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Working Paper

Weather Impacts On Natural, Social And Economic System (WISE) Part II: Individual Perception of Climate Extremes in Italy

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**Weather Impacts on Natural, Social
and Economic Systems (WISE)
Part II: Individual Perception of
Climate Extremes in Italy**

Marzio Galeotti, Alessandra Goria,
Paolo Mombrini and Evi Spantidaki

NOTA DI LAVORO 32.2004

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| CCMP – Climate Change Modelling and Policy |
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Weather Impacts On Natural, Social And Economic Systems (WISE) Part II: Individual Perception of Climate Extremes in Italy

Summary

This paper focuses on the results of the research work carried out by Fondazione Eni Enrico Mattei (FEEM) within the WISE project. This project aims at investigating the effects and the impacts of extreme weather events, particularly very warm summers, mild winters and storms, on the socio-economic systems of European countries. The output consists of a series of empirical studies, both of quantitative and qualitative-descriptive nature. The work of FEEM in the WISE project covers the quantitative analysis of the impacts of climate extremes on the socio-economic system in Italy and the analysis of individuals' perception of climate extremes based on results from individuals' surveys. In this paper is considered the study of the perception of weather impacts through questionnaire survey to the general public. With regard to the individuals' perception survey, a sample of 300 individuals were interviewed by telephone: 150 extracted from the North of Italy and 150 from the South of Italy. Individuals were asked general questions about their perception of climate extremes, and about the impacts of weather extremes on their daily habits at work, at home, in their leisure activities, on their transport patterns, on their health and tourism choices.

Keywords: Climate change, Weather extremes, Perception, Impacts

JEL Classification: Q2, Q250

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1. Introduction

The paper presents the results of the research work carried out by Fondazione Eni Enrico Mattei (FEEM) within the WISE project.

WISE is a project financed by European Commission within the Environment and Climate Research Programme.

The FEEM's partners involved in the project are: the Climatic Research Unit (CRU), University of East Anglia, Norwich (UK); the Postdam Institute for Climate Impact Research (PIK), Postdam (Germany); the Institute for Environmental Studies (IVM), Vrije Universiteit, Amsterdam (NL).

The WISE project aims at investigating the effects and the impacts of extreme weather events, particularly very warm summers, mild winters and storms, on the socio-economic systems of European countries.

The main objectives of WISE were:

- to examine the impacts of a recent hot summer and a recent mild winter on the natural environment and on national economies; to set a monetary value on these impacts, where possible.
- To examine how the impacts of extreme seasons propagate between the national economies of the member countries of the EU. The sectors to be analysed were tourism and agricultural products.
- To examine the impact of climate 'shocks'. The selected shocks are wind storm and cold spells. The sectors to be examined are forestry and property insurance for wind storm, and health and energy supply for cold spells.
- To investigate the perceptions of the general public and management regarding climate extreme and shocks.

The output of the project consists of a series of empirical studies, both of quantitative and qualitative-descriptive nature.

The research work carried out by FEEM was developed in parallel with the research carried out by the other partners: the methodology adopted for the econometric analysis and the economic evaluation of the impact of weather extremes is homogenous across all partners, the surveys' questionnaire for Italy instead was slightly modified in order to be carried out through telephone interviews.

The work of FEEM in the WISE project covered:

- the quantitative analysis of the impacts of climate extremes on the socio-economic system in Italy.
- The analysis of individuals' perception of climate extremes based on results from individuals' surveys.
- Where possible, the economic evaluation of the impacts of weather extremes on the various sectors under analysis.

In this paper is considered the study of the perception of weather impacts through questionnaire survey to the general public.

In a previous paper is considered the statistical modelling of the impact of weather, through quantitative analysis of activity time series.

Surveys were carried out in order to complement through qualitative tools the quantitative evidence on the climate extremes' impacts on the Italian economy and society. With regard to the individuals' perception survey, 300 individuals were interviewed by telephone: 150 individuals in the sample were extracted from Lombardy, a northern Italian region, and the remaining 150 individuals were extracted from Sicily, the Southern island. Individuals were asked general questions about their perception of climate extremes, and about the impacts of weather extremes on their daily habits at work, at home, in their leisure activities, on their transport patterns, on their health and tourism choices. In *Appendix 1* is presented an econometric investigation, based on the same telephonic interviews, to better understand the socio-demographic factors that could influence the perception of extreme seasons.

2. Public Perception Survey of Climate Impacts

2.1. Introduction

The results of the perception survey aim at providing further possible explanations for trends in activities and impacts related to climate change identified through the econometric analysis.

The survey in particular aims at finding out how well people remember unusually extreme seasons and at identifying individuals' adaptive behaviour. Adaptive behaviour is analysed with regard to water and energy consumption, transport patterns, habits at work and at home, as well as tourism choices. The survey identifies which weather extremes' impacts on individuals' behaviour are perceived as relevant, and whether these impacts are positive or negative.

The survey mainly addresses adaptive behaviour to weather sensitivity, although marginally it addresses as well global warming issues, in order to motivate people to answer all the questions.

2.2. Methods

The survey questionnaire is in the Appendix.

The survey was conducted by SELECTA, a market research Italian firm, on behalf of Fondazione Eni Enrico Mattei.

Phone interviews have been carried out on a stratified sample of 300 individuals, selected from two Italian regions, Lombardy and Sicily, located respectively in the North and in the South of Italy.

The two regions differ considerably because of geographical and climate characteristics, as well as because of economic and cultural features.

Lombardy is a flatland and mountain region, characterised by a continental climate, endowed with a highly productive economic activity, concentrated mainly in the industry and service sectors. Sicily, a beautiful and renowned island in South, is indeed characterised by a Mediterranean climate; its beautiful setting, and its historical and cultural richness, represent a big attractiveness for tourism: its economy is mainly based on agriculture and tourism activities.

These two regions have been selected to represent respectively the North and the South, since they exemplify the main differences in terms of economic, cultural, geographic and climate characteristics between the North and the South of Italy. Therefore we refer indiscriminately to the North and to the South when reporting the survey results respectively from Lombardy and Sicily.

The sample is stratified by age, sex and city size. In the sample individuals are identified as well by income level, occupation, education, province and city of residence.

2.3. Perception of Hot and Dry Summers

Figure 1 shows whether for the two regions on average hot and dry summers have a positive or negative influence on individuals' behaviour. In general, people value negatively hot and dry summers. Hot and dry summers have a negative impact on comfort, work, household's activities, leisure, health, commuting and air quality. Air quality is the most important negative aspect associated to hot, dry summers. With regard to water and energy consumption, water use increases considerably during hot and dry summers, while electricity and gas consumption remain constant.

Figure 2 displays the distribution of the perception of specific impacts of hot and dry summers by region. All the impacts are evaluated more negatively by interviewees from the Southern region, Sicily, except for the impact on air quality which is perceived as stronger in Lombardy. The consumption of water and energy in hot and dry summers tends to increase in the South, particularly with regard to water. In Lombardy, there is a positive effect on water consumption, whereas the effect on energy is neutral.

In Figure 3, a closer look at the regional distribution of the level of consumption of energy and gas in hot and dry summers shows a large variability of answers. In the North, for most interviewees the effect of hot and dry summers on energy consumption is mainly neutral, or negative; hot and dry summers tend to have a relatively bigger positive effect on energy consumption in Sicily.

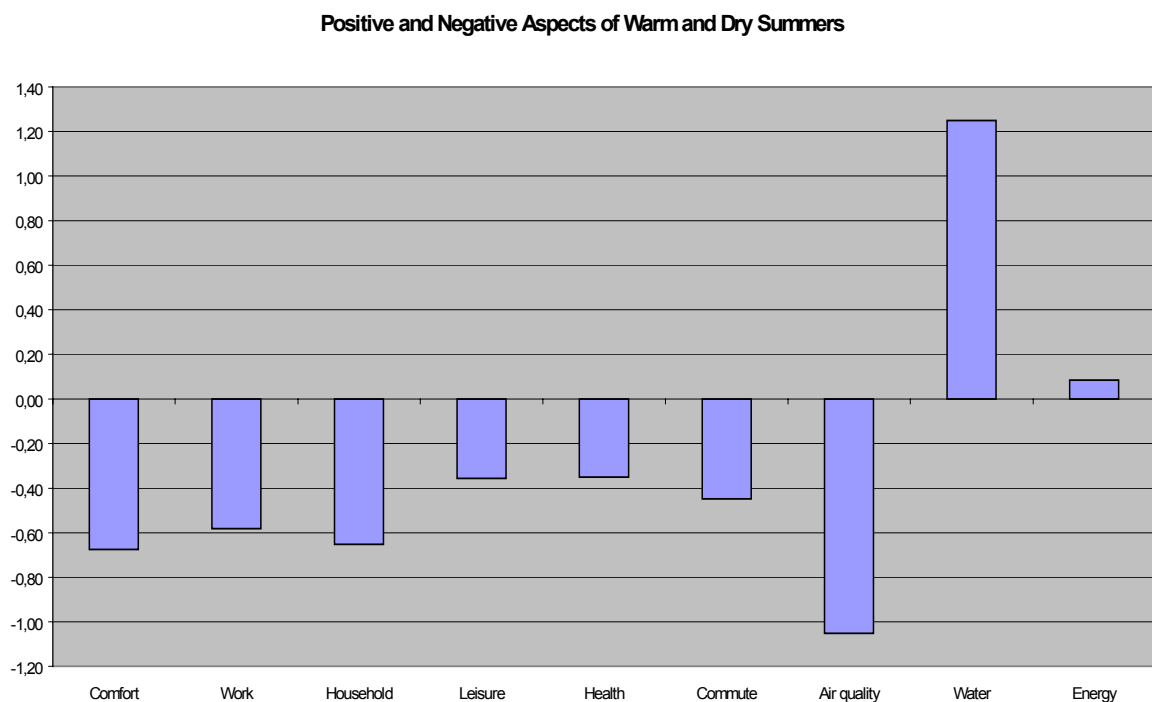


Figure1

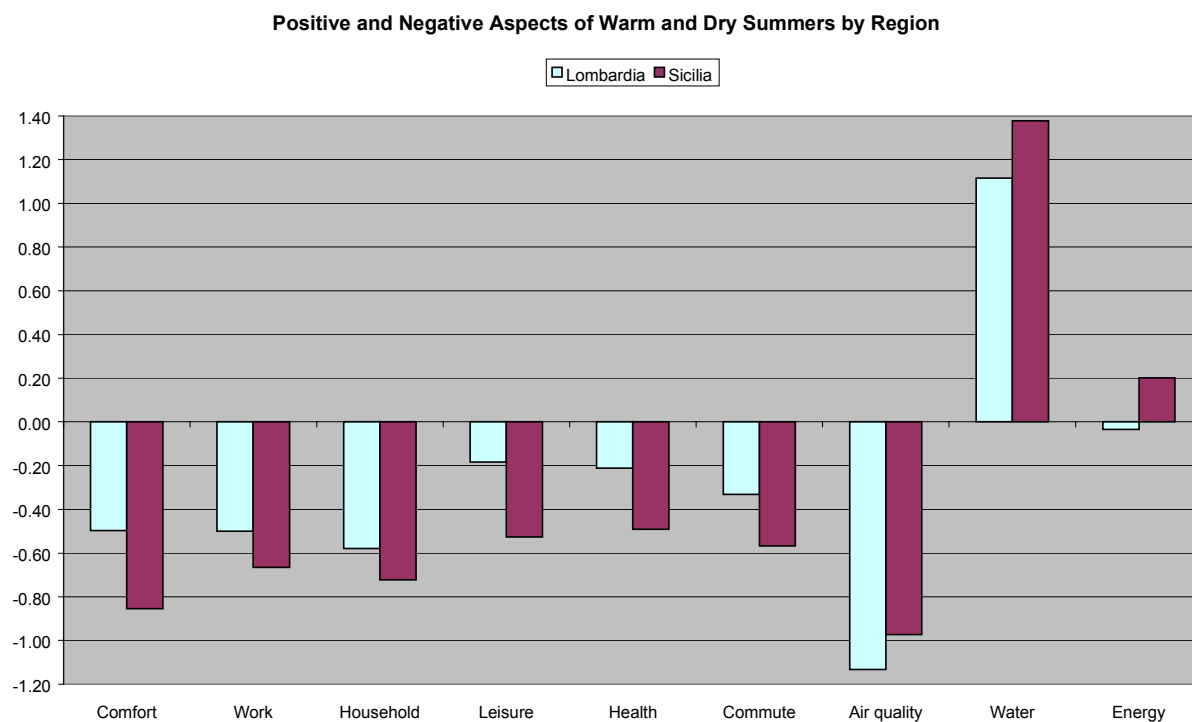


Figure 2

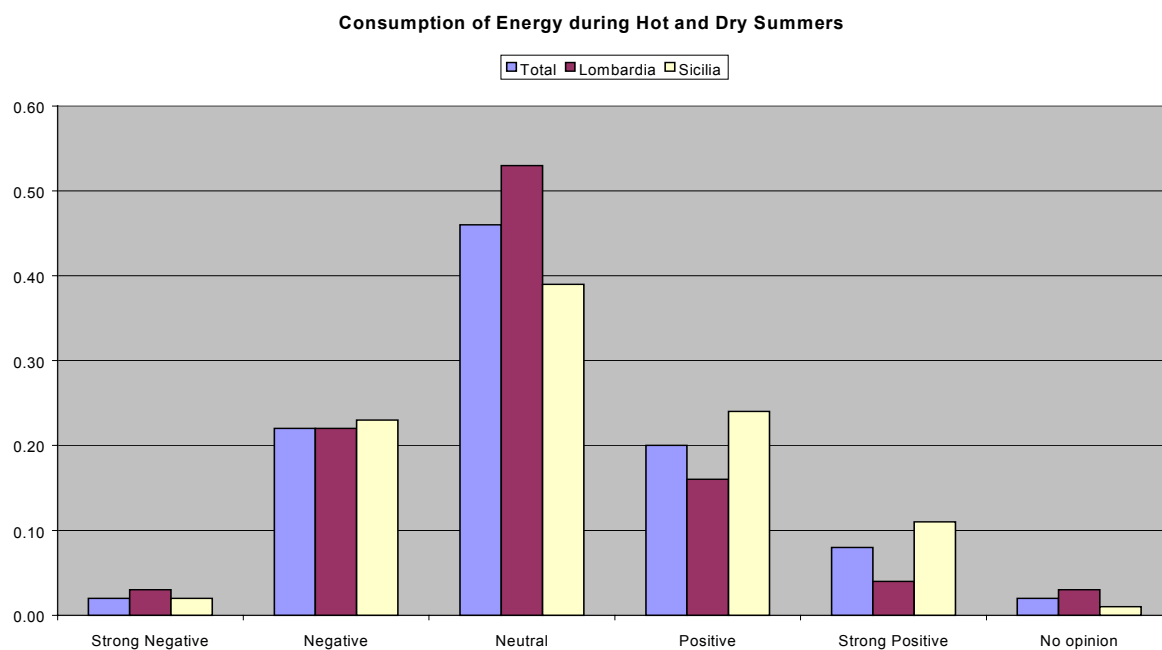


Figure 3

2.4. Perception of Mild Winters

Figure 4 shows the perceived impacts of mild winters. In general, people value positively mild winters, with an exception for air quality, energy consumption and the practice of winter sports, which are negatively affected by mild winters. The negative effect of mild winters on air quality is perceived as the strongest negative effect, whereas the positive impact on comfort is perceived as the strongest positive impact.

