ..... 4

Extremely ..... 5

**c) When you are here at your home, how much does vibrations from the railway bother, disturb or annoy you?**

*Please mark only one box*

Not at all ..... 1

Slightly ..... 2

Moderately ..... 3

Very ..... 4

Extremely ..... 5

**ALL**

**5. If noise from traffic bothers, disturbs or annoys you, could you say what the consequences are for you?**

TO THE INTERVIEWER: THE ALTERNATIVES SHALL NOT BE READ. PUT A CROSS NEXT TO THE ITEM(S) ON THE LIST THAT CORRESPOND BEST WITH IP'S ANSWER. IF ANSWERS ARE NOT LISTED; PUT A CROSS NEXT TO "OTHER ANSWERS" AND WRITE IP'S ANSWER

Find it hard to sleep ..... 1

Sleep with earplugs ..... 2

Do not open windows as often as I would if there were no noise..... 3

Hard to concentrate and disturbing when reading or working ..... 4

Disturbing when watching TV or listening to the radio/music ..... 5

Disturbing when talking in the telephone ..... 6

Get headaches/migraine ..... 7

Other answers ..... 8

Please specify:

**6. When you are here at your home, which *other* noise sources bother, disturb or annoy you?**

TO THE INTERVIEWER: THE ALTERNATIVES SHALL NOT BE READ. PUT A CROSS NEXT TO THE ITEMS ON THE LIST THAT CORRESPOND BEST WITH IP'S ANSWER. IF ANSWERS ARE NOT LISTED; PUT A CROSS NEXT TO "OTHER ANSWERS" AND WRITE IP'S ANSWER

- |   |   |                          |
|---|---|--------------------------|
| No other noise source bother, disturb or annoy me ..... | 1 | <input type="checkbox"/> |
| Road traffic .....                                      | 2 | <input type="checkbox"/> |
| Aeroplanes .....  | 3 | <input type="checkbox"/> |
| Businesses, e.g. cafes, shops or workshops.....         | 4 | <input type="checkbox"/> |
| Neighbours.....   | 5 | <input type="checkbox"/> |
| Railway traffic .....                                   | 6 | <input type="checkbox"/> |
| Tram or Metro .....                                     | 7 | <input type="checkbox"/> |
| Other answers.....                                      | 8 | <input type="checkbox"/> |
- Please specify:
- 

TO THE INTERVIEWER:

IF IP IS RECRUITED FOR ROAD TRAFFIC NOISE **OR** RANDOM SAMPLE (CATEGORIES 1,2 5 or 6 IN QUESTION 1a) -> GO TO QUESTION 7a)

IF IP IS RECRUITED FOR RAILWAY NOISE

(CATEGORIES 3 or 4 IN QUESTION 1a) ) -> JUMP TO TO QUESTION 11a)



## Valuing road traffic noise

7 a)

TO THE INTERVIEWER: READ THE TEXT BELOW SLOWLY AND THOROUGHLY TO IP BEFORE ASKING FURTHER QUESTIONS.

I will now read you a short text.

There are people currently bothered, disturbed or annoyed by noise from road traffic. The authorities are considering implementing a package of measures to reduce noise from road traffic. These measures include noise-absorbing road cover in roads and streets that absorb noise from tires, and add-on engine noise dampening boxes for buses, heavy goods vehicles, private cars, scooters and motorbikes. These measures have proven to be effective in reducing noise in other countries, and people are satisfied with them.

This package of measures will reduce the level of noise here at your home to a level which is *not annoying* to people who are currently bothered, disturbed or annoyed by noise from road traffic. Other conditions such as traffic safety, exhaust fumes, and dust from road traffic will stay the same, and will be addressed by another package of measures. The measures described here reduce road traffic noise only.

This package of measures costs money. The current budget of the road authorities will cover part of these costs, such as the maintenance of the new road cover. However, given their limited budget, those causing noise, such as road users and car manufacturers, and those that benefit from this package of measures, such as residents, will also have to share the costs.

Think about how bothered, disturbed or annoyed you are by noise from road traffic at home now, and how much it is worth to you personally to avoid this. **What is the most you personally are willing to pay per year for the next five years to a special public fund, earmarked for this purpose – in order to remove *your* road traffic noise annoyance when you are at home?** Remember that the money used to avoid noise annoyance must either come from your savings or from what you would have spent on other things.

TO THE INTERVIEWER: IF THE IP SAYS SOMETHING LIKE “GOVERNMENT SHOULD PAY (ALL COSTS)”, SAY “GOVERNMENT WILL ALSO HAVE TO PAY THEIR SHARE OF THE COSTS”. CHECK BOX BELOW IF IT WAS NECESSARY TO READ THIS.

7 b)

TO THE INTERVIEWER: GIVE CARD 2A TO THE IP AND SAY:

Start at the top of CARD 2A. Ask yourself whether you are almost certainly willing to pay \_\_\_\_\_ (READ THE LOWEST AMOUNT) annually for five years to avoid your noise annoyance from road traffic here at home. Put a tick next to the amount you are willing to pay, and continue down the card. Stop when you get uncertain about whether you would pay an amount, and tell me the *highest* amount you almost certainly are willing to pay. *If you are uncertain about the lowest amount, tick “I am not willing to pay anything”.*

TO THE INTERVIEWER: RECORD THE **HIGHEST** AMOUNT IP IS ALMOST CERTAINLY WILLING TO PAY ANNUALLY IN 8a) BELOW. GO TO QUESTION 9.

IF IP SAYS “I am not willing to pay anything”, WRITE “0” in 7a). JUMP TO QUESTION 10a)

IF IP SAYS “I don’t know” OR “I don’t want to answer”, LEAVE 8a) OPEN AND CHECK BOX 8b) JUMP TO QUESTION 10a).

8 a) The IP is almost certainly willing to pay  €annually

8 b) I don’t know/I don’t want to answer

**9. People have different reasons for their willingness to pay to avoid noise annoyance. Please look at the statements on the card, and tell me which ones best describe your view.**

TO THE INTERVIEWER: SHOW CARD 3A AND RECORD THE ANSWERS. IP IS ALLOWED TO STATE MORE THAN ONE REASON.

- I am bothered, disturbed or annoyed by noise from road traffic..... 1
  - Others in my household are bothered, disturbed or annoyed by noise from traffic..... 2
  - I would like to reduce the noise annoyance for the other people in the street ..... 3
  - Other reasons 4
  - Please specify:
- 

TO THE INTERVIEWER: JUMP TO QUESTION 10b

**10 a) People have different reasons for saying they are not willing to pay anything to avoid noise annoyance from road traffic, or for saying they don't know or can't answer this question. Look at the statements on the card, and tell me which ones best describe your views.**

TO THE INTERVIEWER: SHOW CARD 3B AND RECORD THE ANSWERS. IP IS ALLOWED TO STATE MORE THAN ONE REASON.

- I am not that bothered, disturbed or annoyed by the road traffic noise that I would pay. 1
- I cannot afford to pay ..... 2
- It is more important to reduce other nuisances from road traffic ..... 3
- The noise reducing measures cannot remove my annoyance from road traffic noise 4
- If you live in a city there will be road traffic noise .... 5
- I am going to move soon ..... 6
- I already pay enough charges and taxes 7
- Government should pay 8
- Those that cause the noises should pay for it..... 9
- I do not want more roadwork in the street ..... 10
- The question about paying is too difficult to answer ..... 11
- Other reasons 12

Please specify:

---

**10 b) Have any measures been taken in your neighborhood recently to reduce road traffic noise?**

Yes .....	1	<input type="checkbox"/>
No .....	2	<input type="checkbox"/>
Don't know .....	3	<input type="checkbox"/>

TO THE INTERVIEWER: JUMP TO QUESTION 15a)

**Valuing noise from rail**

**11 a)**

TO THE INTERVIEWER: READ THE TEXT BELOW SLOWLY AND THOROUGHLY TO IP BEFORE ASKING FURTHER QUESTIONS.

I will now read you a short text.

There are people currently bothered, disturbed or annoyed by noise from trains. The authorities are considering implementing a package of measures to reduce noise from trains. These measures include grinding rails, installing quiet brakes and noise reducing wheels. These measures have proven to be effective in reducing noise in other countries, and people are satisfied with them. These measures will reduce the level of noise here at your home to a level that is *not annoying*. Other conditions such as traffic safety and vibrations will stay the same, and will be addressed by another package of measures. The measures described here reduce noise only.

