

## Telephone ownership - a cause of sampling bias in Europe?

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**CHAPTER 4****TELEPHONE OWNERSHIP  
A CAUSE OF SAMPLING BIAS IN EUROPE ?***JÜRGEN LASS***4.1 Introduction**

The coverage error used to be a central argument in the past against telephone surveys for getting information about an entire population. The former label of a “quick, but dirty approach” points (Kreiselmaier and Porst, 1989:7) in that direction. In an ideal case a survey sample is just a homomorphically smaller copy of the population. That means there is no substantial difference between the target population to be studied and the “frame population”, to which the sampling scheme is applied. In reality there is a discrepancy between the calculations on the target population and the calculations on the frame population, which is called coverage error. Groves (1989:83) pointed out: “Coverage error arises from the failure to give some units in the target population any chance of being included in the survey...”. For drawing methodologically legitimate conclusions about the target population which are only footed on the smaller copy of a survey one of two essential conditions should be met in telephone surveys. First, all national private households (in the following no distinction between a sample of households and a sample of persons) do have telephones. In this case every household has an equal chance to enter the sample. Or second, if in a country the telephone coverage is not 100%, the characteristics of households with and without a telephone do not differ. This applies not only to qualities on which the researcher is focused but to qualities in a broader sense which may indirectly be related to the qualities under research.

Which condition is more important for practical work? Concerning the single countries of the EU the first quantitative condition is not fulfilled. Some data on this problem are shown in detail below. It can be argued that a full telephone coverage is not necessary because alternative instruments like face to face-surveys do not work better although this instrument can reach all household theoretically. Based on well known face to face surveys in international social science programs the rate of completed interviews ranges from 62% to 77% (Porst, 1993)<sup>18</sup>. Interviews via mail get usually much lower rates of completed interviews (Sosdian and Sharp, 1980) unless the efforts are increased by using the Total

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18 Completed interviews in ISSP on average: West Germany 62.3, Great Britain 66.9, The Netherlands 76.5.  
Completed interviews in General Social Surveys in the United States on average 77%.

Design Method (Dillman, 1978). Since the traditional survey instruments fail to cover more than 20% of the intended target group it could be argued that a telephone density of more than 80% or 90% would be sufficient for practical reasons. The main problem would not be full coverage but nonresponse.

The assumption the higher the telephone density the less important becomes the problem of coverage could be theoretically challenged. In general, the absence of the first quantitative condition would not be particularly problematic, if the second qualitative condition is met. It is theoretically possible that a relatively low telephone density in a country goes together with a structural equality or similarity between owners and nonowners of a telephone. In this case conclusions drawn from a telephone survey can be generalised across the entire population. On the other hand, countries with high telephone supplies might theoretically show the following feature: the smaller the group of nonowners the more different this group will be in its demographic and attitudinal composition.

This phenomenon could be described as a process of concentration of nonownership in the course of ongoing technological modernisation. In the first phase people are more or less equal, only pioneers own a telephone. In the final phase all are more or less equal too, but only a small group of „dropouts“ does not own a telephone. This could result in a biased sample which could in this case not be the basis for drawing correct conclusions about the entire population.

Thus the qualitative question of differences is much more important than the quantitative, country-dependent question of telephone density and the question whether there is a qualitative problem can only be answered empirically.

Some results about the composition of nonowners have been published. These results are not surprising for experts in survey research, but they should shortly be repeated to mention the reasons for the scepticism towards telephone surveys. In the USA, where more than 93% of the 75 million households had a telephone already at the end of the seventies, households without a phone tended to be lower-income households, including retired persons, minority families, and single parent families (Backstrom and Hursh-Cesar, 1981:114). Groves and Kahn (1979) systematically compared personal interview surveying and telephone surveying in the seventies. According to their results, single adult households, less educated and poorer people, minorities, and non-professional and nonmanagerial workers are more likely to have no telephone. West Germany also achieved a high telephone coverage at the end of the eighties (more than 90%, Euler, 1989:314). Jung (1990) found in his West German study 1987/88 in which he compared telephone surveys with face to face-interviews that better educated persons are clearly overrepresented in telephone surveys. Frey et al. (1990:15) did not conduct an empirical study themselves but made some suppositions. They ask the question: who does not have a telephone in West Germany? They proposed the following hypothesis:

- socially weak persons (lower social strata, workers, people with low incomes, people living in the rural areas, homeless people),
- socially „insecure“ people (alone living, older than 70 years), who are not necessarily socially weak persons,

- foreigners,
- people "sine nobiles", who try to protect their private homes.

Nonownership by „snobbism“ may be characterised as an indicator of disintegration. In Germany and not only here a social norm is established that paying a visit without prior announcement by phone is impolite. Therefore nonownership may be an indicator of nonparticipation in social life or of disintegration (Lange and Zernick, 1990:103). If the last point is put aside the reported results can be labelled as a „stratum bias“ in telephone surveys. Like other higher value consumer goods telephones do not spread in the socioeconomic pyramid simultaneously, but over the time from the top to the bottom. Nonownership is to a great extent a function of the availability of material resources (income, purchasing power). This is where simple economic rules play a role: the price of a good has an impact on the demand for it. Costs of telephone charges differ throughout Europe. According to some (unfortunately) older data the cost of maintaining a telephone over a year was two times higher in Germany than in Denmark and three times higher than in Luxembourg. For getting a telephone the relationship of costs had been even more unfavourable in Germany compared to the other two countries (Gölz, 1983). As shown below, the ranking of these countries as regards telephone noncoverage is similar.

The „stratum bias“ could lead to serious problems. In social research people of lower strata are often important subgroups which may differ considerably in their attitudinal profile from the rest of the population. Special institutional forms of integration into society, cultural reasons or feelings of deprivation, dissatisfaction, and apathy have an impact on this special attitudinal profile. Although Groves and Kahn (1979) concluded in their study that telephone nonowners in the USA do not differ greatly from owners as regards many aspects of attitude, one should be cautious about drawing parallels with European countries without having gathered empirical evidence (De Leeuw and van der Zouwen, 1988).

In practice a second aspect of the coverage problem could become virulent. The use of telephone books as sample frame for surveys of population excludes not only the nonowners but also people with secret numbers. The proportion of secret numbers can differ heavily from country to country (Frey et al., 1990:67). The solution to this problem consists of using forms of random digit dialling. In most cases the whole telephone number is not created by chance but only the last digits. This approach is more efficient than the creation of complete random numbers because it leads to more telephone numbers which are in use. Thus, this aspect of a possible coverage error does not necessarily play a role.