Figure 5 shows that the sensitivity to weather extremes in terms of comfort, leisure, health, commuting and insects is perceived more positively in Lombardy than in Sicily. The sensitivity to mild winters in terms of air quality is indeed perceived considerably more negatively in Lombardy. Surprisingly, the practice of winter-sports is perceived as affected more negatively by mild winters in Sicily than in Lombardy. Energy consumption in mild winters as well is affected more negatively in Sicily than in Lombardy.

Figure 6 displays the impacts which show a large variability of answers, with regard to atmosphere, health and air quality. Responses on the other impacts show a low-variance distribution.

In Figure 7, the distribution of the individuals' perception of air quality reveals that in Lombardy most people consider the air quality to be negatively influenced by weather extremes, while in Sicily the spread of the answers is large. However in both regions the size of the indecisive answers is quite large.

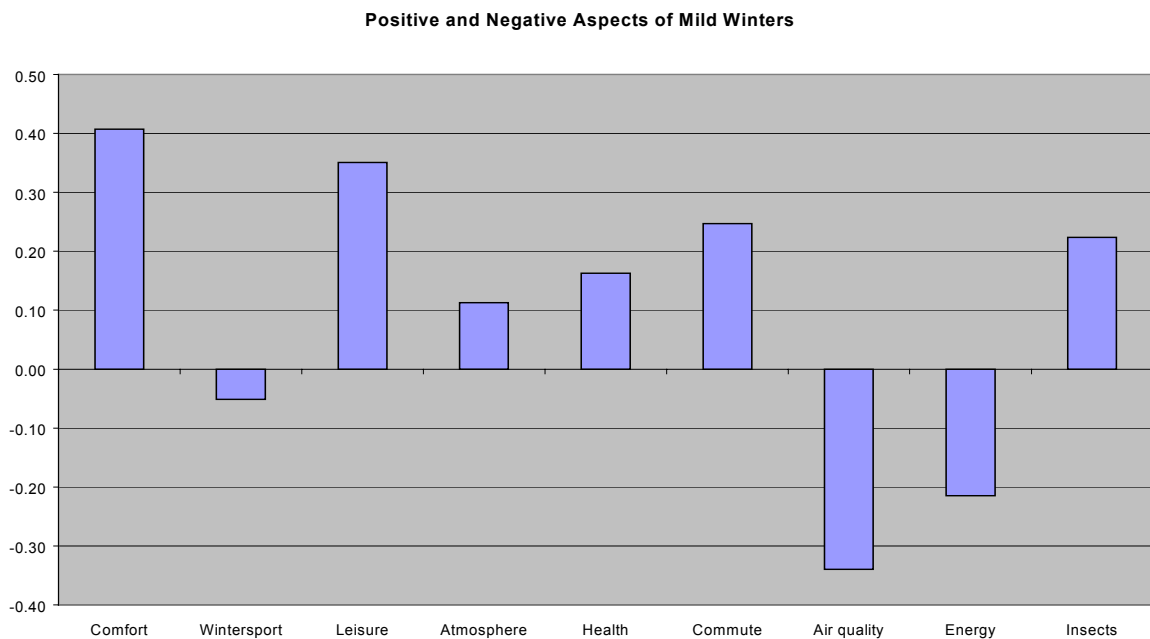


Figure 4

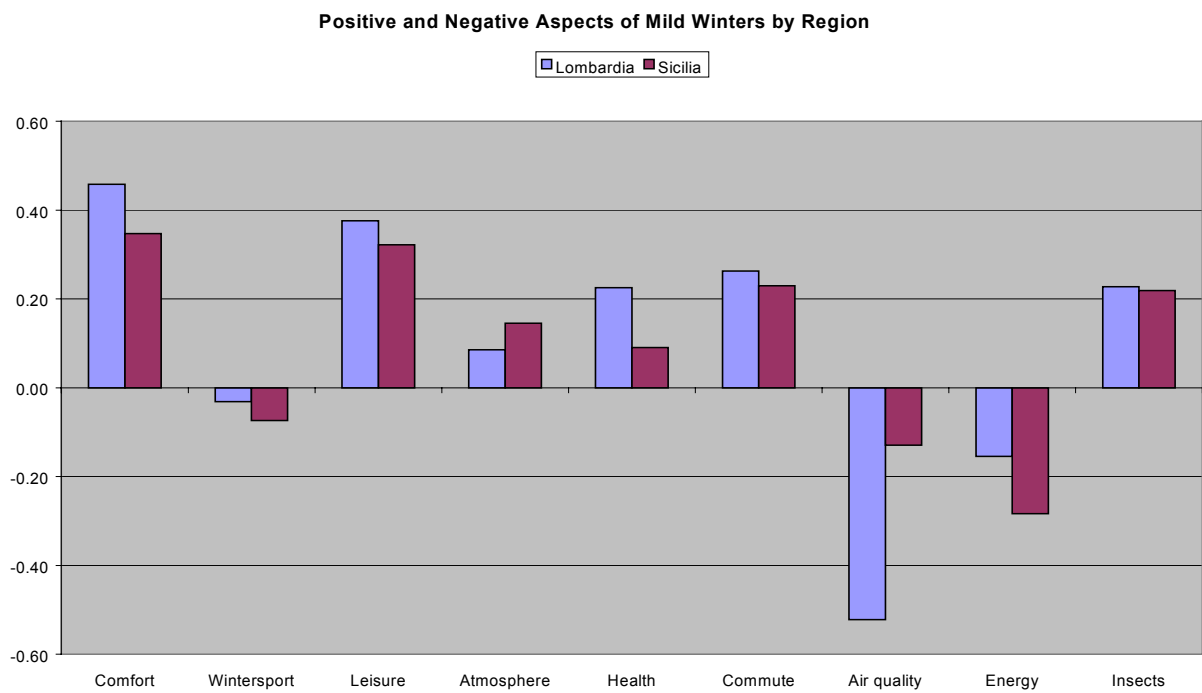


Figure 5

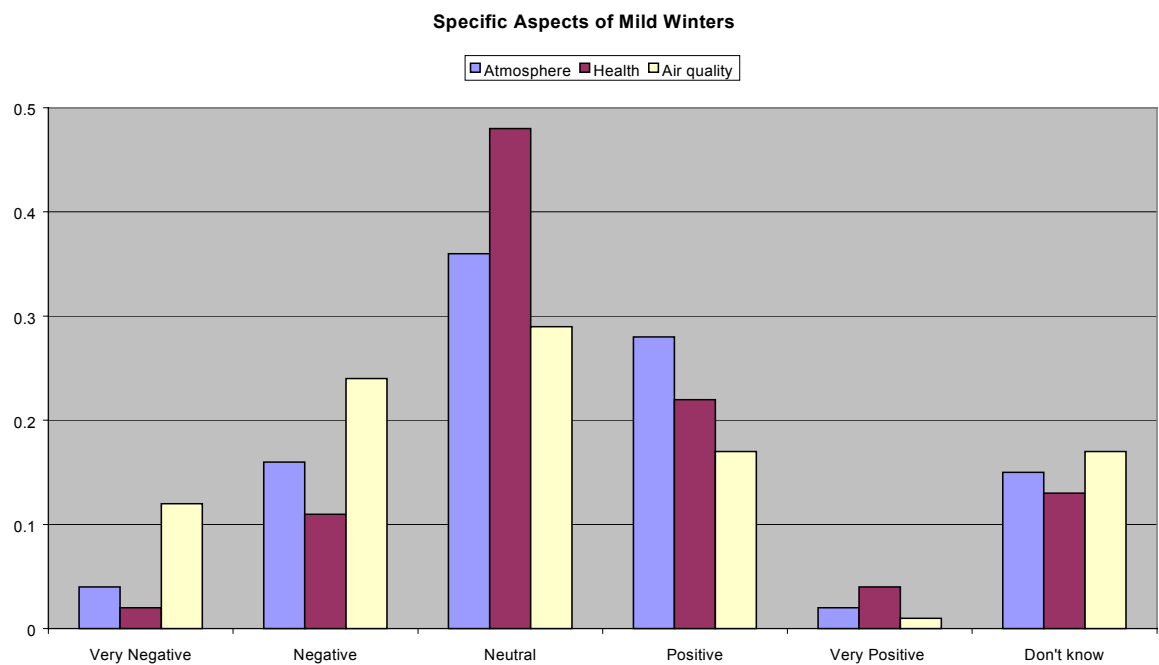


Figure 6

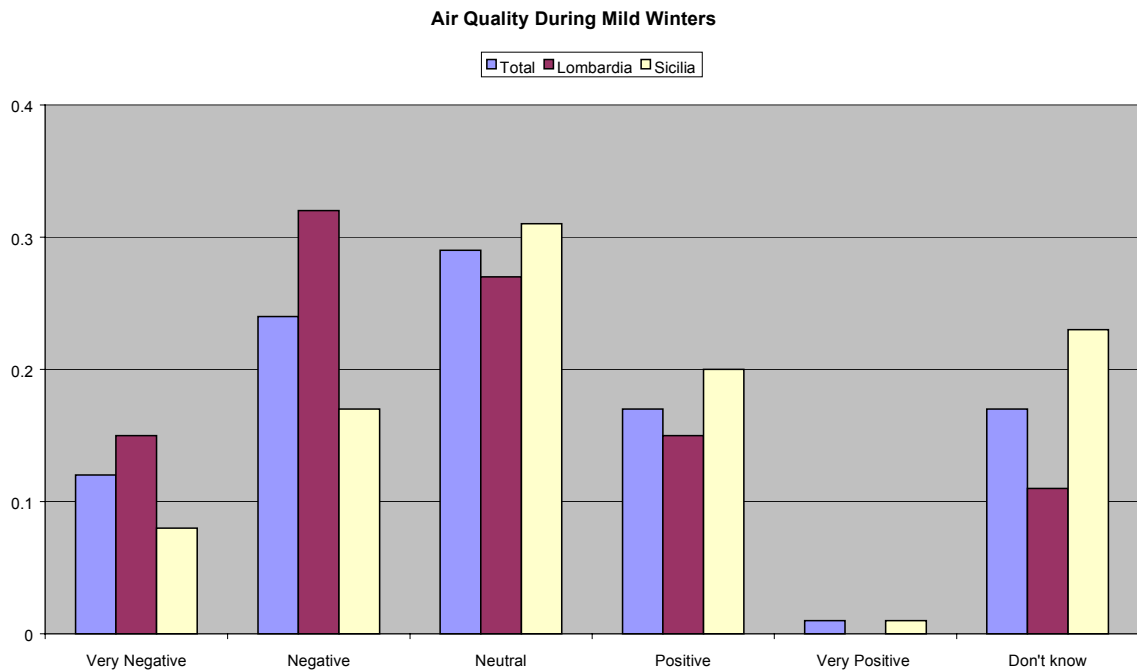


Figure 7

2.5. Perceptions of Climate Change

In Figure 8 we can notice that, although the number of indecisive answers is large, the majority of interviewees think that it is very likely, or simply likely, that hot and dry summers will become more frequent in the future. Figure 9 clearly shows that this opinion is stronger in the region of Sicily, with a larger number of indecisive answers in Lombardy.

Figure 10 shows that when interviewees are asked whether they find worrying the prospect of climate change, the majority finds it very worrying or simply worrying. In this case the number of indecisive answers is limited. In Figure 11 it can be noted that the spread of answers by region is similar.