This package of measures costs money. These extra costs will be shared by households, who benefit from the new noise reducing measures, the railway companies and companies transporting goods. Think about how bothered, disturbed or annoyed you are by noise from rail now, and how much it is worth to you personally to avoid this. **What is the most you are willing to pay annually the next five years to a special state fund earmarked for this purpose, to remove *your* noise annoyance from the railway when you are at home?** Remember that the money used to avoid noise annoyance must either come from your savings or from what you would have spent on other things.

TO THE INTERVIEWER: IF THE IP SAYS SOMETHING LIKE "GOVERNMENT SHOULD PAY (ALL COSTS)", SAY "GOVERNMENT WILL ALSO HAVE TO PAY THEIR SHARE OF THE COSTS". CHECK BOX BELOW IF IT WAS NECESSARY TO READ THIS.

**11 b)**

12 a)

TO THE INTERVIEWER: GIVE CARD 2B TO THE IP AND SAY:

Start at the top of CARD 2B, Ask yourself whether you almost certainly are willing to pay \_\_\_\_\_ (READ THE LOWEST AMOUNT) annually for five years to avoid your noise annoyance from railway here at home. Put a tick next to the amount you are willing to pay, and continue down the card. Stop when you get uncertain about whether you would pay an amount, and tell me the *highest* amount you almost certainly are willing to pay. *If you are uncertain about the lowest amount, tick "I am not willing to pay anything"*.

TO THE INTERVIEWER: RECORD THE **HIGHEST** AMOUNT IP IS ALMOST CERTAINLY WILLING TO PAY ANNUALLY IN 12a) BELOW. GO TO QUESTION 13.

IF IP SAYS "I am not willing to pay anything", WRITE "0" in 12a). JUMP TO QUESTION 14a)

IF IP SAYS "I don't know" OR "I don't want to answer", LEAVE 12a) OPEN AND CHECK BOX 12b). JUMP TO QUESTION 14a).

12 a) The IP is almost certainly willing to pay \_\_\_\_\_ €annually

12 b) I don't know/I don't want to answer

13. People have different reasons for their willingness to pay to avoid noise annoyance. Please look at the statements on the card, and tell me which ones best describe your view.

TO THE INTERVIEWER: SHOW CARD 3C AND RECORD THE ANSWERS. IP IS ALLOWED TO STATE MORE THAN ONE REASON.

- I am bothered, disturbed or annoyed by noise from railways ..... 1
- Others in my household are bothered, disturbed or annoyed by noise from railways..... 2
- I would like to reduce the noise annoyance for the other people along the railway here ..... 3
- Other reasons, ..... 4

Please specify:

TO THE INTERVIEWER: JUMP TO QUESTION 14b.

**14 a) People have different reasons for saying they are not willing to pay anything to avoid noise annoyance, or for saying they don't know or can't answer this question. Look at the statements on the card, and tell me which ones best describe your views.**

TO THE INTERVIEWER: SHOW CARD 3D AND . RECORD THE ANSWERS. IP IS ALLOWED TO STATE MORE THAN ONE REASON.

- |   |    |                          |
|---|----|--------------------------|
| I am not that bothered, disturbed or annoyed by the railway noise that I would pay. | 1  | <input type="checkbox"/> |
| I cannot afford to pay .....  | 2  | <input type="checkbox"/> |
| It is more important to reduce other nuisances from railways                        | 3  | <input type="checkbox"/> |
| The noise reducing measures cannot remove my annoyance from railway noise           | 4  | <input type="checkbox"/> |
| If you live in a city there will be noise ....                                      | 5  | <input type="checkbox"/> |
| I am going to move soon .....   | 6  | <input type="checkbox"/> |
| I already pay enough charges and taxes  | 7  | <input type="checkbox"/> |
| Government should pay   | 8  | <input type="checkbox"/> |
| Those that cause the noises should pay for it                                       | 9  | <input type="checkbox"/> |
| I do not want any more work on the railway tracks .....                             | 10 | <input type="checkbox"/> |
| The question about paying is too difficult to answer .....                          | 11 | <input type="checkbox"/> |
| Other reasons.....  | 12 | <input type="checkbox"/> |
| Please specify:   |    |                          |

**14 b) Have any measures been taken in your neighborhood recently to reduce railway noise?**

- |                  |   |                          |
|------------------|---|--------------------------|
| Yes .....        | 1 | <input type="checkbox"/> |
| No .....         | 2 | <input type="checkbox"/> |
| Don't know ..... | 3 | <input type="checkbox"/> |

**Questions about your household and home**

**15 a) Do you stay at home in the daytime on workdays, i.e. not weekends?**

TO THE INTERVIEWER: THIS COULD BE E.G. WORKING FROM HOME, HAVING VARIABLE WORKING HOURS E.G. WORKING AT NIGHTS, OR BEING UNEMPLOYED. PUT A CROSS NEXT TO THE APPROPRIATE CATEGORY.

- (Please mark one box only)
- |                              |                          |
|------------------------------|--------------------------|
| 1. Yes, most workdays .....  | <input type="checkbox"/> |
| 2. Yes, some workdays .....  | <input type="checkbox"/> |
| 3. No, never or seldom ..... | <input type="checkbox"/> |
| 4. I don't know .....        | <input type="checkbox"/> |

**15 b) Does your spouse (co-habitant) stay at home in the daytime on workdays, i.e. not weekends?**

(Please mark one box only)

- 1. Yes, most workdays .....
- 2. Yes, some workdays .....
- 3. No, never or seldom .....
- 4. I don't know .....
- 5. Not relevant .....

**16. Do you think you are very, a little, or not at all sensitive to noise?**

TO THE INTERVIEWER: READ THE ALTERNATIVES TO THE IP

- 1 Very sensitive .....
- 2 A little sensitive .....
- 3 Not at all sensitive .....
- 4 I don't know .....

**17. Do you have any hearing problems?**

TO THE INTERVIEWER: READ THE ALTERNATIVES TO THE IP

- Yes, very reduced hearing ..... 1
- Yes, slightly reduced hearing ..... 2
- Yes, tinnitus (buzzing in your ears) ..... 3
- No, normal hearing ..... 4
- I don't know ..... 5

TO THE INTERVIEWER: FOR THE **QUESTIONS 18, 19, 20 AND 21** :

- **READ "ROAD TRAFFIC NOISE"** IF IP BELONGS TO THE ROAD TRAFFIC SAMPLE *OR* RANDOM SAMPLE (Question 1b - Categories 1,2,5 or 6)
- **READ "RAILWAY NOISE"** IF IP BELONGS TO THE RAILWAY SAMPLE (Question 1b - Categories 3 or 4)

**18. Does any bedroom face the main source of Road traffic noise/Railway noise?**

TO THE INTERVIEWER: READ THE ALTERNATIVES TO THE IP

- 1 Yes .....
- 2 No .....
- 3 I don't know .....

**19. Do other rooms that are used during the daytime face the main source of Road traffic noise / Railway noise?**

TO THE INTERVIEWER: READ THE ALTERNATIVES TO THE IP

- 1 Yes .....
- 2 No .....
- 3 I don't know .....

**20. How bothering, disturbing or annoying was the Road traffic noise/ Railway noise when you moved in here compared to what you expected?**

TO THE INTERVIEWER: READ THE ALTERNATIVES TO THE IP

- Less bothering, disturbing or annoying than expected ..... 1
- More bothering, disturbing or annoying than expected ..... 2
- Just as bothering, disturbing or annoying as expected ..... 3
- Don't know ..... 4

**21. How bothering, annoying or disturbing is the Road traffic noise / Railway noise now compared to when you moved in here?**

TO THE INTERVIEWER: READ THE ALTERNATIVES TO THE IP

- 1 The noise is better now compared to when I moved in.
- 2 The noise is the same now as when I moved in.
- 3 The noise is worse now compared to when I moved in .....
- 4 I don't know .....

**22. Do your household own or rent your present home?**

- 1 Own .....
- 2 Rent .....
- 3 I don't know .....