This chapter deals empirically with the comparison of telephone and nontelephone households on the level of 14 countries of the EU (West and East Germany are separated). A wide set of variables is included which corresponds to the findings in the cited studies. The compositional structure of the group of telephone nonowners is examined for each country of the EU individually in order to answer the question, which parts of the population are overrepresented in telephone surveys. In a second step a closer look is taken on possible interactional effects between variables.

A crossnational design is a special feature of this study. Countries with a high telephone density can be compared with countries with a lower density. Questions like, "Is the 'causal'

pattern everywhere the same?”, “Or do the countries differ?”, can be answered. This would be consequential for efforts to correct for under-coverage bias in each country, if necessary.

## 4.2 Method

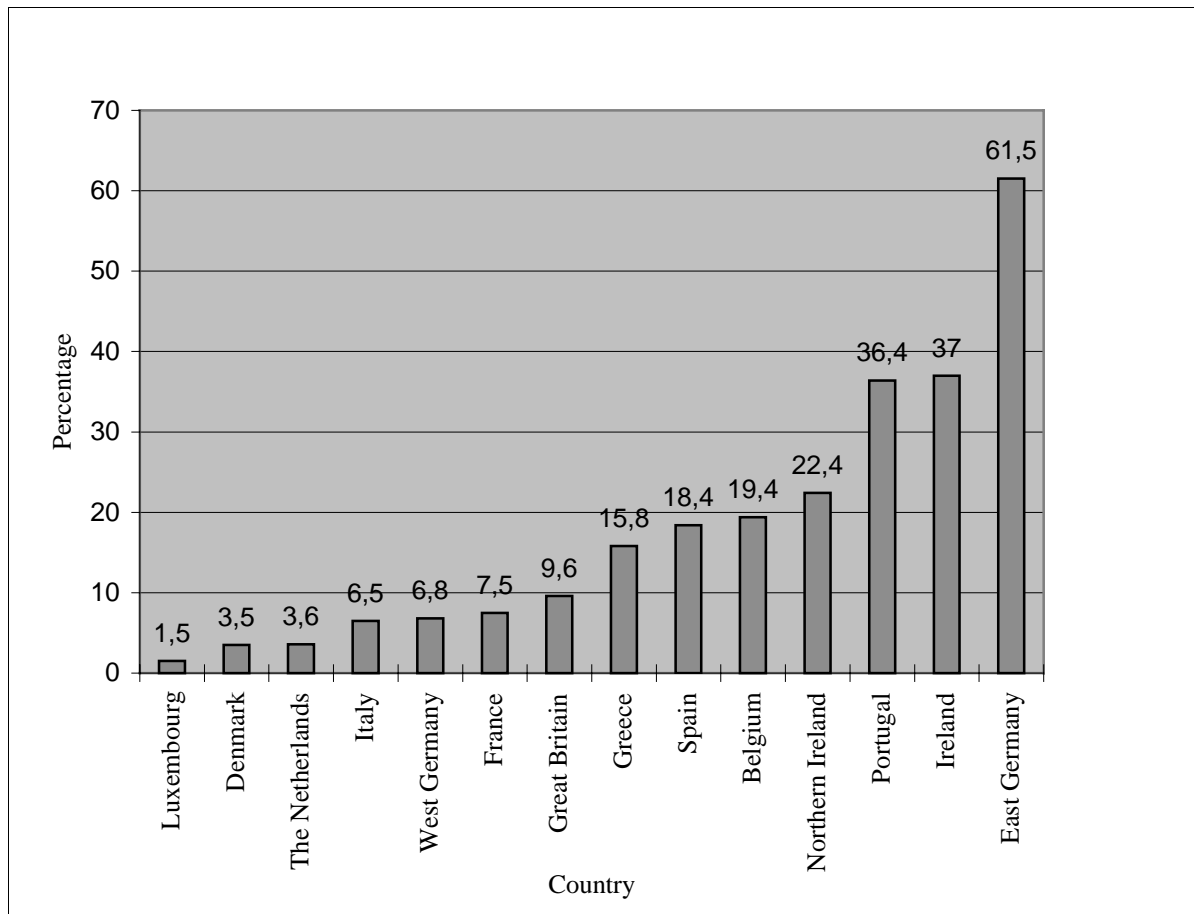
The data base consists of conventional face to face-surveys of the Eurobarometer in the EU member states, excluding the newer members Austria, Sweden and Finland. In the Eurobarometers 38, 38.1, 39, 39.1, 40, and 41, carried out between Autumn 1992 and Spring 1994, information about households with and without a telephone was collected. According to the study reports these surveys are nationally representative. These datasets were cumulated into samples with more than 6,000 respondents for each country (except Luxembourg and Northern Ireland). There were more than 3,000 respondents in Luxembourg and more than 1,800 in Northern Ireland.

**Table 4.1 N of cases in the cumulated Eurobarometer dataset (38, 38.1, 39, 39.1, 40, 41)**

Country	N
Luxembourg	3140
Denmark	6005
The Netherlands	6049
Italy	6206
West Germany	6205
France	6094
Great Britain	6391
Greece	6024
Spain	6050
Belgium	6229
Northern Ireland	1832
Portugal	6002
Ireland	6085
East Germany	6336
Total	78648

In each Eurobarometer the interviewers have been asked to record whether the interviewed household has got a telephone or not. The respondents have not been asked explicitly. Figure 1 shows the national rate of nonownership.

Three groups of countries can be identified. The first group of countries with a high telephone density (more than 90%) includes Luxembourg, Denmark, the Netherlands, Italy, West Germany, France, Great Britain. A second, middle-ranged group (below 90% but above 70%) consists of Greece, Spain, Belgium, and Northern Ireland. The third group (below 70%) comprises countries with an extremely low density (Portugal, Ireland, East Germany). In the last group of countries, the situation is changing rapidly. Particularly in East Germany the change is almost dramatic. A 10% increase in ownership (from 39% to 49%) occurred between Fall 1993 survey and Spring 1994 survey and an increase of 9% (from 49% to 58%) between the surveys conducted in spring and in fall of 1994 (this survey is not further considered due to a lack of some data).

**Figure 1: Percentages without a telephone in household**

The data themselves were gathered in a sampling procedure, which is not necessarily free of errors. There is some likelihood that not all intended interviews were completed, because the fieldwork was finished after a target count of interviews had been realised. In addition, these results concerning telephone ownership are merely based on interviewer observations, which may be systematically biased. For example, the interviewer may not have noticed the telephone if the interview took place in a room other than where the telephone was located. For some countries telephone density data are available from the Statistical Office<sup>19</sup>. These data are used for checking. Nevertheless, the sample distributions closely correspond to the statements from the official data source. The correlation between both sources is really high ( $r = .86$ ).