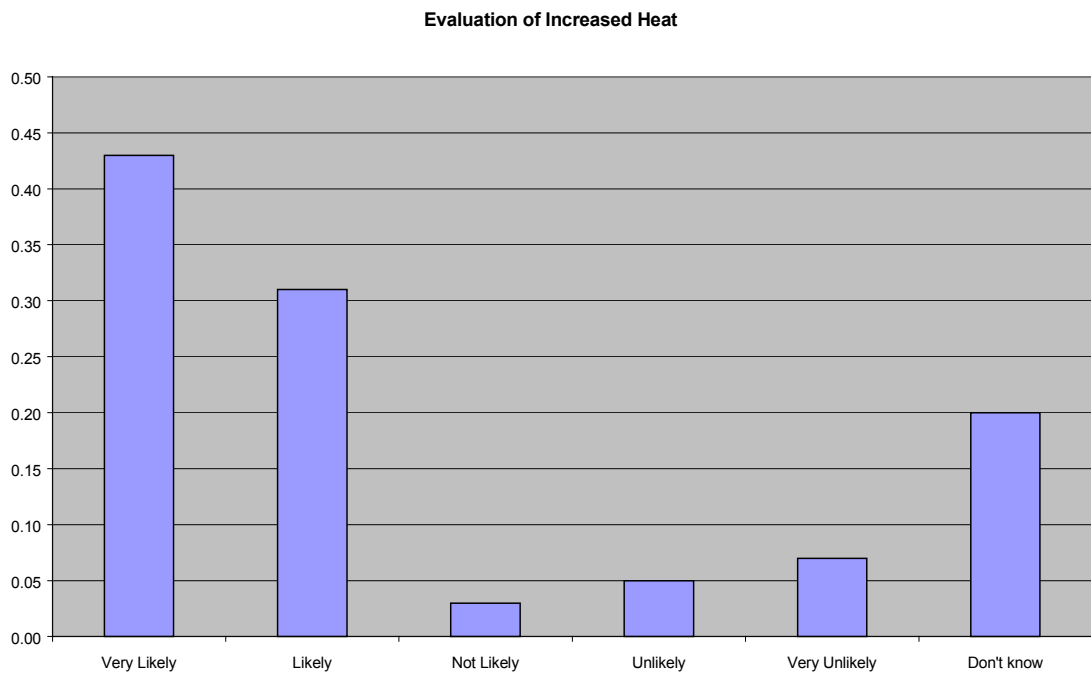


Figure 8

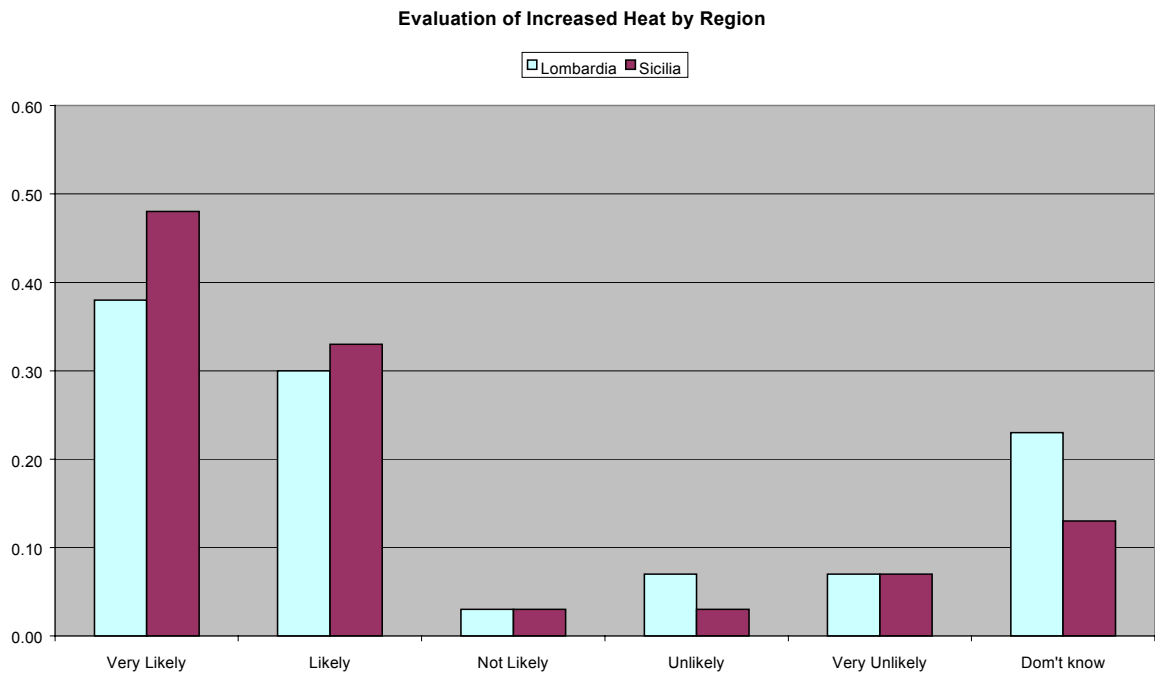


Figure 9

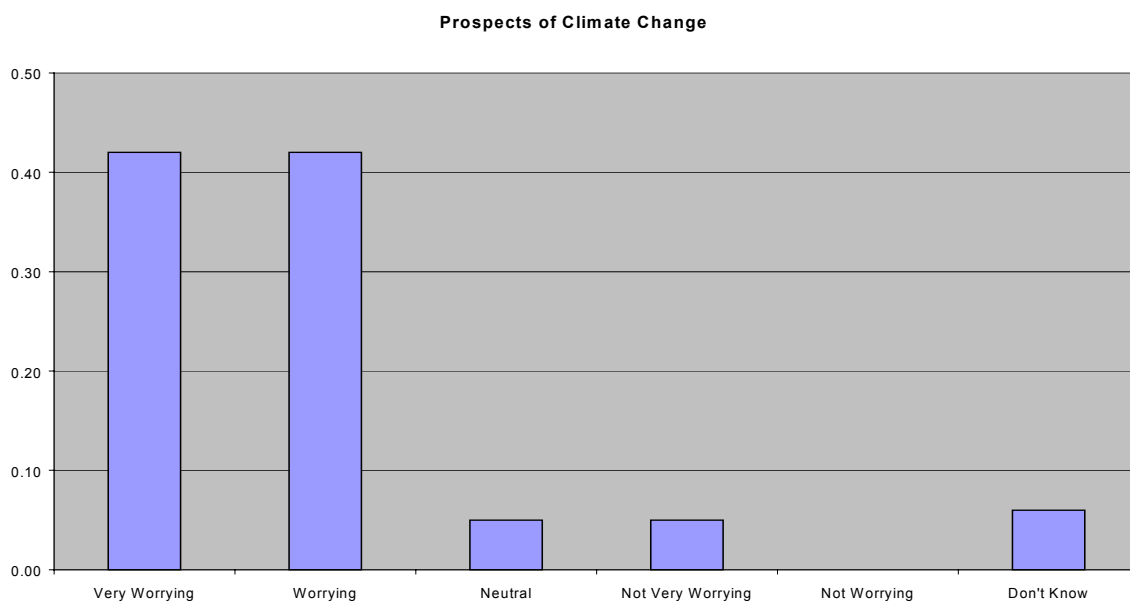


Figure 10

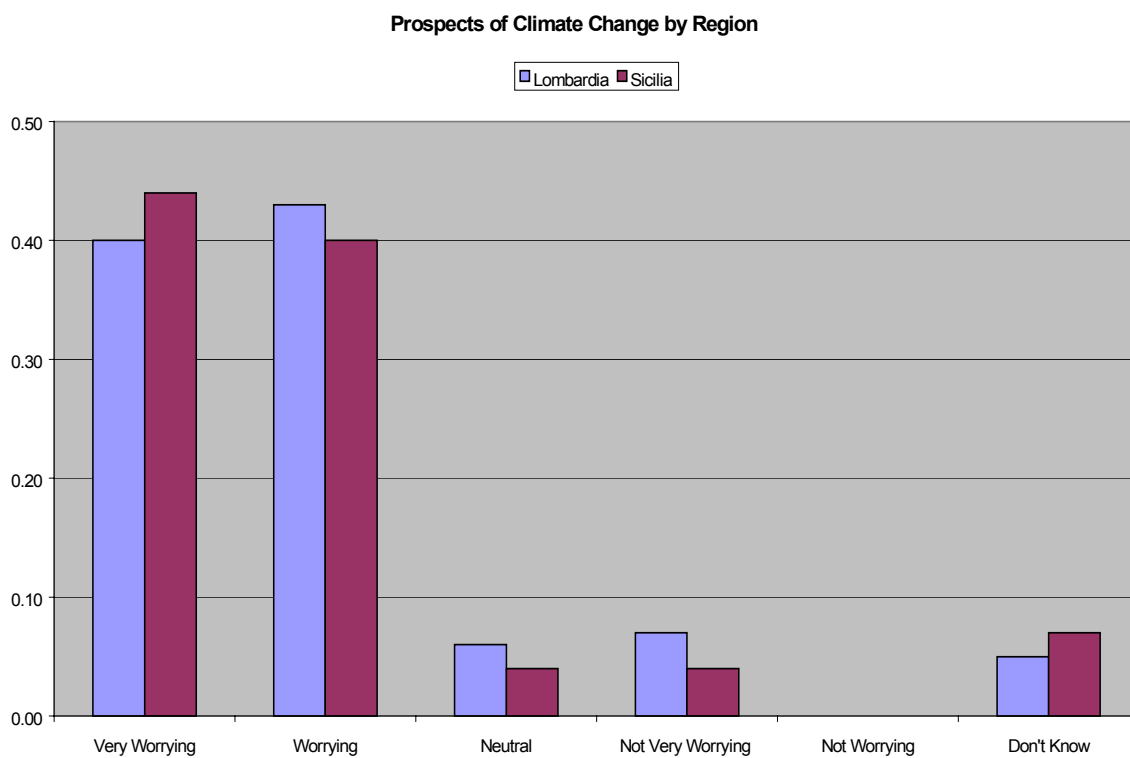


Figure 11

2.6. Adaptation

Figures 12-17 display how interviewees perceive that their behaviour is altered during periods of hot and dry weather.

Figure 12 shows that people tend to use more their motors and their bikes, while the propensity to use public transport, cars and to walk tends to decrease. The distribution of answers by region in Figure 13 reveals that the use of motors and bikes is more popular in Lombardy than in Sicily.

Figure 14 displays how people tend to change their consumption patterns during hot and dry summers. As it could be expected, people tend to prefer outdoor services and activities, such as going to the beach, to the swimming-pool, and being in the nature, with the exception of the preference for outdoor sports which remains constant in Lombardy.

A comparison between the two regions in Figure 15 shows that people from Sicily have a higher preference for going to the beach and to the outdoor restaurants/bars when compared to those from Lombardy. People from Lombardy indeed favour going to the swimming-pool and being in the nature with respect to people from Sicily.

Figure 16 shows that most people do not change their plans for their main vacation due to the extreme seasons, and, if they change them, they prefer to stay home. In addition, short holidays seem to be as responsive as day trips. Figure 17 shows that the answers between the two regions are very similar.

In Figures 18 and 19 a closer look at the distribution of day trips and short holidays following weather extremes reveals that the distribution of answers is spread: there are people who did more day trips/holidays and people who did much less, or simply less. The distribution of the positive, neutral or negative perception between the two regions varies particularly with regard to the negative and neutral impact of weather extremes in terms of adaptation of day trips.