**23. Would you characterise yourself as:**

TO INTERVIEWER: READ THE ALTERNATIVES TO THE IP

- Always on time for work and appointments 1
- Mostly on time 2
- Sometimes I am on time and sometimes I am too late 3
- Mostly coming too late ..... 4
- Always coming too late 5
- I don't know ..... 6

**Value of time scenario: Travel to work**

**24. What would you describe as your occupational situation?**

TO THE INTERVIEWER: READ THE ALTERNATIVES, AND CHECK IP'S ANSWER

<i>Self-employed</i>	<i>1</i>
<i>Employed full-time</i>	<i>2</i>
<i>Employed part-time</i>	<i>3</i>
<i>Student</i>	<i>4</i>
<i>Unemployed</i>	<i>5</i>
<i>Looking after the home full-time</i>	<i>6</i>
<i>Retired</i>	<i>7</i>
<i>Unable to work due to sickness or disability</i>	<i>8</i>
<i>Parental leave</i>	<i>9</i>
<i>Other (please specify)</i>	<i>10</i>

TO THE INTERVIEWER:

IF IP ANSWERS ALTERNATIVE 1, 2 OR 3 IN Q24 → GO TO Question 25.

IF IP ANSWERS OTHER ALTERNATIVES IN Q24 → GO TO Question 38

**25. Thinking about the last journey you made to work, which of the following modes of transportation did you use? Report only one mode of transportation.**

**Only** if you use more than one mode of transportation during the *same* journey to work, report more than one mode.

TO THE INTERVIEWER: READ THE ALTERNATIVES TO THE IP.

<b>Driver of own or household's car</b>	<b>1</b>
<b>Passenger in car</b>	<b>2</b>
<b>Train</b>	<b>3</b>
<b>Tram</b>	<b>4</b>
<b>Metro</b>	<b>5</b>
<b>Bus</b>	<b>6</b>
<b>Bicycle</b>	<b>7</b>
<b>Walking</b>	<b>8</b>
<b>Other,</b>	<b>9</b>
<b>Please specify:</b>	

IF IP ANSWERS ALTERNATIVE 1, 2, 3, 4, 5, 6 IN Q25, GO TO Q26

IF IP ANSWERS ONLY 7, 8 OR 9 IN Q26, GO TO Q 38



26. Approximately how many minutes did your last journey to work take, one way? ,

_____ Minutes (one way)
-------------------------

27. If you were to make the exact same journey to work next week, what do you think would be the chance of experiencing an unexpected delay of 5 minutes or more?

TO THE INTERVIEWER: READ THE ALTERNATIVES TO IP
---

Very likely	1	<input type="checkbox"/>
Quite likely	2	<input type="checkbox"/>
Quite unlikely	3	<input type="checkbox"/>
Very unlikely	4	<input type="checkbox"/>
I don't know	5	<input type="checkbox"/>

28. About how much did your journey to work cost you, one way?

_____ Euro one way
--------------------

29. Who paid for the costs of the journey?

TO THE INTERVIEWER: READ ALTERNATIVES TO IP
---

All paid by myself	1
All paid by other traveller(s) in the vehicle	2
Shared with other traveller(s) in the vehicle	3
A colleague, partner, family member, etc paid all costs	4
My employer paid all costs	5
I don't know	6
Other, please specify:	7

30. About how many kilometres is it from your home to work, one way?

_____ Kilometres
------------------

31. Do you have to reach work by a specific time, or do you have flexible working hours?

TO THE INTERVIEWER: READ ALTERNATIVES TO IP
---

A specific time	1
Flexible working hours	2
I don't know	3

32. How would you rate the overall level of traffic congestion during your last journey to work?

TO THE INTERVIEWER: SHOW CARD 6 AND READ ALTERNATIVES TO IP. CIRCLE ONE.
--

Extremely congested most of the journey	1
Moderate congestion, with occasional periods of heavy congestion	2
Moderate congestion	3
Little congestion, with occasional periods of moderate congestion	4
No or very little congestion	5
I don't know	6

33.

Please imagine a situation exactly the same as your last journey to work , except

- The travel time for your trip can be different from the actual situation at that time, because there is, for example, more or less congestion.
- The travel costs for your trip can also be different from the actual situation, because, for example the petrol price, the cost of parking or ticket price is changed.

Imagine that you can save 5 minutes on your journey to work. **What is the most you personally are almost certainly willing to pay each journey to save 5 minutes travel time going to work?** Please keep in mind your other activities and time constraints surrounding your journey to work..

TO THE INTERVIEWER: SHOW **CARD 4A** TO IP AND READ THE FOLLOWING TEXT

34.

Start at the top of CARD 4A, Ask yourself whether you almost certainly are willing to pay \_\_\_\_\_(LOWEST AMOUNT) per journey to work to save **5 minutes** of travel time . Put a tick next to the amount you are willing to pay, and continue down the card. Stop when you get uncertain about whether you would pay an amount, and tell me the *highest* amount you almost certainly are willing to pay. *If you are uncertain about the lowest amount, tick “I am not willing to pay anything”.*

TO THE INTERVIEWER: RECORD THE **HIGHEST** AMOUNT IP IS ALMOST CERTAINLY WILLING TO PAY EACH JOURNEY IN 34a) BELOW. JUMP TO QUESTION 36.

IF IP SAYS “I am not willing to pay anything”, WRITE “0” in 34a). GO TO QUESTION 35.

IF IP SAYS “I don’t know” OR “I don’t want to answer”, LEAVE 34a) OPEN AND CHECK BOX 34b). GO TO QUESTION 35.

34 a) The IP is almost certainly willing to pay  €EACH JOURNEY

34 b) I don’t know/I don’t want to answer

35. People have different reasons for saying they are **not** willing to pay anything to reduce their travel time, or for saying they don’t know or can’t answer this question. **Please look at the statements on the card, and tell me which ones best describe your view.**

TO THE INTERVIEWER SHOW CARD 4B AND RECORD THE ANSWERS.  
IP IS ALLOWED TO STATE MORE THAN ONE REASON.

I cannot afford to pay more than I do today	1
The prices for public transportation are high enough already	2
Petrol is already too expensive	3
The authorities should build better roads and public transportation	4
It is not possible to save 5 minutes on my travel to work	5
It does not matter if I come 5 minutes earlier to work	6
Other. reasons	7
Please specify	

**36.**

Imagine that you can save **10 minutes** on your last journey to work. **What is the most you personally are almost certainly willing to pay each journey to save 10 minutes travel time going to work?** Please keep in mind your other activities and time constraints surrounding your journey to work.

TO THE INTERVIEWER: GIVE CARD 5A TO THE IP AND SAY:

Start at the top of CARD 5A. Ask yourself whether you almost certainly are willing to pay \_\_\_\_\_ (LOWEST AMOUNT) per journey to work to save **10 minutes** of travel time. Put a tick next to the amount you are willing to pay, and continue down the card. Stop when you get uncertain about whether you would pay an amount, and tell me the *highest* amount you almost certainly are willing to pay. *If you are uncertain about the lowest amount, tick "I am not willing to pay anything"*.

TO THE INTERVIEWER: RECORD THE **HIGHEST** AMOUNT IP IS ALMOST CERTAINLY WILLING TO PAY EACH JOURNEY IN 36a) BELOW. JUMP TO QUESTION 38.

IF IP SAYS "I am not willing to pay anything", WRITE "0" in 36a). GO TO QUESTION 37.

IF IP SAYS "I don't know" OR "I don't want to answer", LEAVE 36a) OPEN AND CHECK BOX 36b). GO TO QUESTION 37.

**36 a) The IP is almost certainly willing to pay** \_\_\_\_\_ **€EACH JOURNEY**

**36 b) I don't know/I don't want to answer**

**37.** People have different reasons for saying they are **not** willing to pay anything to reduce their travel time, or for saying they don't know or can't answer this question. **Please look at the statements on the card, and tell me which ones best describe your view.**

TO THE INTERVIEWER SHOW CARD 5B AND TICK THE ALTERNATIVES THAT BEST DESCRIBES IP's ANSWERS. IP IS ALLOWED TO STATE MORE THAN ONE REASON. IF NO ALTERNATIVE FITS, STATE "OTHER" AND RECORD THE ANSWER.

I cannot afford to pay more than I do today	1
The prices for public transportation are high enough already	2
Petrol is already too expensive	3
The authorities should build better roads and public transportation	4
It is not possible to save 10 minutes on my travel to work	5
It does not matter if I come 10 minutes earlier to work	6
Other.	7
Please specify	

**Socio-Economic Background Variables**

Finally I would like to take a few personal details. These are needed to make sure that we have interviewed a representative sample of the population. Remember, all of these answers will be treated completely confidentially.