The used variables and the categories are presented in table 4.2 To evaluate the differences between owners and nonowners, nine demographic variables are examined. In the last part of the chapter some standard attitude variables are included for demonstrating attitudinal differences between owner groups.

<sup>19</sup> The data (number of telephones per 100 inhabitants) exclude the owners of mobile telephones.

**Table 4.2 Variables used**

Variable	Categories
Gross household income	quartiles
Purchasing power	index based on responses to questions regarding the possession of 10 durable goods with four categories: low, medium low, medium high, high
Social class	middle class, lower middle class, working class, upper class, upper middle class, refuses to be classified, other
Occupation of the respondent	looking after household, student, unemployed, retired, unskilled manual worker, skilled manual worker, supervisor, salesman or driver, farmer or fisherman, shop-owner or craftsman, deskworker, employed professional, professional, middle management, general management
Education	9 categories from 14 years up to 22 years, category 'still studying' is according to the respondent's age distributed over the other categories
Age	recoded into groups: up to 34 years, 35 to 49 years, 50 to 64 years, 65 and older
Sex	female, male
Size of household	number of members, 5 and more put together
Subjective size of community	rural area or village, small or middle size town, big city
Left-right-self placement	harmonised into 3 categories: left, centre, right
Frequency of political discussions	frequently, occasionally, never
Index of 3 media Involvement variables: TV, radio, newspapers	5-point-scales have been added and divided by 3 and then recoded into 5 scale categories

Some remarks concerning the comparability of the items are necessary. A preferable objective size of the community variable was skipped because the categories differ between countries. Therefore the subjective variable has been selected. The income variable is a very difficult one due to response behaviour and technical procedure of harmonisation throughout all the countries. The DK/No answer - refusal-category of the income variable is with 25% still high. A deeper examination shows that people with higher incomes probably tend to refuse an answer. The harmonisation of categories throughout the countries is not exact because the scope of original categories varies from country to country. Thus, a purchasing power variable yields more complete information. The proportion of missing data on the purchasing power variable is slightly more than 1%, and therefore still low. The Eurobarometer contains information about ownership of ten durable goods. The answers are recoded into an index reflecting the purchasing power. Purchasing power as operationalised as it is done here provides information about the extent to which a household's needs are satisfied. Of course, income and purchasing power are attached to the same dimension (the correlation coefficient of both variables  $r=.5$ ).

An additional methodological problem should be mentioned. The possession of a telephone is a characteristic of a household. To explore ownership of telephones data referring to the whole household should be used. Some data examined refer to the individual level. Thus there is a gap between what is intended to study and what the data really cover in some cases. Income, size of household, purchasing power do not cause a problem. These variables refer to the household. In other cases like class or basic political orientation a relative homogeneity between all the adult members of a household could be assumed. Such clearly individual variables like sex or age constitute a problem. This problem of a gap between household and

individual remains unsolved and can only be mitigated by a careful interpretation of the results aware of the „noise“ in the data.

### 4.3.1 The composition of the group of telephone-nonowners

What are the demographic differences between people with and without a telephone? This question shall be discussed with an special attention to the quantitative dimension of telephone coverage. This is useful because of the possible consequences. If there are also and perhaps stronger differences in countries with a high coverage it may be necessary to correct the sample in each country by a different procedure.

A graphical way of presentation has been chosen to describe the very rich data material<sup>20</sup>. The following figure show percentage differences. The proportion of people, who belonged to a special category in the group of owners, is subtracted from the proportion of those, who belonged to a special category in the group of nonowners. Thus, a positive sign indicates an overrepresentation of a specific subgroup and a negative sign indicates an underrepresentation of a specific subgroup within the group of nonowners<sup>21</sup>.

Figure 2 shows the results for some variables which refer more or less to socio-economic status. The variables are family income: falling into the lowest income quartile; low purchasing power: having only two out of ten durable goods; occupation: being a manual worker; social class: belonging to the working class. The percentage differences deliver a simple message. The expectation that lower status groups tend to have no telephone is confirmed. In the group of nonowners people with a low income and low purchasing power, members of the working class, and manual workers are overrepresented. The amount of differences varies: it is large on the income variable and it declines on the other variables with manual workers being the lowest.

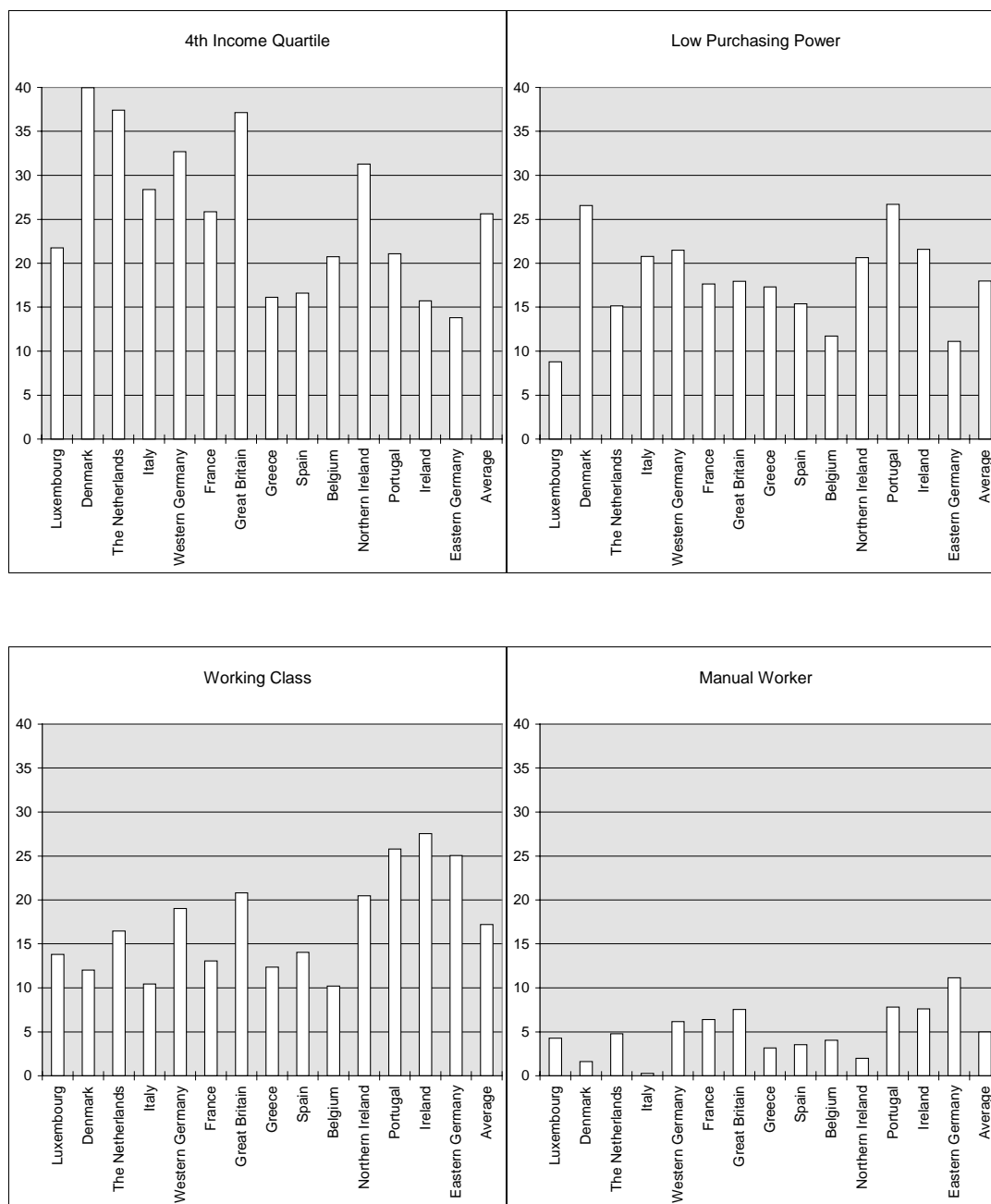
The data indicate a relationship between telephone density in a country and an income effect. Especially in the group of countries with a very high telephone coverage the deviation is enormous. In Denmark, the Netherlands and Great Britain almost 40% more households with low income can be found in the group of nonowners than in the group of owners. In countries with a lower telephone coverage like Ireland or East Germany the income effect is not that strong. This relationship seems to indicate a process of concentration of nonownership in some special groups as the process of technological modernisation goes further.