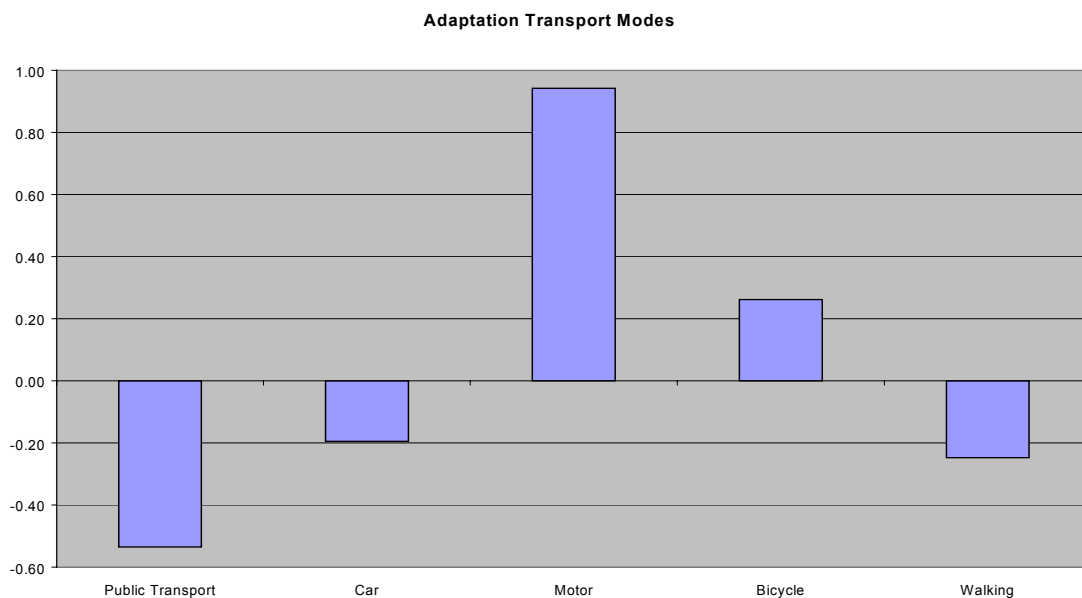


Figure 12

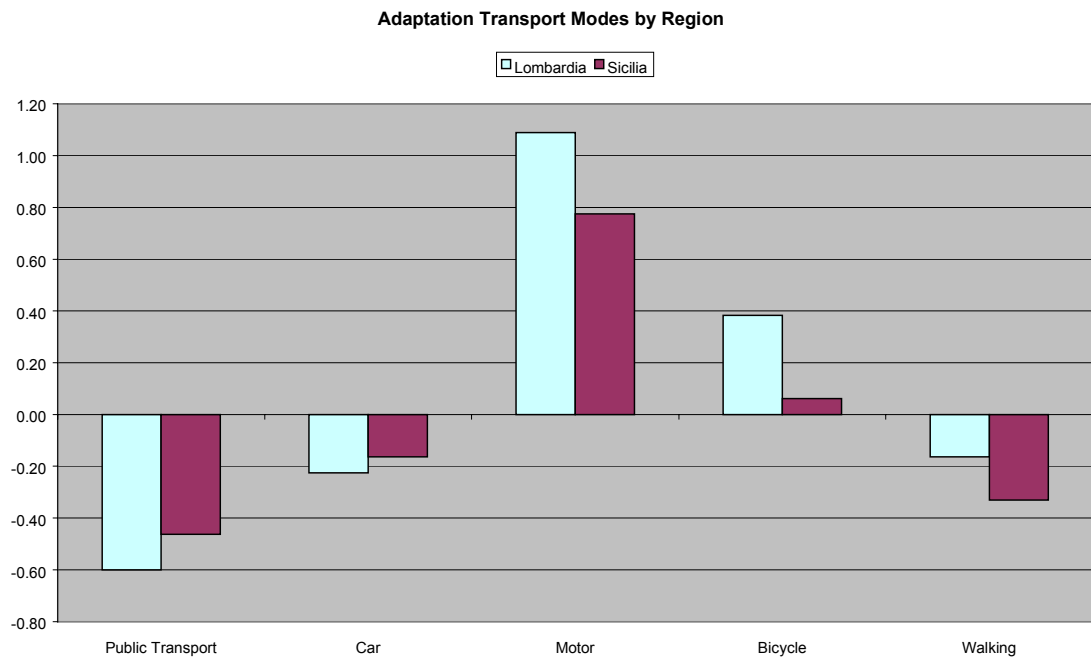


Figure 13

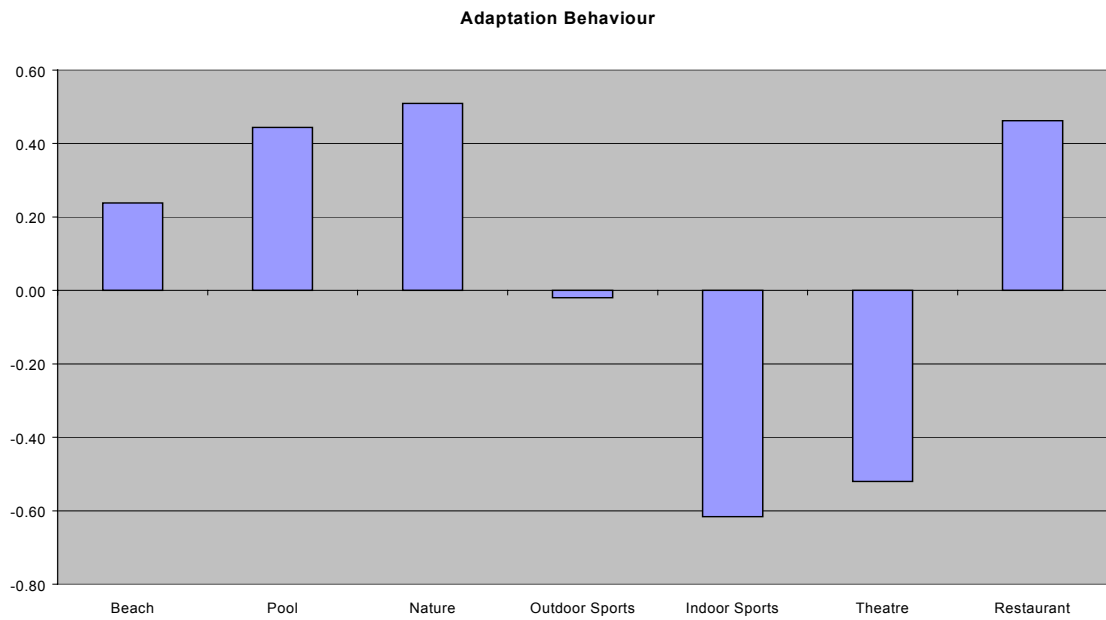


Figure 14

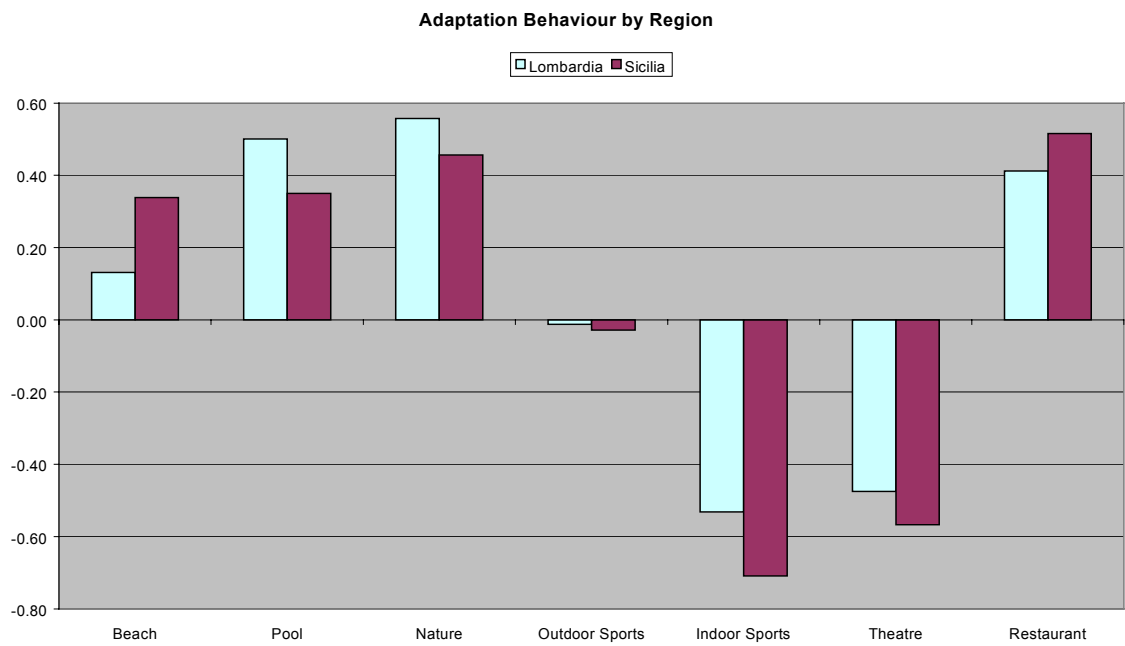


Figure 15

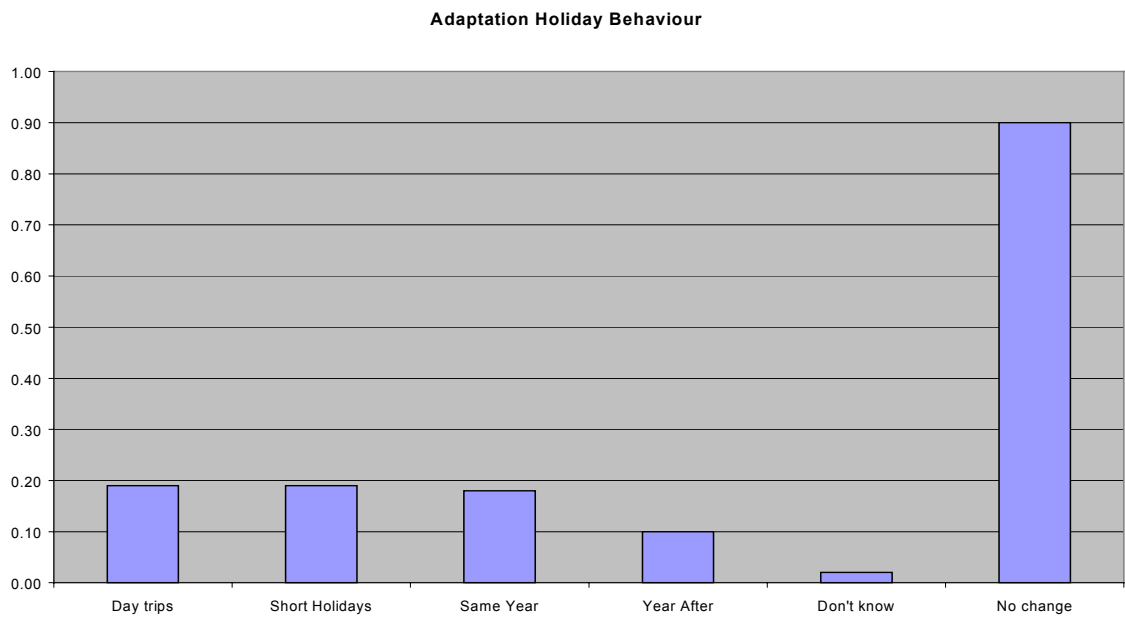


Figure 16

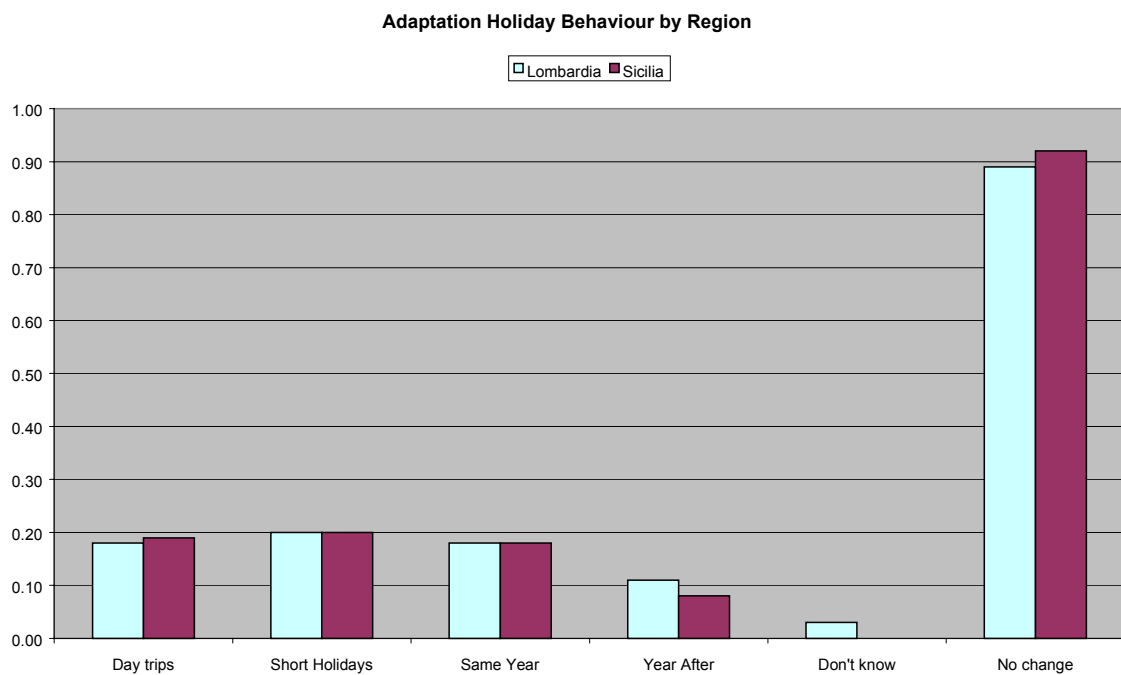


Figure 17

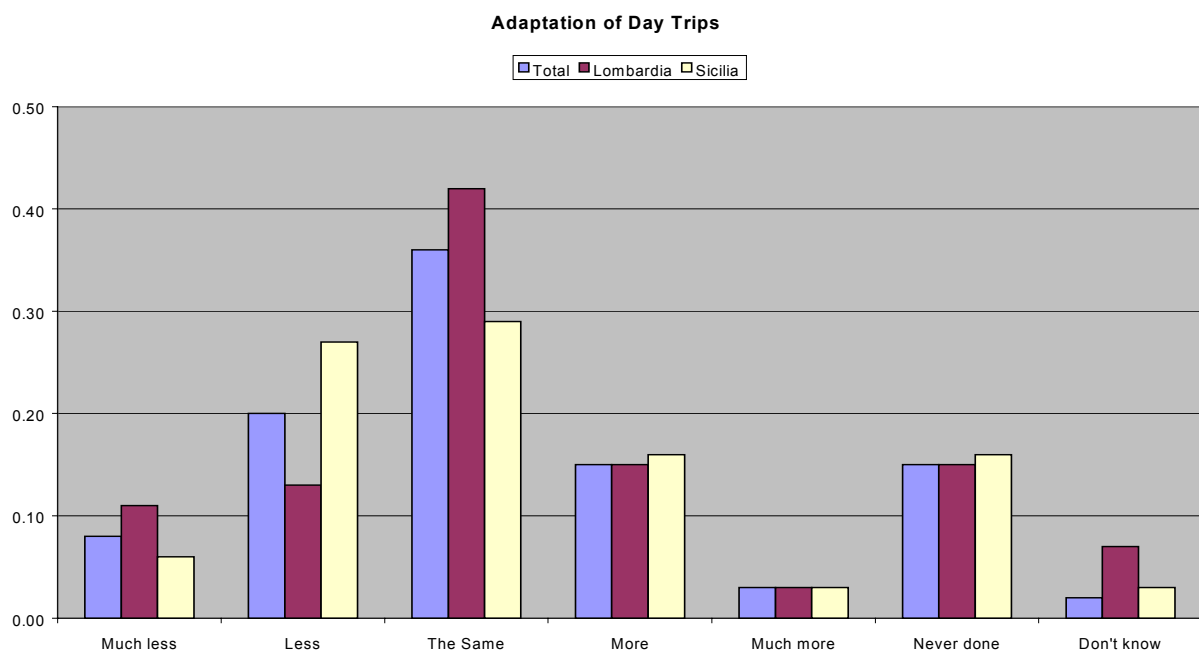


Figure 18

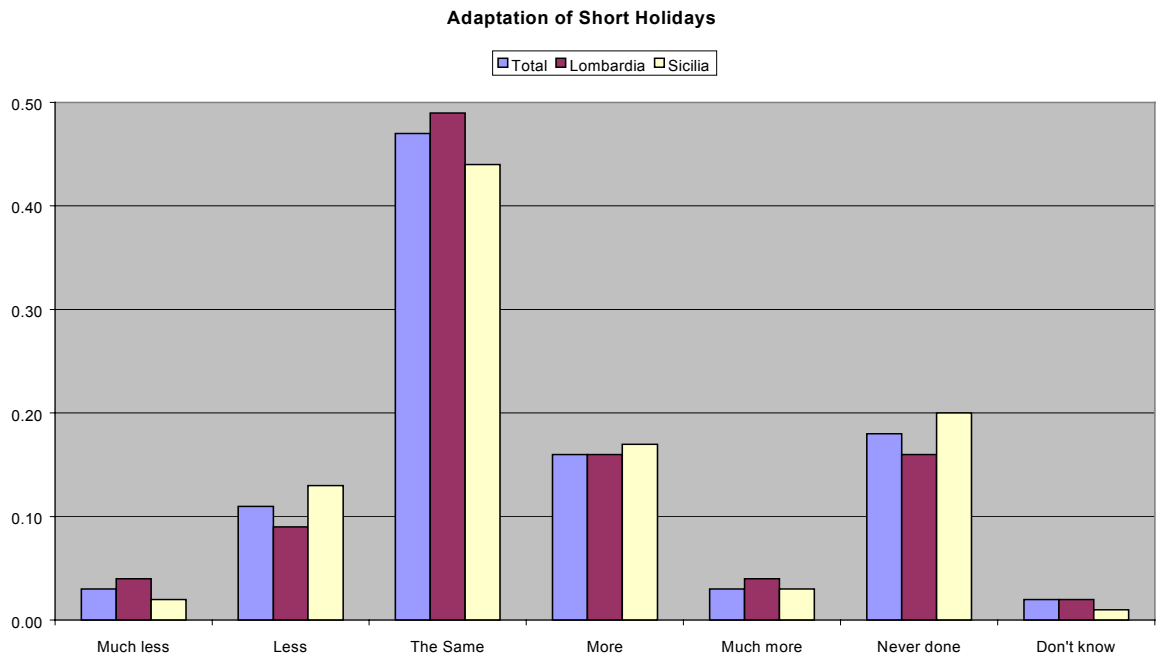


Figure 19

2.7. Perception of Temperature

People were then asked to indicate which summer they remembered being very hot and dry, and which winter was very mild.