**38. Record sex**

TO THE INTERVIEWER: CIRCLE ONE CODE

- Male ..... 1
- Female ..... 2

**39. May I ask which year you were born?**

TO THE INTERVIEWER: WRITE DOWN THE YEAR OF BIRTH

19 \_\_\_\_\_

**40. How many persons are there in your household, including yourself? Only count those who live permanently in your home \_\_\_\_\_**

**41. Of these, how many are 15 years of age or younger? \_\_\_\_\_**

**42. What is your highest completed educational qualification?**

TO THE INTERVIEWER: CIRCLE ONLY ONE CODE

<i>Primary School (7 – 10 years education))</i>	<i>1</i>
<i>Secondary School - theoretical (11 - 13 years)</i>	<i>2</i>
<i>Secondary School - practical education, including trade and office (11 - 13 years)</i>	<i>3</i>
<i>College or University (14 years or more)</i>	<i>4</i>

**43. What is your marital status?**

TO THE INTERVIEWER: CIRCLE ONLY ONE CODE

<i>Single</i>	<i>1</i>
<i>Married/living with someone</i>	<i>2</i>
<i>Divorced/separated</i>	<i>3</i>
<i>Widowed</i>	<i>4</i>

**44. Which of these statements best describes your personal financial situation?**

TO INTERVIEWER: READ ALTERNATIVES TO IP. CIRCLE ONLY ONE CODE.

1	I can afford essentials only	<input type="checkbox"/>
2	I cannot afford luxuries	<input type="checkbox"/>
3	I can afford some luxuries	<input type="checkbox"/>
4	I have enough to be comfortable	<input type="checkbox"/>

**45 a) About how much is your household's combined net income per year; after taxes are paid? Remember to include all sources of income such as child and other state support, student loan and scholarships, pensions, interest and other investment yields. If you are not sure, please give your best estimate to the nearest 1.000 €**

€
---

TO INTERVIEWER: IF IP HESITATES, SAY "WE WILL OF COURSE TREAT THESE ANSWERS CONFIDENTIALLY. WE NEED THIS INFORMATION TO MAKE SURE THAT WE HAVE INTERVIEWED A REPRESENTATIVE SAMPLE OF THE POPULATION". IF IP CONTINUES TO HESITATE, SHOW CARD 7, AND ASK IP TO CHOOSE ONE CATEGORY

**45 b)**

*[Circle one only]*

1. Under 10.000 €	
2. 10.001 - 20.000 €	
3. 20.001-30.000 €	
4. 30.001-40.000 €	
5. 40.001-50.000 €	
6. 50.001-60.000 €	
7. 60.001-70.000 €	
8. 70.001-80.000 €	
9. 80.001-90.000 €	
10. Over 90.000 €	

**46. About how much is your personal net income per year; after taxes are paid?**

€
---

TO INTERVIEWER: IF IP HESITATES, SHOW THE TABLE IN CARD 7, AND ASK IP TO CHOOSE ONE CATEGORY



**Interviewer Questions**

TO INTERVIEWER: PLEASE FILL IN YOUR ANSWERS TO THE QUESTIONS BELOW IMMEDIATELY AFTER THE INTERVIEW IS COMPLETED

**49. How interested did the IP appear to be during the interview?**

*[Circle one only]*

<i>Extremely interested</i>	<i>1</i>
<i>Very interested</i>	<i>2</i>
<i>Somewhat interested</i>	<i>3</i>
<i>Slightly interested</i>	<i>4</i>
<i>Not interested at all</i>	<i>5</i>

**50 a) Did the IP have any difficulty understanding the willingness-to-pay question for noise?**

*[Circle one code]*

<i>Yes</i>	<i>1</i>	--> CONTINUE WITH 50 b)
<i>No</i>	<i>2</i>	--> JUMP TO 51

**50 b) Describe IP's difficulties.**

---

---

---

**51 a) Did the IP have any difficulty understanding the willingness-to-pay question for time saved on a journey to work?**

*[Circle one code]*

<i>Yes</i>	<i>1</i>	--> CONTINUE WITH 51 b)
<i>No</i>	<i>2</i>	--> JUMP TO 52

**51 b) Describe IP's difficulties.**

---

---

---

**52. How serious was the consideration the IP gave to the willingness to pay questions?**

*[Circle one only]*

<i>Extremely serious</i>	<i>1</i>
<i>Very serious</i>	<i>2</i>
<i>Somewhat serious</i>	<i>3</i>
<i>Slightly serious</i>	<i>4</i>
<i>Not at all serious</i>	<i>5</i>

**53. What was your impression of the noise situation in the surrounding area?**

*Please mark only one box*

- Not at all noisy ..... 1
- Slightly noisy ..... 2
- Moderately noisy ..... 3
- Very noisy ..... 4
- Extremely noisy ..... 5

**54. Write any other relevant comments below about this interview.**

---

---

---

---

---

**55. Enter length of interview. \_\_\_\_\_ minutes**



## **Annex 13: Payment Cards**

### ***Card 1***

NOT AT ALL

SLIGHTLY

MODERATELY

VERY

EXTREMELY

**CARD 2A**

**Start at the top. Tick the amounts you almost certainly are willing to pay annually to remove your noise annoyance from road traffic here at home. Stop when you are uncertain, and report the *highest amount you are almost certain you will pay*. If you are uncertain about the lowest amount, tick “I am not willing to pay anything”.**

AMOUNT PER YEAR

- € 5
- € 10
- € 30
- € 50
- € 80
- € 100
- € 200
- € 400
- € 600
- € 800
- € 1000
- € 1500
- € 2000
- € 2500
- € 3000

I am not willing to pay anything	<input type="checkbox"/>
----------------------------------	--------------------------

**CARD 2B**

**Start at the top. Tick the amounts you almost certainly are willing to pay annually to remove your noise annoyance from the railway here at home. Stop when you are uncertain, and report the *highest amount you are almost certain you will pay*.**

***If you are uncertain about the lowest amount, tick “I am not willing to pay anything”.***

AMOUNT PER YEAR

- € 5
- € 10
- € 30
- € 50
- € 80
- € 100
- € 200
- € 400
- € 600
- € 800
- € 1000
- € 1500
- € 2000
- € 2500
- € 3000

I am not willing to pay anything	<input type="checkbox"/>
----------------------------------	--------------------------

***Card 3A – Reasons to Pay***

1. I am bothered, disturbed or annoyed by noise from road traffic
2. Others in my household are bothered, disturbed or annoyed by noise from road traffic
3. I would like to reduce the noise annoyance for the other people in the street
4. Other reasons, please explain

**Card 3B – Reasons NOT to Pay**

1. I am not that bothered, disturbed or annoyed by the road traffic noise that I would pay.
2. I cannot afford to pay
3. It is more important to reduce other nuisances from road traffic
4. The noise reducing measures cannot remove my annoyance from road traffic noise
5. If you live in a city there will be road traffic noise
6. I am going to move soon
7. I already pay enough charges and taxes
8. Government should pay
9. Those that cause the noise should pay for it
10. I do not want more roadwork in the street
11. The question about paying is too difficult to answer
12. Other reasons, please explain

**Card 3c – Reasons to Pay**

1. I am bothered, disturbed or annoyed by noise from railways
2. Others in my household are bothered, disturbed or annoyed by noise from railways
3. I would like to reduce the noise annoyance for the other people along the railway here
4. Other reasons, please explain

### **Card 3D – Reasons NOT to Pay**

1. I am not that bothered, disturbed or annoyed by the railway noise that I would pay
2. I cannot afford to pay
3. It is more important to reduce other nuisances from railways.
4. The noise reducing measures cannot remove my annoyance from railway noise
5. If you live in a city there will be noise
6. I am going to move soon
7. I already pay enough charges and taxes
8. Government should pay
9. Those that cause the noise should pay for it
10. I do not want any more work on the railway tracks
11. The question about paying is too difficult to answer
12. Other reasons, please explain

**CARD 4A**

**Start at the top. Tick the amounts you almost certainly are willing to pay each trip to save *5 minutes* travel time going to work. Stop when you are uncertain, and report the *highest amount you are almost certain you will pay*.**