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20 The presentation is limited to categories only, where „important“ and more or less systematic differences can be observed. Missing values are excluded. The significant categories of all variables are shown later in the CHAID-analyses. There is a rank order between the countries: Luxembourg with the highest telephone density is always presented first and East Germany with the lowest always last.

21 For example: does the characteristic of being a manual worker play a role for telephone ownership or not? The structural composition of the two groups of owners and nonowners of a telephone is compared. If being a manual worker does not play a role, the proportion of manual workers should be the same in both groups.



**Figure 2: The social characteristics of telephone-nonownership I**

As far as purchasing power is concerned the distribution across the countries is more equal. Only two countries, Denmark and Portugal - both with a different telephone profile of coverage, are above average. In summing up, the deviation on this variable between the two ownership groups is remarkable. This is also true for members of the working class. On average nonowners belong 17% more to the working class than owners. The difference is sharper in countries with a low than in countries with a high density. There seems to be an inverse relationship in comparison to income. This impression is strengthened by the next

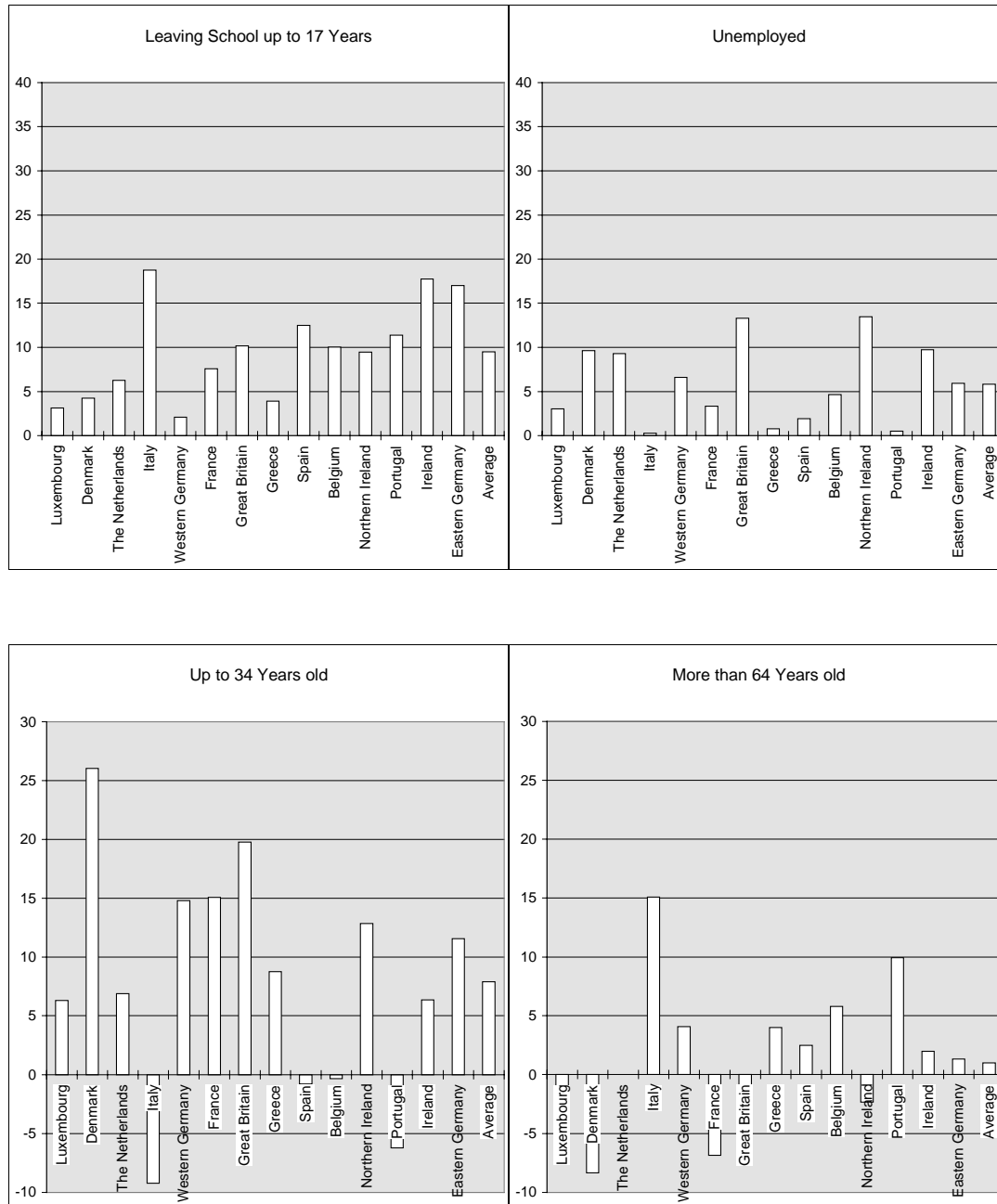
variable. Since class membership reflects the subjective side of self description occupation corresponds more to the objective one. Being a manual worker, whether skilled or unskilled, has an impact on ownership as well. The effect is much smaller than in the case of the subjective variable, but the relationship across countries seems to be the same. Thus all the data taken together give evidence of a status effect, even in the countries with high telephone coverage this effect exists, but the aspect of status which does have an impact varies between the countries.