Figures 20-23 show that most people think that the last summer was very hot and dry and the last winter was very mild, which may be indicative of ‘short memory’. With regard to the mild winter, however, there was a big number of indecisive answers.

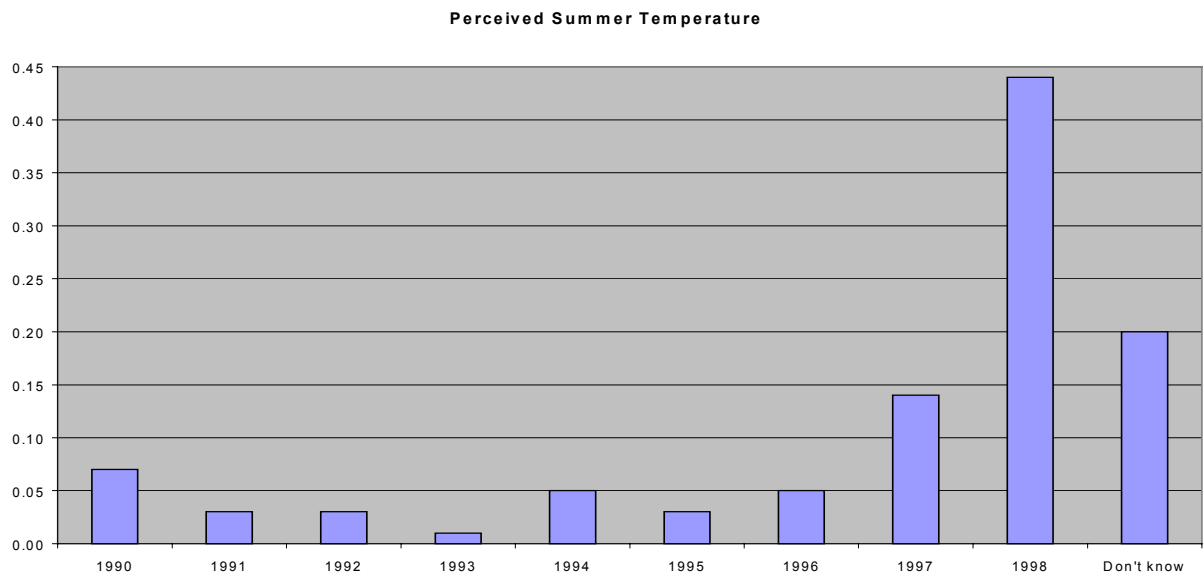


Figure 20

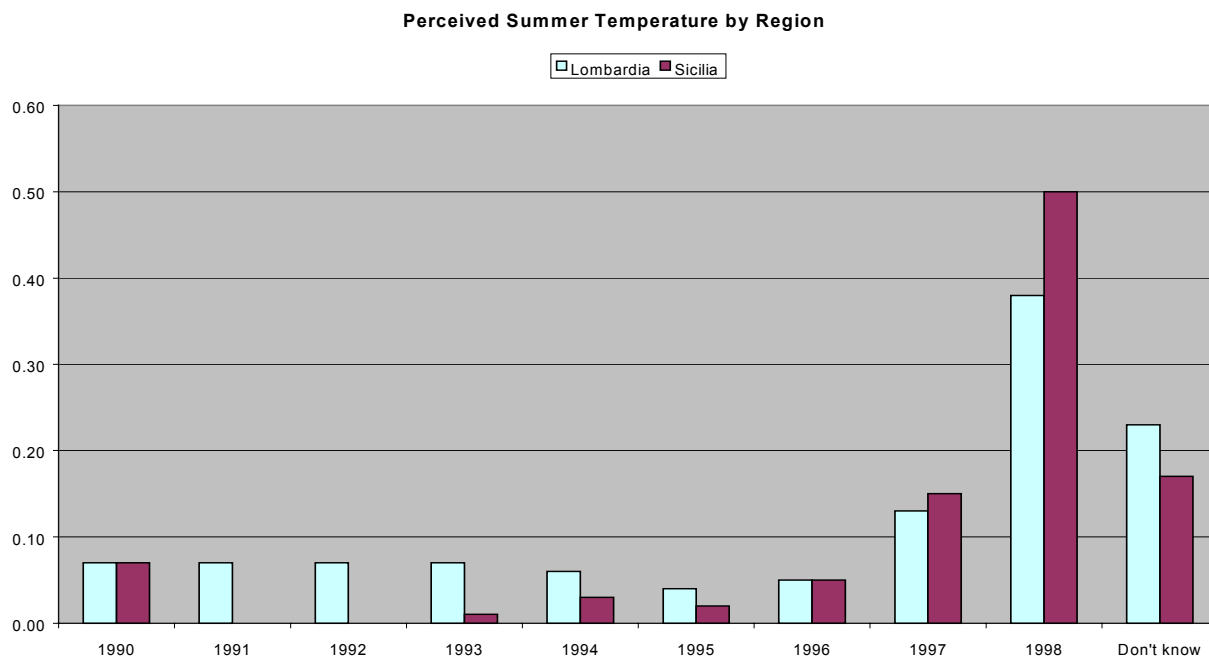


Figure 21

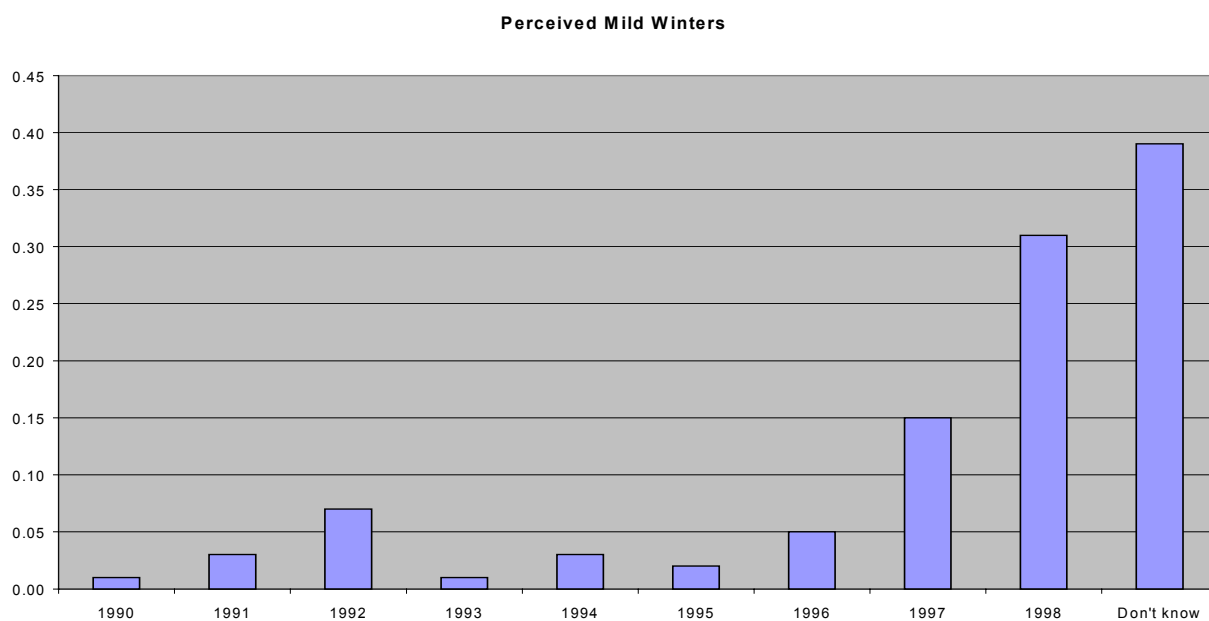


Figure 22

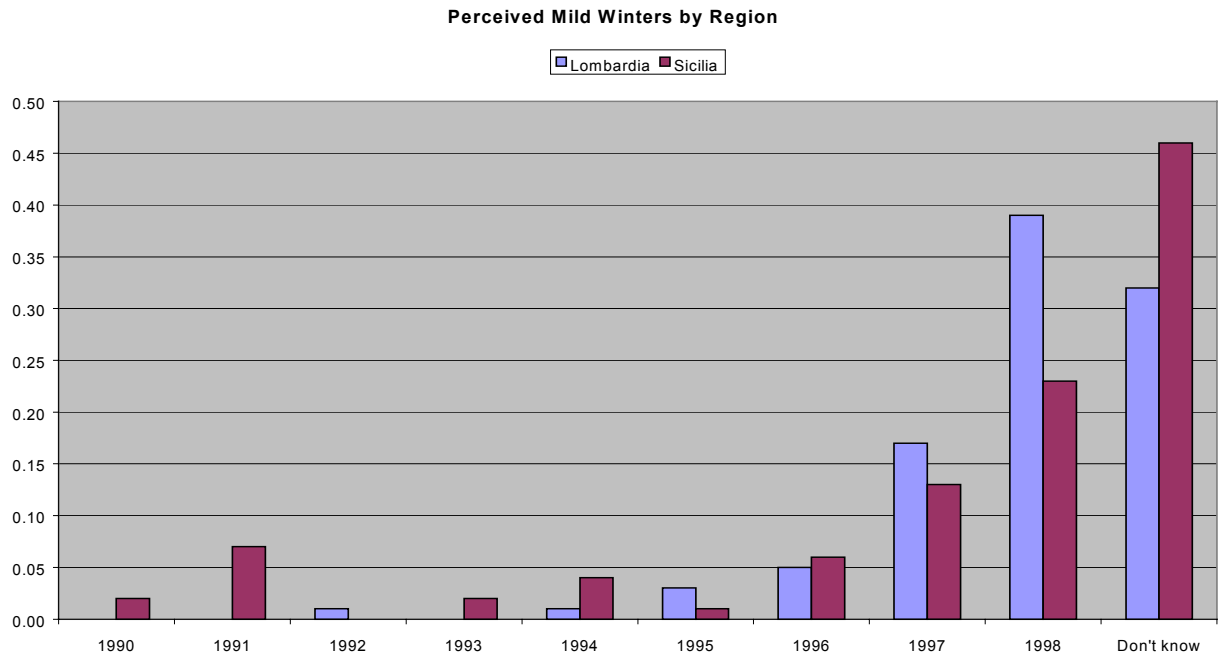


Figure 23

2.8. Conclusions

The survey results show that in the selected sample from the North and the South of Italy individuals perceive unusually extreme seasons as having considerable effects on their life: generally people identify negative effects of extremely hot and dry summers and mild winters on their quality of life, in terms of weather impacts on their comfort, work, leisure, health, commuting and transport patterns, as well as household activities.

Energy and water consumption seem to be quite sensitive to climate extremes, particularly in the South, where water and energy consumption tend to increase during hot and dry summers.

Individuals are particularly concerned about the extreme seasons' impacts on air quality. This concern is definitely stronger in the Northern region.

Regional differences between the North and the South induce people to favour different adaptive behaviours to climate extremes in their daily lives, such as enjoying more activities to the beach and sea-side, abandoning indoor activities, in Sicily, or being more in the nature, going to the swimming pool, using considerably less public transports and private cars in favour of motors and bicycles in Lombardy.

One side of individuals' adaptive behaviour which seems to be not too sensitive to climate extremes is tourism: in both regions vacation patterns do not change neither due to unusually hot and dry summers, nor due to mild winters.

Other interesting results emerge from the individuals' evaluation of the prospect of climate change which is considered to be very worrying, or worrying, for the majority of interviewees.

Past extreme seasons cannot be easily identified by the individuals in the sample: people tend to recall the last summers as being the hottest and driest in the past, which may be indicative of a 'short memory'. More indecisive answers apply to the memory of mild winters.

Overall the survey results suggest that individuals are aware of the effects of climate extremes on their daily habits and on their life's quality, and that they tend to respond to climate extremes through some adaptive behaviour.

3. Conclusions

The results of the public perception survey conducted in Italy show that individuals perceive unusually extreme seasons as having considerable effects on their life: generally people identify negative effects of extremely hot and dry summers and mild winters on their quality of life, in terms of weather impacts on their comfort, work, leisure, health, commuting and transport patterns, as well as household activities.

Energy and water consumption seem to be quite sensitive to climate extremes, particularly in the South.

Individuals, mainly in the Northern region, are particularly concerned about the extreme seasons' impacts on air quality.

Regional differences between the North and the South induce people to favour different adaptive behaviours to climate extremes in their daily lives but in both regions are preferred outdoor activities.