***If you are uncertain about the lowest amount, tick “I am not willing to pay anything”.***

**AMOUNT EACH TRIP (ONE WAY)**

€ 0,25

€ 0,5

€ 0,75

€ 1

€ 1,25

€ 1,5

€ 1,75

€ 2

€ 2,5

€ 3

€ 3,5

€ 4

€ 5

€ 7

€ 10

I am not willing to  
pay anything



**CARD 4B**

I cannot afford to pay more than I do today	<b>1</b>
The prices for public transportation are high enough already	<b>2</b>
Petrol is already too expensive	<b>3</b>
The authorities should build better roads and public transportation	<b>4</b>
It is not possible to save 5 minutes on my travel to work	<b>5</b>
It does not matter if I come 5 minutes earlier to work	<b>6</b>
Other reasons, please explain	<b>7</b>

**CARD 5A**

**Start at the top. Tick the amounts you almost certainly are willing to pay each trip to save *10 minutes* travel time going to work. Stop when you are uncertain, and report the *highest amount you are almost certain you will pay*.**

***If you are uncertain about the lowest amount, tick “I am not willing to pay anything”.***

**AMOUNT EACH TRIP (ONE WAY)**

€ 0,25

€ 0,5

€ 0,75

€ 1

€ 1,25

€ 1,5

€ 1,75

€ 2

€ 2,5

€ 3

€ 3,5

€ 4

€ 5

€ 7

€ 10

I am not willing to pay anything at all

**CARD 5 B**

I cannot afford to pay more than I do today	<b>1</b>
The prices for public transportation are high enough already	<b>2</b>
Petrol is already too expensive	<b>3</b>
The authorities should build better roads and public transportation	<b>4</b>
It is not possible to save 10 minutes on my travel to work	<b>5</b>
It does not matter if I come 10 minutes earlier to work	<b>6</b>
Other reasons, please explain	<b>7</b>

**CARD 6**

**LEVEL OF TRAFFIC CONGESTION**  
**DURING YOUR JOURNEY**

- 1. Extremely congested most of the journey**
- 2. Moderate congestion, with occasional periods of heavy congestion**
- 3. Moderate congestion**
- 4. Little congestion, with occasional periods of moderate congestion**
- 5. No or very little congestion**

**Card 7****Annual net income (after income tax is paid)**

<i>1. Under 10.000 €</i>	
<i>2. 10.001 - 20.000 €</i>	
<i>3. 20.001-30.000 €</i>	
<i>4. 30.001-40.000 €</i>	
<i>5. 40.001-50.000 €</i>	
<i>6. 50.001-60.000 €</i>	
<i>7. 60.000-70.000 €</i>	
<i>8. 70.000-80.000 €</i>	
<i>9. 80.000-90.000 €</i>	
<i>10. Over 90.000 €</i>	

# Annex 14: Questionnaire aircraft noise annoyance survey – Hungary

## Aircraft noise annoyance survey - Hungary

!!! Numbers are to be written like this!!!

1	2	3	4	5	6	7	8	9	0
---	---	---	---	---	---	---	---	---	---

1 a) Enter which sample the IP was recruited for

	Noise level (Lden)	Please mark only one box
rural	< 55	1
	55 – 60	2
	60 – 65	3
urban	< 55	4
	55 – 60	5
	60 – 65	6
	65 – 70	7

1 b) How many IPs did you have to contact between last successful interview and this IP (not counting this IP)

\_\_\_\_\_

1 c) Enter Start Time of Interview: \_\_\_\_\_

### *Introduction*

Hello, my name is ..... from .....(SURVEY FIRM). We are conducting a survey on local living conditions and would like to ask you some questions. This survey is part of a European-wide research project on people's living conditions and your attitudes on the topic. The interview will take between 15 and 20 minutes.

When you answer the questions, remember that it is your opinions we are interested in, and there are no right or wrong answers. All answers will be treated confidentially and will be used solely for research purposes.

### *Description of the area*

2. How many years have you lived in your present home?

\_\_\_\_\_ years

**3. We would like to know what you like most and like least about the area in which you are living. I would first like to ask you about what you appreciate the most, then the least.**

TO THE INTERVIEWER: THE ALTERNATIVES SHALL NOT BE READ. PUT A CROSS FOR THE ITEMS THAT CORRESPOND MOST CLOSELY WITH THE RESPONDENT'S ANSWER. NOTE THE ANSWERS THAT DON'T CORRESPOND WITH ANY CATEGORIES

**3a)**

**Area:**

- 1. Good location, centrally located (in the city) .....
- 2. Good and maintained area, rehabilitation, character/history .....
- 3. Good living conditions (living standards and costs) .....
- 4. Nice view .....
- 5. Beautiful surroundings/streets/green areas .....
- 6. Nice outdoor areas/play grounds .....

**Service and communication:**

- 7. Good public service (schools/kinder garden/old age welfare service/leisure options).....
- 8. Good private service options (shops, banks etc.) .....
- 9. Good health care facilities, doctors, dentists etc .....
- 10. Short distance to work/school .....
- 11. Good public transport (bus, train, underground, tram) ....
- 12. Close to an airport .....
- 13. Convenient parking .....
- 14. Easy to travel by car (no congestions).....

**Road safety:**

- 15. Low level of traffic/traffic in general .....
- 16. Road safety .....
- 17. A safe area for children to play .....

**Noise:**

- 18. Silent/peaceful area .....
- 19. Not annoyed by road traffic noise .....
- 20. Not annoyed by aircraft noise .....
- 21. Not annoyed by any other noise.....

**Pollution:**

- 22. Not annoyed by smell/exhaust gas or dust from road traffic .....
- 23. Not annoyed by any other pollution .....
- 24. Clean air .....

**Social conditions:**

- 25. Nice neighbours.....
- 26. Friends/relatives are living in the area .....
- 27. Low level of crimes/drugs/alcohol abuse.....

**Other:**

- 28. Satisfied in general .....
- 29. Satisfied in general, with some reservations .....
- 30. Unanswered/don't know .....
- 31. Other factors (make notes below).....

**3b) What is that you like least?**

**Area:**

- 1. Poor location.....
- 2. Poor living conditions/lack of maintenance /high costs of living.....
- 3. Unattractive surroundings/unattractive street/lack of cleaning .....
- 4. Poor outdoor surroundings/playgrounds/far from open-air areas .....
- 5. Lots of parked cars .....

**Service and communication**

- 6. Poor public service (kinder gardens, schools, open-air areas, old age welfare service etc .....
- 7. Poor private sector options (shops, banks etc) .....
- 8. Poor public transport (bus, train, metro, tram) .....
- 9. Far from work/school .....
- 10. Far from an airport .....
- 11. Problems in finding parking space/access.....

**Traffic conditions/road safety:**

- 12. Heavy traffic .....
- 13. Unsafe for cycling .....
- 14. Unsafe for children to play .....
- 15. High risk for traffic accidents .....

**Noise:**

- 16. Is exposed to/bothered/is annoyed by noise from road traffic .....
- 17. Is exposed to/bothered/is annoyed by noise from aircraft traffic .....
- 18. Is exposed to/bothered/is annoyed by noise from rail traffic.....
- 19. Is exposed to/bothered/is annoyed by noise from other noise sources.....
- 20. Noise in general .....

**Pollution:**

- 21. Is exposed to/ is annoyed by exhaust gas and/or dust from road traffic .....
- 22. Air pollution in general/ other sources of pollution .....

**Social conditions:**

- 23. Crimes/drugs/alcohol abuse/unsafe surroundings .....
- 24. Poor neighbours /social conditions .....

**Other factors:**

- 25. Not dissatisfied with any conditions
- 26. Dissatisfied in general
- 27. Unanswered/don't know
- 28. Any other answer (make notes below)

<b>Write other factors:</b>



**4. Considering the last 12 months, how much do these things bother, disturb or annoy you when you are here at home? Please look at the alternatives on this card.**

TO THE INTERVIEWER: SHOW **CARD 1** TO THE IP. THEN READ a) AND THE ALTERNATIVES; AND PUT A CROSS NEXT TO IP'S PREFERRED ALTERNATIVE.