Figure 3 offers information about other (in part) status related variables: education (school leaving up to 17 years) and unemployment. People who left school early and the unemployed are overrepresented in the group of nonowners. No country makes an exception here. Concerning education the country-specific pattern is the same, if the outlier Italy is ignored, as is the case at working class and at manual worker. This is not surprising because these variables are correlated. The variable "unemployment" can reflect a tendency to be poor and may also reflect status, because the risk to become unemployed is unequally distributed throughout the different status groups. But a country specific relationship could not be found.

The age group variable is not directly linked up to status and it may reflect life style. In addition, it should be repeated that age is an individual characteristic. In a case of a family persons of different age groups could belong to a household which owns a telephone or not.

However, age may be connected to a person's material resources that determine to what degree that particular person is able to participate in consumption. There are typical risk pattern of material scarcity in the life cycle. The explanations for this phenomenon were documented long ago. Younger people at the beginning of their professional careers may earn too little to fulfil all their expectations as consumers or to satisfy all the needs of their families.

Retired people may not be capable of compensating the loss of their regular income by public pensions and so on (Kohl, 1992). The data confirm this idea at least in part. Especially younger respondents are overrepresented in the group of nonowners. There also seems to be a slight country-related trend suggesting the higher the telephone density the more are the younger overrepresented. Italy, Spain, Belgium and Portugal do not fit into that pattern. Belonging to a younger age group may also reflect a way of life differing from the life style of older groups. Concerning the age group of older respondents the picture looks different. There is a tendency that the higher telephone coverage in a country the more are the older people underrepresented in the group of nonowners. Italy is an outlier both as regards education and the younger generations variable. Again the data give evidence that remarkable differences do exist between ownership groups.

**Figure 3: The social characteristics of telephone-nonownership II**

The last series of figures deals with some basic demographic variables: size of household, sex, and size of community. In Europe lacking material resources vary with the size of household. One person households and households with five or six and more persons are more likely to be poor (Institut für Sozialstudien, 1990:45). Thus nonownership is more likely in these groups than in others. All over the examined European countries the one person

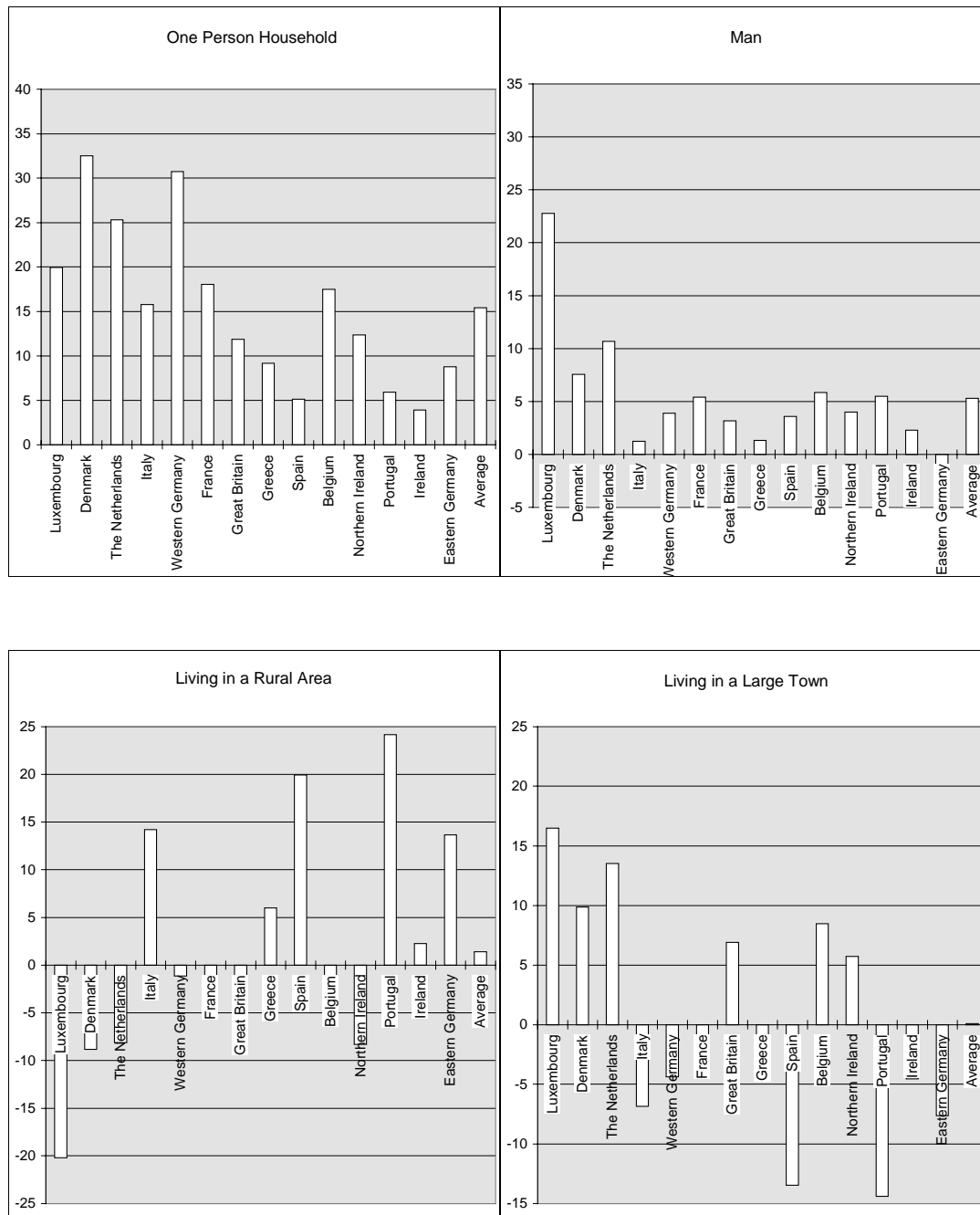
households are overrepresented with 15% at average in the group of nonowners. This difference is one of the highest found in one of the categories of the nine variables considered. In addition, there is a strong country and coverage relationship: the higher the telephone coverage the higher the overrepresentation in the group of nonowners. The five and more person households are not overrepresented. It can be argued that the proportion of one person households is an indicator of individualisation with a North-South difference. The proportion of one person households is in Denmark (35%) and in West Germany (35%) higher than in Spain (11.2%) or Portugal (13.4%)<sup>22</sup>. Family structures are more effective in the South (Hradil, 1992:65). Regarding the higher overrepresentation in the North the process of individualisation obviously goes together with some forms of disintegration or separation from the outside world, although one may think that people living alone should be particularly interested in establishing contacts with the outside world.