One side of individuals' adaptive behaviour which seems to be not too sensitive to climate extremes is tourism: vacation patterns do not change neither due to unusually hot and dry summers, nor due to mild winters.

Other interesting results emerge from the individuals' evaluation of the prospect of climate change which is considered to be very worrying, or worrying, for the majority of interviewees.

Indicative of a 'short memory' about years with extreme weather is the fact that past extreme seasons cannot be easily identified by the individuals in the sample.

Overall the survey results suggest that individuals are aware of the effects of climate extremes on their daily habits and on their life's quality, and that they tend to respond to climate extremes through some adaptive behaviour.

The WISE surveys show consistent and explicable results within and between countries. Perception and adaptation to unusual hot and dry summer weather have an inverse relation to the daily maximum summer temperature. The higher this temperature the less favourably the weather was perceived and the less actively people reacted.

In the UK and The Netherlands unusual hot and dry summer weather was perceived rather favourably, instead in Germany and Italy it was perceived more unfavourably and as a consequence people there reacted less actively.

Clear positive effects of mild winter weather on everyday life were perceived for almost all selected items in all countries except for Germany.

APPENDIX 1: ECONOMETRIC INVESTIGATION*

Introduction

In this appendix are presented the results of an econometric investigation based on the qualitative analysis conducted by FEEM in the WISE project. As previously showed in this paper, one of the objective of WISE project was to analyse the perception of general public regarding climate extremes and, in particular, about the impacts of weather extremes on daily habits at work, at home, in leisure activities, on transport patterns, on health and tourism choices. Using the data of telephonic interviews (the text of the interview is included in *Appendix 2*), has been possible to carry out an analysis of regressions to quantify the relation between the individual characteristics of the interviewees (gender, age, income class, number of persons in the household, region and size of the village/town) and the probability to reply in certain way.

Methodology

Regressions were made using the *bynary probit model* and the *ordered probit model*, models whose dependent variables are of qualitative nature. Coefficients obtained by regressions express how much the probability to reply in a certain way depends on the vector containing the individual characteristic of each interviewee.

At the beginning the regressions were made including in the independent variables all the individual characteristic available (gender, age, income class, number of persons in the household, region and size of the village/town). Afterwards were included, from time to time, the independent variables that were considered explanatory of the behaviour of the dependent variable represented by the replies to interview.

Regression models were chosen depending on the nature of the values of the dependent variable: most times was used the *ordered probit model* because the observed dependent variable denoted outcomes representing ordered or ranked categories (the possible answers were discrete and ordered, for example from “much less” to “much more”); only in a couple of regressions was used the *bynary probit model*, model in which the dependent variable may take on only two values (the alternative replies were NO-YES (0-1)).

Coefficients obtained by regressions show the average change of the dependent variable for each positive unitary change of independent variables (in this case for the independent variables were determined certain classes of age, size of the town and income classes).

Econometric analysis

Tables 1 show that the negative influence of hot and dry summer on many aspects of everyday life is related with gender, age, income and region. In fact, it results that women and interviewees from Sicily perceive more negatively extreme summers. Furthermore, it was predictable that older people suffered more high temperatures but surprises the fact that the higher is the income class the higher is the discomfort caused by hot seasons.

* by Paolo Mombrini, thesis 2001: "*Cambiamento Climatico: Impatti Socioeconomici degli Eventi Climatici Estremi*"

Tables 1: Influence of hot summer on aspects of everyday life

| Dependent Variable: Comfort | | | | |
|---------------------------------------|-------------|----------------------|-------------|-----------|
| Method: ML - Ordered Probit | | | | |
| Included observations: 214 | | | | |
| Number of ordered indicator values: 5 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| INCOME | -0.145683 | 0.058523 | -2.489329 | 0.0128 |
| GENDER(m-f) | -0.426082 | 0.151784 | -2.807151 | 0.0050 |
| REGION(L-S) | -0.466430 | 0.149326 | -3.123578 | 0.0018 |
| AGE | -0.095230 | 0.044510 | -2.139517 | 0.0324 |
| Limit Points | | | | |
| LIMIT_2:C(5) | -2.929708 | 0.463876 | -6.315713 | 0.0000 |
| LIMIT_3:C(6) | -1.779227 | 0.447191 | -3.978672 | 0.0001 |
| LIMIT_4:C(7) | -0.757167 | 0.441625 | -1.714501 | 0.0864 |
| LIMIT_5:C(8) | 0.166364 | 0.464623 | 0.358062 | 0.7203 |
| Akaike info criterion | 2.657463 | Schwarz criterion | | 2.783294 |
| Log likelihood | -276.3485 | Hannan-Quinn criter. | | 2.708310 |
| Restr. log likelihood | -287.6198 | Avg. log likelihood | | -1.291348 |
| LR statistic (4 df) | 22.54244 | LR index (Pseudo-R2) | | 0.039188 |
| Probability(LR stat) | 0.000156 | | | |

| Dependent Variable: Work | | | | |
|---------------------------------------|-------------|----------------------|-------------|-----------|
| Method: ML - Ordered Probit | | | | |
| Included observations: 213 | | | | |
| Number of ordered indicator values: 5 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| INCOME | -0.103174 | 0.058816 | -1.754176 | 0.0794 |
| GENDER | -0.616322 | 0.157544 | -3.912069 | 0.0001 |
| AGE | -0.075543 | 0.045878 | -1.646618 | 0.0996 |
| Limit Points | | | | |
| LIMIT_2:C(4) | -2.526504 | 0.410371 | -6.156637 | 0.0000 |
| LIMIT_3:C(5) | -1.460092 | 0.395509 | -3.691675 | 0.0002 |
| LIMIT_4:C(6) | 0.296009 | 0.392424 | 0.754308 | 0.4507 |
| LIMIT_5:C(7) | 1.022314 | 0.444548 | 2.299673 | 0.0215 |
| Akaike info criterion | 2.350657 | Schwarz criterion | | 2.461122 |
| Log likelihood | -243.3449 | Hannan-Quinn criter. | | 2.395299 |
| Restr. log likelihood | -251.8704 | Avg. log likelihood | | -1.142465 |
| LR statistic (3 df) | 17.05092 | LR index (Pseudo-R2) | | 0.033849 |
| Probability(LR stat) | 0.000690 | | | |

| Dependent Variable: Health Method: ML - Ordered Probit Included observations: 302 Number of ordered indicator values: 5 | | | | |
|--|-------------|----------------------|-------------|-----------|
| | Coefficient | Std. Error | z-Statistic | Prob. |
| AGE | -0.119963 | 0.035685 | -3.361710 | 0.0008 |
| GENDER | -0.492851 | 0.128047 | -3.848986 | 0.0001 |
| REGION | -0.337690 | 0.126950 | -2.660011 | 0.0078 |
| Limit Points | | | | |
| LIMIT_2:C(4) | -3.036247 | 0.334576 | -9.074901 | 0.0000 |
| LIMIT_3:C(5) | -2.020899 | 0.318902 | -6.337052 | 0.0000 |
| LIMIT_4:C(6) | -0.337258 | 0.302756 | -1.113961 | 0.2653 |
| LIMIT_5:C(7) | 0.331173 | 0.315075 | 1.051091 | 0.2932 |
| Akaike info criterion | 2.390975 | Schwarz criterion | | 2.476979 |
| Log likelihood | -354.0373 | Hannan-Quinn criter. | | 2.425386 |
| Restr. log likelihood | -370.3513 | Avg. log likelihood | | -1.172309 |
| LR statistic (3 df) | 32.62795 | LR index (Pseudo-R2) | | 0.044050 |
| Probability(LR stat) | 3.86E-07 | | | |

| Dependent Variable: Commute Method: ML - Ordered Probit Included observations: 301 Number of ordered indicator values: 5 | | | | |
|---|-------------|----------------------|-------------|-----------|
| | Coefficient | Std. Error | z-Statistic | Prob. |
| GENDER | -0.497634 | 0.128565 | -3.870679 | 0.0001 |
| REGION | -0.286754 | 0.127486 | -2.249297 | 0.0245 |
| Limit Points | | | | |
| LIMIT_2:C(3) | -2.564434 | 0.294516 | -8.707272 | 0.0000 |
| LIMIT_3:C(4) | -1.338242 | 0.275180 | -4.863157 | 0.0000 |
| LIMIT_4:C(5) | 0.357615 | 0.269752 | 1.325714 | 0.1849 |
| LIMIT_5:C(6) | 1.043488 | 0.300522 | 3.472246 | 0.0005 |
| Akaike info criterion | 2.292254 | Schwarz criterion | | 2.366150 |
| Log likelihood | -338.9842 | Hannan-Quinn criter. | | 2.321824 |
| Restr. log likelihood | -349.8704 | Avg. log likelihood | | -1.126193 |
| LR statistic (2 df) | 21.77244 | LR index (Pseudo-R2) | | 0.031115 |
| Probability(LR stat) | 1.87E-05 | | | |

Air quality in hot and dry summers is perceived more negatively in Lombardy and in bigger towns. Moreover, as before, women and people with higher income are more influenced (*table 2*).

Table 2: Air quality in hot and dry summers

| | | | | |
|---------------------------------------|-------------|----------------------|-------------|--------|
| Dependent Variable: Air quality | | | | |
| Method: ML - Ordered Probit | | | | |
| Included observations: 206 | | | | |
| Number of ordered indicator values: 5 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| TOWN SIZE | -0.151824 | 0.052941 | -2.867819 | 0.0041 |
| REGION | 0.390232 | 0.156318 | 2.496404 | 0.0125 |
| GENDER | -0.363941 | 0.156450 | -2.326238 | 0.0200 |
| INCOME | -0.108489 | 0.059992 | -1.808407 | 0.0705 |
| Limit Points | | | | |
| LIMIT_2:C(5) | -1.183041 | 0.392595 | -3.013388 | 0.0026 |
| LIMIT_3:C(6) | 0.170005 | 0.387308 | 0.438939 | 0.6607 |
| LIMIT_4:C(7) | 1.239683 | 0.402613 | 3.079089 | 0.0021 |
| LIMIT_5:C(8) | 1.855802 | 0.457801 | 4.053733 | 0.0001 |
| Akaike info criterion | 2.332033 | Schwarz criterion | 2.461271 | |
| Log likelihood | -232.1994 | Hannan-Quinn criter. | 2.384301 | |
| Restr. log likelihood | -242.4366 | Avg. log likelihood | -1.127181 | |
| LR statistic (4 df) | 20.47446 | LR index (Pseudo-R2) | 0.042226 | |
| Probability(LR stat) | 0.000402 | | | |

According to the sample considered, the domestic consumption of water, electricity and gas in extremely hot summers would increase more in Sicily and in smaller villages. Furthermore, as intuitable, an higher income would permit higher consumption of water. At last it is curious to observe that, consequently to hot temperatures, men increase more than women the consumption of energy (*tables 3*).

Tables 3: Water and energy consumption during hot summers

| | | | | |
|---------------------------------------|-------------|----------------------|-------------|--------|
| Dependent Variable: Water | | | | |
| Method: ML - Ordered Probit | | | | |
| Included observations: 212 | | | | |
| Number of ordered indicator values: 5 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| REGION | 0.421689 | 0.160721 | 2.623727 | 0.0087 |
| INCOME | 0.134037 | 0.061648 | 2.174224 | 0.0297 |
| TOWN SIZE | -0.090398 | 0.052514 | -1.721410 | 0.0852 |
| Limit Points | | | | |
| LIMIT_2:C(4) | -1.939723 | 0.459778 | -4.218825 | 0.0000 |
| LIMIT_3:C(5) | -1.132652 | 0.340361 | -3.327801 | 0.0009 |
| LIMIT_4:C(6) | -0.210860 | 0.315146 | -0.669086 | 0.5034 |
| LIMIT_5:C(7) | 0.626132 | 0.318279 | 1.967242 | 0.0492 |
| Akaike info criterion | 2.236665 | Schwarz criterion | 2.347495 | |
| Log likelihood | -230.0864 | Hannan-Quinn criter. | 2.281460 | |
| Restr. log likelihood | -236.3018 | Avg. log likelihood | -1.085313 | |
| LR statistic (3 df) | 12.43079 | LR index (Pseudo-R2) | 0.026303 | |
| Probability(LR stat) | 0.006044 | | | |

| Dependent Variable: Energy | | | | |
|---------------------------------------|-------------|----------------------|-------------|-----------|
| Method: ML - Ordered Probit | | | | |
| Included observations: 296 | | | | |
| Number of ordered indicator values: 5 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| REGION | 0.306593 | 0.125295 | 2.446968 | 0.0144 |
| TOWN SIZE | -0.093506 | 0.040392 | -2.314961 | 0.0206 |
| GENDER | -0.255663 | 0.124936 | -2.046346 | 0.0407 |
| Limit Points | | | | |
| LIMIT_2:C(4) | -2.217069 | 0.325411 | -6.813141 | 0.0000 |
| LIMIT_3:C(5) | -0.871605 | 0.285796 | -3.049748 | 0.0023 |
| LIMIT_4:C(6) | 0.420954 | 0.281884 | 1.493359 | 0.1353 |
| LIMIT_5:C(7) | 1.280227 | 0.295518 | 4.332141 | 0.0000 |
| Akaike info criterion | 2.604763 | Schwarz criterion | | 2.692035 |
| Log likelihood | -378.5050 | Hannan-Quinn criter. | | 2.639705 |
| Restr. log likelihood | -385.3417 | Avg. log likelihood | | -1.278733 |
| LR statistic (3 df) | 13.67348 | LR index (Pseudo-R2) | | 0.017742 |
| Probability(LR stat) | 0.003385 | | | |

As regards the adaptation of transport modes caused by hot summers, the most significant results concern car use (*table 4*): women and older people would tend to use it less. Also the income class and the size of the town seem to affect the propensity to use car in warm seasons: people with high income and that live in bigger towns would reduce less the use of their cars.