**a) When you are here at your home, how much does air pollution and smog bother, disturb or annoy you?**

	<i>Please mark only one box</i>	
Not at all .....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>

**b) How much do you think air traffic contributes to this air pollution and smog?**

	<i>Please mark only one box</i>	
Significantly .....	1	<input type="checkbox"/>
Moderately .....	2	<input type="checkbox"/>
Slightly .....	3	<input type="checkbox"/>
Do not know/does not answer.....	0	<input type="checkbox"/>

**c) If air pollution and smog bothers, disturbs or annoys you, could you say what the consequences are for you?**

TO THE INTERVIEWER: THE ALTERNATIVES SHALL NOT BE READ. PUT A CROSS NEXT TO THE ITEM(S) ON THE LIST THAT CORRESPOND BEST WITH IP'S ANSWER. IF ANSWERS ARE NOT LISTED; PUT A CROSS NEXT TO "OTHER ANSWERS" AND WRITE IP'S ANSWER

Do not open windows as often as I would if the air was cleaner.....	1	<input type="checkbox"/>
Do not hang the clothes in the terrace/garden.....	2	<input type="checkbox"/>
Do not go for a walk in the neighbourhood.....	3	<input type="checkbox"/>
Have to tidy up more often .....	4	<input type="checkbox"/>
I have to spend more on medicine (because of respiratory illnesses) .....	5	<input type="checkbox"/>
I have an illness (asthma, heart diseases), that is why it disturbs me.....	6	<input type="checkbox"/>
Other answers .....	7	<input type="checkbox"/>

Please specify:

Do not know/does not answer	0	<input type="checkbox"/>
-----------------------------	---	--------------------------

**d) Are you affected by air pollution from another source (as well) here at home? If yes, what is that?**

TO THE INTERVIEWER: THE ALTERNATIVES SHALL NOT BE READ. PUT A CROSS NEXT TO THE ITEMS ON THE LIST THAT CORRESPOND BEST WITH IP'S ANSWER. IF ANSWERS ARE NOT LISTED; PUT A CROSS NEXT TO "OTHER ANSWERS" AND WRITE IP'S ANSWER

Not affected by air pollution from another source	1	<input type="checkbox"/>
Road traffic .....	2	<input type="checkbox"/>
Railway.....	3	<input type="checkbox"/>
Factories, workshops.....	4	<input type="checkbox"/>
Neighbours.....	5	<input type="checkbox"/>
Other answers.....	6	<input type="checkbox"/>

Please specify:  
 Do not know/does not answer 0

**5a) In the last twelve months or so when you were here at home how much did aircraft noise bother, disturb or annoy you?**

*Please mark only one box*

Not at all .....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>
Do not know/does not answer	0	<input type="checkbox"/>

**b) If aircraft noise bothers, disturbs or annoys you, could you say what the consequences are for you?**

TO THE INTERVIEWER: THE ALTERNATIVES SHALL NOT BE READ. PUT A CROSS NEXT TO THE ITEM(S) ON THE LIST THAT CORRESPOND BEST WITH IP'S ANSWER. IF ANSWERS ARE NOT LISTED; PUT A CROSS NEXT TO "OTHER ANSWERS" AND WRITE IP'S ANSWER

Find it hard to sleep .....	1	<input type="checkbox"/>
Sleep with earplugs .....	2	<input type="checkbox"/>
Do not open windows as often as I would if there were no noise.....	3	<input type="checkbox"/>
Hard to concentrate and disturbing when reading or working .....	4	<input type="checkbox"/>
Disturbing when watching TV or listening to the radio/music .....	5	<input type="checkbox"/>
Disturbing when talking or talking in the telephone .....	6	<input type="checkbox"/>
Get headaches/migraine .....	7	<input type="checkbox"/>
Gets palpitation.....	8	<input type="checkbox"/>
Other answers .....	9	<input type="checkbox"/>

Please specify:  
 Do not know/does not answer 0

**c). When you are here at your home, which *other* noise sources bother, disturb or annoy you?**

TO THE INTERVIEWER: THE ALTERNATIVES SHALL NOT BE READ. PUT A CROSS NEXT TO THE ITEMS ON THE LIST THAT CORRESPOND BEST WITH IP'S ANSWER. IF ANSWERS ARE NOT LISTED; PUT A CROSS NEXT TO "OTHER ANSWERS" AND WRITE IP'S ANSWER

No other noise source bother, disturb or annoy me .....	1	<input type="checkbox"/>
Road traffic .....	2	<input type="checkbox"/>
Railway traffic.....	3	<input type="checkbox"/>
Businesses, e.g. cafes, shops or workshops.....	4	<input type="checkbox"/>
Neighbours.....	5	<input type="checkbox"/>
Tram or Metro .....	6	<input type="checkbox"/>
Other answers.....	7	<input type="checkbox"/>

Please specify:  
 Do not know/does not answer 0

**6. How much does the risk of aircraft accidents in your neighborhood bother, disturb or annoy you?**

*Please mark only one box*

Not at all .....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>
Do not know/does not answer	0	<input type="checkbox"/>

## WTP questions

TO THE INTERVIEWER: READ THE TEXT BELOW SLOWLY AND THOROUGHLY TO IP BEFORE ASKING FURTHER QUESTIONS.

I will now read you a short text.

The Directorate-General of Environment of the European Union has the aim to reduce the environmental impacts of transport from 2006 onward. A study has been carried out about the problems with road and rail traffic. This study focuses on air transport. They want to introduce two programs to reduce the noise and air pollution of air traffic respectively. I will now talk about these two programs, and will ask questions related to these.

I. Air pollution is to be reduced that the structure of the engines on aircraft will be changed, and new materials would be used in the construction. So the components of fuel could be altered, and this would reduce air pollution. All the manufacturers would have to invent these modifications. The regulation would be modified as well, so that the fuel would not have to be released into the air so often. The results would be controlled by a group of independent, European experts.

### 7a) Have you heard of such air pollution reducing measures?

Yes.....	1
No.....	2
Partly.....	3
Do not know/does not answer.....	0

This package of measures will reduce the level of noise here at your home to a level which is *not annoying* to people who are currently bothered, disturbed or annoyed by aircraft noise. But the number of aircraft flying in the neighborhood would not change. These measures influence air pollution only.

### 7b) Do you think these measures can be efficient?

Yes.....	1
No.....	2
Partly.....	3
Do not know/does not answer.....	0

This package of measures costs money. The bigger part of these costs will be covered by the European Union, the Hungarian State, Ferihegy airport and the airways. But the EU launches this project only if the residents also pay their share. The money will be controlled by the EU, they cannot spend on another purpose.

Think about how bothered, disturbed or annoyed you are by air pollution from aircrafts at home now, and how much it is worth to you personally to avoid this.

**What is the most you personally are willing to pay per year for the next five years to a special EU fund, in order to remove *your* annoyance of air pollution from AIRCRAFTS when you are at home?** Remember that the money used to avoid noise annoyance must either come from your savings or from what you would have spent on other things.

TO THE INTERVIEWER: IF THE IP SAYS SOMETHING LIKE "GOVERNMENT SHOULD PAY (ALL COSTS)", SAY "GOVERNMENT WILL ALSO HAVE TO PAY THEIR SHARE OF THE COSTS". CHECK BOX BELOW IF IT WAS NECESSARY TO READ THIS.

7 c)

7d) The IP is almost certainly willing to pay  Ft annually

7e) I don't know/I don't want to answer

TO THE INTERVIEWER: RECORD THE **HIGHEST** AMOUNT IP IS ALMOST CERTAINLY WILLING TO PAY ANNUALLY IN 7d). GO TO QUESTION 8.

IF IP SAYS "I am not willing to pay anything", WRITE "0" in 7d). JUMP TO QUESTION 9)

IF IP SAYS "I don't know" OR "I don't want to answer", LEAVE 7d) OPEN AND CHECK BOX 7e) JUMP TO QUESTION 9).

**8. People have different reasons for their willingness to pay to avoid air pollution from aircraft. Please look at the statements on the card, and tell me which ones best describe your view.**

TO THE INTERVIEWER: SHOW CARD 2A AND RECORD THE ANSWERS. IP IS ALLOWED TO STATE MORE THAN ONE REASON.

- |  |   |                          |
|--|---|--------------------------|
| I am bothered, disturbed or annoyed by air pollution from air transport.....                       | 1 | <input type="checkbox"/> |
| Others in my household are bothered, disturbed or annoyed by air pollution from air transport..... | 2 | <input type="checkbox"/> |
| I would like to reduce the air pollution annoyance for the other people in the street .....        | 3 | <input type="checkbox"/> |
| Other reasons<br>Please specify:   | 4 | <input type="checkbox"/> |
- 

TO THE INTERVIEWER: JUMP TO QUESTION 10.