The respondent's sex also makes a difference. If a man lives in a household there is a slightly higher probability that the household does not own a telephone. Australian empirical studies show that there is a "pervasive feminine culture of telephone" (Moyal, 1990:196). The usage of telephones refers to the social role of men and women. There is a tendency that men use telephones for instrumental reasons (appointments, making arrangement, purchasing, seeking information) while women use them for intrinsic calls (personal exchange and communication, counselling) (Noble, 1990). It may be that this more a family and neighbourhood contact organising behaviour of the often homemaking women leads more to telephone ownership than the more instrumental orientation of men, who have more favourable opportunity structures for maintaining contacts at their workplace. There is also a very slight relationship with country specific telephone coverage.

Beyond individual variables there may also be a simple structural impact on nonownership. It may be that in some countries of the EU the communication infrastructure is underdeveloped in rural areas compared to towns (Garnham, 1988). Effects of the community size variable on ownership may indicate differences in development of infrastructure. Especially in the South, the rural districts are overrepresented: in Portugal, but also in Spain, in Italy and in Greece, although the latter three countries have a higher coverage than the first. But this can be interpreted as an indicator that developing infrastructure in towns has been given priority. Again, there also exists a relationship with coverage. Rural areas are particularly well served in countries with a high coverage (Luxembourg, Denmark, and the Netherlands). A reflection of this finding can be found if the population in „large“ towns is examined. This country-related pattern also backs the supposition that infrastructure does indeed have an impact on telephone ownership.

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22 See Statistisches Bundesamt 1994.

**Figure 4: The social characteristics of telephone-nonownership III**

### 4.3.2 Interaction: which variables interplay?

The composition of the nonowners throughout the European countries are shown and some expectations are confirmed. So far the description has been univariate or bivariate. Now the description changes to the multivariate level. What about interaction effects? It may be that

some variables influence nonownership only in combination with others. It may also be that some variables strengthen each other mutually in their relationship with nonownership. As a third possibility, it may occur that some effects detected on the univariate level may only reflect an underlying dimension like status and that they go down in effects of other variables. As a consequence, effects of low education level, unemployment or being a one person household may disappear in a multivariate analysis. Therefore a simple CHAID approach<sup>23</sup> is used. Compared to the previous description all categories of variables are examined including the missing data category. In addition, information concerning the size of a group is supplied. CHAID is an explorative approach and a problem of exploration exists. For example, if ten random variables get correlated at least two significant coefficients appear. But in this case some criteria exist to decide whether a prediction is plausible or not. For the sake of readability the CHAID trees are omitted. Instead of this only the most deviant groups are presented in table 4.3.

In the CHAID-analysis, the following criteria for the detection of extremely deviant groups have been used: significance  $p < 0.5$ , no group should be smaller than 2 % of the population, group should be 50 % or more (East Germany: 25%) above average of nonownership (normal type), 75 % or more (East Germany: 35%) above average of nonownership (italic), 100 % or more (East Germany: 45%) above average of nonownership (bold). Under the given condition that no segment with a high proportion of nonowners should be smaller than 2% of the population older than 14 years and the deviation should be extreme (at least 50% above average except East Germany) in most cases three variables are sufficient to „predict“ nonownership. Almost in every country subgroups could be identified where the proportion of nonowners is twice as high as among the average population (in East Germany a ceiling effect is working because of a proportion of more than 60% of nonowners). Especially in countries with a high density such subgroups could be found. For evaluating this deviation the size of the group should be taken in consideration. The higher the proportion of nonownership and the larger the group the more serious the deviation. In the table these important cases are marked with a \*. It can be seen that only in half of the cases the group with the highest proportion of nonownership is also the most important one.

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23 It identifies those groups which are most likely to have no telephone. CHAID segmented the respondents into groups which differ with respect to ownership as a dependent variable. It sorts the „predictors“ according to their significance (chi square). That means the „best predictor“ is that variable where the observed relationship between an independent and dependent variable is most likely. Or in other words, the differences in the proportion of the dependent variable are highly significant in one or more categories of the independent variable. In the next step the categories of the „best predictor“ are split up into smaller subgroups of the second „best predictor“ and so on (Kass, 1980; DuToit et al., 1986).

**Table 4.3 Causes of nonownership: most deviant groups (results of a CHAID-analysis)**

Country	Description of the Groups	% population (A)	% non-owners (B)
Luxembourg	3rd or 4th income quartile and small or large town and man	7.8	7.0
Denmark	4th income quartile and up to 49 years old and low purchasing power	3.8	22.2
	4th income quartile and up to 49 years old and not low purchasing power +uk*	9.0	10.8
	3rd income quartile and low purchasing power +uk	2.9	8.0
The Netherlands	4th income quartile and man and one person household +uk*	3.5	18.4
	3rd income quartile +uk and one person household and lower middle class or working class or other +uk	2.8	13.7
	4th income quartile and man and more than one person household	4.8	7.9
	4th income quartile and woman and up to 64 years old*	8.5	7.6
Italy	low purchasing power +uk and one person household*	4.7	25.5
	low purchasing power +uk and two or three persons household and lower middle class or working class +uk	6.3	15.7
	medium low purchasing power and lower middle class or working class or refused or other + uk and education up to 15 years +uk	6.3	14.5
	medium low purchasing power and middle class or upper middle class or upper class and rural and man	3.4	11.3
West Germany	4th income quartile and low purchasing power +uk and up to 49 years old	2.5	34.4
	4th income quartile and not low purchasing power and man and one person household	3.2	21.5
	4th income quartile and low purchasing power +uk and older than 49 years*	4.9	18.4
	3rd income quartile and low or medium low purchasing power and up to 34 years old	3.1	15.4
	4th income quartile and not low purchasing power and woman and working class or refused +uk	2.7	14.9
France	low purchasing power +uk and up to 64 years old and man*	4.7	24.4
	low purchasing power +uk and up to 64 years old and woman and rural or small city	2.8	23.4
	medium low purchasing power and man and up to 34 years old	5.5	16.2
	low purchasing power +uk and up to 39 years old and large city	3.6	15.7
Great Britain	4th income quartile and up to 49 years old and man	2.7	47.7
	4th income quartile and up to 49 years old and woman*	4.1	35.9
	4th income quartile and older than 49 years and low purchasing power +uk	4.2	22.6
	unknown income quartile and medium low purchasing power and up to 34 years old	2.6	21.9
	3rd income quartile and up to 34 years old	5.0	21.2
	unknown income quartile and low purchasing power	2.8	20.6
Greece	unknown purchasing power*	4.6	34.7
	low purchasing power and one person household	4.1	34.4
	low purchasing power and more than one person household and looking after household or student or unemployed or employed	4.1	33.3