Table 4: Car use in hot summers

| Dependent Variable: Car | | | | |
|---------------------------------------|-------------|----------------------|-------------|-----------|
| Method: ML - Ordered Probit | | | | |
| Included observations: 214 | | | | |
| Number of ordered indicator values: 6 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| AGE | -0.178977 | 0.047342 | -3.780540 | 0.0002 |
| INCOME | 0.136200 | 0.058152 | 2.342138 | 0.0192 |
| TOWN SIZE | 0.103515 | 0.050914 | 2.033119 | 0.0420 |
| GENDER | -0.272313 | 0.151175 | -1.801303 | 0.0717 |
| Limit Points | | | | |
| LIMIT_2:C(5) | -1.813646 | 0.398280 | -4.553693 | 0.0000 |
| LIMIT_3:C(6) | -1.523276 | 0.392111 | -3.884804 | 0.0001 |
| LIMIT_4:C(7) | -0.758502 | 0.383514 | -1.977771 | 0.0480 |
| LIMIT_5:C(8) | 0.785306 | 0.385188 | 2.038763 | 0.0415 |
| LIMIT_6:C(9) | 1.565269 | 0.419126 | 3.734605 | 0.0002 |
| Akaike info criterion | 2.755988 | Schwarz criterion | | 2.897547 |
| Log likelihood | -285.8907 | Hannan-Quinn criter. | | 2.813191 |
| Restr. log likelihood | -300.8316 | Avg. log likelihood | | -1.335938 |
| LR statistic (4 df) | 29.88193 | LR index (Pseudo-R2) | | 0.049666 |
| Probability(LR stat) | 5.17E-06 | | | |

The coefficients obtained by regressions relating to consumption patterns during hot and dry summer point out that people that tend to go more to the beach are the younger, persons from Sicily and from bigger towns and obviously people with high income. Interviewees that decide to stay more in the countryside are men and Lombards (*tables 5*).

Tables 5: Activities influenced by hot summer

| Dependent Variable: Beach Method: ML - Ordered Probit Included observations: 214 Number of ordered indicator values: 6 | | | | |
|---|-------------|----------------------|-------------|-----------|
| | Coefficient | Std. Error | z-Statistic | Prob. |
| AGE | -0.236255 | 0.046467 | -5.084367 | 0.0000 |
| INCOME | 0.144958 | 0.057228 | 2.533001 | 0.0113 |
| REGION | 0.445262 | 0.149671 | 2.974940 | 0.0029 |
| TOWN SIZE | 0.105924 | 0.051637 | 2.051327 | 0.0402 |
| Limit Points | | | | |
| LIMIT_2:C(5) | -0.785482 | 0.351388 | -2.235370 | 0.0254 |
| LIMIT_3:C(6) | -0.542924 | 0.348730 | -1.556860 | 0.1195 |
| LIMIT_4:C(7) | -0.223708 | 0.346841 | -0.644988 | 0.5189 |
| LIMIT_5:C(8) | 0.978158 | 0.353775 | 2.764914 | 0.0057 |
| LIMIT_6:C(9) | 1.695085 | 0.362256 | 4.679247 | 0.0000 |
| Akaike info criterion | 3.015478 | Schwarz criterion | | 3.157038 |
| Log likelihood | -313.6562 | Hannan-Quinn criter. | | 3.072681 |
| Restr. log likelihood | -338.1497 | Avg. log likelihood | | -1.465683 |
| LR statistic (4 df) | 48.98702 | LR index (Pseudo-R2) | | 0.072434 |
| Probability(LR stat) | 5.88E-10 | | | |

| Dependent Variable: Nature Method: ML - Ordered Probit Included observations: 302 Number of ordered indicator values: 6 | | | | |
|--|-------------|----------------------|-------------|-----------|
| | Coefficient | Std. Error | z-Statistic | Prob. |
| REGION | -0.290113 | 0.122625 | -2.365846 | 0.0180 |
| GENDER | -0.294290 | 0.122943 | -2.393705 | 0.0167 |
| Limit Points | | | | |
| LIMIT_2:C(3) | -2.070174 | 0.275931 | -7.502511 | 0.0000 |
| LIMIT_3:C(4) | -1.989745 | 0.274236 | -7.255583 | 0.0000 |
| LIMIT_4:C(5) | -1.769411 | 0.270366 | -6.544501 | 0.0000 |
| LIMIT_5:C(6) | -0.643356 | 0.260529 | -2.469419 | 0.0135 |
| LIMIT_6:C(7) | 0.289197 | 0.261071 | 1.107734 | 0.2680 |
| Akaike info criterion | 2.935179 | Schwarz criterion | | 3.021183 |
| Log likelihood | -436.2121 | Hannan-Quinn criter. | | 2.969590 |
| Restr. log likelihood | -442.3921 | Avg. log likelihood | | -1.444411 |
| LR statistic (2 df) | 12.35999 | LR index (Pseudo-R2) | | 0.013970 |
| Probability(LR stat) | 0.002070 | | | |

To analyse the replies relating to influence of hot summer on holiday behaviour see *tables 6*. Compared to a normal summer it results that women and older people express their discomfort doing less day trips and short holidays; on the contrary are willing to do this kind of holidays the young, in particular males.

Tables 6: Adaptation of day trips and short holidays during hot summer

| Dependent Variable: Day trips | | | | |
|---------------------------------------|-------------|----------------------|-------------|-----------|
| Method: ML - Ordered Probit | | | | |
| Included observations: 296 | | | | |
| Number of ordered indicator values: 6 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| AGE | -0.171942 | 0.035084 | -4.900787 | 0.0000 |
| GENDER | -0.370871 | 0.122971 | -3.015918 | 0.0026 |
| Limit Points | | | | |
| LIMIT_2:C(3) | -2.267024 | 0.260820 | -8.691913 | 0.0000 |
| LIMIT_3:C(4) | -1.933363 | 0.253561 | -7.624853 | 0.0000 |
| LIMIT_4:C(5) | -1.327970 | 0.245578 | -5.407536 | 0.0000 |
| LIMIT_5:C(6) | -0.259961 | 0.240524 | -1.080810 | 0.2798 |
| LIMIT_6:C(7) | 0.779324 | 0.262919 | 2.964120 | 0.0030 |
| Akaike info criterion | 3.120342 | Schwarz criterion | | 3.207614 |
| Log likelihood | -454.8106 | Hannan-Quinn criter. | | 3.155284 |
| Restr. log likelihood | -470.5916 | Avg. log likelihood | | -1.536522 |
| LR statistic (2 df) | 31.56201 | LR index (Pseudo-R2) | | 0.033534 |
| Probability(LR stat) | 1.40E-07 | | | |

| Dependent Variable: Short holidays | | | | |
|---------------------------------------|-------------|----------------------|-------------|-----------|
| Method: ML - Ordered Probit | | | | |
| Included observations: 212 | | | | |
| Number of ordered indicator values: 6 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| AGE | -0.108061 | 0.044932 | -2.404976 | 0.0162 |
| GENDER | -0.413723 | 0.152166 | -2.718894 | 0.0066 |
| INCOME | 0.143639 | 0.057545 | 2.496099 | 0.0126 |
| Limit Points | | | | |
| LIMIT_2:C(4) | -1.692735 | 0.386460 | -4.380109 | 0.0000 |
| LIMIT_3:C(5) | -1.543774 | 0.384528 | -4.014727 | 0.0001 |
| LIMIT_4:C(6) | -1.190626 | 0.382163 | -3.115495 | 0.0018 |
| LIMIT_5:C(7) | 0.163210 | 0.376511 | 0.433481 | 0.6647 |
| LIMIT_6:C(8) | 1.320404 | 0.401321 | 3.290141 | 0.0010 |
| Akaike info criterion | 2.832794 | Schwarz criterion | | 2.959458 |
| Log likelihood | -292.2762 | Hannan-Quinn criter. | | 2.883989 |
| Restr. log likelihood | -303.7446 | Avg. log likelihood | | -1.378661 |
| LR statistic (3 df) | 22.93679 | LR index (Pseudo-R2) | | 0.037757 |
| Probability(LR stat) | 4.16E-05 | | | |

The results obtained by regressions show that the choice to modify the plans for main vacation due to the extreme season depends particularly on income: the higher is the income, the smaller is the propensity to change the plans (*tables 7*). Also the gender and the region are explanatory variables of holiday behaviour: women would not change their plans for main vacation of the same year and people from Sicily would not change their plans for vacation of the following year.

Tables 7: Adaptation of plans for main vacation during hot summer

| Dependent Variable: Holiday behaviour (same year) | | | | |
|---|-------------|-----------------------|-------------|----------|
| Method: ML - Binary Logit | | | | |
| Included observations: 211 | | | | |
| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
| GENDER | -0.703000 | 0.202600 | -3.469888 | 0.0005 |
| INCOME | -0.213579 | 0.123476 | -1.729720 | 0.0837 |
| Mean dependent var | 0.170616 | S.D. dependent var | | 0.377068 |
| S.E. of regression | 0.380024 | Akaike info criterion | | 0.939578 |
| Sum squared resid | 30.18346 | Schwarz criterion | | 0.971349 |
| Log likelihood | -97.12545 | Hannan-Quinn criter. | | 0.952420 |
| Avg. log likelihood | -0.460310 | | | |
| Obs with Dep=0 | 175 | Total obs | | 211 |
| Obs with Dep=1 | 36 | | | |

| Dependent Variable: Holiday behaviour (one year later) | | | | |
|--|-------------|-----------------------|-------------|----------|
| Method: ML - Binary Logit | | | | |
| Included observations: 212 | | | | |
| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
| INCOME | -0.595855 | 0.200327 | -2.974417 | 0.0029 |
| REGION | -0.582316 | 0.271663 | -2.143523 | 0.0321 |
| Mean dependent var | 0.103774 | S.D. dependent var | | 0.305688 |
| S.E. of regression | 0.304594 | Akaike info criterion | | 0.678362 |
| Sum squared resid | 19.48325 | Schwarz criterion | | 0.710028 |
| Log likelihood | -69.90638 | Hannan-Quinn criter. | | 0.691161 |
| Avg. log likelihood | -0.329747 | | | |
| Obs with Dep=0 | 190 | Total obs | | 212 |
| Obs with Dep=1 | 22 | | | |

For the majority of interviewees it is very likely that extreme summers will become more frequent in the future. Looking at the values in *table 8* it can be noted that the reply to this question is related to gender and age: older people and, in particular, women express more this problem.

Table 8: Evaluation of increased heat

| Dependent Variable: Evaluation of increased heat | | | | |
|--|-------------|-----------------------|-------------|----------|
| Method: ML - Binary Logit | | | | |
| Included observations: 248 | | | | |
| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
| GENDER | 1.213773 | 0.278264 | 4.361956 | 0.0000 |
| AGE | 0.153385 | 0.104999 | 1.460819 | 0.1441 |
| Mean dependent var | 0.899194 | S.D. dependent var | | 0.301681 |
| S.E. of regression | 0.296367 | Akaike info criterion | | 0.626152 |
| Sum squared resid | 21.60703 | Schwarz criterion | | 0.654486 |
| Log likelihood | -75.64289 | Hannan-Quinn criter. | | 0.637559 |
| Avg. log likelihood | -0.305012 | | | |
| Obs with Dep=0 | 25 | Total obs | | 248 |
| Obs with Dep=1 | 223 | | | |

Passing on the analysis of the answers relative to a recent mild winter (*tables 9*), it is evident that the highest comfort of unusual mild temperatures is perceived by women. With regard to health, instead, higher benefits

are noticed in Lombardy and in smaller villages. At last, both concerning comfort and health, it results that older people enjoy less the positive effect of unusual warm winter.

Tables 9: Influence of mild winter on aspects of everyday life

| Dependent Variable: Comfort | | | | |
|---------------------------------------|-------------|----------------------|-------------|-----------|
| Method: ML - Ordered Probit | | | | |
| Included observations: 263 | | | | |
| Number of ordered indicator values: 5 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| GENDER | 0.391534 | 0.135037 | 2.899455 | 0.0037 |
| AGE | -0.058819 | 0.038914 | -1.511506 | 0.1307 |
| Limit Points | | | | |
| LIMIT_2:C(3) | -1.653330 | 0.299445 | -5.521306 | 0.0000 |
| LIMIT_3:C(4) | -0.877086 | 0.268965 | -3.260966 | 0.0011 |
| LIMIT_4:C(5) | 0.436338 | 0.267562 | 1.630791 | 0.1029 |
| LIMIT_5:C(6) | 1.974139 | 0.288395 | 6.845263 | 0.0000 |
| Akaike info criterion | 2.402154 | Schwarz criterion | | 2.483648 |
| Log likelihood | -309.8832 | Hannan-Quinn criter. | | 2.434904 |
| Restr. log likelihood | -315.5252 | Avg. log likelihood | | -1.178263 |
| LR statistic (2 df) | 11.28386 | LR index (Pseudo-R2) | | 0.017881 |
| Probability(LR stat) | 0.003546 | | | |

| Dependent Variable: Health | | | | |
|---------------------------------------|-------------|----------------------|-------------|-----------|
| Method: ML - Ordered Probit | | | | |
| Included observations: 264 | | | | |
| Number of ordered indicator values: 5 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| AGE | -0.057120 | 0.039632 | -1.441258 | 0.1495 |
| TOWN SIZE | -0.084838 | 0.043121 | -1.967434 | 0.0491 |
| REGION | -0.170433 | 0.135236 | -1.260257 | 0.2076 |
| Limit Points | | | | |
| LIMIT_2:C(4) | -2.652018 | 0.313611 | -8.456395 | 0.0000 |
| LIMIT_3:C(5) | -1.739622 | 0.280565 | -6.200426 | 0.0000 |
| LIMIT_4:C(6) | -0.144748 | 0.267189 | -0.541744 | 0.5880 |
| LIMIT_5:C(7) | 1.046824 | 0.279531 | 3.744927 | 0.0002 |
| Akaike info criterion | 2.359281 | Schwarz criterion | | 2.454098 |
| Log likelihood | -304.4252 | Hannan-Quinn criter. | | 2.397382 |
| Restr. log likelihood | -309.1018 | Avg. log likelihood | | -1.153126 |
| LR statistic (3 df) | 9.353255 | LR index (Pseudo-R2) | | 0.015130 |
| Probability(LR stat) | 0.024945 | | | |

As observed for extreme summers, also in winters with mild temperatures air quality seems to be negatively influenced in particular in Lombardy and in bigger towns (*table 10*).