9) People have different reasons for saying they are *not* willing to pay anything to avoid annoyance from the air pollution of aircraft, or for saying they don't know or can't answer this question. Look at the statements on the card, and tell me which ones best describe your views.

TO THE INTERVIEWER: SHOW CARD 3A AND RECORD THE ANSWERS. IP IS ALLOWED TO STATE MORE THAN ONE REASON.

- |  |    |                          |
|--|----|--------------------------|
| I am not that bothered, disturbed or annoyed by the air pollution from air traffic that I would pay..... | 1  | <input type="checkbox"/> |
| I cannot afford to pay .....   | 2  | <input type="checkbox"/> |
| It is more important to reduce other nuisances from air traffic .....                                    | 3  | <input type="checkbox"/> |
| The pollution reducing measures cannot remove my annoyance from aircraft air pollution.....              | 4  | <input type="checkbox"/> |
| If you live in a city there will be air pollution from aircraft....                                      | 5  | <input type="checkbox"/> |
| I am going to move soon .....  | 6  | <input type="checkbox"/> |
| I already pay enough charges and taxes   | 7  | <input type="checkbox"/> |
| Government should pay  | 8  | <input type="checkbox"/> |
| Those that cause the pollution (e.g the airways) should pay for it.....                                  | 9  | <input type="checkbox"/> |
| The question about paying is too difficult to answer .....   | 10 | <input type="checkbox"/> |
| Other reasons  | 11 | <input type="checkbox"/> |

Please specify:



**10. Now I will talk about the second program which is intended to reduce aircraft noise.**

The measures include the following: introduction of noise absorbing walls in the vicinity of the airport to reduce noise next to the airport. The noisiest aircraft would be banned from Budapest Ferihegy Airport. Farther from the airport active noise control would be installed. This has been developed in the United States. Deployed microphones record the noise level, and loudspeakers emit noise of a specific frequency. This reduces noise due to the phenomenon of interference. This equipment can be well fitted in the surroundings and it looks aesthetic. It is neither a hazard to men or animals.

**10a) Have you heard of such noise reducing measures?**

- |                                 |   |
|---------------------------------|---|
| Yes.....                        | 1 |
| No.....                         | 2 |
| Partly.....                     | 3 |
| Do not know/does not answer.... | 0 |

This package of measures will reduce the level of noise here at your home to a level which is *not annoying* to people who are currently bothered, disturbed or annoyed by aircraft noise. Other conditions such as traffic safety, exhaust fumes, and vibrations from air traffic will stay the same, and will be addressed by another package of measures. The measures described here reduce aircraft noise only.

**10a) Do you think these measures can be efficient?**

- Yes..... 1
- No..... 2
- Partly..... 3
- Do not know/does not answer..... 0

This package of measures also costs money. The bigger part of these costs will be covered by the European Union, the Hungarian State, Ferihegy airport and the airways here as well. But the EU launches this project also only if the residents also pay their share. This money will also be controlled by the EU, it cannot be spent on another purpose.

Think about how bothered, disturbed or annoyed you are by aircraft noise at home now, and how much it is worth to you personally to avoid this.

**What is the most you personally are willing to pay per year for the next five years to a special EU fund, in order to remove *your* aircraft noise annoyance when you are at home?** Remember that the money used to avoid noise annoyance must either come from your savings or from what you would have spent on other things.

TO THE INTERVIEWER: IF THE IP SAYS SOMETHING LIKE “GOVERNMENT SHOULD PAY (ALL COSTS)”, SAY “GOVERNMENT WILL ALSO HAVE TO PAY THEIR SHARE OF THE COSTS”. CHECK BOX BELOW IF IT WAS NECESSARY TO READ THIS.

10 c)

TO THE INTERVIEWER: RECORD THE **HIGHEST** AMOUNT IP IS ALMOST CERTAINLY WILLING TO PAY ANNUALLY IN 10d) BELOW. GO TO QUESTION 11a.

IF IP SAYS “I am not willing to pay anything”, WRITE “0” in 10d). JUMP TO QUESTION 12)

IF IP SAYS “I don’t know” OR “I don’t want to answer”, LEAVE 10d) OPEN AND CHECK BOX 10e) JUMP TO QUESTION 12).

**10d) The IP is almost certainly willing to pay**  **Ft annually**

**10e) I don’t know/I don’t want to answer**

**11a. People have different reasons for their willingness to pay to avoid noise annoyance. Please look at the statements on the card, and tell me which ones best describe your view.**

TO THE INTERVIEWER: SHOW CARD 3A AND RECORD THE ANSWERS. IP IS ALLOWED TO STATE MORE THAN ONE REASON.

- I am bothered, disturbed or annoyed by noise from air traffic..... 1
  - Others in my household are bothered, disturbed or annoyed by noise from air traffic..... 2
  - I would like to reduce the noise annoyance for the other people in the street ..... 3
  - Other reasons 4
- Please specify:

**In this version there is no question 11b.**

TO THE INTERVIEWER: JUMP TO QUESTION 13.

12) People have different reasons for saying they are not willing to pay anything to avoid aircraft noise annoyance, or for saying they don't know or can't answer this question. Look at the statements on the card, and tell me which ones best describe your views.

TO THE INTERVIEWER: SHOW CARD 3B AND RECORD THE ANSWERS. IP IS ALLOWED TO STATE MORE THAN ONE REASON.

- |  |    |                          |
|--|----|--------------------------|
| I am not that bothered, disturbed or annoyed by the road traffic noise that I would pay. | 1  | <input type="checkbox"/> |
| I cannot afford to pay .....   | 2  | <input type="checkbox"/> |
| It is more important to reduce other nuisances from air traffic .....                    | 3  | <input type="checkbox"/> |
| The noise reducing measures cannot remove my annoyance from aircraft noise               | 4  | <input type="checkbox"/> |
| If you live in a city there will be aircraft noise .....                                 | 5  | <input type="checkbox"/> |
| I am going to move soon .....  | 6  | <input type="checkbox"/> |
| I already pay enough charges and taxes   | 7  | <input type="checkbox"/> |
| Government should pay  | 8  | <input type="checkbox"/> |
| Those that cause the noise should pay for it.....  | 9  | <input type="checkbox"/> |
| The question about paying is too difficult to answer .....                               | 10 | <input type="checkbox"/> |
| Other reasons  | 11 | <input type="checkbox"/> |

Please specify:

13) Now that you have been informed about both of the programs, please stop and think again how much you would be willing to pay in the following five years, once a year to reduce these polluting factors. **I remind you, that the EU will only launch the project, if the inhabitants also pay their share.**

13a) The respondent is almost certainly willing to pay \_\_\_\_\_ Ft annually to reduce the annoyance from aircraft air pollution.

13b) The respondent is almost certainly willing to pay \_\_\_\_\_ Ft annually to reduce the annoyance from aircraft noise.

***Questions about your household and home***

14) Do you stay at home in the daytime on workdays, i.e. not weekends?

TO THE INTERVIEWER: THIS COULD BE E.G. WORKING FROM HOME, HAVING VARIABLE WORKING HOURS E.G. WORKING AT NIGHTS, OR BEING UNEMPLOYED. PUT A CROSS NEXT TO THE APPROPRIATE CATEGORY.

(Please mark one box only)

- |                              |                          |
|------------------------------|--------------------------|
| 1. Yes, most workdays .....  | <input type="checkbox"/> |
| 2. Yes, some workdays .....  | <input type="checkbox"/> |
| 3. No, never or seldom ..... | <input type="checkbox"/> |
| 4. I don't know .....        | <input type="checkbox"/> |



**15) Does your spouse (co-habitant) stay at home in the daytime on workdays, i.e. not weekends?**

(Please mark one box only)

- 1. Yes, most workdays .....
- 2. Yes, some workdays .....
- 3. No, never or seldom .....
- 4. I don't know .....

**16. Do you think you are very, a little, or not at all sensitive to noise?**

TO THE INTERVIEWER: READ THE ALTERNATIVES TO THE IP

- 1 Very sensitive .....
- 2 A little sensitive .....
- 3 Not at all sensitive .....
- 4 I don't know .....