	professional or management or employed position (working mainly at a desk) or manual worker		
	medium low purchasing power and up to 34 years old and up to two persons household	2.6	29.6
	low purchasing power and more than two persons household and up to 34 years old and 2nd or 3rd or 4th income quartile	4.2	27.3
Spain	low purchasing power +uk and rural*	10.2	36.9
	medium low purchasing power and small city and education up to 18 years +uk and man	4.1	29.6
	medium low purchasing power and rural	11.3	28.8
Belgium	low purchasing power +uk and man	4.6	43.2
	medium low purchasing power and one person household +uk*	5.6	38.6
	low purchasing power +uk and woman	6.0	34.8
Northern Ireland	low purchasing power +uk and up to 34 years old	5.1	62.8
	low purchasing power +uk and older than 34 years and 4th income quartile	5.3	53.6
	medium high purchasing power and up to 34 years old*	9.7	42.1
Portugal	unknown purchasing power*	6.0	80.3
	low purchasing power and working class +uk and unemployed or manual workers or supervisor or farmer/fisherman or employed position (working mainly at a desk) or professional or management	4.4	74.9
	low purchasing power and working class +uk and looking after home or student or retired or shopowner/craftman or salesman/driver and up to two persons household	5.3	63.2
	medium low purchasing power and working class +uk and up to 34 years old	2.5	56.9
	low purchasing power and lower middle class and rural	4.1	55.4
Ireland	low purchasing power +uk and working class +uk and up to 34 years old*	3.9	77.0
	low purchasing power +uk and working class +uk and between 35 and 64 years old and man	2.7	71.6
	medium low purchasing power and unemployed	2.7	68.7
	low purchasing power +uk and working class +uk and between 35 and 64 years old and woman	2.6	60.5
	medium low purchasing power and manual worker	4.7	57.7
	low purchasing power +uk and working class +uk and older than 64 years	5.1	57.7
	low purchasing power +uk and lower middle class or refused or other class	3.4	56.5
East Germany	working class and small or large city +uk and up to 29 years old and up to two persons household	2.5	91.7
	working class and rural and low purchasing power +uk	3.5	90.1
	working class and rural and medium low purchasing power	6.9	84.1
	working class and rural and higher purchasing power and man	2.9	81.1
	working class and small or large city +uk and 2nd or 3rd income quartile and up to 34 years old	4.5	79.0
	working class and small or large city +uk and 4th income quartile*	7.7	77.8

\* indicates „Importance“ defined as the product of A and B



As indicated in the first description the impact of variables varies with telephone coverage in a country. In the country group of high telephone density, with the exception of Italy and France, income is the „best predictor“. In the two other groups purchasing power is the dominant factor. But in the group, containing Portugal, Ireland and East Germany working class is an overriding feature. In East Germany it is even the „best predictor“. It is not surprising that the status-related variables are significant, but the really important result is that the pattern depends on the country. Of course, the general pattern needs some qualification. Working class plays also a little role in some cases like the Netherlands, Italy and West Germany. But in this group it tends to be more a phenomenon of working class and lower middle class. In addition, in some cases not only the lowest purchasing power and income group is involved. But the general pattern remains untouched by these qualifications.

Second, a further important result is that the „predictive power“ of less education, being manual worker and unemployment evaporates in most cases, although on the univariate level evidence of a substantial effect has been found. That means in most cases that the effect is dissolved by other variables like income, purchasing power, and belonging to the working class. In part the same seems to be true for household size. In Denmark, where the largest effect of household size was found on the univariate level, the household variable loses its “predictive power”, but on the other hand in other countries like for instance Luxembourg, France, Great Britain. In the Netherlands the impact of household size remains remarkably strong.

Third, although the effects of sex have been rather slight on the univariate level they are not neutralised altogether. In eleven of 14 countries being a man plays a role.

Forth, age has some impact. In all the countries investigated it could be generalised that nonownership is more the matter of all age groups up to 64 years old than of the older people. In 26 interaction terms involving age only in four cases the age group is older than 64 years. But this must not be interpreted as follows: even poor older people try to arrange to have a telephone because their action radius is limited and they want to maintain a communication device. In four cases being older has an autonomous effect.

Fifth, effects of infrastructure are hard to detect. This would be the case if in a country also in any other than in a low status group the overrepresentation of rural areas would be visible. This could be the case in Spain.

Sixth, in two cases a deeper cause of nonownership is visible. There is an apparent inconsistency in Denmark and in West Germany each in the second group. In both cases the group is characterised by the fourth income quartile and by medium low or higher purchasing power. This inconsistency can be interpreted as an indicator of indebtedness of the respective household. This indebtedness is the deeper cause of nonownership.

Seventh, Italy tends to be exceptional. It does not really fit into the country-pattern. Although it falls into the group of high telephone coverage the variable of purchasing power and not of income has an impact. Working class membership and low education levels play a role here. In Italy the last group is characterised by a possible contradiction. Although the respondents claim to be members of at least the middle class they seem to be ascetic.