Table 10: Air quality in mild winter

| Dependent Variable: Air quality | | | | |
|---------------------------------------|-------------|----------------------|-------------|--------|
| Method: ML - Ordered Probit | | | | |
| Included observations: 250 | | | | |
| Number of ordered indicator values: 5 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| REGION | 0.496889 | 0.137207 | 3.621471 | 0.0003 |
| TOWN SIZE | -0.219650 | 0.043320 | -5.070454 | 0.0000 |
| Limit Points | | | | |
| LIMIT_2:C(3) | -1.049706 | 0.242446 | -4.329651 | 0.0000 |
| LIMIT_3:C(4) | -0.049596 | 0.233869 | -0.212067 | 0.8321 |
| LIMIT_4:C(5) | 0.966395 | 0.240432 | 4.019404 | 0.0001 |
| LIMIT_5:C(6) | 2.530168 | 0.323219 | 7.828026 | 0.0000 |
| Akaike info criterion | 2.669052 | Schwarz criterion | 2.753567 | |
| Log likelihood | -327.6315 | Hannan-Quinn criter. | 2.703067 | |
| Restr. log likelihood | -345.4300 | Avg. log likelihood | -1.310526 | |
| LR statistic (2 df) | 35.59692 | LR index (Pseudo-R2) | 0.051526 | |
| Probability(LR stat) | 1.86E-08 | | | |

With regard to domestic consumption of electricity and gas (*tables 11*), it is important to say that, as for hot summers, also in mild winters people that live in smaller village change more their consumption: in this case they reduce it. Another analogy with the results of the consequences of hot summers, is the fact that, with unusually mild winter temperatures, women decrease more energy consumption. Observing the results of regressions emerges that also the income class is an explanatory variable: the higher is the income, the higher is the reduction of consumption in mild winter.

Tables 11: Energy consumption in mild winter

| Dependent Variable: Energy | | | | |
|---------------------------------------|-------------|----------------------|-------------|--------|
| Method: ML - Ordered Probit | | | | |
| Included observations: 187 | | | | |
| Number of ordered indicator values: 5 | | | | |
| | Coefficient | Std. Error | z-Statistic | Prob. |
| INCOME | -0.105242 | 0.060304 | -1.745190 | 0.0810 |
| TOWN SIZE | 0.122106 | 0.050903 | 2.398765 | 0.0165 |
| GENDER | -0.255924 | 0.161428 | -1.585369 | 0.1129 |
| Limit Points | | | | |
| LIMIT_2:C(4) | -2.312964 | 0.389984 | -5.930923 | 0.0000 |
| LIMIT_3:C(5) | -0.616029 | 0.348963 | -1.765313 | 0.0775 |
| LIMIT_4:C(6) | 0.658325 | 0.348141 | 1.890976 | 0.0586 |
| LIMIT_5:C(7) | 1.442897 | 0.366160 | 3.940618 | 0.0001 |
| Akaike info criterion | 2.469073 | Schwarz criterion | 2.590023 | |
| Log likelihood | -223.8583 | Hannan-Quinn criter. | 2.518082 | |
| Restr. log likelihood | -228.9838 | Avg. log likelihood | -1.197103 | |
| LR statistic (3 df) | 10.25098 | LR index (Pseudo-R2) | 0.022384 | |
| Probability(LR stat) | 0.016549 | | | |

Conclusions

The results obtained by the analysis of regressions show that the answers to the questions of the interview depends on almost all the individual characteristics considered.

The strongest influence is exerted by the gender of the interviewees. In fact, in most of the regressions the independent variable relative to the gender is explanatory of the replies. Women are strongly and negatively influenced by hot and dry summers, both in everyday life (in particular at work and at school), and in holiday behaviour. Discomfort caused by high temperatures perceived by women is so strong that they would be willing to reduce the number of short holidays and day trips, but not the plans for main holidays. In unusual mild winters, on the contrary, women are influenced positively and in particular improves their personal comfort. It is curious the fact that, concerning domestic consumption of gas and electricity, women always restrict the use: in hot summer, in fact, men increase more the consumption and in mild winter are women to decrease it more.

Another significant independent variable is the age, although in this case the relation was predictable. Older people, in fact, are more influenced by summer heat perceiving negative effects especially on their health. Adaptive behaviour consists on change some daily habits and on the tendency to move less, reducing the use of almost all the means of transport. Less foreseeable was the fact that also in mild winters the old enjoy less the unusually high temperatures. As regards the assumption that future summers will be increasingly hot and dry, older people and women think that this is a very probable and worrying prospect.

Analysing the relation between region and the replies to interview is clear that in Sicily people is more influenced by extreme summer seasons. Considering the impacts on health, in summer the worst effects emerge in Sicily and in winter the advantages are perceived more in Lombardy. As concerns air quality, when occur extreme seasons (hot summers and mild winters) people from Lombardy assert that air become considerably worse.

From the analysis appears that some answers depend on the size of the town in which interviewees live. People living in bigger towns are strongly influenced by extreme seasons and, in particular, perceive a worsening of air quality. Consequently they decide to go more to the seaside and countryside. On the other side, people that live in smaller villages in hot summers adapt their behaviour reducing more the use of their cars and in mild winters they obtain more advantages. As regards the consumption of water, gas and electricity, in summers they would increase more in smaller villages, while in winters would decrease more in bigger towns.

It is interesting to notice that the perception of hot summer is influenced also by income: people with higher incomes are strongly and negatively influenced in their activities at work and in daily habits; furthermore they perceive more that air quality get worse. To limit these negative impacts they would allow themselves more day trips, in particular to the seaside, but they would not be willing to modify their plans for main holidays and to lessen the use of their cars. As concerns the consumption, in hot and dry summer, as predictable, people with higher income would use more water and in mild winter they would reduce more, in proportion, the consumption of electricity and gas.

To finish, it must be underlined that from the regressions emerges that the number of persons living in the household is not a significant explanatory variable of the replies to the interview.

APPENDIX 2: ITALIAN WISE QUESTIONNAIRE

You can probably remember a hot and dry summer in recent years. Please think about this unusual summer, and answer the following questions.

1. In your everyday life, did an especially hot and dry summer here in Italy had any impacts on?

| | (-2) | (-1) | (0) | (1) | (2) | |
|---|----------------------|--------------------------|------------------------|----------------------|----------------------|---------------------------|
| | very unfavourably | somewhat unfavourably | un- changed | somewhat changed | very favourably | can't remember |
| A Your personal comfort | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| B Your activities at work / school | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| C Your housework | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| D Your outdoor leisure activities | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| E Your health | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| F Your everyday travel | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| G Air quality | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| | <i>much less</i> | <i>somewhat less</i> | <i>un- changed</i> | <i>somewhat more</i> | <i>much more</i> | <i>can't remember</i> |
| H Your water use | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| I Your domestic consumption of electricity and gas | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

2. Did you change the way you travelled during the especially hot and dry summer weather?

| | (-2) | (-1) | (0) | (1) | (2) | |
|-------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | much less | somewhat less | un- changed | somewhat more | much more | never use |
| A Public transport use | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| B Private car use | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| C Motorbike/scooter use | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| D Bicycle use | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| E Walking | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

3. How did the especially hot and dry summer weather influence the following activities?

| | (-2) | (-1) | (0) | (1) | (2) | | |
|---|----------------------|----------------------|------------------------|----------------------|----------------------|----------------------|-----------------------|
| | <i>much less</i> | <i>somewhat less</i> | <i>un- changed</i> | <i>somewhat more</i> | <i>much more</i> | <i>never use</i> | <i>can't remember</i> |
| A Beaches / lakes | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| B Swimming pools | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| C Countryside (e.g. forests, National parks et.) | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| D Outdoor sport facilities | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| E Indoor sport centres | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| F Theatres/cinemas/museums | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| G Outdoors restaurants/bars | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

4. Did you make fewer or more day trips during the hot and dry summer compared to a normal summer?

| (-2) | (-1) | (0) | (1) | (2) | | |
|----------------------|----------------------|------------------------|----------------------|----------------------|----------------------|-----------------------|
| <i>much less</i> | <i>somewhat less</i> | <i>un- changed</i> | <i>somewhat more</i> | <i>much more</i> | <i>never made</i> | <i>can't remember</i> |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

5. Did you make fewer or more weekend trips and short holidays breaks (2-3 days) during the hot and dry summer?

| (-2) | (-1) | (0) | (1) | (2) | | |
|----------------------|----------------------|------------------------|----------------------|----------------------|----------------------|-----------------------|
| <i>much less</i> | <i>somewhat less</i> | <i>un- changed</i> | <i>somewhat more</i> | <i>much more</i> | <i>never made</i> | <i>can't remember</i> |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

6. Did the hot summer influence your main summer holiday plans for this year?

| <i>yes</i> | <i>no</i> | <i>can't remember</i> |
|----------------------|----------------------|-----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

7. Did the hot summer influence your main summer holiday plans for the next year?

| <i>yes</i> | <i>no</i> | <i>Can't remember</i> |
|----------------------|----------------------|-----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

If yes in what way(s) did you change your plans?

(Please tick all that apply).

- A. Stayed at home instead of going away
- B. Went away instead of staying at home
- C. Stayed in Italy instead of going abroad
- D. Went abroad rather than remaining in Italy
- E. Changed the timing of my main holiday
- F. Took more days holiday

| |
|--|
| |
| |
| |
| |
| |
| |

8. Perhaps you remember which unusually hot and dry summer you have been thinking about.

can't
remember

Year

Thank you for answering the questions about a previous hot summer. Now we'd like to ask you some questions about the future.

1. How probable do you think is the assumption that future summers will be increasingly hot and dry?

| | | | | |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| (-2) | (-1) | (0) | (1) | (2) |
| very | somewhat | neither | somewhat | very |
| probable | probable | nor | improbable | improbable |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

2. How do you judge the prospect of global warming?

| | | | | |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| (-2) | (-1) | (0) | (1) | (2) |
| very | somewhat | indifferent | somewhat | very |
| worrying | worrying | | attractive | attractive |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

For the next set of questions, we would like you to remember an unusually warm winter in the last few years.

3. In your everyday life, did an especially warm winter here in Italy had any impacts on?

| | (-2) <i>Very unfavourably</i> | (-1) <i>somewhat unfavourably</i> | (0) <i>un-changed</i> | (1) <i>somewhat favourably</i> | (2) <i>very favourably</i> | <i>can't remember</i> |
|---|----------------------------------|--------------------------------------|--------------------------|-----------------------------------|-------------------------------|-----------------------|
| A Your personal comfort | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| B Your everyday travel | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| C Practising winter sports | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| D Other outdoor leisure activities | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| E Your perception of winter | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| F Your health | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| G Air quality | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| | <i>much less</i> | <i>somewhat less</i> | <i>un-changed</i> | <i>somewhat more</i> | <i>much more</i> | <i>can't remember</i> |
| H Your consumption of electricity & gas | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| I Insects, mice | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

12. Perhaps you remember which unusually warm winter you have been thinking about.

| | <i>can't remember</i> |
|---------------------------|-----------------------|
| Year <input type="text"/> | <input type="text"/> |

Could you please provide us with some information about yourself ?

S1. What is the name of the village/town and province where you live?

S2. Which size has the village/town where you live?

| | | | | | | |
|-----|-------|--------|---------|----------|-------|------------|
| <10 | 10-20 | 20-100 | 100-500 | 500-1000 | >1000 | don't know |
|-----|-------|--------|---------|----------|-------|------------|

S3. Your gender?

| | | | |
|------|----------------------|--------|----------------------|
| Male | <input type="text"/> | Female | <input type="text"/> |
|------|----------------------|--------|----------------------|

S4. Which age group do you belong to?

| | | | |
|----------|----------------------|----------|----------------------|
| A. 16-24 | <input type="text"/> | E. 55-64 | <input type="text"/> |
| B. 25-34 | <input type="text"/> | F. 65-74 | <input type="text"/> |
| C. 35-44 | <input type="text"/> | G. 75+ | <input type="text"/> |
| D. 45-54 | <input type="text"/> | | |

S5. Which of the following best describes you?

| | |
|---|----------------------|
| A Student | <input type="text"/> |
| B Housewife | <input type="text"/> |
| C Employed | <input type="text"/> |
| D Freelance | <input type="text"/> |
| E Seeking work | <input type="text"/> |
| F Retired | <input type="text"/> |
| G Other (<i>please say what it is</i>): | <input type="text"/> |

.....
....

If employed, please give occupation:

.....

S6. In which of the following income classes does your family belong?

| | |
|------------------------------------|----------------------|
| A until 1.500.000 Lire | <input type="text"/> |
| B from 1.500.000 to 3.000.000 Lire | <input type="text"/> |
| C from 3.000.000 to 4.500.000 Lire | <input type="text"/> |
| D from 4.500.000 to 6.000.000 Lire | <input type="text"/> |
| E from 6.000.000 to 7.500.000 Lire | <input type="text"/> |
| F more than 7.500.000 Lire | <input type="text"/> |

S7. How many persons live in your household?

Please state the number

Many thanks for your kind collaboration.

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- (lix) This paper was presented at the ENGIME Workshop on “Mapping Diversity”, Leuven, May 16-17, 2002
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- (lxi) This paper was presented at the Eighth Meeting of the Coalition Theory Network organised by the GREQAM, Aix-en-Provence, France, January 24-25, 2003
- (lxii) This paper was presented at the ENGIME Workshop on “Communication across Cultures in Multicultural Cities”, The Hague, November 7-8, 2002
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