**17. Do you have any hearing problems?**

TO THE INTERVIEWER: READ THE ALTERNATIVES TO THE IP

- Yes, very reduced hearing ..... 1
- Yes, slightly reduced hearing ..... 2
- Yes, tinnitus (buzzing in your ears) ..... 3
- No, normal hearing ..... 4
- I don't know ..... 5

**18. How bothering, disturbing or annoying was aircraft noise when you moved in here compared to what you expected?**

TO THE INTERVIEWER: READ THE ALTERNATIVES TO THE IP

- Less bothering, disturbing or annoying than expected ..... 1
- More bothering, disturbing or annoying than expected ..... 2
- Just as bothering, disturbing or annoying as expected ..... 3
- Don't know ..... 4

**19. How bothering, annoying or disturbing is aircraft noise now compared to when you moved in here?**

TO THE INTERVIEWER: READ THE ALTERNATIVES TO THE IP

- 1 The noise is better now compared to when I moved in.
- 2 The noise is the same now as when I moved in.
- 3 The noise is worse now compared to when I moved in .....
- 4 I don't know .....

**20. Do your household own or rent your present home?**

- 1 Own .....

- 2 Rent .....
- 3 I don't know

**Socio-Economic Background Variables**

Finally I would like to take a few personal details. These are needed to make sure that we have interviewed a representative sample of the population. Remember, all of these answers will be treated completely confidentially.

**21. Record sex**

TO THE INTERVIEWER: CIRCLE ONE CODE

- Male ..... 1
- Female ..... 2

**22. May I ask which year you were born?**

TO THE INTERVIEWER: WRITE DOWN THE YEAR OF BIRTH

19 \_\_\_\_\_

**23. How many persons are there in your household, including yourself? Only count those who live permanently in your home \_\_\_\_\_**

**24. Of these, how many are 18 years of age or younger? \_\_\_\_\_**

**25. What is your highest completed educational qualification?**

TO THE INTERVIEWER: CIRCLE ONLY ONE CODE

<i>Primary School (7 – 10 years education))</i>	<i>1</i>
<i>Secondary School - theoretical (11 - 13 years)</i>	<i>2</i>
<i>Secondary School - practical education, including trade and office (11 - 13 years)</i>	<i>3</i>
<i>College or University (14 years or more)</i>	<i>4</i>

**26. What is your marital status?**

TO THE INTERVIEWER: CIRCLE ONLY ONE CODE

<i>Single</i>	<i>1</i>
<i>Married/living with someone</i>	<i>2</i>
<i>Divorced/separated</i>	<i>3</i>
<i>Widowed</i>	<i>4</i>

**27. Which of these statements best describes your personal financial situation?**

TO INTERVIEWER: READ ALTERNATIVES TO IP. CIRCLE ONLY ONE CODE.

1	I can afford essentials only	<input type="checkbox"/>
2	I cannot afford luxuries	<input type="checkbox"/>
3	I can afford some luxuries	<input type="checkbox"/>
4	I have enough to be comfortable	<input type="checkbox"/>

**28a). About how much is your net income per month; after taxes are paid? Remember to include all sources of income such as child and other state support, student loan and scholarships, pensions, interest and other investment yields. If you are not sure, please give your best estimate to the nearest 10.000 Ft.**

**Ft**

TO INTERVIEWER: IF IP HESITATES, SAY "WE WILL OF COURSE TREAT THESE ANSWERS CONFIDENTIALLY. WE NEED THIS INFORMATION TO MAKE SURE THAT WE HAVE INTERVIEWED A REPRESENTATIVE SAMPLE OF THE POPULATION". IF IP CONTINUES TO HESITATE, SHOW CARD 4, AND ASK IP TO CHOOSE ONE CATEGORY

**28b.**

*[Circle one only]*

1. Under 50.000 Ft	1
2. 50.000 – 100.000 Ft	2
3. 100.001 – 150.000 Ft	3
4. 150.001 – 200.000 Ft	4
5. 200.001 – 250.000 Ft	5
6. 250.001 – 300.000 Ft	6
7. 300.001 – 350.000 Ft	7
8. 350.001 – 400.000 Ft	8
9. 400.001 – 450.000 Ft	9
10. Above 450.000 Ft	10

**29. What would you describe as your occupational situation?**

TO THE INTERVIEWER: PUT A TO THE ITEMS THAT CORRESPONDS THE MOST WITH THE RESPONDENT'S ANSWER. NOTE THE ANSWERS THAT DON'T CORRESPOND WITH ANY CATEGORIES

<i>Self-employed</i>	<i>1</i>
<i>Employed full-time</i>	<i>2</i>
<i>Employed part-time</i>	<i>3</i>
<i>Student</i>	<i>4</i>
<i>Unemployed</i>	<i>5</i>
<i>Looking after the home full-time</i>	<i>6</i>
<i>Retired</i>	<i>7</i>
<i>Unable to work due to sickness or disability</i>	<i>8</i>
<i>Home on maternal leave</i>	<i>9</i>
<i>Other (please specify)</i>	<i>10</i>

**30) What is your attitude towards air transport? Please choose the one that best describes your feelings!**

SHOW CARD 5.

<i>I like to travel by air.</i>	<i>1</i>
<i>Neutral</i>	<i>2</i>
<i>I am afraid to travel by air.</i>	<i>3</i>
<i>I am bothered if aircraft fly above me or in my neighbourhood.</i>	<i>4</i>

**31) How many times have you flown by now?**

- 1    0.....
- 2    1-10.....
- 3    > 10

**32a) Is your work somehow connected to air transport?**

- 1    Yes .....
- 2    No .....
- 3    I don't know

IF THE ANSWER IS YES, JUMP TO Q34.

**32b) Is one of your close relative's work somehow connected to air transport?**

- 1 Yes .....
- 2 No .....
- 3 I don't know

IF THE ANSWER IS YES, JUMP TO Q34.

**32c) Is one of your friend's/distant relative's work connected to air transport?**

- 1 Yes .....
- 2 No .....
- 3 I don't know

**33a) Is your work somehow connected to transport?**

- 1 Yes .....
- 2 No .....
- 3 I don't know

IF THE ANSWER IS YES, JUMP TO Q34.

**33b) Is one of your close relative's work somehow connected to transport?**

- 1 Yes .....
- 2 No .....
- 3 I don't know

IF THE ANSWER IS YES, JUMP TO Q34.

**33c) Is one of your friend's/distant relative's work connected to transport?**

- 1 Yes .....
- 2 No .....
- 3 I don't know

**34. How important is environment protection to you?**

SHOW CARD 6.

<i>Not at all important.</i>	<i>1</i>
<i>Slightly important.</i>	<i>2</i>
<i>Moderately important</i>	<i>3</i>
<i>Very important</i>	<i>4</i>
<i>Extremely important</i>	<i>5</i>

**35) Do you buy environment friendly products?**

<i>Yes, often.</i>	<i>1</i>
<i>Yes, sometimes.</i>	<i>2</i>
<i>No, never.</i>	<i>3</i>
I don't know	<i>4</i>

**36a) Are you member of an environment protection organisation?**

- 1 Yes .....
- 2 No .....
- 3 I don't know

**36b) If yes, which? \_\_\_\_\_**

**37) Do you think it is a measure protecting the environment if**

**a) the air pollution originating from aircraft is reduced?**

- 1 Yes .....
- 2 No .....
- 3 I don't know

**b) aircraft noise is reduced?**

- 1 Yes .....
- 2 No .....
- 3 I don't know



<i>Extremely serious</i>	<i>1</i>
<i>Very serious</i>	<i>2</i>
<i>Somewhat serious</i>	<i>3</i>
<i>Slightly serious</i>	<i>4</i>
<i>Not at all serious</i>	<i>5</i>

**42. What was your impression of the noise situation in the surrounding area?**

**a) How loud was aircraft noise?**

*Please mark only one box*

Not at all loud. ....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>

**b) How loud was road traffic noise?**

*Please mark only one box*

Not at all loud. ....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>

**c) How loud was railway noise?**

*Please mark only one box*

Not at all loud. ....	1	<input type="checkbox"/>
Slightly .....	2	<input type="checkbox"/>
Moderately .....	3	<input type="checkbox"/>
Very .....	4	<input type="checkbox"/>
Extremely .....	5	<input type="checkbox"/>

**c) A noise from another source is loud:**

<i>Industrial noise</i>	<i>1</i>
<i>Building site</i>	<i>2</i>
<i>Other, please specify:</i>	<i>3</i>

**43. Write any other relevant comments below about this interview.**

---



---



---

<b>44. Enter length of interview. _____ minutes</b>
---