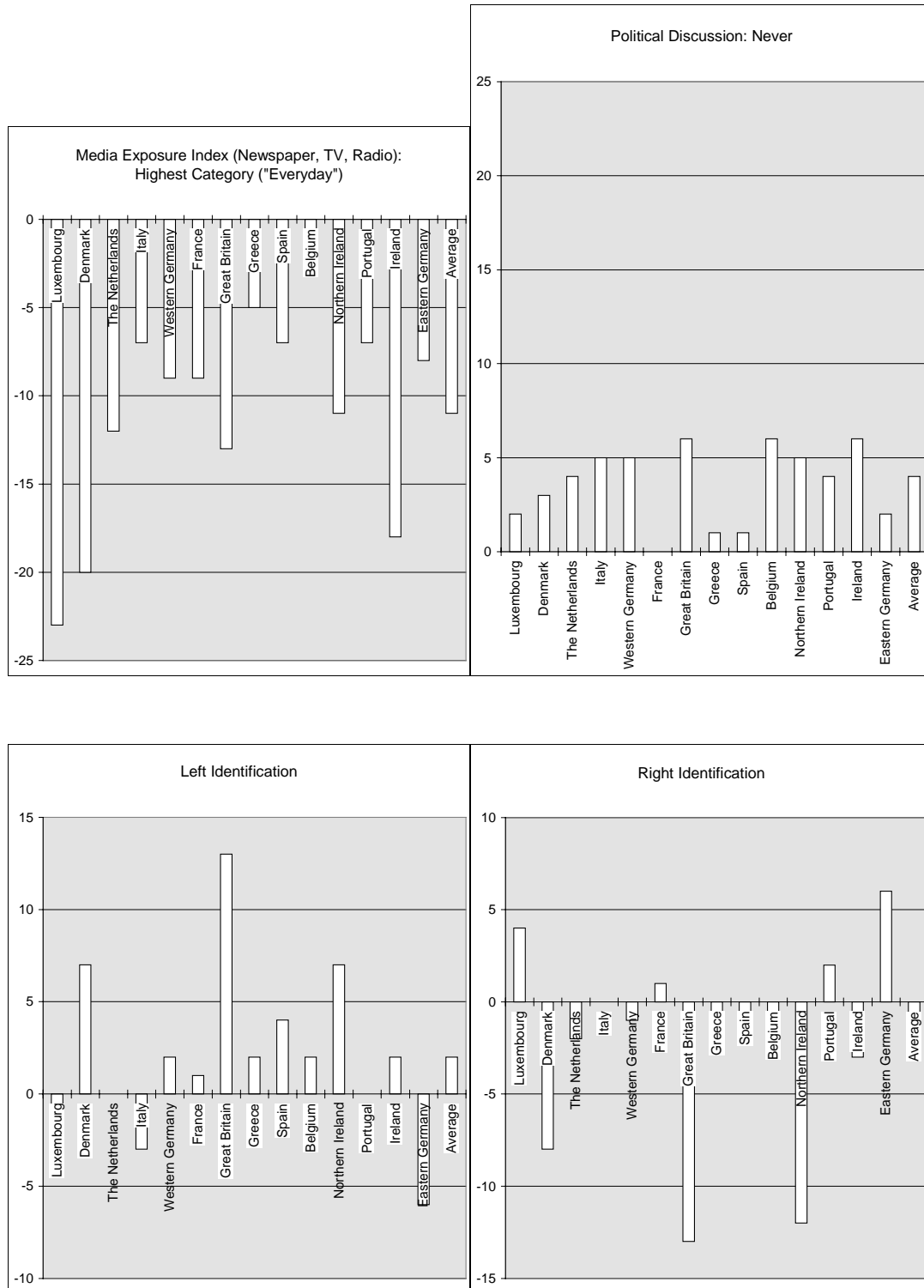
In general, the results of the CHAID-analysis give a structured picture as it is presented in the seven points above. The interactional structure between the variables is explored. The possibility that some variables influence nonownership only in combination with others can be practically neglected. Regarding the interactions the main result is a clearing up of the findings of the univariate level. Some effects (low education level, unemployment, manual worker, one person household) detected on the univariate level reflect in most cases only an underlying dimension like status or something else like poverty, although some effects have been remarkable. Now they go down due to effects of other variables and they disappear. There are some variables that strengthen each other mutually in their relationship with nonownership. There are also some other surprising interactions like between low income and low purchasing power, but these effects remains exceptional. Sex is a candidate with an autonomous effect despite the problem that it is as individual feature and not a characteristic of a household.

#### **4.4 Effects on attitudes**

In the normal case of survey research attitudes are the central variables. If socioeconomic differences exist, it does not necessarily mean that these cause substantial differences at the level of attitudes. Considering the literature, which argues that there is an ongoing process towards stronger individualisation in Western societies (Beck, 1986), the relationship between social structure and attitudes may become weaker or may eventually disappear (Schnell and Kohler, 1995). In addition, a developed, nation-wide system of mass communication can compensate original differences. Thus, what are the attitudinal differences between people with and without a telephone? If the status hypothesis reflects reality, attitudinal effects should also be supported by the data. There may also be behavioural effects. It could be expected that nonowners are less involved into the political information flow. They may also be less inclined to discuss politics. This is primarily due to a lack of motivation. Cognitive effects may be visible in the way how politics is structured or at least evaluated with the left-right scheme. In the group of nonowners a tendency to use the left ideological label should be found.

Figure 5 presents the results. The variables show the expected pattern. Nonowners tend to be less involved into the information flow. Thus, they can be less mobilised, they are less affected by new ideas. Consequentially they participate less in political discussions. In some countries (Denmark, Great Britain, Northern Ireland), there is also a tendency to think more left in the group of nonowners.

**Figure 5: Attitudinal characteristics of telephone-nonownership**



Again, differences have been found. It is possible that these differences do not matter, because the group of nonowners is very small in most of the countries. The proportion of nonowners in the sample must be taken into consideration. That is the quantitative question which will be addressed in the next chapter. Here we have at least seen that there can be large differences between owners and nonowners of telephones.

#### 4.5 Conclusion

In quantitative perspective differences in telephone coverage exist. But in the not fully covered countries the situation changes rapidly. And looking at market and opinion research in West Europe one can find a simple rule of thumb: the higher the telephone density the higher the proportion of telephone interviews (ESOMAR, 1995)<sup>24</sup>. Telephone interviews will increase even further. Nevertheless a „stratum bias“ in telephone surveys even in countries with a high coverage still exists. Especially in countries with a high density extreme deviant subgroups could be found.

To summarise the qualitative results: There are substantial differences between owners and nonowners. The groups differ at the socio-demographic level. People, who earn less than average, who have a low purchasing power, who describe themselves as belonging to the working class tend to be among those candidates, who do not have a telephone. On some variables like income the differences are particularly large for countries with a high coverage. The most remarkable result is that the appearance of this bias changes between country groups. In the countries with high density income is the key variable and in the countries with low density working class gets more important. In the more modernised countries class stratification is weakened (Clark and Lipset, 1991). In the countries with low density value systems and lifestyles related to class stratification seems to be influential. Not having a telephone is part of this lifestyle.

But other variables play a role too. In the Netherlands one person households would be underrepresented. It is more unlikely that older people do not have a telephone than younger. In addition, households where a man lives are undercovered. There is a general tendency in telephone surveys that women are overrepresented because housewives are easier to contact by phone than outside the home working men. The underrepresentation of men in telephone surveys would be strengthened by the overrepresentation of man in the group of nonowners. The found demographic differences seem to have an effect on attitudes. It should not be forgotten that the basis of the presented calculations may also be biased. The problems of representativity of classic face to face-surveys are well known (see chapter 3). That means that the real bias in telephone surveys may be more serious than reflected in this study. Here we saw large differences between owners and nonowners. How large the bias in responses is due to coverage will be an issue in the next chapter.

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24 The European Society for Opinion and Marketing Research (ESOMAR) has published findings according to which, for example, in Denmark 53% of all quantitative data collection efforts were conducted by telephone in 1994 (Luxembourg 75%, Germany 29%, Greece 26%, United Kingdom 18%, Spain 32%, Portugal 12%, Ireland 12%).